



# HIGH PRECISION SURVEYS ON HIGH DEMANDING SITES

**PROJECT:** Esperance Branch Line Infrastructure Upgrade – Esperance, Western Australia **CLIENT:** Arc Infrastructure

## PROJECT BACKGROUND

The Esperance Branch Line (EBL) is a single line, (almost) 400km long railway, running from Kalgoorlie to Esperance in Western Australia.

The original line was established in the 1930's and underwent a significant upgrade in the 1960's to standardise the rail gauge. Today, EBL continues to play a fundamental role in transporting iron ore, fuel, and grain from Kalgoorlie to Esperance.

However, as more freight moves to rail (and off the roads), EBL will be expected to support additional tonnage from the resource and infrastructure sectors. To support this increase in freight movements, it is imperative EBL is regularly upgraded and efficiently maintained.

The ongoing maintenance and upgrade of the railway line includes lengthening crossing loops, replacing sleepers and rails, and supporting drainage and ballast programs.

Arc Infrastructure - a transport infrastructure owner and access provider in Western Australia -

engaged MNG to provide detailed feature survey works at 23 sites along the EBL, as part of the 2022 infrastructure upgrade project.

## CHALLENGES

The surveying the EBL presented several, significant challenges for the MNG team.

Due to the age of the track and poor historical record management, there is almost no survey detail of the existing line. This made engineering design within the program, difficult.

As an active rail line, all remediation works need to be conducted between scheduled train services. Safety within the rail corridor is paramount and a Work on Track Authority is required prior to commencement. A Track Protection Officer was also required on location.

Due to the remoteness of the site (which spanned 18km) and extreme weather conditions, some sites were only accessible at certain times of the year.



## SOLUTIONS

MNG understood the need to provide accurate, detailed information of the rail line, ballast, and topography. As such, the team proposed a tiered program to enable detailed engineering. This approach would also allow subsequent construction works to be undertaken at a later date, with full survey control.

MNG worked with Arc Infrastructure, the Track Protection Officer, and the operational team to prioritise the sites. This ensured all works were conducted efficiently and safely between scheduled track services, without disruption to other work crews.

Maintaining strong communications with local teams ensured access to individual sites was possible, and foreseeable logistical issues were addressed. This helped to keep the project on time and on budget.

The MNG team worked to understand the rail engineer's requirements for the track geometry (including rail alignment, curves, cross slopes, and gradients), and proposed a combination of surveying techniques to ensure data requirements were obtained in the most time effective manner.

In addition to traditional surveying techniques, MNG utilised its specialised track survey system (the Amberg Trolley) to precisely capture track geometry information.

Concrete survey control points were connected to the state survey network to ensure the integrity of the overall project.

The highly accurate survey data supported the design of the "as-built" documentation, the

planning of railway line refurbishment, and would enable future construction activities.

## OUTCOMES

MNG completed all survey works on time, on budget and in accordance with track and civil survey guidelines.

The MNG team compiled, checked, and delivered detailed survey plans in a staged manner to allow Arc Infrastructure's design engineers to commence their programs in a timely manner. Typically, plans and high accuracy digital data was supplied to Arc Infrastructure within a week of the field work being completed.

MNG also computed the rail centreline, relevant geometry, and track chainage for each of the sites and compiled the information into a database. This database was then configured to the client's requirements and directly uploaded into their system, saving time and resources.

Used to determine features such as maximum curvature and impact on the environment, the inclusion of the survey data will significantly reduce time in the design phase of the railway line refurbishment and upgrades.

Arc Infrastructure has commended MNG for its work on the project, particularly with the supply of the track centreline

## TALK TO US

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