

A NEW VISION FOR SURVEYING MAIN ROADS IN QUEENSLAND

A team at Queensland's Department of Transport and Main Roads (TMR) has boosted safety, cut costs and streamlined surveying work by introducing an innovative 360 degree digital camera system.

In a move aimed at improving the safety of workers, TMR adopted a Trimble V10 Imaging Rover with Trimble Vision on-board for a substantial survey on Pumicestone Road.

By moving to digital imagery, surveyors were kept off the road with the added benefits that the whole project was made quicker and simpler with reduced costs.



“TMR spends taxpayer dollars wisely, and the trial proved we were saving time, money, and mitigating safety risks.”

Ray Miller, a TMR Senior Surveyor.

Trimble Vision benefits for TMR

- *Road surveys performed from the footpath improve safety for all*
- *Complex traffic control logistics are avoided*
- *Surveys performed by day, not night*
- *Health and safety costs are lower*
- *Digital image capture creates full and detailed job records*

The Challenge



There's a lot going on at the intersection of Pumicestone and Beerburum Roads, just north of Caboolture, Queensland.

Traffic is continuous, and just 30 metres to the east, trains bustle along the North Coast railway line.

With this in mind, TMR needed to consider surveyor safety before starting a major upgrade in the area.

Would its team be confined to night surveys with expensive traffic control? Or was there a way to remotely capture the extensive but vital site data without putting surveyors on the road?

“We'd usually need to occupy the road with a total station and prism, and no risk assessment would allow us to do that without traffic control at the very least, so we'd probably end up doing the job at night,” said TMR senior surveyor Ray Miller.

Overall, the risks of the job would take time and cost to mitigate.

“As well as the survey crew, you've got at least three traffic controllers plus bump trucks, lights, set-up, and signs, plus Queensland Rail would need to be informed and they have their own controls and procedures for safety.

“It becomes a time-consuming logistical challenge,” said Ray.

So Ray and his team began looking for a technological solution that would keep surveyors safe but also deliver a simpler and less expensive process.



TMR first encountered Trimble Vision technology on the Trimble S8 Total Station. So putting Trimble Vision at the rover was an exciting prospect.



TMR found Trimble V10 workflows intuitive and easy to learn, with all essential training completed before the trials were over. It also integrated easily with TMR's workflows.

The solution would need to integrate with existing surveying equipment and deliver the accuracies they were already achieving, if not better. Initially, they considered a laser scanner.

“One of our scanners would’ve performed fine,” said Ray.

“But a big piece of equipment is overkill for this type of job- like breaking an egg with a sledgehammer.”

So how could all criteria be met with a safe, successful and cost-effective solution?

The Solution

TMR was already familiar with Trimble Vision technology from working with the Trimble S8 Total Station, so the next step was to explore the option of a new Trimble V10 Imaging Rover.

The Trimble V10 is an integrated camera system on a rover pole, which precisely captures 360-degree digital panoramas. It offered TMR the potential to visually document each job site without venturing into traffic. They could capture imagery on the job then measure required features – such as line markings - back in the office.

Rod Yann, SEQ Sales Manager at UPG, loaned the team a Trimble V10 Imaging Rover and supported them through two trials. On both, TMR consistently achieved accuracy better than 10 mm, which was exactly what was needed for this task. They also completed training on the system with even their two least-experienced surveyors becoming proficient.

“TMR spends taxpayer dollars wisely, and the trial proved we were saving time, money, and mitigating safety risks,” said Ray Miller.

“In the end it was a straightforward decision.”

TMR bundled a Trimble V10 purchase with two new Trimble S9 Total Stations.

TMR personnel found the Trimble V10 integrated seamlessly with all their standard workflows. Once control was established in the normal way, they simply positioned the Trimble total station in a central location as a Trimble V10 survey requires fewer stations than a typical conventional one.

A surveyor then walks around the job site with the instrument, precisely capturing 360-degree panoramic images of the entire area from the footpath.

With this new approach in place, surveyors remained well away from traffic throughout the Pumicestone Road project and the whole image capturing process took TMR just 2-3 hours.

In the office, TMR processes its Trimble V10 image data in Trimble Business Center office software. Once the data is processed, a surveyor begins measuring survey-grade points simply by locating key features and points in the images.

“When you’re familiar with the workflow it’s probably faster even than walking on the job site,” said Miller. “You’re not having to be mindful of traffic; you’re literally just sitting in the office firing off points.”



Without Trimble Vision technology, Ray Miller and his crew would need to perform their Bruce Highway survey at night with traffic control, resulting in greatly increased cost and introducing the extra risk of staff fatigue.

The Results

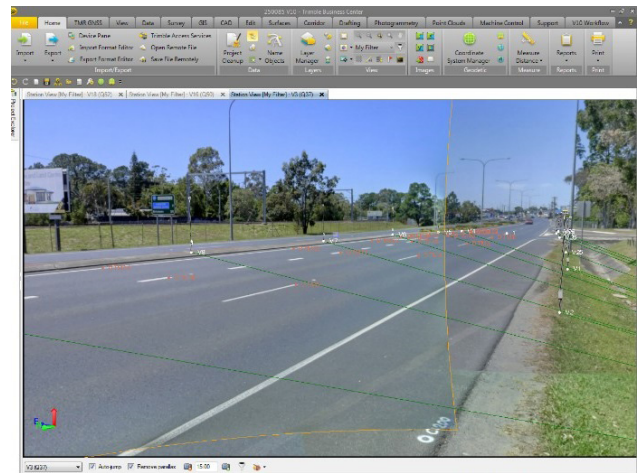
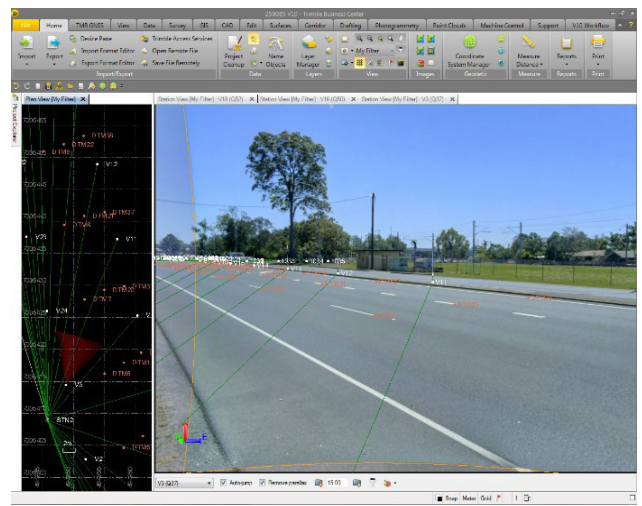
The team surveyed its entire Bruce Highway project without setting foot on the road. And while their objective was to “collect the pavement”, ultimately they gathered an enormous sphere of data that included everything they could see.

“If we miscode something we don’t have to spend a day revisiting the site,” said Ray Miller.

“We just have another look at the Trimble V10 data and amend the point straight away.

The site records we get via the image data save an enormous amount of time.”

TMR has always been an early technology adopter and its innovative approach is paying off with road construction projects finished faster and at lower cost.



Data processing in Trimble Business Centre software takes minutes to set up and is completed in a few hours - either in the background or overnight. Measuring features such as traffic signs and line markings with survey-grade accuracy is quick and efficient. Note in the field images need to be captured in brief gaps in busy traffic to ensure the majority of the target area is visible in the resultant images.

The standards for each job are also higher - in accuracy, record-keeping and, of course, safety for all.

Ray Miller looks forward to a day when Trimble V10 images captured today can be used for data mining in the future, when surveys can be re-engineered from the data, avoiding new surveys performed from scratch.

In the meantime, TMR is putting Trimble Vision technology to work every way it can - 360 degrees in fact - from the footpath.