Old Woodcocks Road Dust Suppressant Trial – Update

Recommendation

That the Board receives this report.

Executive summary

Auckland Transport is facing significant pressure to deliver a higher level of service on unsealed roads, particularly from new residents. Unsealed roads produce a lot of dust which is a nuisance, impacts on vehicle operating costs (because of their uneven nature) and potentially impacts on public health.

The trial has identified that the Notta /Otta seal options appear to minimise dust and provide acceptable whole of life costs when applied on sound foundations and in low shears stress areas on straight roads with good drainage.

Continuation of the trial over 5 years will provide time to validate our whole of life assumptions as intervention and/or repairs are actioned.

Given the current performance of the trial area, we are however proposing to expand the trial into other areas of the network in late summer 2017/18 to further determine what gradient, drainage and/or foundation conditions are suitable for this approach to dust suppression.

Strategic context

The paper details AT's approach in trialling dust suppressants on Old Woodcocks Road in Rodney and provides an update on the current trial. Dust is a nuisance, and adversely impacts on public health. The purpose of the dust suppressant trial is to identify suitable cost effective treatment options for addressing this problem.

Background

Auckland Transport has 7,300km of road across the Auckland region of which 863km (12%) is unsealed road. 646km unsealed roads are in the Northern area (Rodney). 60% of the unsealed roads carry less than 100 vehicles per day.

Auckland Transport is investigating dust mitigation strategies for unsealed roads in the northern region.

Currently, seal extension costs between $400,000 to $1.5 million per km depending on the level of geometric improvements and pavement strengthening necessary. Auckland Transport will be sealing approximately 10.22 km of unsealed roads as part of its $10m seal extension programme over the 3 years (2015/16 to 2017/18).

Control Sites

Six control sites for the dust suppressant trails have been established on Old Woodcocks Road in Rodney

Site 1: Conventional two coat chip seal on a 200mm stabilised pavement. This section is representative of a standard sealed road in Rodney

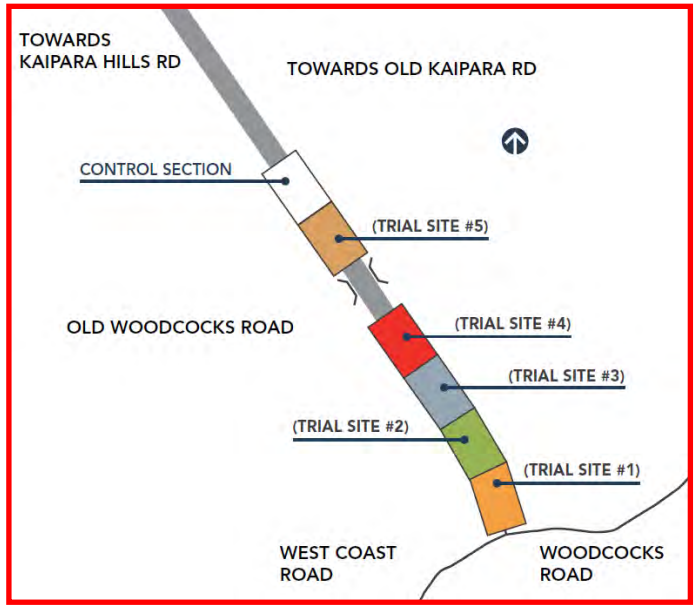
Performance to date: No surface failures have been identified within this trial section. Some minor edge break failures noted are the result of limited shoulder support for the cemented basecourse layer.

Site 2: Conventional two coat chip seal over existing pavement. This section is representative of a historically sealed road in Rodney.

Performance to date: Existing failures (chip stripping due to 'wet' basecourse at the time of sealing) have regressed however not significantly.

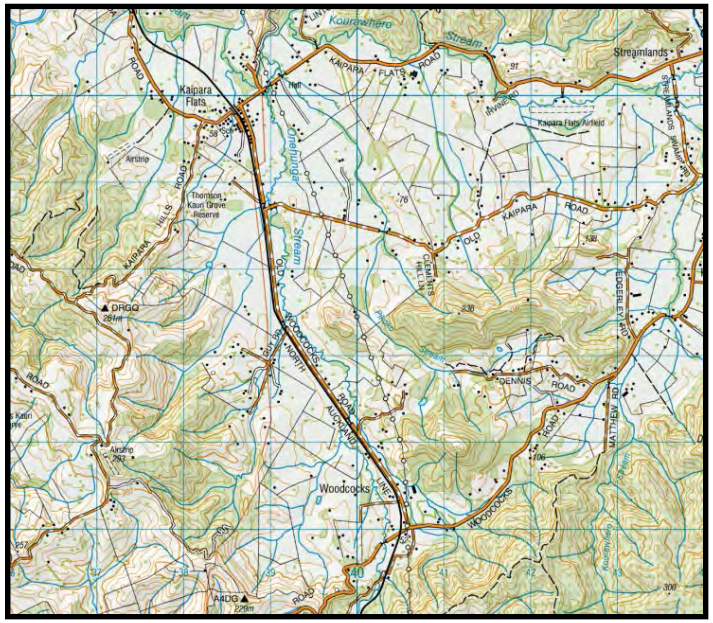
Site 3: Proprietary product referenced as Notta Seal. Notta seal is essentially a heavy duty chip seal that uses higher quality metal. The heavy application of binder allows 'self-healing' of the seal as the binder flushes to the surface.

Performance to date: The Notta Seal is performing consistently along the length of the trial section. The surface is being subject to two areas of increased heavy vehicle manoeuvring into a building site at #551 Old Woodcocks Road with minimal surface flushing and stripping of the chip.



Site 4: Proprietary product referenced as Otta Seal. Based on the original concept developed in the Otta Valley of Norway in the 1960's and provides a quick, economic, medium-term solution for unsealed roads. It is extensively used overseas and occasionally in NZ. It has a low quality aggregate and a heavy application of binder to allow 'self-healing' of the seal as the binder flushes to the surface.

Performance to date: The Otta Seal is also performing as expected with no potholing or surface failures to date, with the only surface issues being the excessive flushing of the surface. The site has been confirmed as being too rich in binder, but this will not affect performance.



Site 5: Unsealed pavement using MAP40 (MAP = maintenance all passing) aggregate as a running course. MAP40 is a lower quality 'maintenance' aggregate that is softer than the premium roading metal typically used and breaks down under traffic to form a more tightly bound surface.

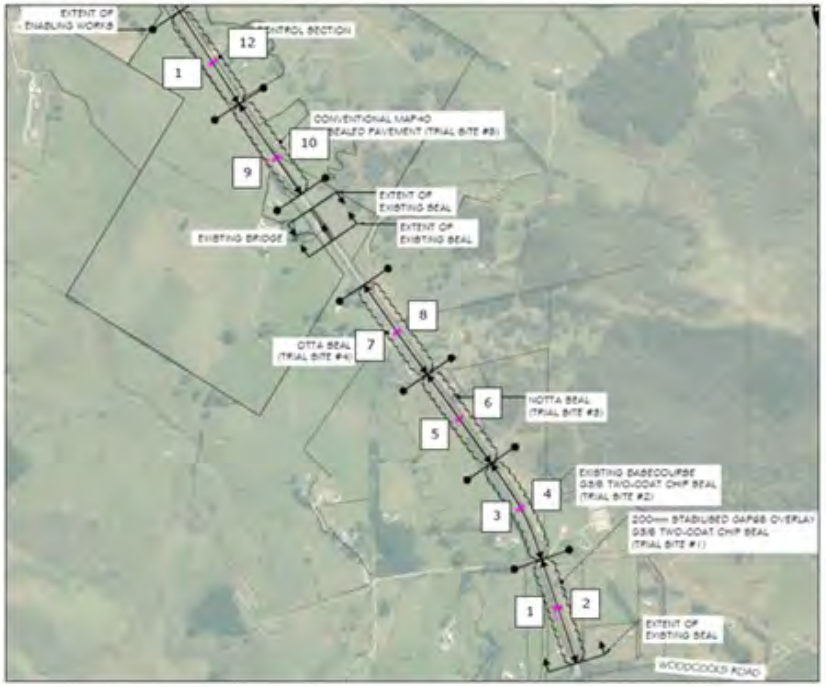
Performance to date: The MAP40 is performing significantly better than the control section, with only minor potholes forming within the wheel tracks at the southern end of the trial section. However, despite an increased ride quality the MAP40 aggregate is producing more dust than the GAP40 pavement – this can likely be attributed to the clay minerals within the MAP40 aggregate.

Site 6: Unsealed 'control' pavement. Site 6 is the control site using standard roading aggregate.

Performance to date: The control pavement is showing significant, expected signs of deterioration since its last maintenance grade in December 2016. The control section had formed significant potholes outside #439 Old Woodcocks Road, however these have recently been patched by the Downer RCM patrol crew.

Monitoring

Dust Monitoring devices were installed in February 2017 and data collection commenced from March 2017. The following summarises the results to date**:**



Position	Date	Mass deposition (insoluble solids) [g/m²/30 days]
1	30th March 2017 – 1st May 2017	1.2
2		0.5
3		3.4
4		0.3
5		0.5
6		1.5
7		<0.1
8		0.5
9		15
10		14
11		11
12		11

Initial sample analysis indicates a significant reduction in dust production across all paved trial sites, with average recovery across the sealed section seven times less than compared to the unsealed sections.

Dust monitoring of the trial site will be undertaken for a minimum of 12 months to obtain a complete seasonal spectrum of dust production across six sites.

On-going visual monitoring for 5 years, or until sufficient evidence is gathered.

Indicative Whole life Analysis

To help determine which treatment solution is likely to provide the best whole of life outcomes, maintenance and intervention, the install costs and projected maintenance/intervention costs over 40 years have been analysed to produce the following whole of life analysis:

FORECAST WHOLE-OF-LIFE COSTS OVER 40 YEAR PERIOD						
Trial Section	Treatment	(PV) Annual Maintenance	(PV) Periodic Maintenance	(PV) TOTAL/300m	(PV) TOTAL/km	(PV) TOTAL/km/YEAR
200mm Stabilised Overlay	$ 64,830.12	$ 360.00	$ 3,836.00	**$ 69,026.12**	**$ 230,087.07**	**$ 5,752.18**
Chip Seal	$ 9,764.07	$ 3,630.00	$ 25,031.00	**$ 38,425.07**	**$ 128,083.57**	**$ 3,202.09**
*Notta Seal**	$ 9,817.50	$ 3,630.00	$ 14,925.00	**$ 28,372.50**	**$ 94,575.00**	**$ 2,364.38**
*Otta Seal**	$ 10,824.00	$ 3,630.00	$ 16,455.00	**$ 30,909.00**	**$ 103,030.00**	**$ 2,575.75**
MAP40	$ 27,210.30	$ 7,745.00	$ 60,753.00	**$ 95,708.30**	**$ 319,027.67**	**$ 7,975.69**
Control	$ -	$ 15,490.00	$ 60,753.00	**$ 76,243.00**	**$ 254,143.33**	**$ 6,353.58**

*** Forecast based on contractor indication of reduced sealing rate for bulk quantity (10000m^2 +)**

The rates for Notta Seal and Otta Seal are based off preliminary discussions with the suppliers and subject to a ‘reasonable’ programme of work being available.

Both Notta Seal and Otta Seal provide very similar whole of life costs.

The existing low cost treatments of maintenance metal or MAP40 do not appear to provide the best whole of life outcomes in this situation. It should be noted however, that the above analysis and these findings only apply on the unsealed network where there is minimal gradient and straight horizontal alignment, a robust foundation already exists and there is existing reliable drainage.

The above will be validated over the next five years as actual intervention/maintenance detail is collected.

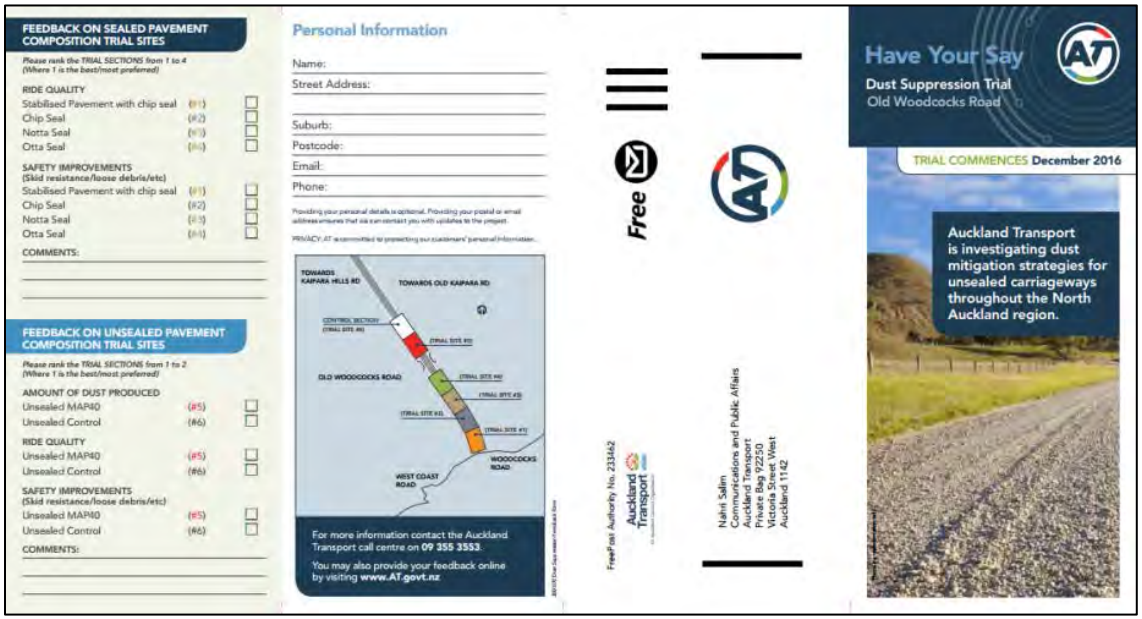
External Consultation/Engagement

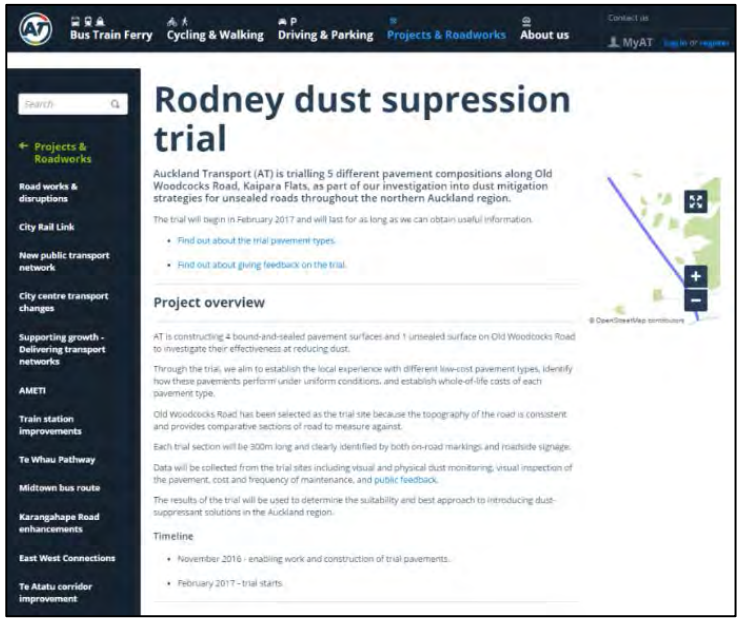
A presentation was made to the Rodney local board in July 2016 to provide an overview of the proposed dust suppressant trials on Old Woodcocks Road.

Informative signage was installed in February 2017 to assist with the official consultation for the public which commenced in March 2017. Refer to photo of the typical signage board.

The public can provide feedback via the Auckland Transport website or via free post public consultation forms, which have been distributed to local schools and nearby residents.

Free post public consultation leaflets are shown below.





Next steps

1. Auckland Transport proposes to continue with the current dust suppressant trial (up to 5 years).
2. Auckland Transport proposes to further expand the trials to incorporate the trial of chemical dust suppressant treatments to test the viability of these products.

Document ownership

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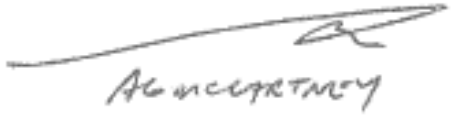
Recommended by	Tony McCartney **Group Manager Assets & Maintenance**	
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