



Image courtesy of The Shire of Serpentine Jarrahdale

# TONKIN HWY EXTENSION

**PROJECT** Tonkin Highway Extension | Serpentine – Jarrahdale WA

**CLIENT** Main Roads Western Australia

## THE SITE

The Tonkin Highway is a 50km north-south highway running along the eastern corridor of the greater Perth metropolitan area. The south-east corridor is an important and fast-growing area faced with increased congestion, higher travel times for freight vehicles and reduced safety outcomes on the existing road network. A growing population will put significant pressure on the existing road network with volumes exceeding recommended capacity.

Federal & State Governments have committed over \$500 million to the infrastructure project which will extend the Tonkin Highway approximately 14km, as a four lane dual carriageway further south to connect with the South Western Highway. This will also include a shared path along the corridor. Furthermore, the project scope also includes consideration of the Kwinana South Western rail line realignment between Bishop Road and the Perth to Bunbury rail line south of Mundijong Road.

## THE CHALLENGE

To assist with entering the design phase for the extension of Tonkin Highway south, Main Roads Western Australia (MRWA) required an accurate topographical survey model across 7,500ha. The cost and the time to survey such a large area using conventional survey techniques across mixed use land sites posed a significant challenge to the project.

## THE SOLUTION

MNG proposed a mix of high accuracy Aerial Laser Scanning (ALS) and Mobile Laser Scanning (MLS) solutions to provide dense coverage over the 14km route. Utilising their Stratus-1 aerial survey system, mounted in a Cessna RG182 aircraft, the entire site was surveyed in complete detail covering properties that were inaccessible to ground survey teams at the time. A significant benefit of the ALS was the quick and discrete data capture which enabled a broad coverage to aid the site awareness over the proposed road corridor. The aerial survey was enhanced by Cirrus-1, MNG's purpose-built MLS survey system. It was used to quickly and safely capture a high accuracy point cloud for a feature survey along accessible roads in the project area.

ALS was captured across a two day program following calibrations. Aerial photography was simultaneously captured at 7cm GSD to produce an orthophoto of the project area.

Cirrus-1 conducted multiple passes along a series of accessible roads within the project site in a single day. The survey was planned so that both the ALS & MLS utilised the same control reference marks.

# CASE STUDY

## THE OUTCOME

A combined project point cloud was classified and provided a rich visualisation of the project area and surrounds for use by MRWA for various assessments.

ALS point cloud was compared to MLS in designated sites to achieve point cloud coincidence  $\pm 50\text{mm}$  @  $2\sigma$ .

Sufficient points were extracted from the ALS point cloud to create a digital terrain model of the site.

Data extraction of the MLS point cloud included edge of bitumen, kerb lines, road shoulder and above ground services and furniture etc.

The final digital ground survey model is a combination of manually extracted features within MLS corridors and automated ALS ground mesh. Deliverables including the point cloud, model key point ground surface, ortho-mosaic aerial imagery and various reporting outputs were successfully issued to MRWA.



STRATUS-1 AERIAL LASER SCANNER



CIRRUS-1 MOBILE LASER SCANNER

A KEY BENEFIT TO THE CLIENT WAS BEING ABLE TO INTEGRATE THE ALS AND THE MLS TOGETHER IN A SINGLE HOMOGENEOUS POINT CLOUD.

MNG PROVIDE INNOVATIVE  
AND PERSONALISED SOLUTIONS  
FOR ALL PROJECTS

TALK WITH US TODAY TO FIND OUT MORE

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