Category 3: Excellence in Sustainability and Innovation

VRMC Flood Recovery Patching Works

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Downer EDI Works Pty Ltd

Downer
Relationships creating success

2024 AustStab Awards of Excellence

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Overview of the Initiative

- Patching Works undertaken by Downer for the Victorian Road Maintenance Contract
- Remediation of approx. 44,000m^2 of pavement across 15 different roads
- 170 individual Patches throughout the Northeast of Victoria
- Failures due to unprecedented flood event in Victoria in 2022
- Stabilisation using a Triple Blend of Lime, Slag & Cement

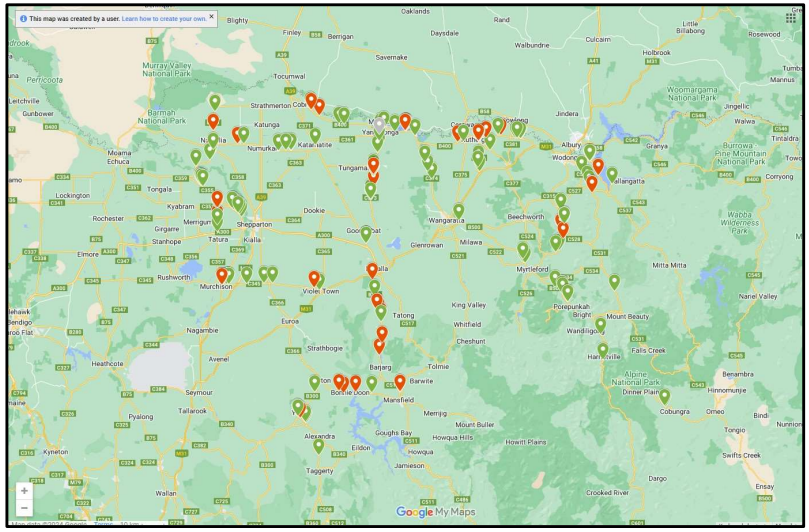

Figure 1: Geographic Location of Works

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Initiative Description

The agreed scope was to undertake stabilization of the in-situ material within the agreed patch extents to a depth of 200mm with a binder percentage of 3% (or 14.4kg/m^2). When scoping the works, due diligence was undertaken on the in-situ material using DCP testing to ensure that the agreed stabilization treatment would be suitable for application and thus ensuring the strength and longevity of the repaired pavement. The scope involved the remediation of approximately 44,000m^2 of pavement across 15 different roads, with the works being completed utilizing two stabilizing crews over the course of a three-month period.

Pulverization of Existing Pavement & Seal to a depth of 200mm.

DCP Testing of pulverized existing pavement to determine suitability of material for in-situ stabilisation.

Stabilise existing pavement material to a depth of 200mm using Triple blend of Lime, Slag & Cement.

Preparation of Stabilised Base Layer for Sealing.

Application of Size 10/7mm Primer Seal to Stabilised Base Layer.

Re-instatement of Original Pavement Markings and Removal of Aftercare.

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Operating Environment

- Environmentally/Culturally Sensitive Area
- Experiences both extremes of weather systems
- Working under lane closures with Live Traffic
- Patches vary from around 10m^2 to 4000m^2
- Average patch size of 200 square metres
- Daily mobilisation to & from Patch Locations
- Multiple Crews used to complete patches

Figure 2: Backwatering of Stabilised Patches

Operating Environment

- At the commencement of the project, Downer was required to abide by the DTP Contingency Arrangements for Discovery of human skeletal remains, historic heritage or aboriginal cultural heritage
- Works undertaken from February to May 2024. This meant that the affects of both Summer, Autumn and Winter conditions needed to be dealt with by the crew during the
- 4 Stabilisation shifts undertaken per week from Monday to Thursday.
- 3 Seal visits undertaken per week from Wednesday to Friday.
- Line Marking of patches stabilised and sealed the week prior are completed on Monday morning.

Operating Environment

Large Patching Crew Composition (for Patches greater than 100m^2)

- 1 Supervisor, 1 Leading Hand
- 2 Watercart & Operator
- 1 12T Smooth Drum Roller and Operator
- 1 Grader and Operator
- 1 Stabiliser and Operator
- 1 Spreader and Operator
- 1 Prime Mover
- 3-5 Traffic Controllers (depending on location of works)

Small Patching Crew Composition (for Patches less than 100m^2)

- 1 Supervisor
- 1 Watercart/Float Trailer & Operator
- 1 7T Twin Drum Roller Operator
- 1 Grader and Operator
- 1 Skid Steer w/ Profiler attachment
- 1 Spreader and Operator
- 1 Prime Mover
- 3-5 Traffic Controllers (depending on location of works)

Key Challenges

- Logistics required to mobilise to multiple patch location in any given shift/week
- Coordination of works with multiple subcontractors of varying disciplines to ensure works are completed in a timely manner
- Working with Live Traffic
- Maintenance of Stabilised Patches prior to Sealing Works
- Re-work due to deterioration of the patch location during the time between stabilisation and sealing works
- Ensuring Aftercare set-ups on unsealed patches remains compliant post de-mobilisation
- Emergency Patches completed in Asphalt

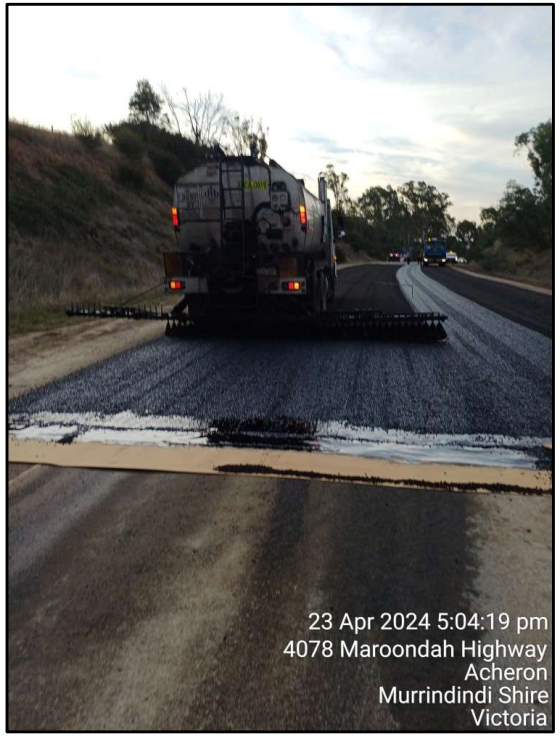

Figure 3: Sealing of Stabilised Patches

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Points of Interest

- Averaging between 3000-4000 m^2 of Stabilising completed per week with two patching crews
- All Patches documented during Scoping, Delivery and Post Completion Phase
- Any changes to Patch Dimension, Stabilisation Depth, or materials used was communicated to client
- Real time information provided to client regarding the completion status of each individual patch
- Quality documentation on each patch location, shared in live folder with the client

Figure 4: Stabilisation of In-situ Subgrade Material

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Evidence of Success

- Remediate existing pavement material as opposed to removal and replacement with virgin quarry material
- Initiative allowed additional area additional area to be completed within a given shift without compromising the overall quality and expected longevity of the works undertaken
- Increase in Patching productivity reduced cost overall cost and timeframe for completion of works
- 3 Month Post Completion Assessment of Patches has indicated no failures of Stabilised Patches

Figure 5: Stabilisation of In-situ Subgrade Material

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Supporting Data

- As evidenced through Table 1 on the next slide, the option to Stabilise the pavement was more cost effective than removing the existing material and replacing it with virgin material
- Both of these options were provided to DTP for consideration prior to the works being completed
- The productivity of both the stabilising and remove and replace options were calculated based on previous experience when completed similar works
- The combination of the time and cost saving demonstrated a clear value proposition for the initiative
- This was also a positive from a sustainability perspective as we did not have to replace the existing material with virgin quarry material in order to achieve the desired outcome.
- The quantity of rock saved through pavement recycling techniques equates to approximately 15800T
- The implementation of the initiative also eliminated approximately 650 Truck movements required to deliver virgin quarry material to site, which subsequently has a positive impact on the carbon foot print of the project.

Supporting Data

1.0	Stabilisation of In-Situ Material				
Item	Description of Works	Estimated Quantity	Unit	Rate ($)	Extended Amount($)
1.1	Stabilise the in-situ subgrade layer to a depth of 200mm using a Triple Blend of Lime, Slag & Cement with a spread rate of 14.4kg/m2.	44,000.00	m^2	$ 18.88	$830,720.00
2.0	Remove & Replace Failing Subgrade Material				
2.1	Supply, Place and Compact 200mm thick Layer of Size 20mm Class 2 FCR up to Existing Surface Level.	44,000.00	m^2	$ 22.53	$991,320.00

Table 1: Cost Analysis

- Cost Analysis highlights saving through Pavement Recycling
- Clear Value Proposition presented to Client

1.0	Stabilisation of In-Situ Material				
Item	Description of Works	Estimated Production	Unit	Actual Area to Treat	Duration of Works
1.1	Stabilise the in-situ subgrade layer to a depth of 200mm using a Triple Blend of Lime, Slag & Cement with a spread rate of 14.4kg/m2.	1,200.00	m^2	44,000.00	37 Days
2.0	Remove & Replace Failing Subgrade Material				
2.1	Supply, Place and Compact 200mm thick Layer of Size 20mm Class 2 FCR up to Existing Surface Level.	1,050.00	m^2	44,000.00	42 Days

Table 2: Time/Production Analysis

- Significant time saving through Pavement Recycling
- Less disruption to Tourists and Local Residents

Practical Application

1. All Patches to be stabilised at 200mm depth (DC to provide guidance on m2 variance) moving forward.
2. Patches that are under 350m2 DO NOT require forward spreading.
3. Any previous sites previously stabilised or where material deemed unsuitable, DC are to advise Project Engineer but with the knowledge that approval will be granted to remove 300mm and replace with 150mm crushed rock class 2/3 and a top stabilised top layer with Road Maker.
4. Road maker is to be used for all Flood Recovery sites.
5. Test pit – please do a quick check of material profile.
6. Scoping Requirements Document – All of the above including the seal preference will be drafted by myself over the coming day for presentation and sign off by the client to inform moving forward.

Table 3: Excerpt of Finalised Scope of Work from VRMC

VRMC - PATCHING WORKS - PACKAGE 2

Patch Stabilised
Patch Sealed
Patch Removed from Scope

AV ID	Asset Name	Start reference point	Initial Area (m2)	Scoped Area (m2)	Scoped Area (m2)	Date Stabilised	Date Sealed	Date Line Marked	ITP Completed (Y/N)
2663679, 2663703, 2663716	Benalla-Tocumwal Road	1.6 KM	525	28 x 7 = 196 43 x 3.5 = 151 30 x 7 = 210	557	Tuesday 26th of March	Wednesday 27th of March	Thursday 28th of March	Yes
~~2896463~~	~~Benalla-Tocumwal Road~~	~~49.432 KM~~	~~125~~	Completed in Asphalt by others					
2661310	Benalla-Yarrawonga Road	28.41	1120	160 x 7 =1120	1120	Tuesday 6th of February	Saturday 17th of February	Monday 19th of February	Yes
3006722	Benalla-Yarrawonga Road	28.755	91	13 x 7 = 91	91	Tuesday 6th of February	Saturday 17th of February	Monday 19th of February	Yes
2661351	Benalla-Yarrawonga Road	30.242	91	26 x 3.5 = 91	91	Tuesday 6th of February	Saturday 17th of February	Monday 19th of February	Yes
2775470	Benalla-Yarrawonga Road	35.138	58	15 x 3.5 = 52.5	52.5	Wednesday 7th of February	Saturday 17th of February	Monday 19th of February	Yes
2893749	Benalla-Yarrawonga Road	39.487	420	60 x 7 = 420	420	Wednesday 7th of February	Saturday 17th of February	Monday 19th of February	Yes
2893781	Benalla-Yarrawonga Road	39.711	252	26 x 7 = 252	252	Wednesday 7th of February	Saturday 17th of February	Monday 19th of February	Yes
3006350	Benalla-Yarrawonga Road	40.47	301	301	301	Wednesday 7th of February	Saturday 17th of February	Monday 19th of February	Yes
3006298	Benalla-Yarrawonga Road	41.045	293	293	293	Wednesday 7th of February	Saturday 17th of February	Monday 19th of February	Yes
2775703	Benalla-Yarrawonga Road	42.585	65	10 x 8 = 80	80	Wednesday 7th of February	Saturday 17th of February	Monday 19th of February	Yes
2894322	Benalla-Yarrawonga Road	50.352	1020	136 x 7.5 = 1020	1020	Thursday 8th of February	Friday 16th of February	Monday 19th of February	Yes

Table 4: Excerpt of Live Tracking of Patch Completion Status

Supporting Visual Content

Figure 6: Scoping of Patch Locations prior to Commencement

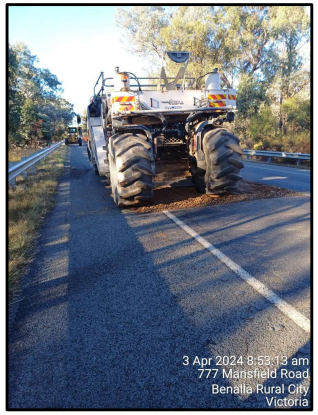

Figure 7: Pulverizing the existing subgrade material

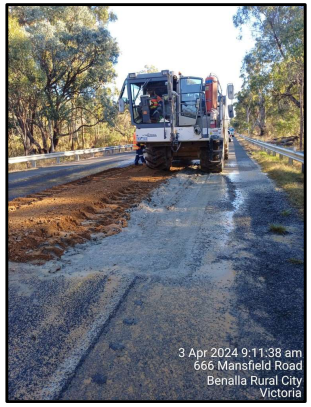

Figure 8: First run of Triple Blend Stabilising Completed

Figure 9: Compaction Effort on treated Subgrade Layer

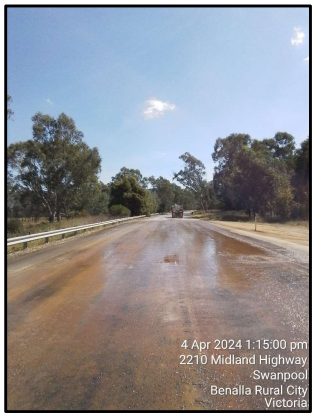

Figure 10: Proof Roll of Subgrade Layer & ITP Sign off with VicRoads

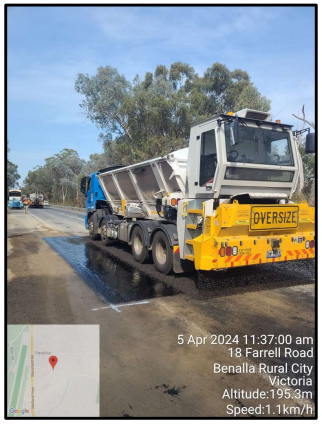

Figure 11: 10/7mm Primerseal occurring on Stabilised Pavement

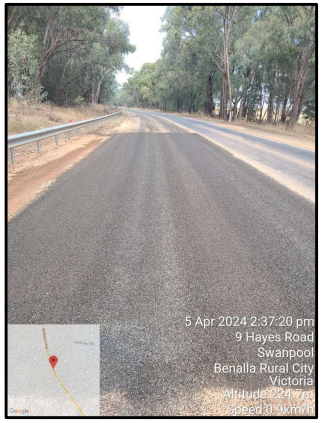

Figure 12: 10/7mm Primerseal Completed on Stabilised Pavement

Figure 13: The Team delivering a quality result

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