

## CASE STUDY: Aviation

### ➔ Key Project Elements

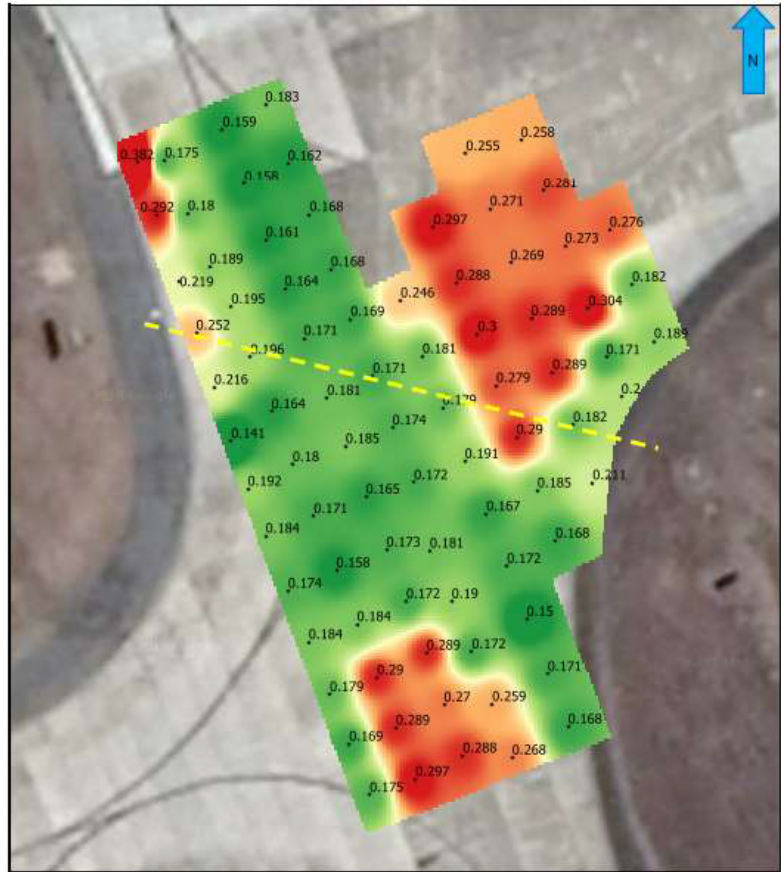
- Heavy Weight Deflectometer (HWD)
- Pavement Failure Structural Analysis

### ➔ Outputs

- Thematic maps showing pavement deflections, slab modulus, subgrade 'k' reaction values and load transfer results.
- Statistical summary of pavement layer stiffness
- Locations of potential slab corner voids

### ➔ Objectives

The specific objective of the investigation was to assess the damaged concrete slabs and surrounding areas for their structural properties and functional capabilities.



## DEFENCE AIRPORT

Aug –Oct 2018

### Client Requirements

Douglas Partners commissioned PMS to perform a structural pavement evaluation for selected concrete slabs within an Australian airport utilised by defence aircraft. . The site location was an area of concrete pavement that showed signs of distress in the form of cracking.

### Benefits to Client

- A graphical and statistical analysis of the pavement structural performance.
- Quantified pavement performance measures utilised for further failure analysis and to inform of rehabilitation/treatment options.
- Indication of possible subsurface erosion and settlement issues.

# DEFENCE AIRPORT

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## Methodology

- Completed project-level HWD testing on selected pavement sections.
- For each HWD test point, the peak applied load and peak deflections were recorded from 9 geophones. Spacing ranged from under the centre of the load, to 1.5m from the load.
- Slab centre deflection basin testing was used to estimate slab elastic modulus, whilst longitudinal and transverse slab joints were tested for load transfer efficiency.
- Load transfer was tested across the slab cracks to assess the residual friction load transfer available.
- Additional testing at the corner of the slabs was conducted, to assess potential voids caused by erosion and subsurface settlement.
- 84 slabs were tested for basin deflections and 52 LTE assessments over 23 construction joints and 3 slab cracks.
- For each slab subject to this investigation, testing was undertaken on the:
  - o Transverse Joint Approaching (TJA);
  - o Transverse Joint Leaving (TJL);
  - o Longitudinal Joint Approaching (LJA);
  - o Longitudinal Joint Leaving (LJL); and o Basin-Centre (B).
- Using pavement cores and borehole logs, the deflection basins were back calculated using the ELMOD\_6 software to estimate the pavement layer stiffness (elastic moduli),
- Using the geographically referenced data and results thereof, thematic heat maps were produced, to provide a graphical representation of the pavement performance.
- Histograms were developed to provide a visual representation of the statistical analysis of the data.

