

Gain control and deliver faster, cost-efficient projects with fewer complaints

By providing a rich understanding of traffic conditions and variables like noise, with real-time visibility so you can tailor activity on site.

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Introduction

Australia's massive infrastructure spend aims to help the country recover from the economic impacts of the pandemic – but without a change in approach, we run the risk that our cities will grind to a halt with avoidable and costly disruption.

Streamlining the delivery of major works by tailoring activity to the surrounding community will be crucial to ensuring that the \$225 billion in combined state and federal infrastructure investments doesn't go to waste.

Disruptions to major projects often arise due to well intentioned blanket rules which restrict operating hours in order to decrease disruptions to traffic and the general public. These rules do not allow for adaptations that could greatly benefit specific projects, and this lack of nuanced, granular insight can lead to major inefficiencies and worse outcomes for the impacted communities.

Insights into local conditions informs plans that optimise working hours each day, increasing productivity and efficiency. Allowing a major project to begin even one hour earlier or finish one hour later each day based on actual conditions can shave weeks off completion time, significantly reducing costs and overall community disruption.

Reducing the impact of construction projects on the local community and road users whilst providing direct productivity benefits by lowering traffic volumes around projects is critical in maintaining a social licence to operate.

When major works can consider the traffic impact and needs of the project's environment, a wealth of other benefits can follow, ranging from reduced emissions to improved quality due to longer continuous periods of activity.

With real time insights, asset owners, government regulators and construction companies can not only get a clearer vision of how a project can best proceed, but also continuously adapt and monitor performance every step of the way.

Deliver projects faster, with improved outcomes

Though there can be challenges in shifting the way the industry has traditionally operated for the last five decades, pandemic recovery initiatives offer a golden opportunity to change the way the industry incorporates the adoption of technology and data driven insights.

A new approach, which places real-time insights at the center of informed decision-making, can unlock greater cost saving opportunities.

Incorporating data, and more importantly, context from a range of sources, construction technology platform Mooven has made it possible for contractors, asset owners and government agencies to leverage a rich understanding of how our cities operate to make better informed decisions.

Mooven's use of real-time data and insights can rapidly illustrate the impact of delays across transport networks, and has allowed them to help speed up project delivery timelines by as much as 50 per cent.

The platform allows construction outfits to meet 30-day baseline traffic-monitoring targets faster. So far, Mooven has won more than half of Australia and New Zealand's top 50 construction companies as clients.

Not only can Mooven's technology improve project efficiency, but it may also open up the industry to a new generation of workers. Co-founder and CEO of Mooven, Micah Gabriels, explained that amid an expected labour shortage for the industry, the implementation of innovative technologies can be a draw to knowledge workers who are passionate about solving major societal issues and developing new ways to solve global issues.

The following three case studies from Mooven demonstrate how having the right insights can allow projects to be completed faster, with confidence and more cost efficiently, which is not only the best way forward for a specific project, but for the industry as a whole.

Georgiou switches gear and fast-tracks Queensland motorway build with Mooven

When worksites shut down across the country due to COVID-19 lockdowns, Queensland's continued success in managing the outbreak has resulted in an impressive infrastructure boom.

With the announcement of a four-year, \$27.5 billion infrastructure spend, the Queensland Government is backing future demand and seizing opportunities for the state by connecting regions and creating more liveable communities. Road safety is at the heart of this plan.

Whether it's for the construction teams or road users, efficiency on our roads will always be critical.

National civil and building construction company Georgiou Group has a long history of delivering quality road projects, safer transport infrastructure, building local industry and creating sustainable jobs for Queenslanders. On track for completion in late 2022, the Australian and family-owned business is delivering the \$82 million M1 Pacific Motorway Yatala South Interchange (Exit 41) upgrade on the Gold Coast for a repeat client, the Department of Transport and Main Roads (TMR).

Yatala's upgrade

Yatala's industrial precinct is a rapidly developing area. The upgrade is set to improve traffic flow, increase efficiency at the interchange, and improve reliability of access conditions for freight movements and transit times for all motorway users.

With a new bridge across the M1, additional lanes, the upgrade of roundabouts to signalised intersections, and the relocation of on-ramps and off-ramps, the project represents Georgiou's first major motorway project in the region.

Seeking innovative ways to deliver projects that stay at the forefront of customer expectations was an important element of the contract. That's where Mooven stepped in with technology to allow the fast collection and analysis of real-time GPS data. This has given Georgiou greater context and visibility at speed, allowing construction teams to get on site sooner.

Gearing up for smarter planning

As part of its strategy to develop its traffic management approach, Georgiou selected Mooven's Travel Time Monitoring software to leverage real-time traffic data, so the company could accurately and rapidly illustrate the impact of delays across the transport network during construction.

Senior Project Engineer at Georgiou, Mitchell Hugo, said, "Working with Mooven, data collection could

start almost instantly, so in less than two hours, we were able to demonstrate how Georgiou could maintain intersection performance throughout the construction period, avoiding project delays and potential cost overruns."

Mooven gets in early to help project managers understand possible efficiencies and transform the way construction and road projects are delivered.

By recognising a gap in the market, Mooven has allowed clients to keep pace with the digital economy and make a mark on the industry's regulatory demands by using smarter processes with internet of things (IoT) built into the fabric.

Keeping pace

Whether it is for construction workers on the ground or drivers travelling along the motorway, true safety and efficiency on the road demands knowledge of real-time impact.

"We're now proving that it's possible for the industry to lower the impact to road users while ensuring we maintain our deadlines," Hugo said.

"With concise traffic data at our fingertips, if there is an accident near our worksite that affects the road network, we can provide a better picture of when and where we need to operate and adjust schedules when necessary, ensuring we don't set ourselves back or cause further impact on the network."

Road closures are not a simple task on the Pacific Motorway, but with Mooven's software, Georgiou is navigating these environmental constraints through adjusting on-site resources in real-time.

Micah Gabriels, CEO at Mooven, said that with the ability to make evidence-based decisions about when and how to work, Mooven is quickly becoming the de facto standard for traffic monitoring on roadworks throughout Queensland.

"What we're really doing is helping the industry understand how to work in harmony with its surroundings – improvements to our cities of tomorrow shouldn't hurt the goings of our cities today," Mr Gabriels said.

"With the ability to slot Mooven into its project toolbox as an off-the-shelf resource, the rapid implementation and ease of use made it ideal for Georgiou to not only perform the necessary monitoring and get onto the worksite as soon as possible, but the digital footing has also given the team the visibility to ensure the steady flow of traffic throughout the build."

WBHO cuts construction time with automated detours

WBHO Infrastructure works with clients and partners to deliver exceptional project outcomes throughout Australia and globally. One such project was the Princess Freeway-Forsyth Road interchange, part of the Western Roads Upgrade initiative in Melbourne. This project required WBHO to widen an existing bridge over the Princess Freeway, and duplicate a bridge over a major metropolitan railway line.

No easy task. Especially with the added complexities of two freeway exit ramps, a busy metro train service, interface with a high-pressure pipeline, daily traffic volume exceeding 100,000 vehicles and densely populated suburbs to the north and south of the worksite.

For projects requiring long periods of disruption to the flow of traffic, alternative routes are necessary to avoid travel delays.

WBHO Australia and Mooven used innovative technology to analyse alternative routes and provide tailored journey advice for motorists, spreading the impact of the construction site across a range of detour paths.

With reduced impact on the community, WBHO was able to streamline and accelerate project delivery.

The challenge

A job of this magnitude and location would require reducing traffic to just a single lane for ten weeks. This generates a significant impact on customers' journeys, making excessive delays, and greatly reducing safety for workers on site. But being required to allow traffic through seemed a necessity based on current allowances.

Just putting this on paper already anticipated an exhausting task laced with public complaints. So WBHO were determined to uncover an alternate option that would challenge the status quo, and

streamline the project – all while producing a more favourable outcome for everyone.

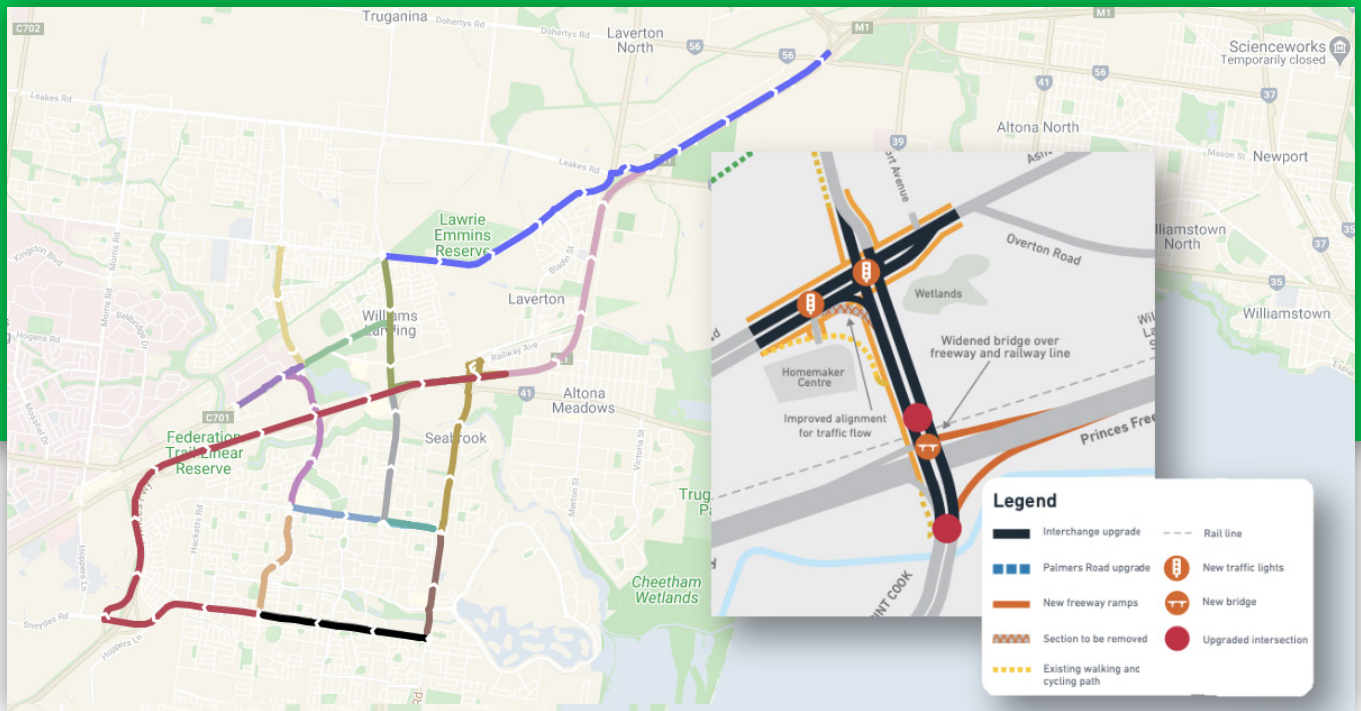
All indicators pointed to one best option. Instead of closing a single lane, they would close the full site and halve the expected project to just five weeks. There was a large caveat for this to be successful – WBHO was required to demonstrate an effective and workable detour plan, that minimised disruption to customers and diverted them to the best route/s, all while communicating this in real time to road users.

The solution

WBHO approached Mooven to help solve their traffic management and community messaging problems.

With the volume of traffic they were dealing with, and the knowledge that moving that traffic to a detour would cause significant congestion, a solution was created where multiple detour routes were





developed. The plan then was to dynamically direct traffic down different routes depending on the driver location and the actual conditions being seen on these detours – thereby limiting any excessive impact that may occur.

This required not only real-time route monitoring, but the ability to automatically direct customers down the quickest detour as conditions changed throughout morning and evening peaks.

Laying the groundwork

To help prove the effectiveness of the detour plan and ensure there were no issues in running the boards, Mooven set up 17 baseline routes. This would monitor the current site, potential detours, and the surrounding network.

With no monitoring hardware needed, this process costs a fraction of comparable, hardware-based solutions and allowed for a rapid launch and for WBHO to iterate and improve the design. All 17 routes were set up and being monitored within two hours of the order to proceed.

Showing clear and concise results summarised through the Mooven dashboard, WBHO and Mooven then worked with the Department of Transportation to define the rules for detour recommendations. These rules were based on the journey times and delays monitored through the routes. All of this information was at their fingertips through the Mooven dashboard.

With a full route design in place and a VMS integration created through Mooven's Application Programming Interface (API), WBHO presented their case to Major Road Projects Victoria and were approved for a full site closure. With many team members having been already exposed to Mooven's process and results, they were quick to understand and have confidence with the information presented.

Outcomes delivered

Once the six boards went live, it was easy to see the positive impact on community and project. Four boards displayed dynamic detour messages and two displayed total trip times.

WBHO Traffic Engineer, Dieter Burkhardt, said, "We didn't receive any complaints for the duration of the work. Drivers quickly adapted and used the alternate roads.

"Being able to close the ramp greatly improved the outcome of the project. Without Mooven this would have been very difficult to get across the line. We couldn't be happier with the execution of the project."

With a full site closure, drivers informed, and the power to continuously monitor for any further disruption of incidents on the network, WBHO swiftly executed their work.

The work resulted in:

- A 50 per cent reduction in total project time, from ten weeks to five weeks
- Zero complaints
- Improved site safety
- Delivered within budget

As the project continued, having visibility over the network in real-time proved invaluable as they worked on the ground. While shared access gave great transparency and accountability. There was also an added level of comfort provided from the automatic alert system.

Bringing in Mooven afforded WBHO many capabilities that were previously unavailable. Through a unified central platform the company can monitor all of its roads and ensure the smooth execution of a road plan.

Jacobs plans with queue monitoring insights

While Mooven's traffic management technology is crucial to the efficient delivery of major road projects, it can also provide insights across a range of locations.

Jacobs in Hobart has been utilising Mooven across a number of sites – baselining traffic behaviour and validating other observations. In turn, this informs traffic modelling and planning, feeding into the capital and project strategy to deliver more effective road assets and economic benefit to the Tasmanian community.

The challenge

Getting stuck in traffic queues is one of the more frustrating aspects of driving in any urban or rural area. Queues caused by traffic peaks, road works, special events, or incidents all cause disruption leading to frustration, unforeseen delays, and complaints.

But monitoring queues – where and when they occur, how long the queue is, and the type of delay that drivers may suffer – has always been surprisingly difficult and expensive. It has required multiple pieces of sophisticated digital equipment, a lot of expensive human observation, or both.

In addition, that equipment takes time to procure and set up, often delaying the start of projects and putting more workers in harm's way to install equipment on or near the road. It's even more difficult when the queue extends beyond the line-of-sight – behind buildings or parkland, around corners or over hills.

In reality, that complexity, delay and expense means that queueing and the issues queues cause are simply ignored at many project locations.

The solution

Mooven has solved a lot of these challenges, delivering a unique method of accurately viewing and reporting the behaviour of traffic queues. Most often, Mooven's queue method requires zero hardware installed thus no workers on foot. Queue sites can be set up online and be monitored in minutes. Compared to hardware-based or people-based solutions, Mooven is fast, easy and very economical to use.

By aligning the queue behaviour with traffic journey-time and delays, communications strategies using VMS boards can inform drivers in real-time of expected conditions (such as their expected journey), which reduces frustration and complaints. With

proper planning, alternate routes and travel times can be communicated to drivers, enabling them to make their own decision on the best way forward.

The case: Jacobs

Recently, Jacobs in Hobart has been utilising Mooven across a number of sites – baselining traffic behaviour and validating other observations. In turn, this informs traffic modelling and planning, feeding into the capital and project strategy to deliver more effective road assets and economic benefit to the Tasmanian community.

The most complex challenge was to accurately measure morning peak queueing behaviour at a roundabout in Hobart that was experiencing extensive peak hour queueing.

Mathew Brooks, Senior Associate Transport Engineer with Jacobs' Hobart office, said, "The Mooven queue monitoring was very flexible. Mooven worked with us to set up a tailored monitoring and reporting solution to measure queues up to 2km from the approach.

"We were also pleased that the Mooven data correlated very well with drive-through tests and other manual observations.

"We also gained access to the detailed queueing data and detailed traffic behaviours for input into other planning processes and solutions. This gave us the confidence to use the Mooven queueing data as a key component within our traffic planning process."

Mooven provided assistance with:

- Traffic modelling and planning insights to improve access from suburbs to Hobart CBD
- Monitoring queue length and journey time impact approaching a major roundabout at morning peaks
- Measuring queues up to 2kms from the roundabout
- The short project window placed challenges on installing and enabling hardware

Outcomes Delivered

- Accurate and detailed queue insights
- Improved Site Safety: Zero workers on foot to set up and continually execute queue monitoring
- Project up and running in under half a day from confirmed order

Bringing in Mooven allowed Jacobs to confidently make decisions based on data and key insights as part of their project traffic planning.

Wellington Water delivers difficult infrastructure

Insights from Mooven also allow for the execution of technically challenging but critical utility infrastructure, such as Wellington Water's pump stations and water main renewal projects.

Wellington Water's role is to manage the drinking water, wastewater and stormwater services within the Wellington regions. They represent the largest body of expertise in water infrastructure services management in New Zealand, outside of Auckland.

GHD is one of the world's leading professional services companies operating in the global market sectors of water, energy and resources, environment, property and buildings, and transportation.

Managing the complexities and limitations of Wellington's water system requires an extensive tool belt to avoid significant disruptions to the community on what is often a narrow yet well-balanced network. As such, Wellington Water is constantly searching for innovative approaches to solving problems.

GHD's Craig Brown and Callum Alison incorporated Mooven into the delivery of Wellington Water projects to provide the ability to monitor its impact on the network during projects and develop strategies to minimise that impact.

Two recent projects are building the Dixon Street pump station and the Box Hill and Burma Road water-main renewal.

Dixon Street Pump Station

The Dixon Street Pump Station is the first to be constructed in Central Wellington in over 40 years. This allows Wellington Water to provide wastewater services to a growing population, and relieves pressure on other pump stations around the city, reducing the chance of overflows into the harbour.

Given the lack of space, the central location presented a significant challenge, requiring an innovative approach that would work within the space constraints, while still delivering all the services required.

Understanding a busy CBD location

Mooven's platform allowed GHD to monitor a full network of routes and roads – giving a bird's-eye view of activity around the worksite, as well as the flow-on effects to the surrounding network, in real time.

Pre-construction monitoring was implemented to help Wellington Water, GHD and Brian Perry (the lead contractor) inform their construction plans and determine the risk of various closure and layout options.

Implementing Mooven gave GHD the assurance that if any issue occurred, they'd be quickly alerted when a KPI was breached, and have the capacity to rapidly respond.

GHD's Water Lead, Callum Allison, said, "The biggest thing for me is the reassurance. I felt more confident in our position by being able to see that there weren't really any traffic peaks to worry about.

"If anything did happen, then we had somewhere to start from and show evidence that we were front footing the issue and using real-time data to try and plan things in advance."

Responding to traffic concerns

As the project continued, Wellington Water and GHD were asked to pause construction due to concerns raised over traffic impacts around the worksite.

However, due to GHD's preparation, Mooven was able to quickly demonstrate the actual impact on journey times so work could start again. Comparing journey times pre and during construction provided a clear evidence base for responding to perceived issues.

Proving there was only a slight increase in delay, the work started back up. From there, both Wellington City Council and the delivery team (WWL, GHD and Brian Perry) had access to the same body of information – meaning full visibility and transparency during the works.

Being such a high profile job, this also gave the team an arsenal of information to respond to the media if any concerns were to arise.

Achieved results

The use of Mooven's software enabled Wellington Water and GHD to have a complete understanding of traffic conditions around the immediate works site and the surrounding area. Having this information on hand facilitated conversations with project stakeholders and freed up more time to deliver the works.

Proactive notifications were also enabled for the contract to provide situational awareness of any potential incidents.

Project Engineer at GHD, Mike Syred, said, "Working in what is sometimes an extremely constrained environment means it's inevitable we'll impact the surrounding network.

"Having full visibility in what that impact is, and being able to create strategies around this has proven to be invaluable to us and the community."

The project went on to win the IPWEA New Zealand Excellence Award 2019, for the best public works project (under \$5 million) due to the innovative construction methodology deployed to address the tight physical space.

Box Hill and Burma Road

Project two was a water main upgrade in a high profile area of Wellington, that serves as the backup route for the main state highway. The project involved laying over 1100m of water piping through Box Hill.

Pre-works to repair pot-holes in the area led to a flurry of complaints from residents. The location works would be occurring as a main thoroughfare and provided the primary access to three different schools.

As construction began traffic monitoring was extended onto a range of side and backstreet that could potentially be impacted. This proved invaluable as it highlighted that while traffic on Burma and Box Roads was flowing, the traffic management setup was causing greater than anticipated delays on some side roads.

With clear visibility of the location and extent of the impacts, Wellington Water pivoted their strategy.

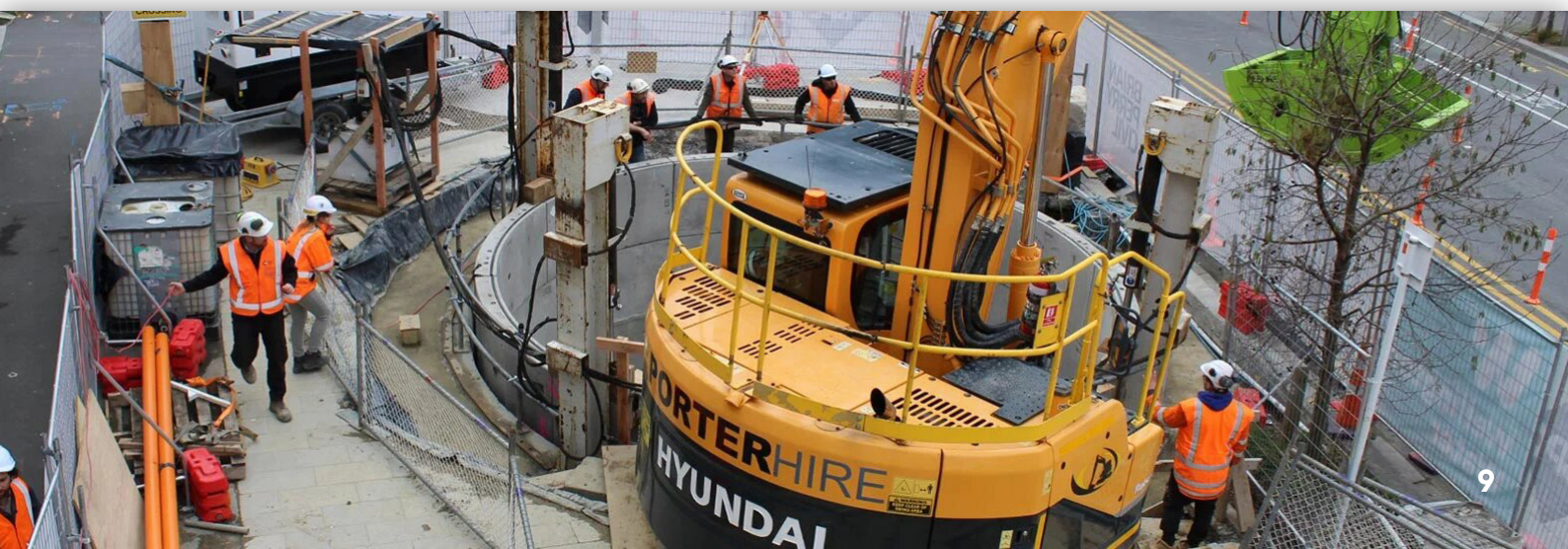
A revised traffic management strategy was implemented to address delays on side roads. As the area was being continuously monitored, it was possible to watch the results come in and confirm that their revised strategy was working.

Unlocking productivity gains

As conditions stabilised, it became clear that the working window could be extended without an adverse impact on motorists in the area. A small gain in available hours has a disproportionate impact on delivery due to the sunk cost of setting up the worksite and opening trenches each day.

This strategy allowed Wellington Water to lay up to an extra 10m of pipe per day, not only providing productivity gains but also a victory for the community as works could move more quickly down the road resulting in less disruption.

In both occasions, it was the extensive visibility of the network, an evidence-based approach to monitoring, and the ability to test strategies and rapidly respond that helped Wellington Water execute so successfully.



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