OPEN PLAN

CASE STUDY

Smart traffic tools driving East Coast recovery

Large cyclone recovery programme requiring support and tools to help right-size the construction approach and reduce traffic delays

A high level of traffic coordination was necessary, with over 450* planned recovery projects spread across 863km of state highway

Creation of three innovative tools to streamline and automate the prediction and monitoring of delays on the transport network

March 2025

The challenge

In February 2023, Cyclone Gabrielle caused significant damage to large sections of road and rail across the Te Matau a Māui Hawkes Bay and Te Tairāwhiti Gisborne regions. In response, the Transport Rebuild East Coast (TREC) Alliance was quickly formed – with three main contractors working in partnership with NZ Transport Agency Waka Kotahi (NZTA) and KiwiRail to keep traffic moving around the east coast.

Open Plan were brought in to form the Network Operations Team, to monitor and predict traffic delays on state highways during the delivery of the $634M recovery programme.

The team worked with TREC journey managers to set clear targets for acceptable levels of vehicle movement through construction works. Open Plan monitored traffic volumes and flows throughout the works to make sure these levels were being met, as well as carrying out in-depth predictions around the impact different construction methods would have on traffic. These insights were crucial in right-sizing construction approaches to keep people and freight moving.

With over 863km of road to cover across the two regions, and over 450* recovery projects, this was a huge logistical challenge. To top it off, the state highways recovery programme had to be coordinated around third-party works (e.g., local council works, maintenance and operations and speed and infrastructure work). These challenges left the team with two options; hire more people to help with traffic planning – or innovate!

**Not including other projects happening at the same time – like resilience, maintenance and operations.*

PROGRAMME OF WORKS COVERING

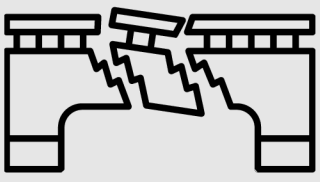
863km

OF STATE HIGHWAY

AN ALLIANCE DELIVERING

460

RECOVERY PROJECTS



THE DEVELOPMENT OF

3

INNOVATIVE TRAFFIC TOOLS TO STREAMLINE DECISION-MAKING

Streamlining traffic monitoring and predictions with new tools

Open Plan added significant value through the creation of three innovative tools to speed up the manual work of predicting and monitoring delays, by automating parts of the process. This includes the:

Delay Prediction Tool

This tool uses NZTA's Traffic Management System traffic volume data to show how many cars might be on the road at specific times (e.g., school pick-up, weekends, holidays etc). The tool uses this information together with information about the planned work, to predict delays, queue lengths, traffic volumes, and expected travel times. The tool can automatically produce a spreadsheet for any traffic monitoring site in New Zealand to show these predictions – for one worksite, or along a road with many worksites.
The delay prediction tool is used to help plan construction work to smooth delays over time, avoiding periods of long delays followed by times with little or no disruption. It also aids in communicating journey times and delays to the public.

Delay Monitoring Tool

This tool measures how long it takes to travel on different roads every week. It uses data from TomTom (like the GPS in cars) to see how travel times change at different times of the day and on different roads. This tool can also compare the current travel times to how long the same trip used to take in the past, pre-cyclone, generating a weekly report of all this information automatically. So, if you want to know if traffic is getting better or worse on a particular road or at a certain time, this tool can help you find out.
The tool is used together with the Delay Prediction Tool to monitor actual delays on the network against what was predicted. This ensures that the network is operating efficiently, and that planned work is impacting the network as expected.

Prototype Live Delay Monitoring Tool

This tool uses TomTom data to monitor the performance of the network in real-time, providing alerts if delays reach a certain threshold.

The above tools helped the Open Plan team to provide advice to TREC teams and facilitate efficient and effective decision-making around their construction approach and traffic management set-up. For example, the tools enabled decisiveness around the best traffic management approach for long weekends and regional events, based on historic traffic data and the current number of worksites. Findings from the tools were pulled into simple graphics that could be sent around teams within TREC. The Communications and Engagement team, for example, used figures from the tool to help with community and stakeholder engagement, to keep everyone informed of expected travel times.

With such a large network to cover, these tools have resulted in some big time and cost savings for TREC, as well as a significant reduction in delays for people travelling around the east coast.

Summary traffic flow report

TTM Location:	
Length of Single Lane Section (m):	1000
Speed Limit (km/h)	80
TTM Speed (km/h)	30
Proposed Month of Works	July
Select Analysis Period	Weekday
Growth Factor	1
Report Based on Telemetry Site*:	
Report Prepared by:	

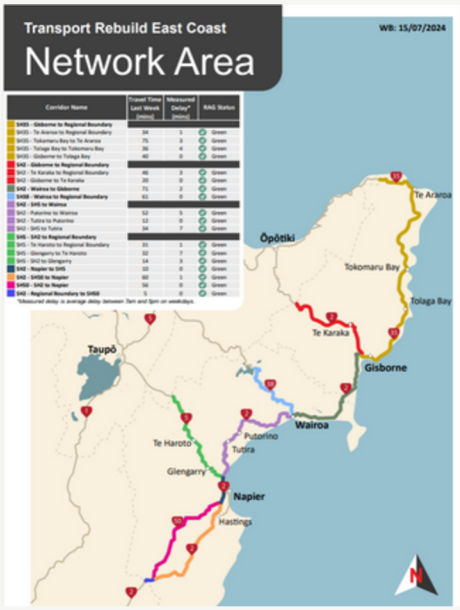
Applies to Stop Go and Stop Stop Analysis sheets — Min allowable cycles: 6
Applies to Stop Go and Stop Stop Analysis sheets — May need to reduce for sites >2000m
Applies to Stop Go and Stop Stop Analysis sheets
Applies to the Daily Traffic Profiles, Stop Go and Stop Stop Analysis sheets
Applies to the Daily Traffic Profiles, Stop Go and Stop Stop Analysis sheets
Applies to Stop Go, Stop Stop, and Corridor delay planning sheets

AADT by Day of the Week	Volume	Peak Hour	Volume	PHF	% Heavy
Sunday	4657	15:00	474	0.98	7%
Monday	4307	14:45	330	0.99	20%
Tuesday	4058	14:45	321	0.99	23%
Wednesday	4087	15:45	328	0.93	23%
Thursday	4476	14:45	360	0.99	21%
Friday	5135	15:30	445	0.95	16%
Saturday	4090	11:15	362	0.96	9%

Dates with higher than usual volume**	
+ 10-20%	07/01, 08/01, 13/01, 17/01, 18/01, 21/01, 22/01, 24/01, 08/02, 09/02, 10/02, 13/02, 14/02, 15/02, 18/02, 20/02, 22/02, 02/03, 03/03, 08/03, 15/03, 20/04, 24/04, 27/04, 24/
+ 20-30%	04/01, 06/01, 09/01, 10/01, 11/01, 12/01, 19/01, 20/01, 23/01, 17/02, 10/03, 17/03, 21/04, 03/06, 25/10, 26/10, 21/12, 26/12
+ 30-40%	25/01, 27/01, 06/02, 19/04, 23/04, 23/12
+40-50%	01/01, 05/01, 26/01, 28/01, 18/04, 27/12, 29/12
+ 50% or more	02/01, 03/01, 05/02, 07/02, 22/04, 28/10, 24/12, 28/12, 30/12, 31/12

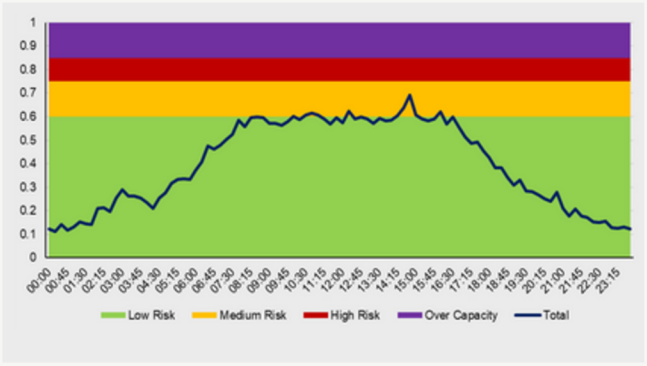
*figures should be used as a guide only as sites can have missing or erroneous data
**based on 2019 telemetry data with the following public holidays: 01/01, 02/01, 06/02, 19/04, 22/04, 25/04, 03/06, 25/10, 28/10, 25/12, 26/12

Weekly graphic circulated within TREC

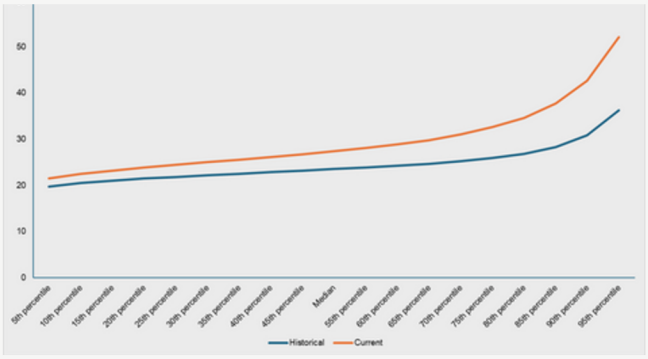


Maximum queue length

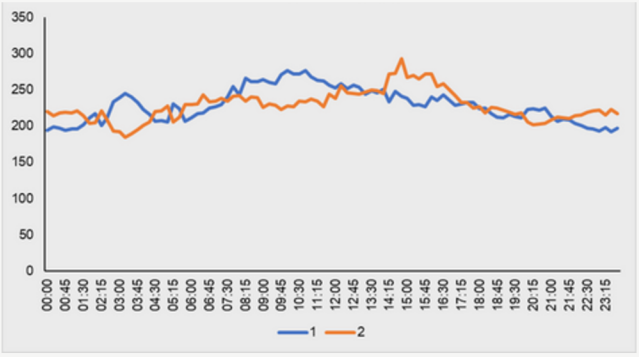
Degree of saturation



Current travel time against pre-cyclone baseline



Average delay(s)



Detailed table of corridor travel times by percentile across the day

Time	5th percentile	10th percentile	15th percentile	20th percentile	25th percentile	30th percentile	35th percentile	40th percentile	45th percentile	Median	55th percentile	60th percentile	65th percentile	70th percentile	75th percentile	80th percentile	85th percentile	90th percentile	95th percentile	Average	Sample Size	Coverage
0:00-1:00	4.43	4.43	4.43	4.53	4.72	4.72	4.92	4.92	5.02	5.05	5.05	5.13	5.13	5.20	5.40	5.40	5.70	5.70	6.70	5.02	12	100%
1:00-2:00	3.95	3.95	4.20	4.32	4.32	4.98	4.98	4.98	5.20	5.20	5.20	5.35	5.35	5.35	5.45	5.45	5.45	6.73	6.73	5.13	7	100%
2:00-3:00	4.47	4.47	4.58	4.58	4.58	4.67	4.67	4.70	4.75	4.78	4.78	4.92	4.93	4.93	5.20	5.20	5.20	5.45	5.45	4.87	7.2	100%
3:00-4:00	4.48	4.43	4.65	4.67	4.68	4.65	4.68	4.75	4.88	4.87	4.87	5.05	5.05	5.13	5.13	5.17	5.17	5.30	5.30	4.85	9.3	100%
4:00-5:00	4.48	4.52	4.65	4.70	4.78	4.82	4.97	5.00	5.08	5.08	5.08	5.13	5.13	5.18	5.20	5.30	5.32	5.37	5.48	5.00	9.9	100%
5:00-6:00	3.88	4.17	4.23	4.28	4.33	4.37	4.42	4.43	4.47	4.58	4.55	4.68	4.67	4.73	4.80	4.85	4.98	5.68	5.70	4.58	20.15	100%
6:00-7:00	4.15	4.36	4.48	4.45	4.48	4.53	4.57	4.60	4.63	4.67	4.68	4.72	4.75	4.80	4.88	4.97	5.07	5.17	5.28	4.68	62.2	100%
7:00-8:00	4.27	4.42	4.47	4.58	4.53	4.57	4.62	4.67	4.78	4.75	4.78	4.85	4.93	5.03	5.10	5.15	5.20	5.27	5.38	4.83	98.4	100%
8:00-9:00	4.36	4.43	4.58	4.53	4.57	4.62	4.63	4.67	4.78	4.75	4.80	4.87	4.95	5.02	5.10	5.17	5.27	5.48	5.68	4.87	131.4	100%
9:00-10:00	4.25	4.37	4.47	4.53	4.58	4.68	4.62	4.65	4.68	4.73	4.78	4.87	4.93	5.02	5.08	5.17	5.28	5.47	5.72	4.90	168.3	100%
10:00-11:00	4.36	4.48	4.47	4.52	4.57	4.62	4.65	4.67	4.73	4.75	4.80	4.85	4.92	5.00	5.10	5.20	5.35	5.53	5.88	4.88	140.2	100%
11:00-12:00	4.23	4.38	4.45	4.50	4.55	4.58	4.63	4.68	4.73	4.78	4.83	4.87	4.93	4.98	5.03	5.12	5.23	5.38	5.63	4.83	100.15	100%
12:00-13:00	4.43	4.52	4.58	4.62	4.67	4.73	4.78	4.83	4.92	4.97	5.02	5.07	5.12	5.17	5.25	5.38	5.52	5.68	6.07	5.07	137.1	100%
13:00-14:00	4.37	4.48	4.53	4.58	4.63	4.68	4.73	4.78	4.82	4.88	4.93	4.98	5.03	5.10	5.17	5.23	5.32	5.45	5.68	4.93	141.25	100%
14:00-15:00	4.38	4.47	4.53	4.60	4.63	4.68	4.73	4.78	4.83	4.88	4.95	4.98	5.03	5.08	5.13	5.20	5.28	5.48	5.87	4.97	151.6	100%
15:00-16:00	4.36	4.43	4.58	4.57	4.60	4.63	4.67	4.72	4.78	4.78	4.83	4.87	4.92	4.97	5.05	5.12	5.18	5.28	5.42	4.83	151.6	100%
16:00-17:00	4.26	4.36	4.48	4.47	4.58	4.53	4.58	4.63	4.67	4.78	4.73	4.77	4.86	4.87	4.93	5.00	5.18	5.23	5.42	4.77	168.65	100%
17:00-18:00	4.25	4.35	4.48	4.45	4.58	4.53	4.57	4.58	4.62	4.65	4.68	4.73	4.77	4.83	4.90	4.98	5.07	5.17	5.30	4.73	119.15	100%
18:00-19:00	4.23	4.33	4.42	4.47	4.53	4.58	4.62	4.65	4.78	4.75	4.80	4.87	4.93	5.00	5.08	5.15	5.20	5.30	5.47	4.80	98.75	100%
19:00-20:00	4.27	4.37	4.43	4.48	4.53	4.60	4.63	4.67	4.78	4.75	4.80	4.88	4.97	5.00	5.07	5.10	5.18	5.32	5.57	4.82	57.65	100%
20:00-21:00	4.08	4.27	4.25	4.42	4.47	4.50	4.57	4.60	4.62	4.67	4.68	4.72	4.78	4.82	4.88	5.00	5.10	5.25	5.35	4.72	33.35	100%
21:00-22:00	3.78	4.08	4.15	4.25	4.30	4.33	4.38	4.45	4.48	4.52	4.57	4.58	4.68	4.83	4.85	4.73	4.80	5.00	5.32	4.59	33.35	100%
22:00-23:00	4.15	4.36	4.37	4.48	4.43	4.48	4.50	4.55	4.57	4.65	4.67	4.75	4.88	4.85	5.03	5.20	5.22	5.28	8.32	4.92	14.8	100%
23:00-24:00	4.63	4.77	4.78	4.92	4.93	4.97	4.98	5.00	5.08	5.08	5.15	5.18	5.23	5.28	5.35	5.37	5.47	5.48	6.15	5.15	10.6	100%