*Category 4: Excellence in Pavement Recycling and Stabilisation in Local Government*

# Foamed Asphalt in Palm Beach: A Queensland First

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# Project Overview

- The aim of this project was to trial and evaluate the performance of the first **Foamed Asphalt** project in Queensland on 3.6 lane km of collector roads at Palm Beach

CITY OF GOLDCOAST.

Project Approval
Project Funding
Project Owner

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Project Management
Project Design & Construction
Research Testing

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# Description of Initiative



The section in red is a 1km length of Mallawa Drive in Palm Beach that was subjected to additional post-construction testing to verify uniformity of mixing in the horizontal and vertical directions. The image on the right shows the same section of Mallawa Drive prior to construction. It was a previously cement stabilised pavement that was last treated in the 1990s

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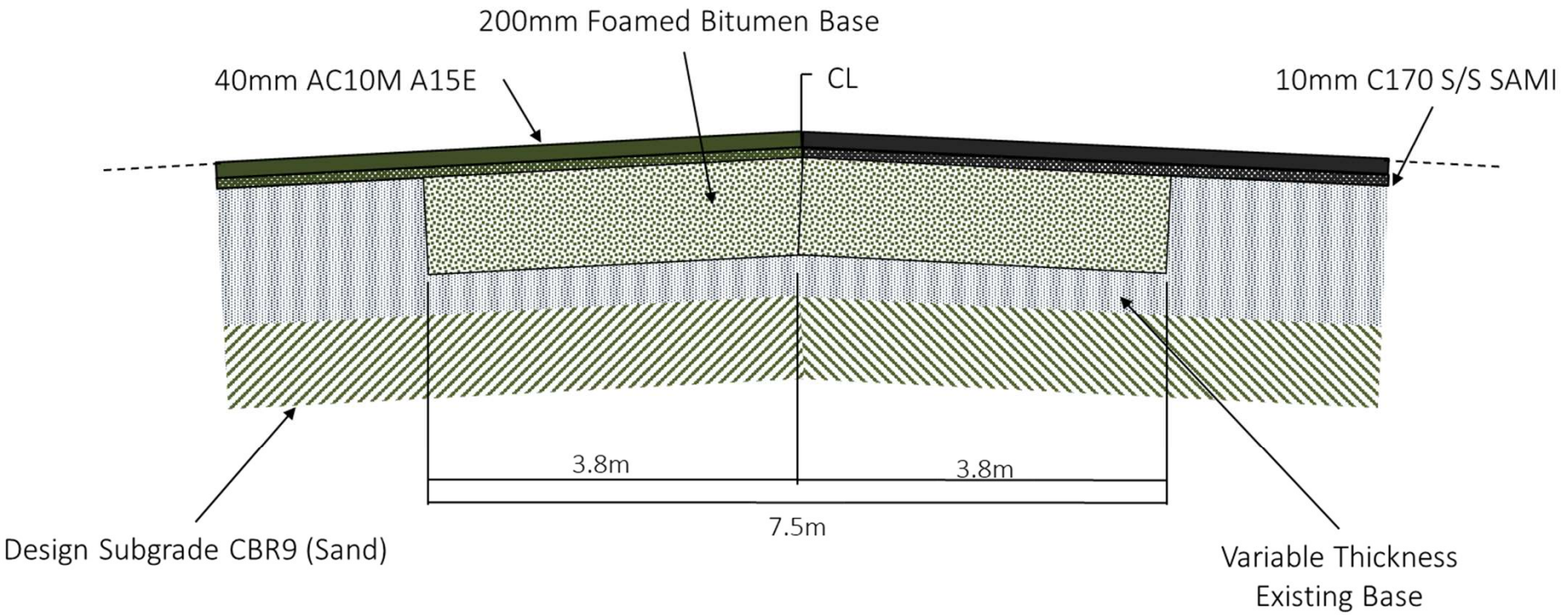
# Location

Aerial shot of the foamed asphalt process underway at Palm Beach on Mallawa Drive. Evidence of the highly populated and environmentally sensitive location along the canals on the eastern side of the road and bushland on the western side of the road.

# Project Scope




Section 1: Tallebudgera Dr to Abelia St

The project scope was to recycle the 2 x 3.8m wide carriageways which encroached into the shoulders by approximately 300mm. The foamed asphalt process not only enabled a 200mm foamed bitumen pavement to be produced insitu, but allowed the 3.8m runs to be paver-laid in a single mixing pass due to the down cutting rotor mechanism as well as being placed full width in each run. Further, the previously cement treated bound pavement did not require pre-pulverising due to the capability of the W380CR Recycler.

# The Construction Train

The entire construction train moves only in a forward facing direction. This provides increased safety benefits over other processes.

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# Project Challenges

1. **Sand Subgrade:** Although the sand subgrade provided a good design CBR (9%), there was no prior experience of how the 54 tonne recycler would perform on such a subgrade. Due to the large surface area of the 4 tracks on the recycler, the unit weight was actually less than a standard 1m profiler. So there ended up being no issues with the recycler traversing the sand subgrade.
2. **Logistics:** Due to the size of the recycler, moving it to the site and storing it between shifts was challenging. Specific permits were required for the transportation by road and crossing a small concrete bridge between Mallawa Drive and Tallebudgera Drive.
3. **Sewer Manholes x 28:** Multiple sewer manholes existed on the site. These were all lowered prior to the recycling process being undertaken. Some of them however could not lowered deep enough due to the permanent concrete structure within the sewer line, meaning some manholes encroached into the recycling and paving run. This required some handwork to resolve.
4. **Lack of Fines:** The fines content of the existing cement treated material was at the lower end of the AGPT4D recommended grading curve, ~3-5%. It was decided to trial a section with the addition of flyash to supplement the lack of fines. This was pre-blended with the nominal 1.5% hydrated lime required for the foamed bitumen operation and spread as a single powder drop.

# Key Points of Interest



There was a lot of media attention for this project. Mayor Tom Tate and Councillor Daphne McDonald attended the site to promote this trial project. It was captured by Channel 7, 9, 10 and the Gold Coast local news feed. Watch one of the news feeds at https://youtu.be/bilozWZO49g

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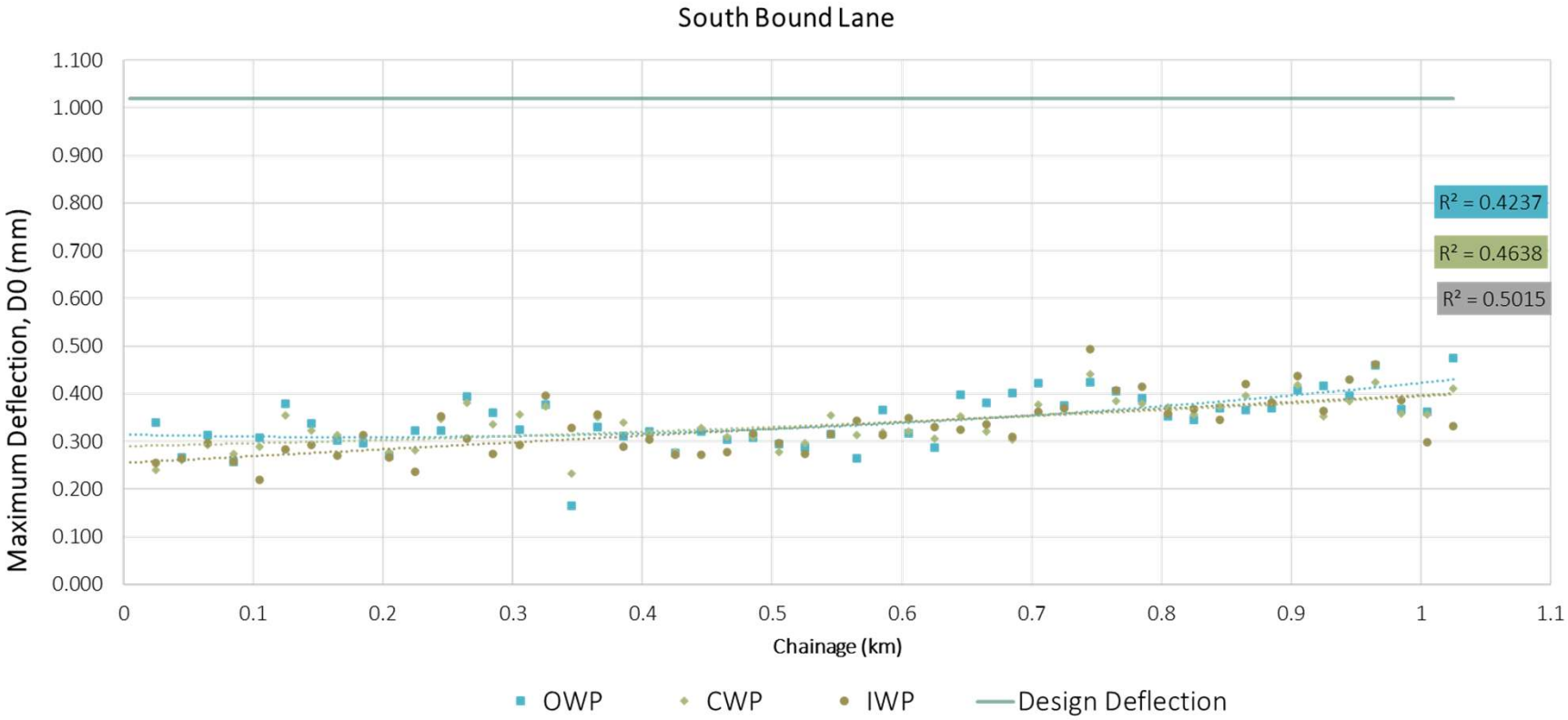
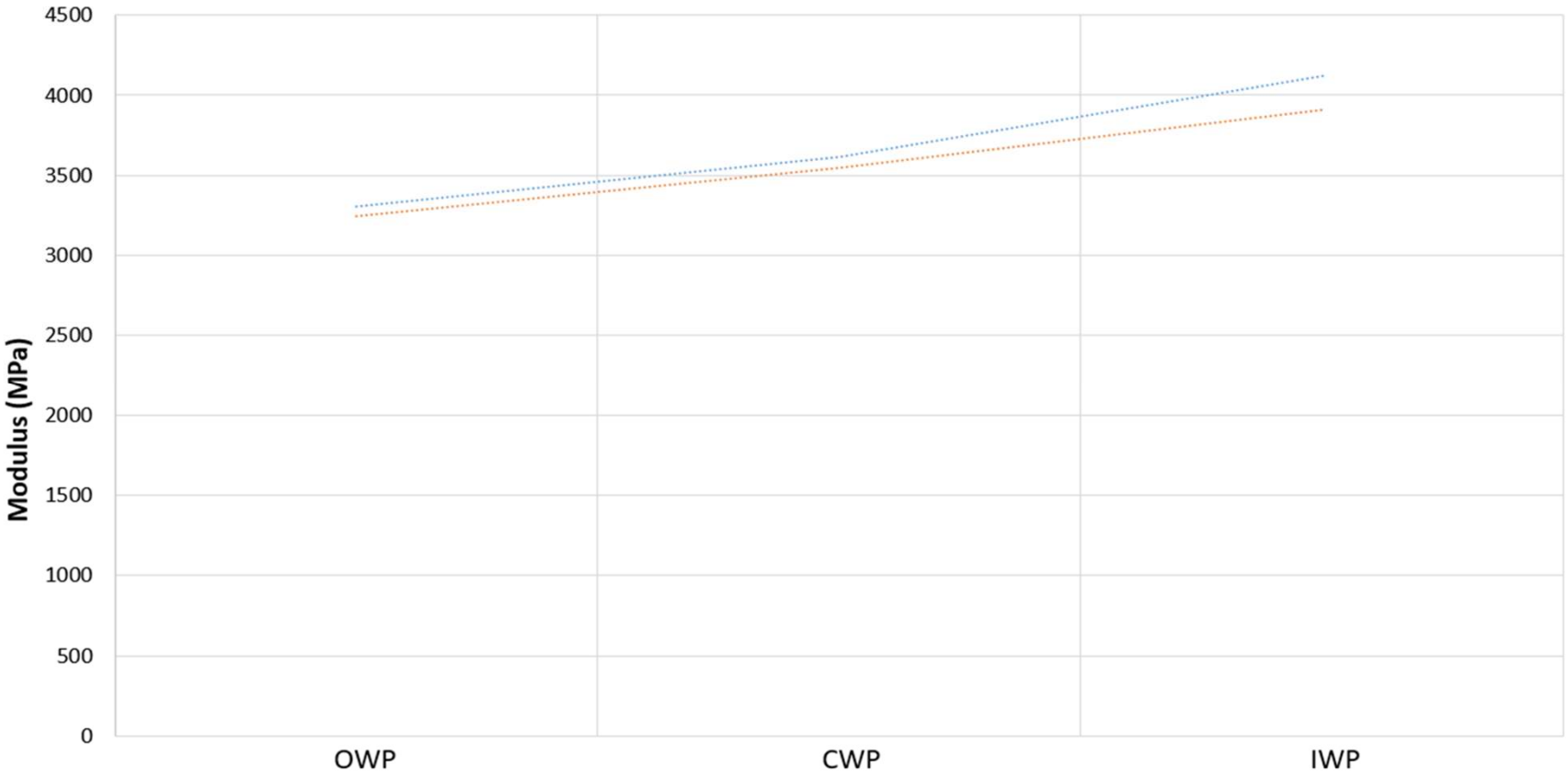
# Evidence of Success




This plot shows an example of the deflections measured approximately 3months post rehabilitation in the southbound lane. The aim was to observe the variation (or lack thereof) in deflection across the width of the lane from 3 FWD drops across the lane – being outer wheel path (OWP), centre wheel path (CWP) and inner wheel path (IWP).

The results are not only significantly under the design deflection of 1.04mm, but are very consistent across the 3 lane locations. This supports the uniformity of mixing produced by the single pass down cutting process.

# Evidence of Success




This plot illustrates the low variation in back calculated cured modulus from the FWD testing between the 3 transverse lane locations along the length of the test site, which was 1km. Results are displayed in average values.

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# Testing


18 cores were extracted from the 1km length, 9 from each direction. Modulus testing was undertaken on the top and bottom of each core. Cores were approximately 4 months old.

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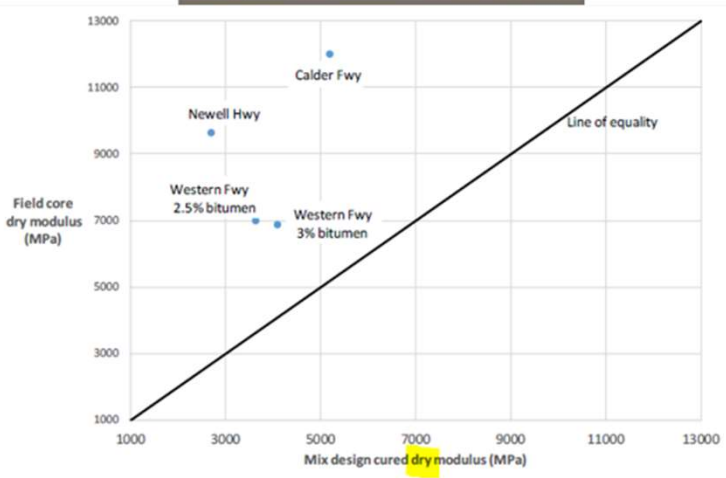
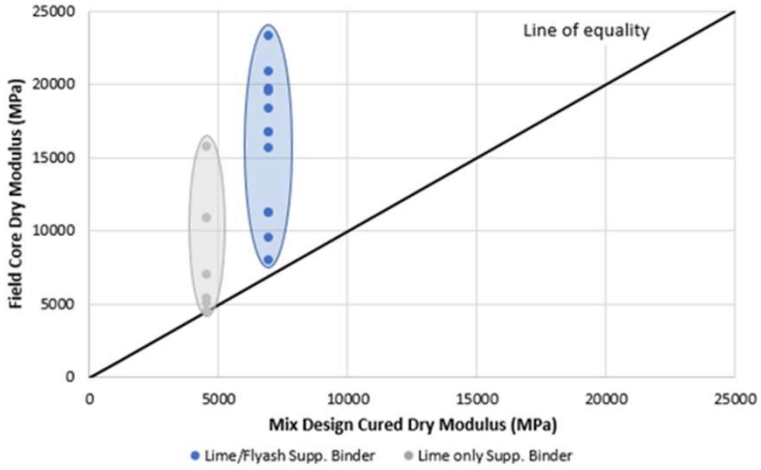
# Testing






This is a direct comparison of the dry moduli obtained from the extracted cores after 4 months of field curing versus the same evaluation performed by Austroads in their Foamed Bitumen performance project which showed the increase in field core modulus was approximately 2.5-3.0 times the mix design modulus. The effects of the fly ash as a filler to correct the deficiency in fines was clearly evident in higher strengths on Mallawa Drive, however the same 2.5-3.0 ratio was observed.

# The Finished Site

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# Demonstration of Project Initiative in Use

Northbourne Avenue in Canberra
Asset Owner: ACT Government

Bundeena Drive, Royal National Park
Asset Owner: Sutherland Shire Council

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