Laser Scanning Pavement Auditing Survey
Northern Diversion Project
Melbourne

Paul Natsikas
Kevin Ide

Project Background

Northern Diversion Sewer Project

• Northern suburbs of Melbourne
• 12.5 kilometres of tunnels
• Stage 1 – 8 km
• Stage 2 – 4.5 km
Project Stakeholders

- Melbourne Water – Tunnel asset owner and client
- Transurban – CityLink Freeway Tollway operator
- VicRoads – Responsible authority for surrounding roads
- John Holland – Tunnel constructor
- Aurecon – Project Management and Supervision
- SKM – Design and Geotechnical

Site location

- 5 metres from pavement surface to crown (top) of tunnel below
- Safety – Traffic Management required
Site location

The Project Brief

- Survey intelligent client and stakeholders
- Pre and post construction survey
- Survey to VicRoads Class AUD1 specification
  - Horizontal ± 0.030 m
  - Vertical ± 0.005 m
- Total Station and digital level
- Real time construction monitoring - John Holland
- Pavement Strength Evaluator (PaSE) - Vicroads
- Daily driving tests
So why use Laser Scanning?

Whoever has the most data WINS!
Instrumentation

- Leica TCRA 1203 robotic total station
- Leica DNA10 Digital Level and invar staff
- Leica ScanStation 2

Field Survey

- Pre-construction survey August 2009
- Post-construction survey October 2009
- Safety – Management and night operations
- Survey Control
  - Stable marks
  - Fixed targets for the duration of the project
  - Same marks for Laser Scan and Total Station
Processing

• Extraction of data to DTM grid mesh
• 50 mm x 50 mm interval
• Review of data to remove non pavement strikes
Results and comparisons

- Contour comparison
- DTM difference by contour
- DTM grid spot level comparison
- DTM difference by volume
- Long section comparison
- Driving
Outcomes and conclusions

An appreciation of Laser scanning

- Accuracy ✓
- Repeatability ✓
- Coverage ✓
- Data density ✓
Questions