

New Zealand



IPWEA

INSTITUTE OF PUBLIC WORKS
ENGINEERING AUSTRALASIA

ROAD INFRASTRUCTURE
MANAGEMENT FORUM

Our Carbon Equation

Balancing the Maintenance Carbon Equation

Peter Mortimer and
Shane Browne | Downer
NZ

RIMS

Roading Infrastructure Management Support

in association with

IDS 
Infrastructure
Decision Support

Balancing the Maintenance Carbon Equation

- Maintenance Treatment life expectancy
- Longer life treatments have a lower whole of life carbon intensity
- Longer life treatments are expensive
- Right balance between \$ v Life v CHG
- Downer Maintenance Treatment Selection tool



Our Carbon Equation

Convergence of initiatives

Research Paper 635. Dr
Greg Arnold et al 2017

Pavement maintenance patch trials
December 2017

G Arnold (Road Science)
G Mudgway (Road Science)
O Dickin (Downer)

New Zealand Transport Agency research report 635
Contracted research organisation - Road Science

Carbon Footprints. Dr
Phillipa O'Shea RIMS 2017



Putting TSD on the Map.
Grant Clarke RIMS 2020



Our Carbon Equation

The impetus for improvement

- Reduction of rework
- Less reliance on the knowledgeable few
- Provide client assurance
- Use a data driven approach
- Use a technology solution

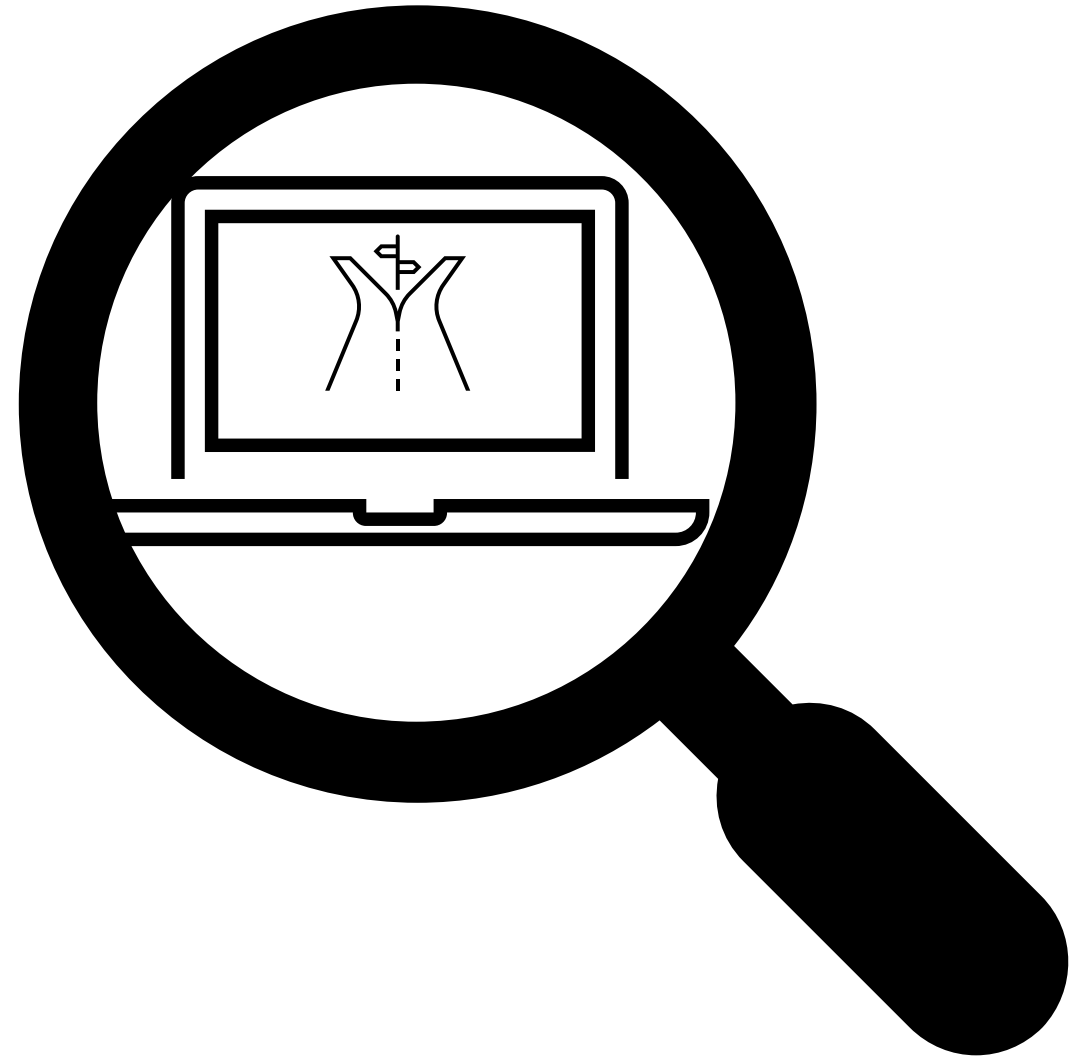


Our Carbon Equation

Where we are getting our data....

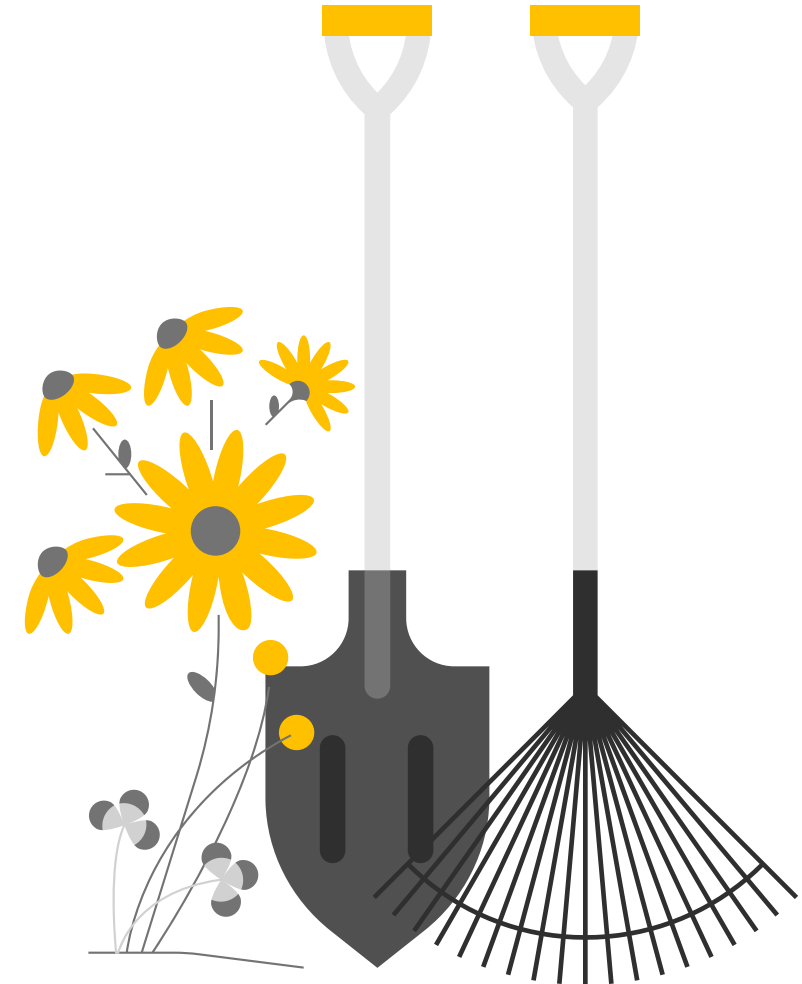
RAMM Datasets

- Traffic information
- Pavement Information
- Test Pit data
- Traffic Speed Deflectometer Data
- Geometry Information



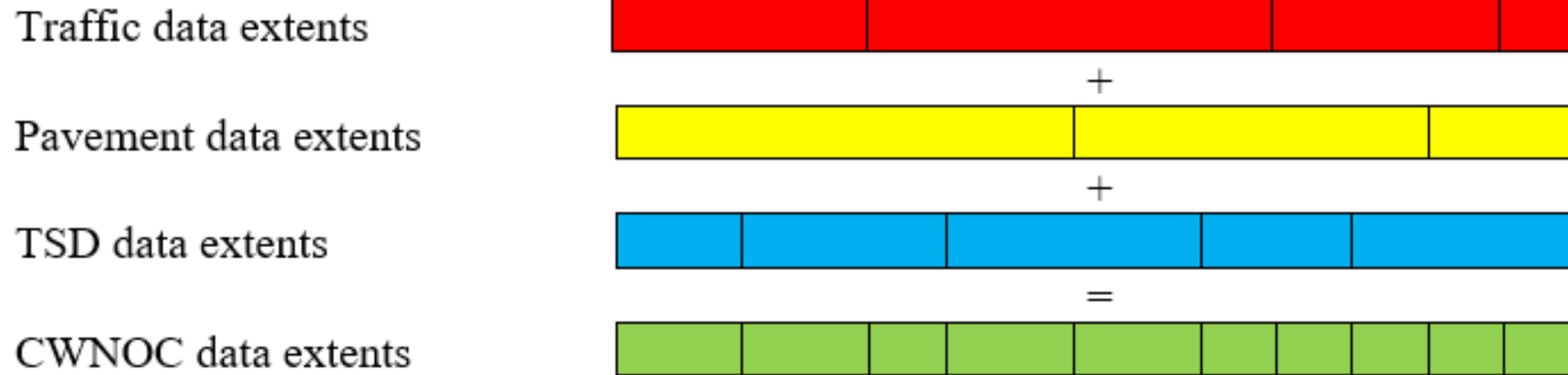
Cleaning & Prepping the data

- Calculating ESA's
- Splitting out the subgrade from pavement layers
- Getting subgrade and pavement CBRs
- Converting TSD to FWD



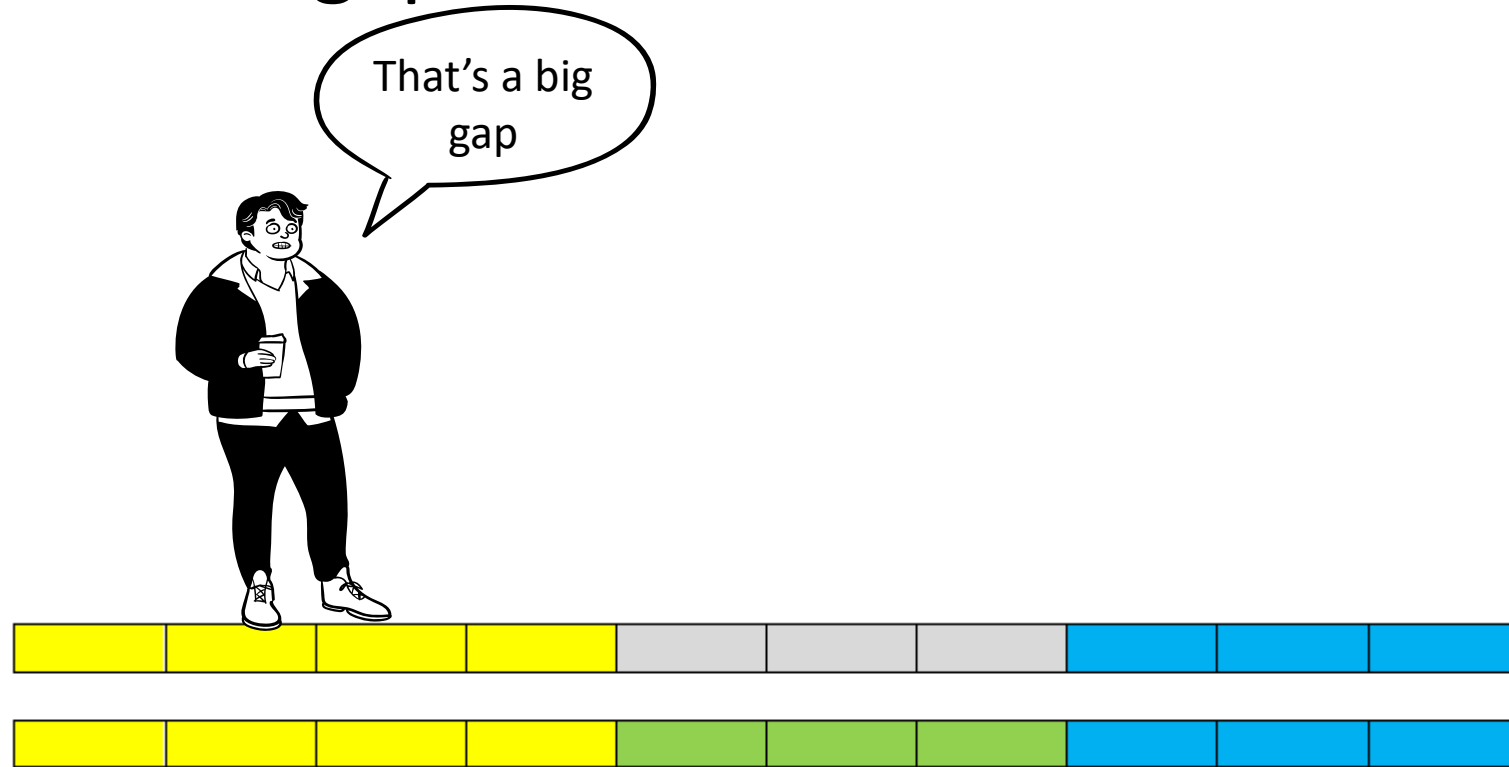
Our Carbon Equation

Creating the Dataset



Our Carbon Equation

Filling in some gaps



How we determined the treatments

- Estimated CBR using pavement thickness

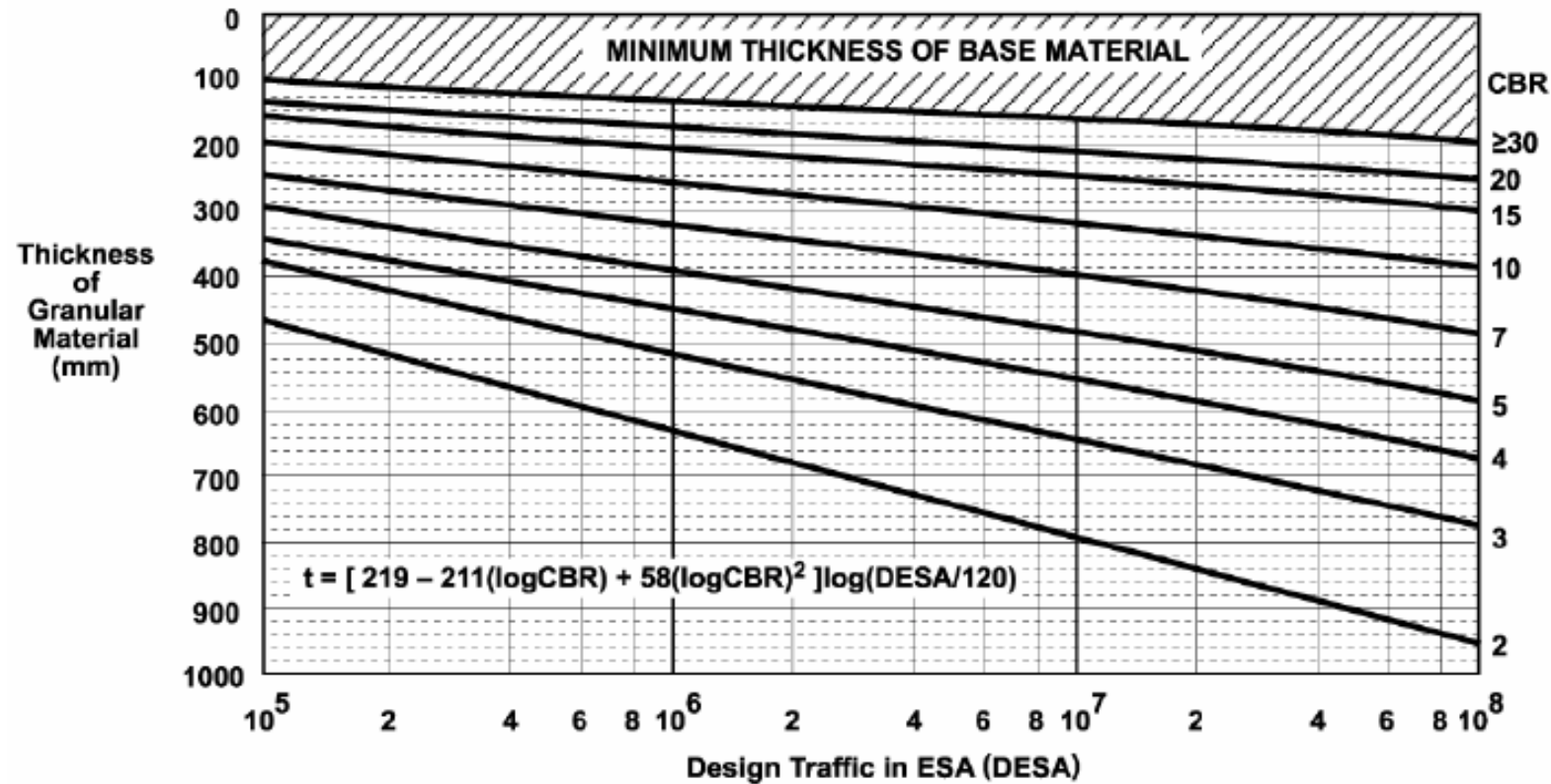
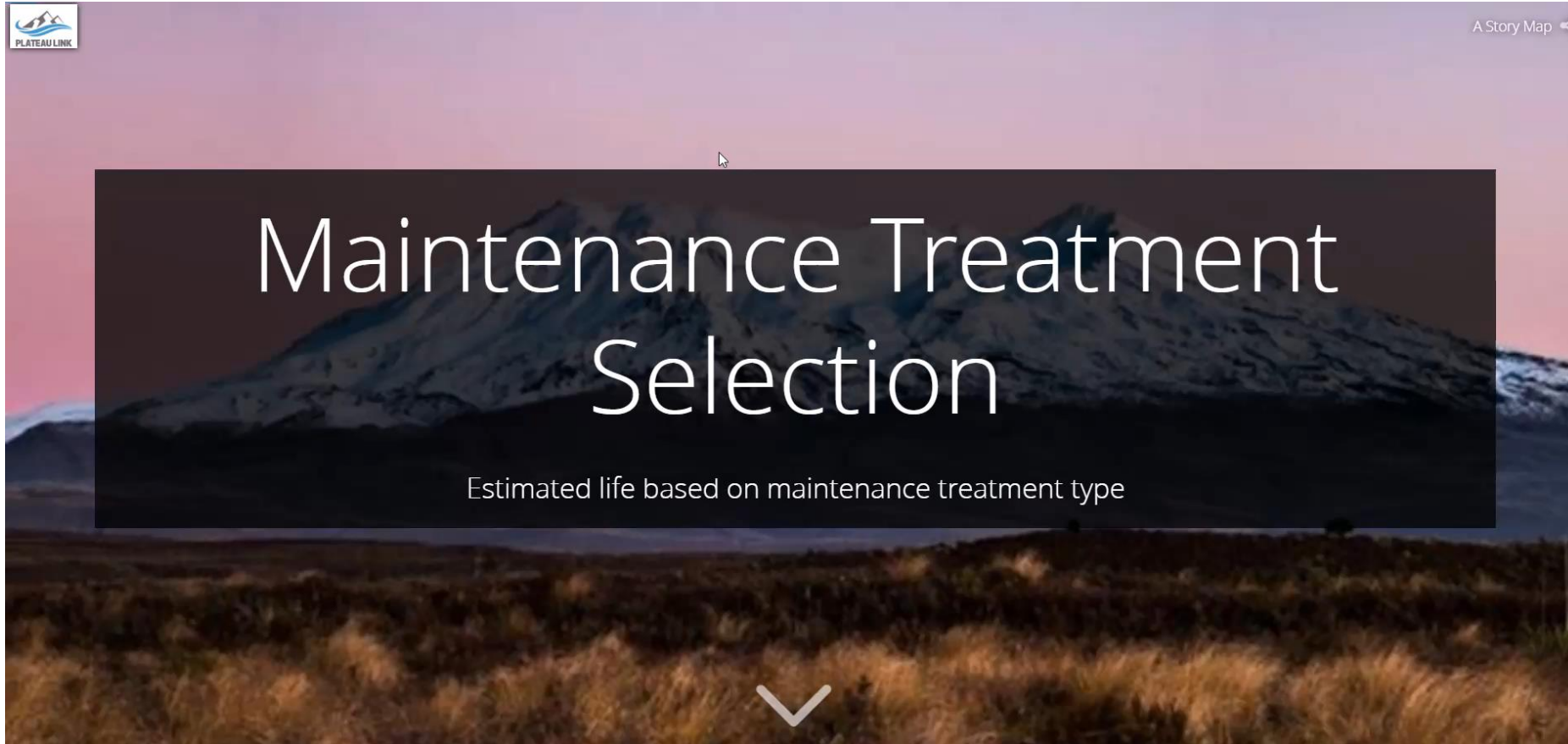


Figure 8.4: Design chart for granular pavements with thin bituminous surfacing

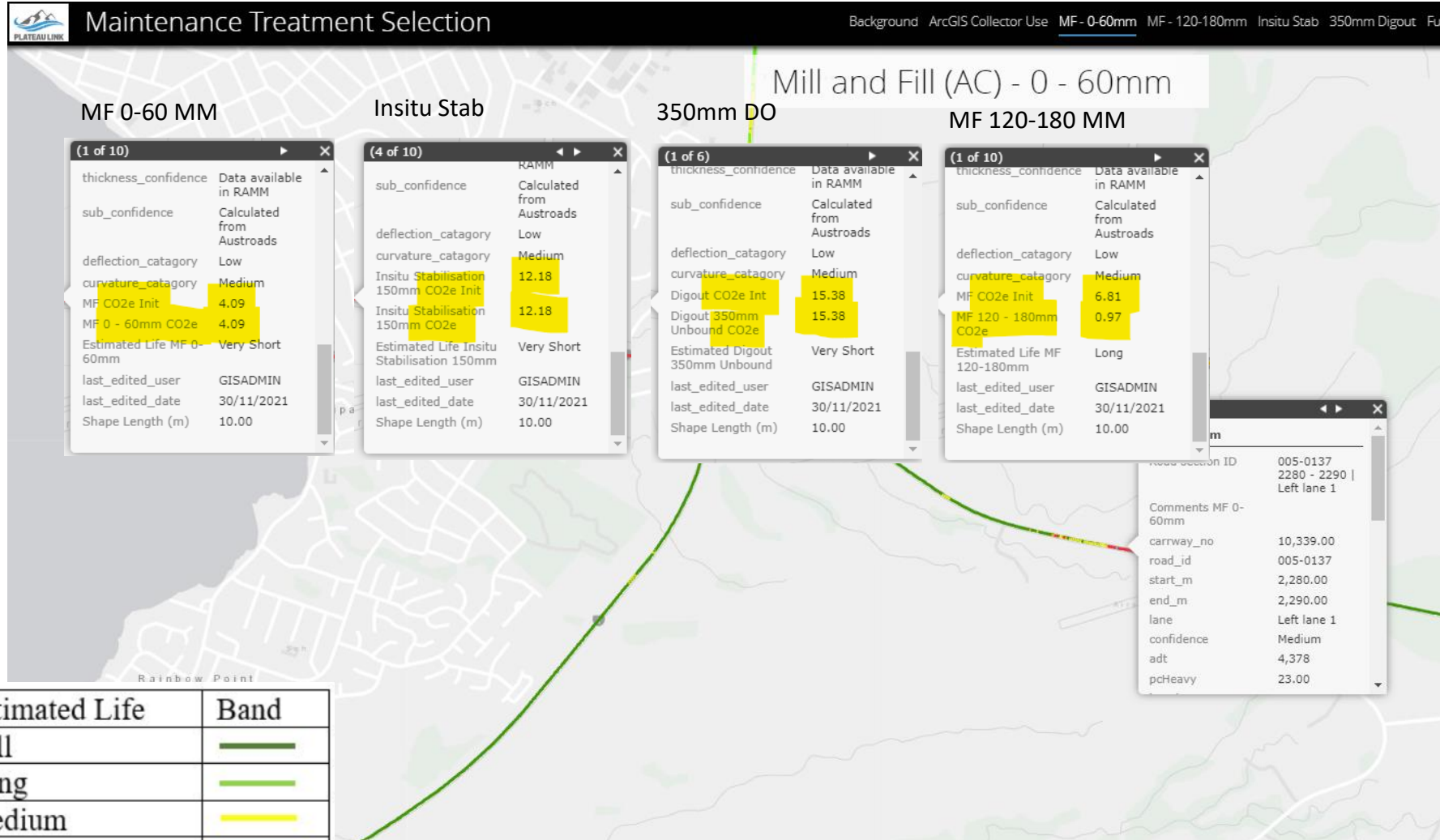
Treatment Selection

Category	Life Span	Legend
Very Short	< 2 years	Red
Short	>2 <5 years	Orange
Medium	>5 < 8 years	Yellow
Long	>8 < 10 years	Light Green
Full	≥ 10 years	Dark Green

How to choose the treatment



Comparing carbon intensities



Our Carbon Equation

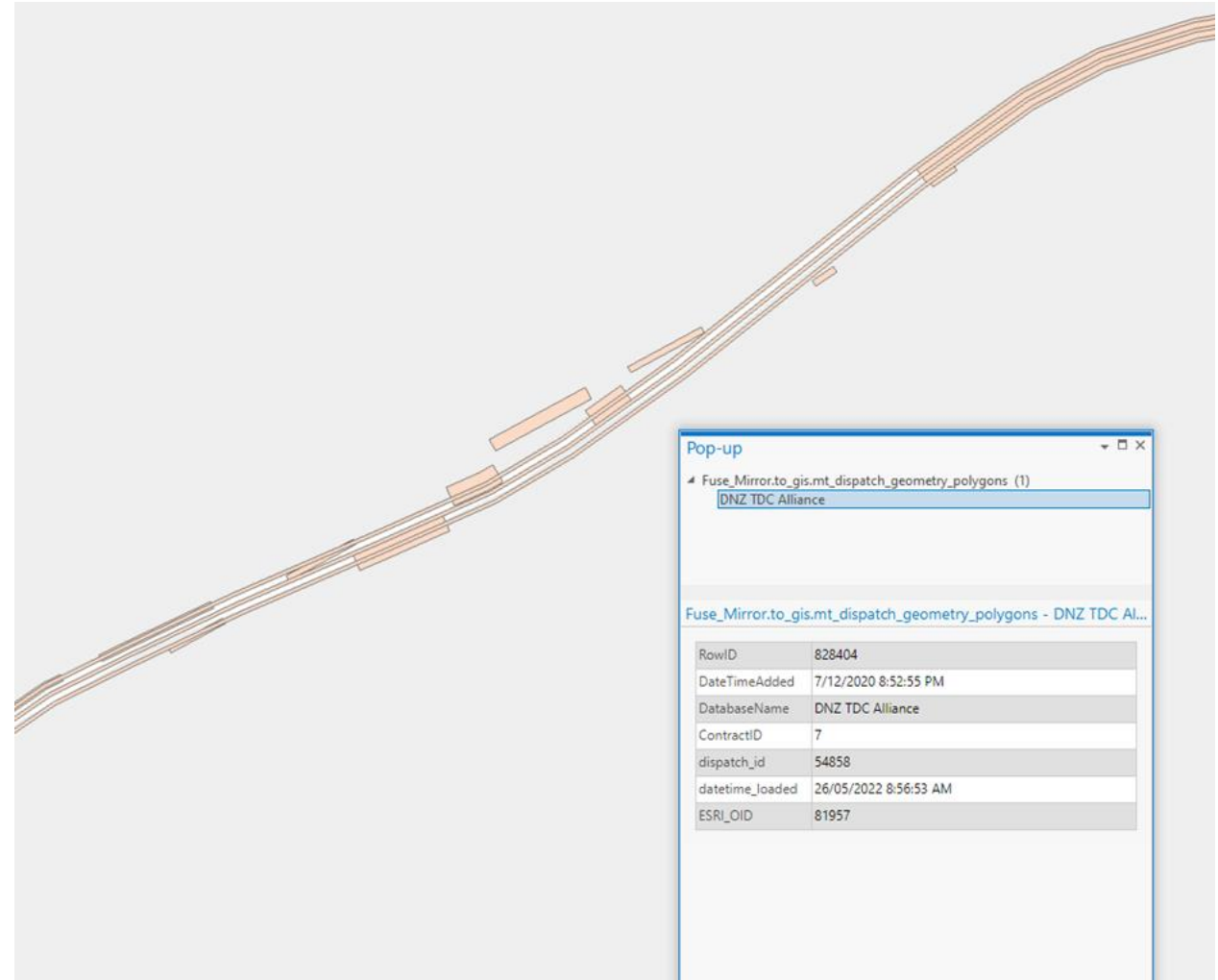
Field Mobility

- Arc GIS Field Maps
- Location services enabled
- Layers toggled on or off
- Interrogate maintenance treatment life estimate
- Location search function
- Position on map by GPS
- Field Validation



Next Steps

- To integrate faults collected in RAMM
- Requires integration with our Fuse data mart
- Roll out to more SH networks
- Integrate our fault AI system to ground truth and validate AI detections



Our Carbon Equation

Acknowledgements

- Shane Browne – Auckland Transport
- Central Waikato NOC Team
- Olly Dicken - Downer
- Dr Greg Arnold – Road Science
- Gee Tsang - Downer