



PaveState – Overview

DESKTOP OR MOBILE APPLICATION

ASSET MANAGEMENT TOOL

PaveState – Overview

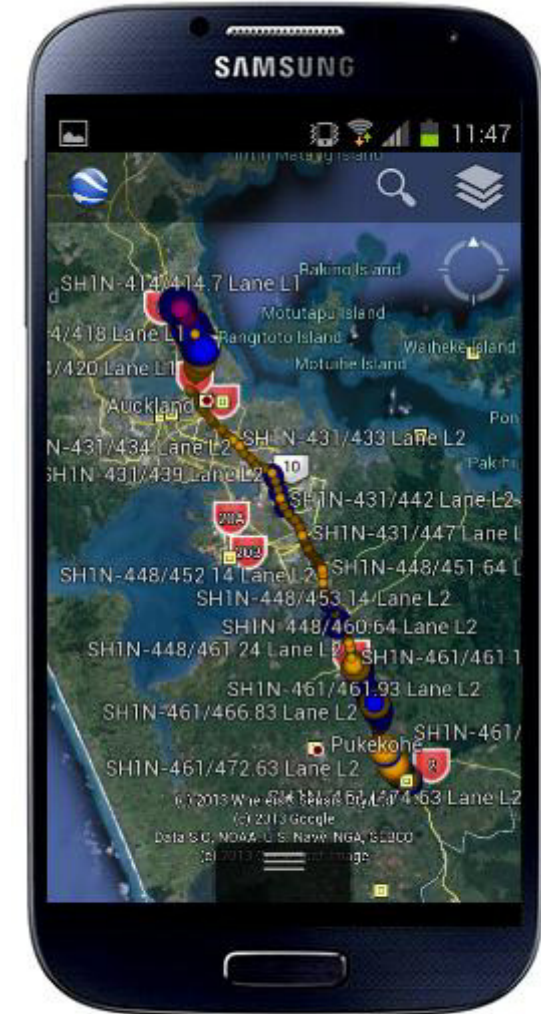
PaveState is a tool for understanding the condition and structural state of pavements, their distress mechanisms, expected future performance and maintenance and/or rehabilitation requirements.

Pavement condition data may be collected on GPS enabled smartphone or tablet. At present roughness and video may be collected with most smartphones. The user may select which sensors are of interest in later models eg gyro sensors which can record data on cross-fall in relation to curve radius which is of particular interest for identification of the higher risk corners on unsealed roads, so that grader operators can be alerted to any safety issues in advance if deterioration is occurring.

Visual condition data may also be entered, with convenient short-cut tapping or directional swipes to enter the nature and severity of the most common types of defects encountered.

Collected condition data and structural evaluations can be presented in different ways:

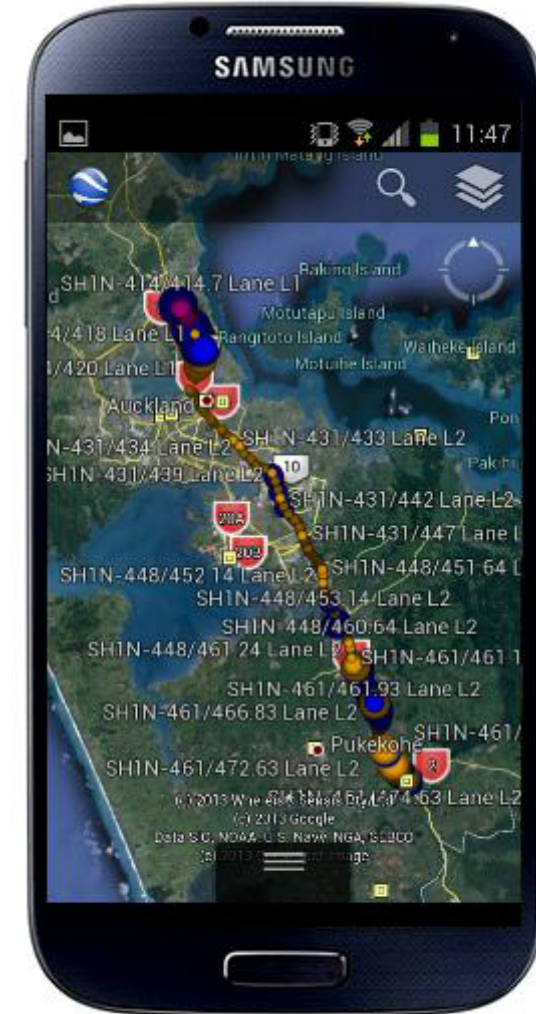
- In the office – desktop viewing properties of the entire network
- In the field – at each test position along the road during inspections or maintenance/rehabilitation, using a GPS enabled smartphone or tablet.



PaveState – Overview

PaveState enables a pavement designer/asset manager/maintenance staff to visualise the properties of the road at their current location, namely:

- Positions where structural information has been obtained (e.g. FWD or TSD deflections, test pits, Scala probes etc.) and,
- Relevant pavement structural parameters, such as structural indices, CBR, subsurface drainage needs and their potential for improvement, current and expected distress modes, critical layers and associated remaining life (ie when distress modes are likely to bring the pavement to a structurally terminal condition).

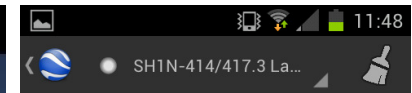
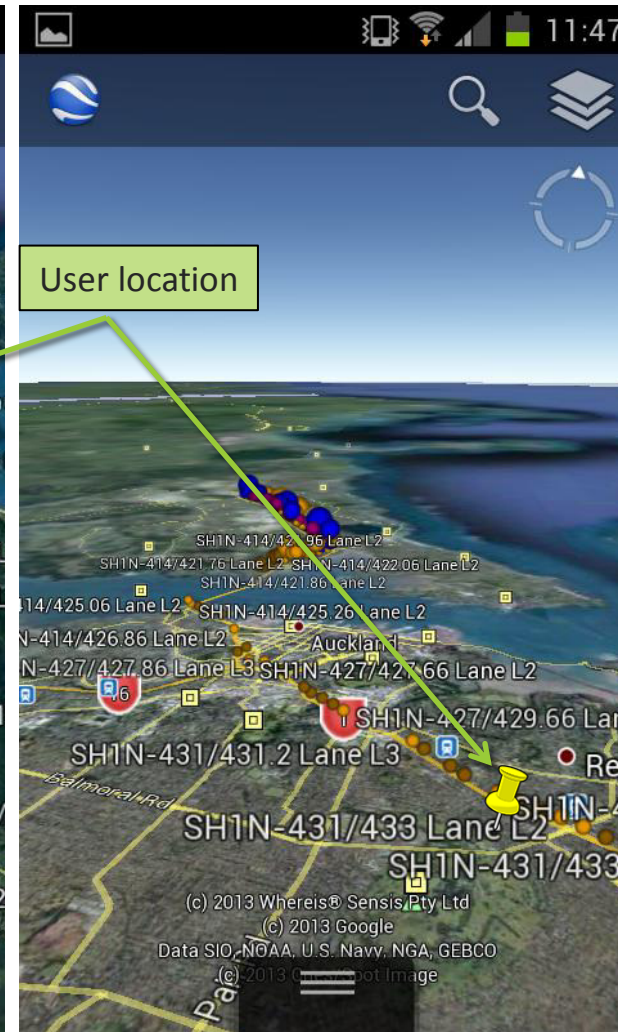
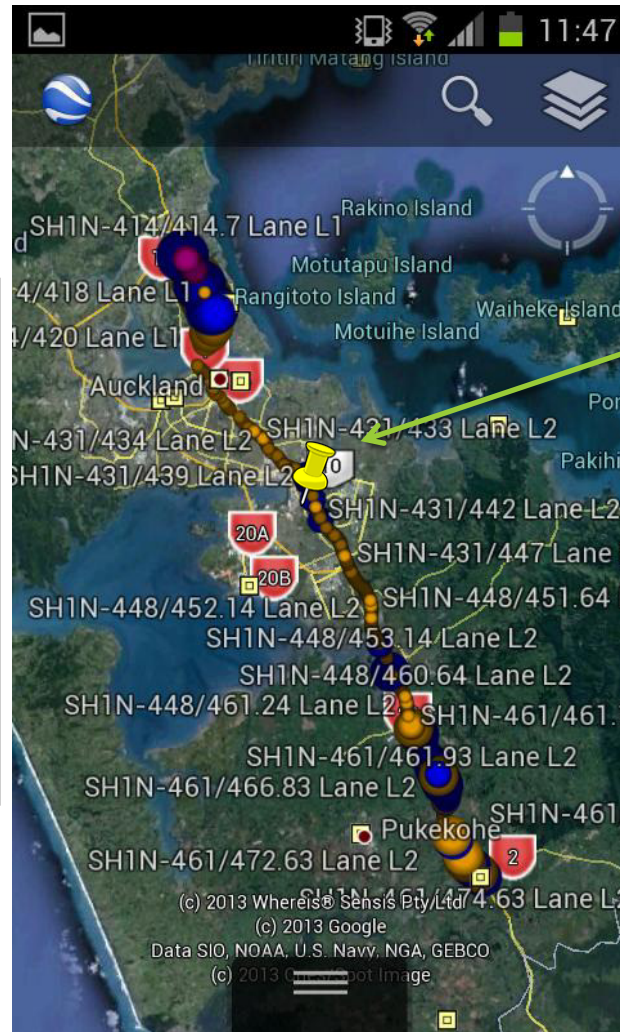


PaveState – Operational Steps

1. Collection of data by “crowd sourcing” or “organisational sourcing” with consequent upload.
2. Collation of relevant pavement condition data from deflection testing equipment (FWD, Benkelman Beam, etc.) and/or geotechnical testing (Scala penetrometer, boreholes, test pit information, and laboratory results) from either investigations or construction QA.
3. Conversion of all collated condition data for upload to RAMM, or directly into a KMZ output file which can be loaded and viewed directly in Google Earth on any capable device (including tablets, smartphones or laptops).

PaveState – Output

Potential Pavement Life is displayed using dots at each test point – colour coded and scaled according to chosen parameters.



Design ESA (25 years)	2.20E+06	
Total Life, Rutting* (years)	24	<div></div>
Total Life, Roughness* (years)	50	<div></div>
Total Life, Flexure* (years)	4	<div></div>
Total Life, Shear* (years)	13	<div></div>
Total Life, Governing IAL* (years)	4	<div></div>
Potential Total Life for the most critical distress mode (years)	4	<div></div>
Test Date	21/08/2012	
*Note: models are uncalibrated for this site.		

Distress Mode Least Life
 Shear ☐ Flexure ☒ Cracking Roughness Rut
 Instability ☐

Potential Total Least Life of Pavement (years)



PaveState – Output

SH73-145/145.8 Lane L1

Potential Life and Distress Mode

Design ESA (25 years)	1.46E+06	
Total Life, Rutting* (years)	1	
Total Life, Roughness* (years)	8	
Total Life, AC Cracking* (years)	N.A.	
Total Life, Flexure* (years)	89	
Total Life, Shear* (years)	90	
Total Life, Governing IAL* (years)	1	
Potential Total Life for the most critical distress mode (years)	1	
Test Date	9/08/2012	

*Note: models are uncalibrated for this site.

Distress Mode Least Life

Shear Instability Flexure Cracking Roughness **Rutting**

Potential Total Least Life of Pavement (years)

> 25 25 > 10 10 > 5 < 5

Directions: [To here](#) - [From here](#)

Clicking on a single marker point will bring up an itemised report, which will reflect the output fields the user has chosen.

User

SH73-145/145.8 Lane L1

SH73-145/145.7 Lane R1

SH73-145/145.6 Lane L1

SH73-145/145.5 Lane R1

SH73-145/145.4 Lane L1

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SH73-145/129.1 Lane R1

SH73-1

PaveState – Output

Various parameters can be displayed – most commonly:

- User location (using smart phone or other device's inbuilt GPS),
- Locations of all adjacent FWD tests (most recent, but also going back 20 years for some areas)
- High speed data – rutting/roughness
- Critical distress mode at each FWD test point,
- Remaining pavement life before the critical distress mode becomes terminal
- Evaluation of whether maintenance/resurfacing is viable, or rehabilitation is required

PaveState – Output

Potential
Pavement
Life – PC
output



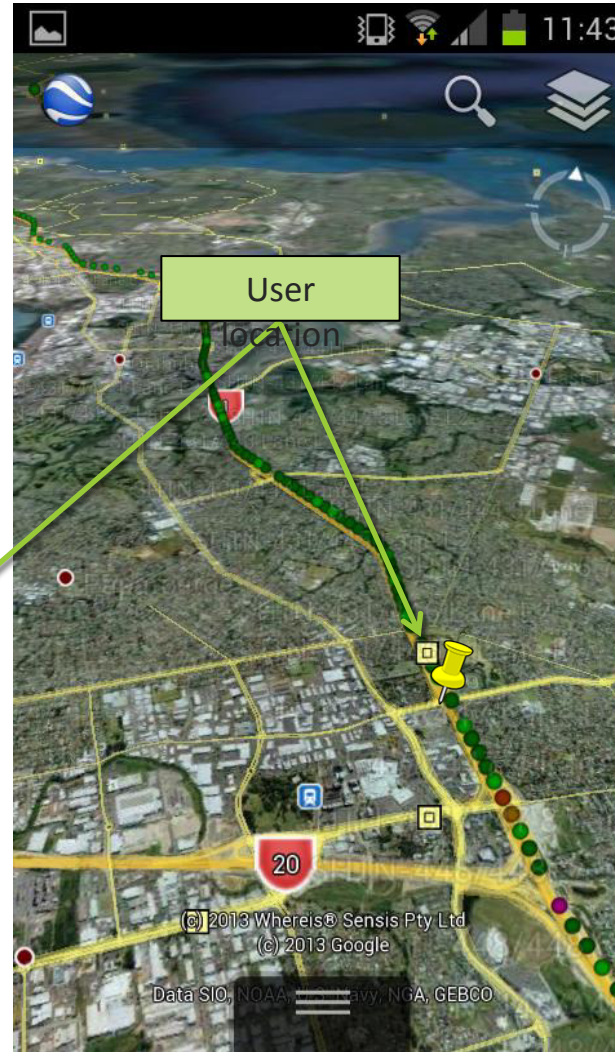
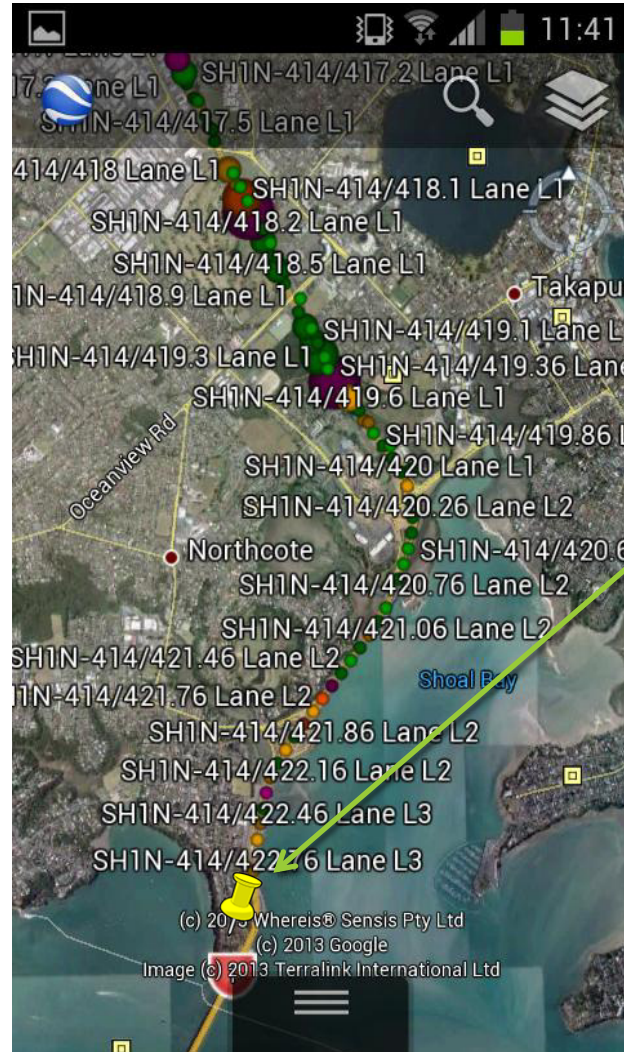
PaveState – Output

Other parameters of common interest are:

- Moduli of the various layers
- Subgrade CBR
- Subgrade non-linearity exponent (shows potential for drainage improvement)
- Expected type and depth of remedial treatment necessary to give 25 years life

PaveState – Output

Drainage
Parameters –
Smartphone
output



Drainage Layer

CBR (%)	10
Design ESA (25 years)	1.76E+07
Subgrade Modulus Exponent	-0.4
Base Layer Modulus (MPa)	1546
Total Life, Rutting* (years)	9
Test Date	22/08/2012
*Note: models are uncalibrated for this site.	

Potential for Improvement in Stiffness (CBR) from Drainage

High **Moderate** Minor None

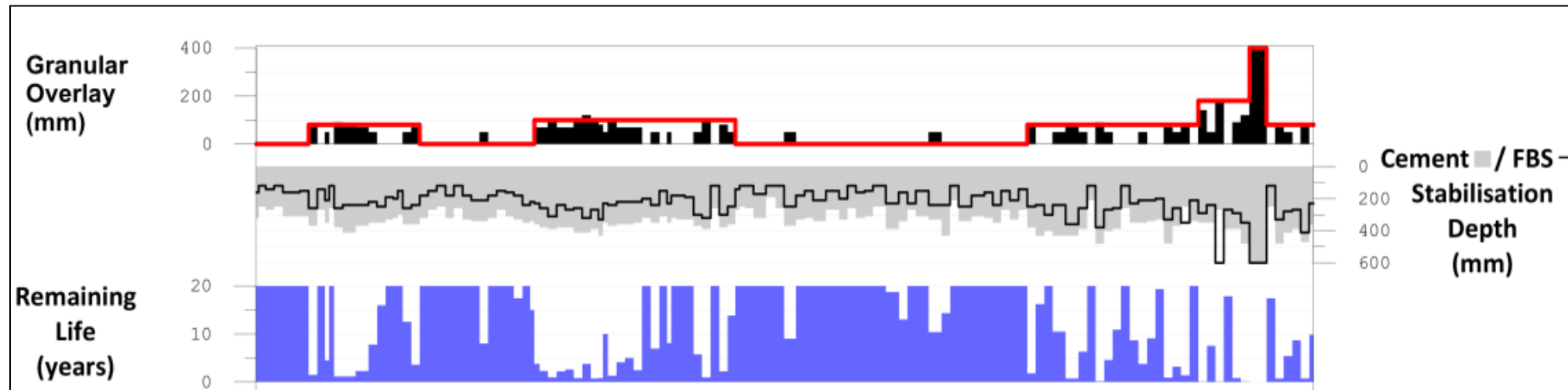
Potential Total Rutting Life of Pavement (years)



PaveState – Output

Clicking on the Overview icon brings up a summary of either:

- The treatment length (for rehabilitation with options for depths of cement/foamed bitumen stabilisation or overlay thicknesses)
- The full length of the road (for network management)



PaveState - Conclusion

