SMART AND EFFECTIVE TRAFFIC DISRUPTION MINIMISATION - WALMSLEY ROAD CLOSURE

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Abstract

Following the devasting January 2023 Anniversary weekend floods followed quickly by Cyclone Gabriel, Auckland Council's Healthy Waters 'Making Space for Water' programme included the Te Ararata project in Māngere, South Auckland. This includes the replacement of the Walmsley Road bridge to achieve greater flow capacity and reduce blockage risk beneath Walsmley Road and within the Te Ararata Creek. Walmsley Road (which is a key arterial road in South Auckland carrying 17,500 vehicles/day) was closed for approximately seven months.

Working in partnership with Auckland Transport (AT), New Zealand Transport Agency (NZTA) and Auckland Airport, the Healthy Waters delivery team (Auckland Council, HEB, Tonkin+Taylor and Mooven) prepared a Disruption Minimisation Plan (DMP). The DMP is an invaluable tool to smartly monitor and manage any disruption effects of detoured traffic within a large area of South Auckland's State Highway and AT's roading network. Its delivery is being managed and monitored by a cross-functional squad of SMEs from the afore-mentioned organisations, working together collaboratively to deliver rapid response to any situations arising on the roading corridor.

This presentation will provide details of how the DMP was developed, outlining roles and agreements as part of a Working Group set up with AT, NZTA and Auckland Airport and use of modelling to decide on the monitoring area. We will also present findings from our extensive communications with stakeholders (through workshops and meetings), community engagement (through meetings, social media and letter drops), and road users (through a website and static and Variable Message Signs) in the lead up to, and during, the closure. We will also outline the development and findings from our real-time Mooven monitoring model including development of vehicle and bus journey time/delay/queue KPI's and incident flags and also how we developed and implemented temporary traffic management measures to manage issues identified by the monitoring of detour routes. Finally, we will present lessons learnt from the DMP which could be applied to future infrastructure projects involving road closures.

Author Contribution Statement

Colin Shields from Tonkin & Taylor (T+T) was the Healthy Waters Transport Lead for the project. Anna Gallaher from T+T provided support on all aspects of the project. Aqil Imam was the Auckland Transport (AT) lead. The success of the Disruption Minimisation Plan could not have been achieved without the hard work, dedication and close working partnership between Auckland Council Healthy Waters, AT, NZTA, Auckland Airport, HEB, Tonkin & Taylor and Mooven.

1. Walmsley Road closure overview and project objectives

1.1. Background

As shown in Figure 1 (below) Walmsley Road is a key arterial route in South Auckland, carrying 17,500 vehicles/day with large numbers of freight traffic and extensive peak period congestion. Walmsley Road is adjacent to SH20 and SH20A, Māngere residential and town centre, the Airport and various industrial and warehousing estates.

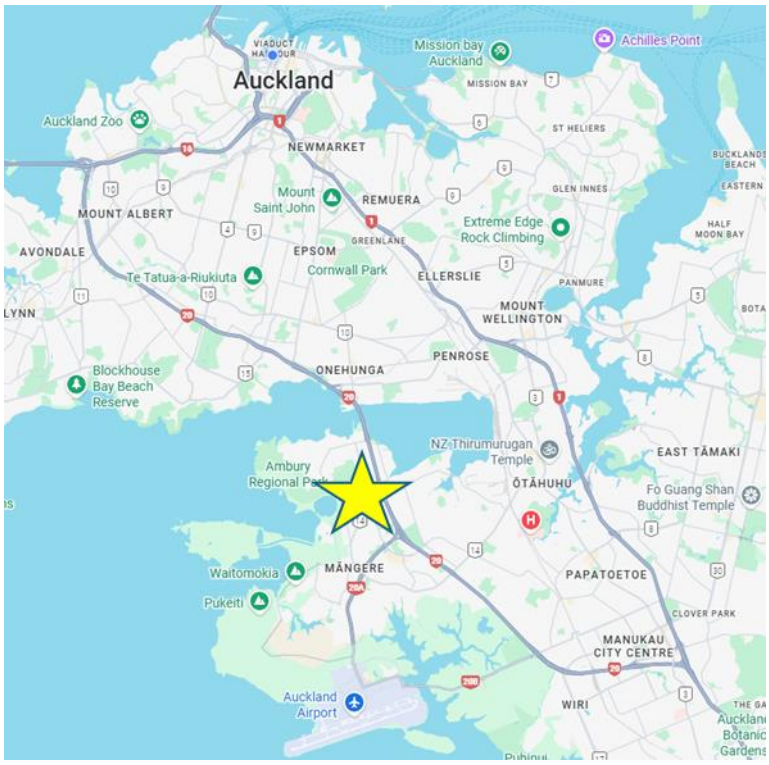

Figure 1: Location Plan

Following the devasting January 2023 Auckland Anniversary weekend floods followed quickly by Cyclone Gabriel, the Auckland Council 'Healthy Waters, Making Space for Water' project was initiated. This accelerated programme fast tracked flood resilience projects across Auckland, bringing together infrastructure upgrades, community support, advanced tools and smarter planning to better manage stormwater. This paper will focus on the work conducted in Māngere, South Auckland, an area that was identified as one of the worst hit by the severe weather events as shown in Figure 2 (below):

‘Don’t waste a good crisis’: Māngere offered hope after disaster

Mary Afemata, Local Democracy Reporter

April 12, 2025 ·08:21am Share

Floods devastated parts of Māngere during the anniversary floods of 2023. More than 160 homes in Māngere were deemed fully or partially unliveable following the floods.

Figure 2: News article following the start of work on the Making Space for Water programme

The Te Ararata Creek Flood Resilience Project involved the replacement of a culvert and realignment of Te Ararata Creek to make the stormwater network more resilient and increase stormwater capacity, building a safer and more resilient community. This work required the demolition of the existing Walmsley Road bridge and construction of a new bridge.

The project will reduce potential flood levels for 250 properties including 38 properties with intolerable risk of life and 100 properties with floor level flooding. It will also reduce flood risks caused by blockages for up to 1000 properties.

1.2. Alternative options to the temporary bridge closure

Several options for construction of the project were considered, including:

- Option 1 – Construction of a temporary bridge south of the existing bridge - rejected primarily due to land acquisition required.
- Option 2 – Construction of a temporary bridge to the north with the option of either a) two-way road or b) a one-way road eastbound. Rejected due to:
    - Increased project construction period of 18 to 24 months (compared to seven months with temporary closure option). This would impact on the Central Government funding window which required the projects to be completed by 1 July 2026.
    - A longer construction period would increase the impact on the community and leave flood-prone areas at risk for a longer period.
    - Increased costs compared to the temporary closure option, exceeding budget allocation.

  - High level economic assessment indicated that travel time costs for the temporary bridge were up to three times greater than a temporary closure.
- Option 3 - A seven month closure of Walmsley Road Bridge.

Option 3 was the preferred option given that the construction works would be delivered faster and therefore reducing the time the community remained at risk of intolerable flood risk. The project would ultimately also be delivered at a significantly lower cost and within the Central Government funding window.

While Option 3 was chosen, it did present its own set of challenges given the need to divert traffic onto detour routes. This needed to be safely and efficiently managed and this paper presents the work undertaken to achieve this through the development and implementation of a Disruption Minimisation Plan (DMP). Construction of the project is shown in Figure 3 below:

Figure 3: Project construction

2. Disruption Minimisation Plan (DMP) preparation

2.1. DMP key elements

Key elements of the DMP included:

- Stakeholder communications – A Working Group was set up consisting of Auckland Council Healthy Waters, HEB, T+T, AT, NZTA/Auckland System Management (ASM) and Auckland Airport.
- Communications Strategy - A clear and actionable strategy was developed, including roles and responsibilities, incident response strategy, works coordination with other planned works, signage and complaint escalation systems.

- Monitoring Strategy – A baseline pre closure scenario was developed (for all traffic, freight and buses), Mooven (an AI-powered technology business specialising in the monitoring and management of disruption around infrastructure delivery), was used along with drone surveys and SCATS and CCTV data.
- Risk workshops were held with the Working Group to help identify the key risks.
- Workshops were held with the Working Group to develop contingency plans for incidents on the signed detour routes.
- Mitigation - pre closure and contingency mitigation measures were identified and protocols for Traffic Resolutions, Safe System Audits, Corridor Access Requests and Traffic Management Plan (TMP) approvals were established.
- Emergency Action Plan – Development and modelling of emergency scenarios and procedures.
- Key Performance Indicators (KPI's) a number of KPI's were developed to assist with interpreting the monitoring findings and measuring direct construction impacts including:
    - Journey time KPIs of 7 minutes and 10 minutes were implemented for impacted intersections and on specific routes, compared to the baseline situation, to manage additional journey time impacts for motorists.
    - Queue length KPI's included specific motorway off-ramp queue KPIs to ensure construction activity didn't cause blocking back onto the mainline that would create safety hazard and impact motorway journey times.
    - Public transport performance KPIs included measuring bus delays versus schedule timings within the monitoring area, removing delays that were present when the bus approached the monitoring area, as well as additional journey times as the result of detour routes.
- Reporting – Weekly and monthly monitoring reports, as well as daily check ins and co-location of staff at the start of the closure. A RAID (Risks, Assumptions, Issues and Dependencies) register was also used to log and monitor all of the various Working Group actions. This was discussed at the regular Working Group meetings both before and during the closure.

2.2. Pre-closure modelling

In the absence of an available strategic transport model, manual modelling was undertaken by T+T to define the proposed detour routes (including for light vehicles, heavy vehicles and for buses) and the anticipated wider roading network to monitor during the closure. AT also commissioned a bespoke Aimsun transport model and the results of this model correlated very closely to the manual modelling assessments. Based on this, the DMP monitoring area was defined as shown in Figure 4 and also baselined the expected disruption that was to be managed.

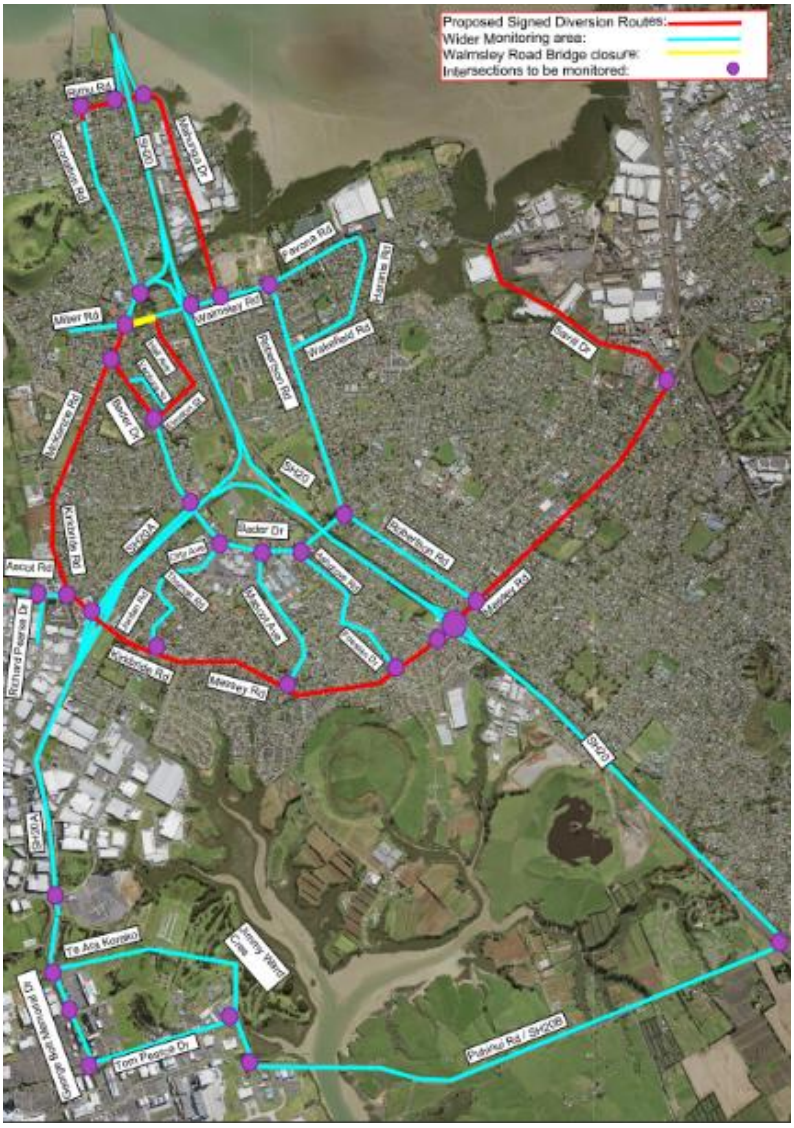

Figure 4: Monitoring area

2.3. Mitigations implemented before the closure

A number of temporary measures were implemented prior to the bridge closure to safely and efficiently manage the predicted amount of detoured traffic including, but not limited to:

- Changes to affected intersections including implementation of temporary new traffic signals and roundabouts.
- Parking and heavy vehicle traffic access restrictions to improve traffic flow.
- Traffic calming (through the use of speed cushions) and speed reductions in residential areas.
- New bus routing and bus stops.
- Additional CCTV cameras.
- Static and mobile Variable Message Signs (VMS) to inform drivers of the signed detour routes and of the closure taking place.

A number of additional contingency measures (including traffic signal timings, revised intersection layouts and additional traffic calming and parking controls) were also identified which would enable the rapid implementation of these additional measures if required.

2.4. Communications Strategy

Extensive stakeholder, community and resident communication channels were established at the outset of the project which included:

- Healthy Waters and AT websites, where the public could complete a pulse survey to report any issues with transport or disruption impacts.
- Ongoing stakeholder consultation including Māngere-Ōtāhuhu Local Board, Iwi, utility and infrastructure providers, faith and community leaders, schools, town centre groups, freight groups and resident associations.
- Ongoing local residents consultation including letter drops/fliers and community meetings covering 32,000 properties.
- Media (radio and press) campaign advising of the road closure and signed detour routes.
- Airport comms team providing information to airport visitors and nearby businesses.
- Social media campaigns.
- Communication to public transport users including:
  - Targeted app notification to bus users of affected routes with notifications at four weeks, two weeks and three days before the closure.
  - Service alerts targeting impacted bus routes and stops.
  - Service announcement on AT website.
  - Signs in bus shelters four weeks before the closure advising passengers that their bus will be detoured.
  - Wayfinding signs in/near closed bus stops directing passengers to alternative stops (with a map).

3. Smart monitoring and implementation of additional mitigation measures

3.1. Background

The closure of Walmsley Road bridge took place on Saturday 4 October 2025. Monitoring was undertaken by the Working Group to understand the impact of displaced traffic in terms of travel times, delays, congestion, queues, safety, freight, buses and active modes through a combination of measures including:

- Live traffic data from floating vehicle providers (Google and TomTom) to analyse traffic flows, congestion and travel times within Mooven.
- Live public transport performance to analyse bus schedule adherence and delays.
- Traffic volumes via SCATS, NZTA telemetry sites and historical traffic surveys.
- CCTV.
- Drone surveys.
- On site observations.
- Weather conditions and events (eg traffic incidents, closures, weather events and cultural events like concerts and sports games) to validate unexpected changes in transport performance.
- Pulse survey and public feedback.

3.2. Mooven monitoring

In the six months prior to the Walmsley Road bridge closure, typical weekday journeys were monitored, and a baseline journey time was captured across the network. This baseline enabled the Working Group to establish a comparison post closure and identify and react to delays above the baseline.

Figure 5 (below) shows the Mooven operations hub, which gives the overall real-time journey time comparison against the average of the previous four weeks. This was invaluable to provide an initial snapshot of what was happening on the network post closure as it removed normal, expected congestion patterns to provide visibility of where and when the network was performing worse than normal.

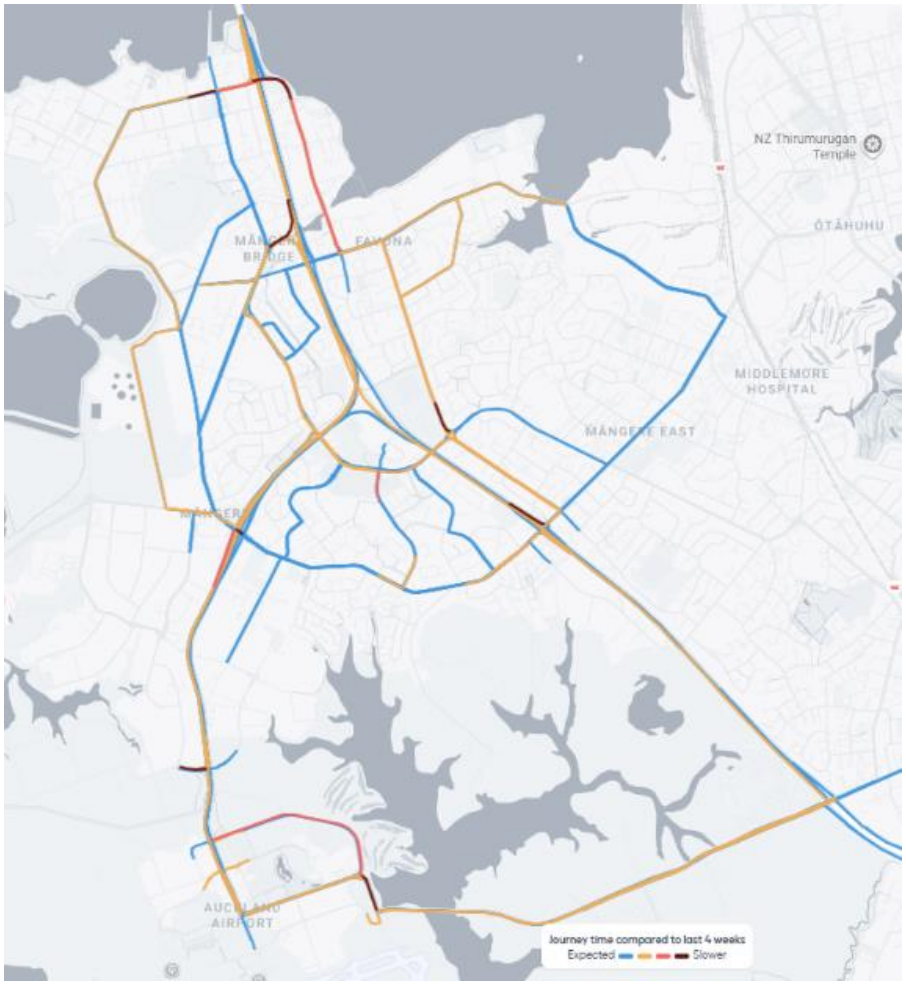

Figure 5: Mooven Operations Hub

Mooven site impact monitoring (see Figure 6 below) enabled investigation of individual routes, intersections, bus routes etc, compared to the baseline to identify additional journey times and delays over 24 hours, a week or a month and was customised to show any day range within the monitoring period. The Working Group also was able to define additional comparison periods to quickly review delays against the pre-construction baseline versus specific stages of the project.

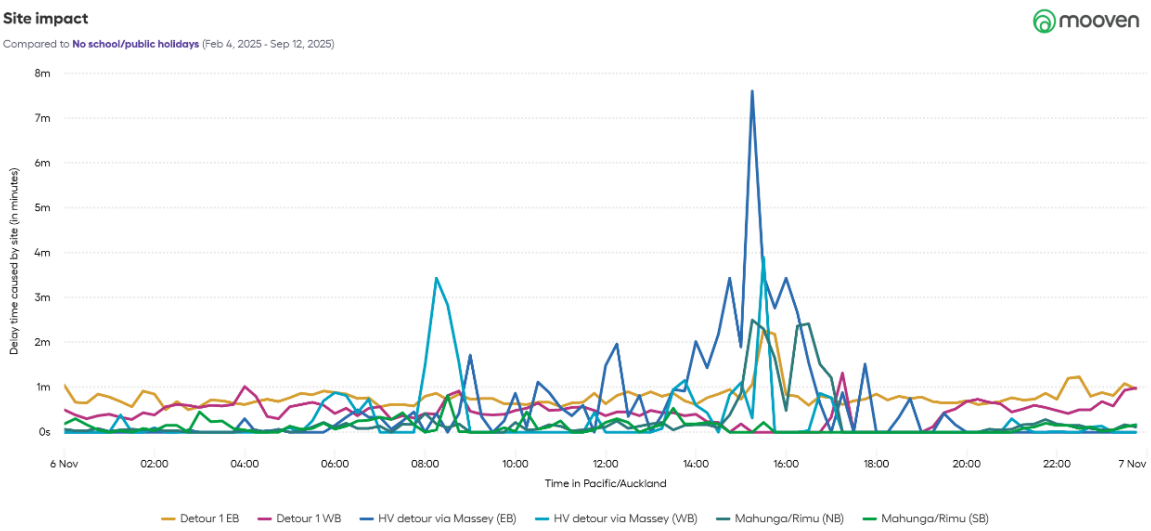

Figure 6: Mooven Site Impact

Mooven scorecards were prepared which provided a weekly and monthly birds eye review of the project disruption management performance, as shown in Figure 7 below.

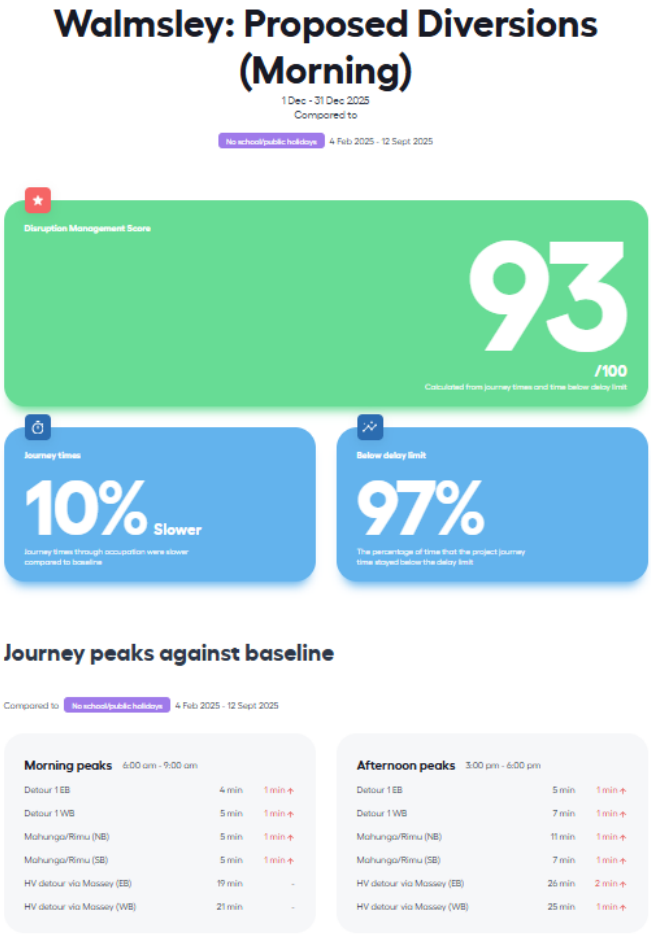

Figure 7: Mooven Scorecard

The disruption score provided a weighted, single metric that incorporated how often journey times were slower than pre-construction and how often delay KPI's were exceeded. This was accompanied by an overview of morning and afternoon peak performance, by key corridor so the Working Group could quickly identify issue areas.

3.3. SCATS and CCTV monitoring

A key success factor for the project was the initial co-location of the Working Group within Auckland Transport's Operation Centre (see Figure 8 below) where the team were able to utilise the Mooven monitoring supplemented by real time SCATS (signal timings and traffic flows) and CCTV data (to enable observation of conditions and issues).

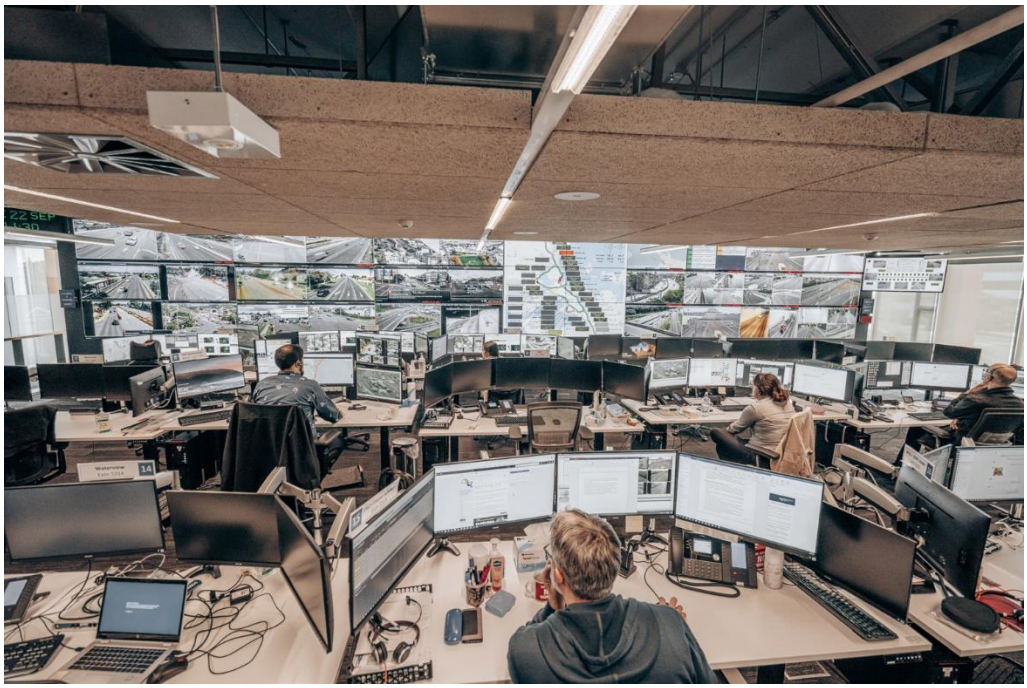

Figure 8: AT Operation Centre

This proved invaluable to understand in greater detail any issues raised by Mooven and also to assist in rapid implementation of mitigation measures. Types of issues observed included queues on the state highway and local road networks, delays through intersections and freight traffic not using signed detour routes and unsafe driver behaviours.

3.4. Drone surveys

Drone surveys were carried out prior to, and during the closure to show the extents of any queues that developed during the morning and evening peak periods (see Figure 9, below). This provided valuable information on traffic conditions in locations with no or limited CCTV coverage.

Figure 9: Drone survey

3.5. Stakeholder and public feedback

The project was developed in close collaboration with the local community and during construction community engagement was maintained through residents, schools and whānau joining site visits, workshops and BBQs to learn about flood resilience and environmental protection. On going communications were also key during the closure with feedback being used to help inform decisions on any required additional mitigation measures. Members of the public and stakeholders raised issues through the Healthy Waters and AT communication channels (as identified in section 2.4). Within the first four months of the closure circa 70 comments were received with positive feedback including:

- *"Traffic coping better than expected".*
- *"Good communication and signage".*
- *"Works for flood resilience appreciated"*.

Key concerns (which the Working Group used to inform additional mitigation measures) included:

- *"Increased congestion".*
- *"Increased freight traffic".*
- *"Too many speed humps"* – although there were mixed comments praising in terms of slowing vehicle speeds but negative comments about the speed cushions increasing delays.
- *"Illegal manoeuvres by vehicles".*
- *"Safety of pedestrians"*.

3.6. Mitigation measures implemented during the bridge closure

Based on the concerns raised by the public, combined with the findings from the smart monitoring, additional mitigation measures were rapidly implemented by the Working Group to address issues as they arose. Examples included:

- Signal timing changes – based on CCTV observations and complaints received, signal timings were optimised at a number of signal intersections where traffic flows had changed.

- Additional signage and communications - in the first two weeks of the closure an issue arose with freight traffic using one of the detour routes which was signed for light vehicles only. This route was a residential street and was not suitable for the large number of trucks. Through employing CCTV analytics with a combination of measures such as additional signs (both static and VMS) and detailed communications with the freight associations and operators, these breaches were quantified, truck drivers were made aware of the signed detour route for freight traffic and the problem was resolved..
- Additional traffic calming on the signed light vehicle route – based on complaints received and observations of driver behaviour to try and avoid some of the speed cushions, additional speed cushions were installed to ensure drivers undertook safe manoeuvres.
- Changes to road layouts – based on site observations, the conspicuity of a temporary roundabout was not very clear and additional road markings were quickly implemented, resulting in safer driver behaviour.
- Illegal manoeuvres – at one location complaints were received that drivers were carrying out illegal U turns. Additional signage to reinforce the no u turn and additional hit sticks were installed.
- Vibration - at one location residents complained about vibration from vehicles passing over a pair of speed cushions, and this pair was removed following an investigation of the root cause.

3.7. DMP Reporting

Weekly and monthly reports were prepared which covered:

- Issues occurring during the week and action taken.
- Mooven monitoring results including KPI alerts, site impact (i.e. comparison with the baseline), bus journey times, incidents and an overall Mooven scorecard assessment.
- Traffic flow changes including freight volumes.
- Drone monitoring results.
- Any specific complaints received, results from the pulse survey and actions taken.

The RAID (Risks, Assumptions, Issues and Dependencies) register proved an effective mechanism to ensure the various actions were captured and that these actions were implemented.

4. Overall findings, lessons learnt and recommendations

Major infrastructure works on critical urban corridors are often assumed to require prolonged disruption and community dissatisfaction. The seven month closure of Walmsley Road in Māngere, Auckland, challenged this assumption. This paper has demonstrated how working in partnership, a comprehensive Disruption Minimisation Plan combining early and sustained community and stakeholder engagement with rich, real-time transport data, enabled a materially different project outcome. Rather than relying on static modelling and reactive mitigation, a collaborative Working Group was set up and a single source of truth using live traffic, freight, public transport and incident data. This approach allowed rapid identification of emerging issues, timely implementation of targeted mitigations, and transparent communication with affected communities and stakeholders. The result was a significant reduction in anticipated congestion impacts, maintained public transport reliability, rapid resolution of issues as they arose and strong community support for a full road closure that enabled faster construction and reduced flood risk. The project demonstrates that with the right planning, partnership working, live data and proactive engagement, major works such as

this project which delivers a stronger and safer future for the Māngere community, can be delivered more efficiently while retaining public trust and support.

Although initially there were issues with freight traffic using the signed light vehicle detour route and resident complaints about some of the traffic calming, these issues were quickly resolved. Likewise initially there were some issues with signal timings at some intersections but again these were quickly optimised. This project has demonstrated that road closure doesn't have to result in traffic disaster. Overall (and using the overall conference theme of), "*by working with what we have",* by working collaboratively, we successfully, safely and efficiently managed additional traffic on detour routes with the closure of Walmsley Road bridge and provided "*resilience for the future".*

In terms of what went well, key lessons learnt for future projects included:

- The need for early planning to minimise disruption, with the DMP being a key planning tool. The response plan was ready early and implemented effectively.
- Partnership working – this is essential to ensure that the project team and the road controlling authorities are working together with a common aim and goal.
- Early and ongoing involvement of the Community achieved buy in to the option of closing Walmsley Road (primarily due to the much shorter construction period compared to building a temporary bridge) and involving the community in events during the project construction.
- Two way communications with stakeholders and the public was very important both prior to and during closure.
- Monitoring and having one source of truth which, on this project, was a combination of Mooven, SCATS data, CCTV and drone surveys used by the Working Group to make confident, data-driven decisions quickly and effectively.
- Signing - Both static and VMS was essential to provide drivers with key messages.
- Agile and flexible mitigation measures were implemented quickly with the necessary delivery processes on the whole assisted by speedy approvals.
- Operational delivery – the AT RAID register kept all tasks tracked and up to date.

Issues that didn't go so well and are key learnings to inform future projects included:

- Initial messaging/maps for heavy-vehicle detours did not filter down to drivers quickly enough, creating issues on the signed light vehicle route. Greater earlier engagement with clearer maps and comms would have prevented this.
- Truck drivers were guided by Google maps which advised truck drivers to use the signed light vehicle detour route (since this was the shortest and fastest route within Google maps). Unfortunately, AT were not able to influence Google maps and the weightings applied to routes when roads are closed to avoid traffic using unsuitable routes. For future projects, early engagement with Google maps would be recommended.
- For this project it was not possible to have a direct link between Mooven and AT SCATS traffic flow data. This would have been useful to provide real time traffic flows in addition to journey time and delays and it is recommended that this is set up for future projects.