



Practitioners' Guideline: Reclaimed Asphalt Pavements in Asphalt Applications on Local Government Roads in WA

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This guideline has been prepared to support the use of reclaimed asphalt pavements (RAP) in asphalt applications across the local government network in Western Australia (WA).

Background

The Australian Waste Policy Action Plan, prepared by the Australian State and Territory governments and the Australian Local Government Association in 2019, set a target of 80% resource recovery by 2030. In response to this Action Plan, WA's *Waste Avoidance and Resource Recovery Strategy 2030* sets targets for increased material recovery while the *State Road Funds to Local Government Agreement (2023/24–2027/28)* includes a commitment by local government to increase the usage of recycled materials in road construction.

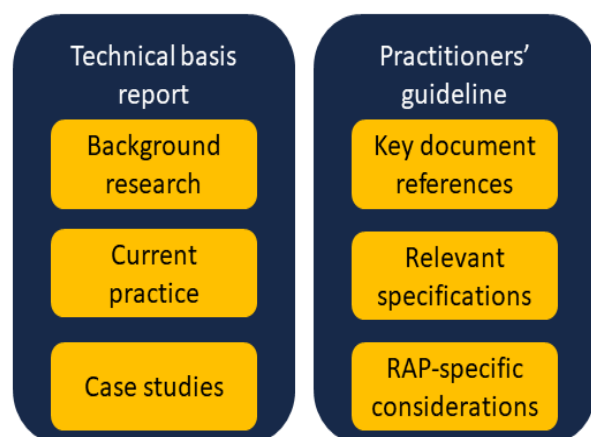
RAP is derived from the milling of existing asphalt during re-surfacing activities. It can then be incorporated back into asphalt either in situ or transferred to an asphalt plant where it can partially replace a component of new asphalt mixes. Since RAP is derived from pre-existing pavements, it is reused with a relatively high degree of confidence. As such, its use is widely adopted across Australia. However, the technology know-how remains with asphalt manufacturers, and so, it is expected that local government practitioners will stand to benefit from specific guidance.

RAP stockpiles



Approach

A total of 2 documents focusing on the use of RAP in asphalt were prepared:



A technical report comprising a literature review and stakeholder consultations was used as the basis for a concise guideline for practitioners. The report covers:

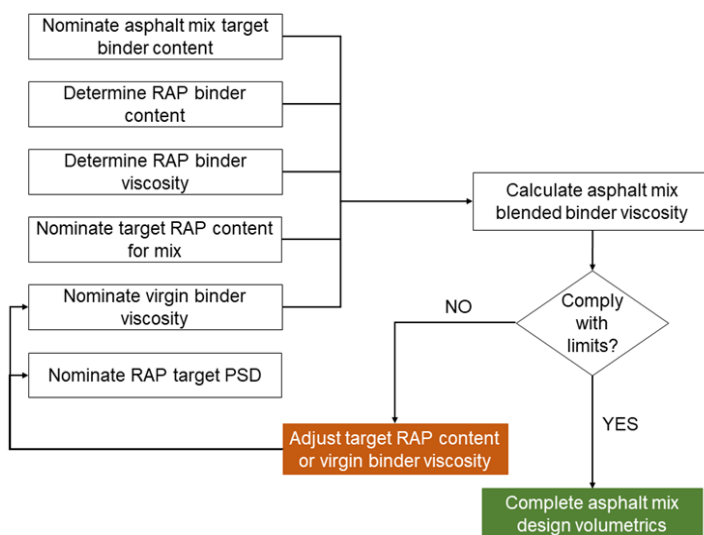
- the technology
- applications in asphalt
- benefits including economic, performance and environmental
- work health and safety and environmental impacts
- national and local specifications
- challenges, risks and mitigation measures
- case studies.

The practitioners' guideline presents key aspects of the technical report as they relate to mix design and construction. The guideline focuses on additional considerations when the incorporation of RAP is planned.

Findings

The literature review and stakeholder consultation activities identified an opportunity to increase the informed adoption of RAP in asphalt applications by local governments in WA. RAP can be used in the manufacture of asphalt wearing (except in SMA), base and intermediate courses according to the IPWEA/AfPA asphalt specification (2023). The WA local government asphalt network primarily comprises thin asphalt surfacings on a granular pavement, while the type of work undertaken is typically rehabilitation projects. As such, the use of RAP would be limited to wearing course layers.

The specification permits the use of RAP in asphalt up to 15% by mass of the mix (wt.%) without any modifications to the process. When more than 15 wt.% is planned for use, the following process can be followed:



When compared to mixes without RAP, asphalt mixes containing up to 15 wt.% RAP are typically found to have comparable:

- tensile strength
- weathering performance
- rutting resistance
- ravelling resistance
- fatigue cracking resistance.

Where more than 15 wt.% RAP is to be added, some adjustments to the mix design may be required to achieve equivalent performance to mixes without RAP. These may include adjusting the selected binder grade or incorporating rejuvenating agents.

In all cases, a RAP management plan should be in place. In WA, all available asphalt plants have the

capacity to process asphalt with less than 15 wt.% RAP, while plants that can process up to 30 wt.% RAP are also available.

Depending on the RAP content, the temperature of the virgin aggregates may need to be increased in order to remove any moisture present in the RAP, while no other modifications to the placement, compaction and finishing processes need to be made.

References

- Austrroads 2009a, *Guide to pavement technology Part 3: Pavement surfacings*, AGPT03-09, Austrroads, Sydney, NSW.
- Institute of Public Works Engineering Australasia (WA) & Australian Flexible Pavement Association (WA Branch) 2023, *Technical specification, tender form and schedule for supply and laying of asphalt surfacing*, IPWEA and AfPA, WA, viewed 5 January 2023.
- Main Roads Western Australia 2022, *Recycled materials at Main Roads*, D21#13639, Australia, TGoW, Australia, viewed 10 January 2022, <<https://www.mainroads.wa.gov.au/globalassets/community-environment/sustainability/recycled-materials-reference-guide.pdf>>.

How does this research change the way we think?

The use of RAP in asphalt up to 15 wt.% is an established practice for many contractors across Australia and is supported by national and state specifications. Recent technological advances have even seen the effective concentration of RAP in new asphalt increase.

MRWA specifications permit the use of RAP in intermediate courses. However, the local government asphalt network primarily comprises a thin asphalt layer on a deep granular pavement. The IPWEA/AfPA asphalt specification permits the use of RAP on asphalt wearing courses across the WA local government network up to 15 wt.% without any changes to the mix. To facilitate this practice though, local government practitioners are expected to benefit from specific guidance.

The practitioners' guideline developed in this research provides a summary of material requirements, specifications, material supply and management as well as any design and construction considerations as they relate specifically to the use of RAP in asphalt.

It is expected that the guideline will give confidence to the practitioners when dealing with RAP as it can support their current project management and delivery processes. It is considered that, as a result, the adoption of RAP in asphalt applications will assist local governments to achieve their recycled material uptake targets.