

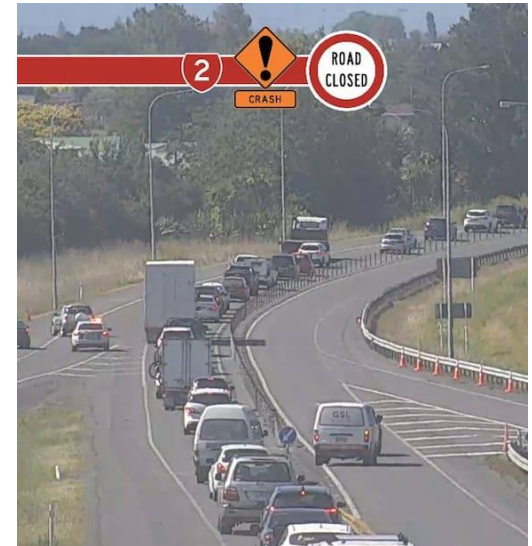
LEVERAGING AI SMART CAMERAS FOR SAFER AND MORE EFFICIENT CONSTRUCTION

A real-world NZ case
study from the Hawke's
Bay Expressway



Why construction is a problem period
Construction \neq steady-state networks

Risk increases before crashes appear



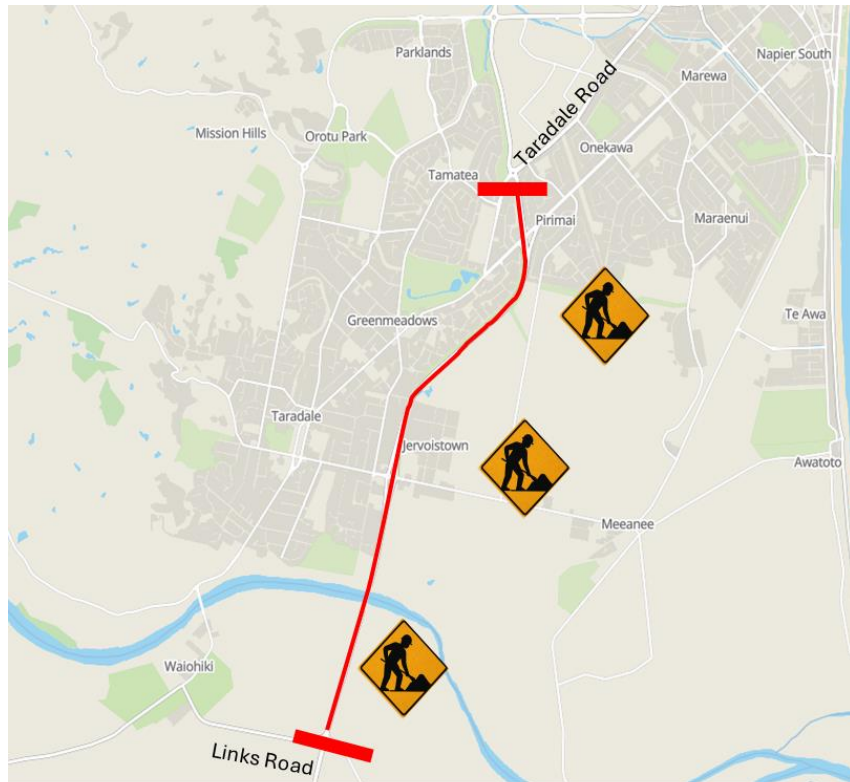
Unstable



The traditional data gap.
What we can measure vs what we
need



Project context: Hawke's Bay Expressway. A live construction network



The key question we asked.
How do we manage risk during
construction, and not after it?



Enter AI video analytics.
From “dumb cameras” to smart
assets



Two types of AI deployments. Pulse v Live analytics

Conflicts Heat Map
By road user

DENSITY SEVERITY?

Map

Filter Options

Time to

Site * Granard-Beaudesert Int

Timezone: GMT+1000 (Aust)

Post Ex

3448.2

Average Peak Hour Veh


Peak Hour: 14:45 - 15:44

Crash Risk by

Conflicts per 1000 vehicles

0.00 3.33 5.00 6.67 8.33 10.00

6 7 8



Conflict time:
2025-03-21 10:28:02
Conflict: Pedestrian
TTC: 1.07 s
Delta-V: 14.95 KPH

Conflict Video Clips

KPH MPH

All Clips MAP LIST EXPORT

BULK DELETE

#	Date	Time	Conflict Type	Road User 1 Speed (KPH)	Road User 2 Speed (KPH)	SSM Type	SSM Value	Rating	Comment	Actions
1	21-Jun-2022	16:22:25	Pedestrian	16.54	30.56	PET	4.2	☆☆☆☆☆	N/A	📹 🗑️
2	21-Jun-2022	16:22:25	Pedestrian	11.83	30.66	PET	4.88	☆☆☆☆☆	N/A	📹 🗑️
3	22-Jun-2022	09:35:18	Pedestrian	6.47	24.08	PET	4.68	☆☆☆☆☆	N/A	📹 🗑️
4	22-Jun-2022	15:09:16	Pedestrian	5.92	12.92	PET	4.24	☆☆☆☆☆	N/A	📹 🗑️
5	23-Jun-2022	09:42:57	Bicycle	11.37	10.35	PET	2.84	☆☆☆☆☆	N/A	📹 🗑️
6	23-Jun-2022	15:46:03	Pedestrian	10.02	15.11	PET	9.04	☆☆☆☆☆	Very close p	📹 🗑️

Total 6 items.

How the AI actually works. What the AI “sees”



Site *

Waiohiki / Links Road Inters...

Timezone: GMT+1300 (Pacific/Auckland) -

Camera

Camera

LOAD

Live Stream: Camera

This page shows live streaming for selected camera

Current Site Local Time: 18 Feb 2026 - 12:19 PM

GMT+1300 (Pacific/Auckland)



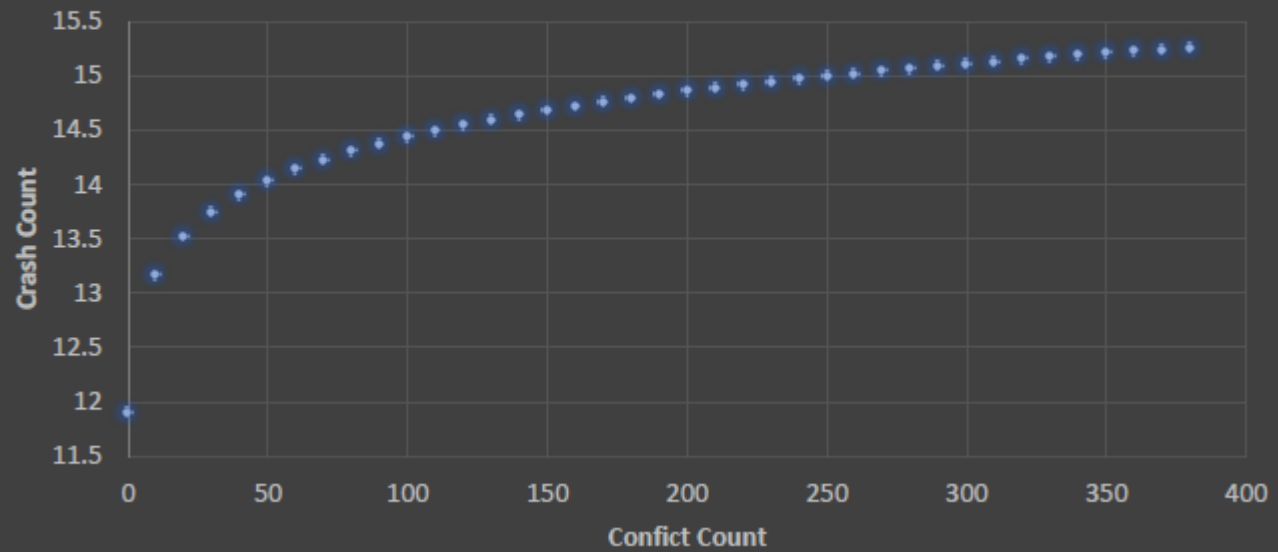
- Pedestrian
- Bicycle
- Motorbike
- Heavy Vehicles
- Light Vehicles
- E-Scooter

LV: 4
HV: 1
PED: 0



Measuring safety before crashes.
Critical conflicts, not crash counts

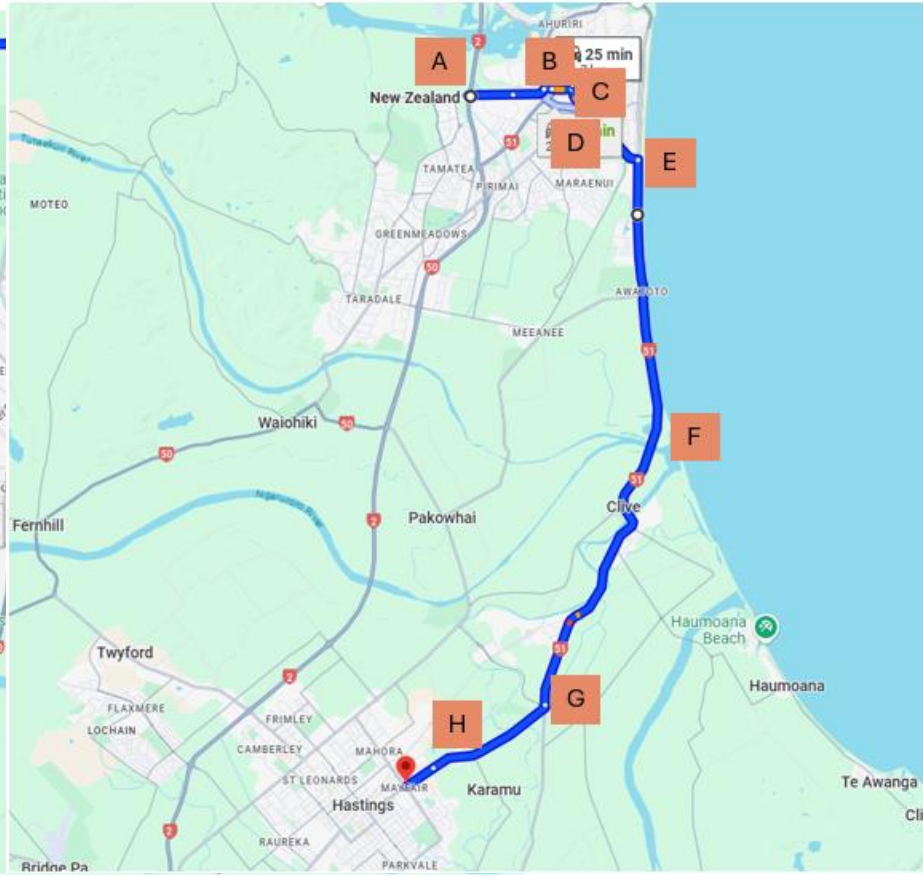
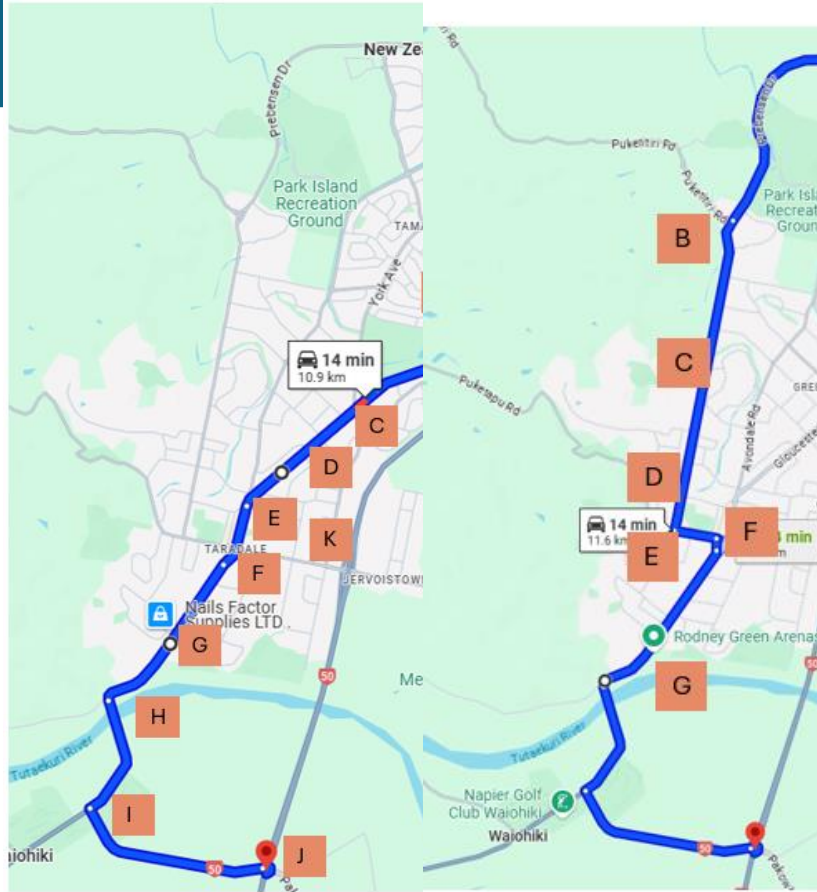
Estimated Crashes Per 5 Years vs Hourly Conflicts
(High Volume Signalized: Maj = 8000/hr, Min=3000/hr, Peds = 600/hr)



Interactions
Disturbed Passages



Western Detour – Option 1 Eastern Detour – Option 1




Risk Prioritised





Stage 2: Live monitoring during construction.


Watching the network respond in real time


Local Time: 18-Feb-2026 12:02

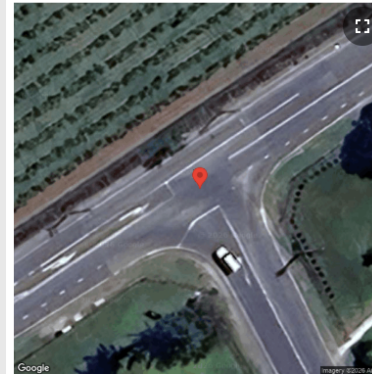
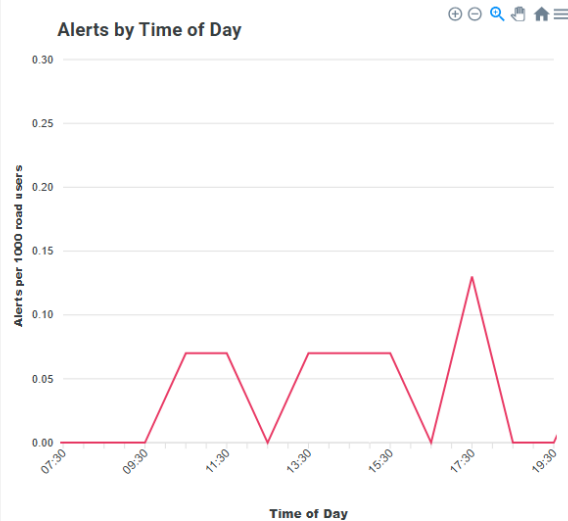
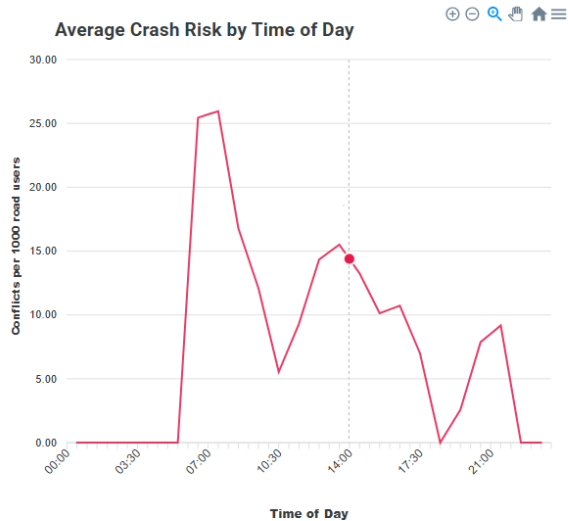
 **15,194**
Average Daily Traffic (ADT)

 **68**
Average Daily Active Traveler Traffic

 **7.96**
Average Hourly Conflicts

 **0**
Average Hourly Active Traveler Conflicts

 **9**
Total Alerts



Highlights

Highest flows **12,608 units** recorded for **Passenger Car**

Highest active traveler flows **62 units** recorded for **Bicycle**



Protecting a critical structure. Bridge at Waiohiki (8 tonne limit)

Sites
Waiohiki / Links Road Interse...
Select sites...

Date Range
Custom

Start Date 10-Feb-2026 End Date 17-Feb-2026

Alert Types
Critical Conflict Select aler...

Managed Alerts

Time Range : 00:00 - 23:59

View Type
Alert Feed View

LOAD EXPORT CSV

Alert History | 81 results shown (out of 81)

2:29 PM - 10 Feb 2026	Site: Waiohiki / Links Road Intersection
Heavy Vehicle Impact on Vulnerable Bridge	Type: Double Trailer
Structure_SB	Severity: Double Trailer
Potential Impact on Waiohiki Bridge Structure	Road User: Double Trailer
14:15 - 14:29	VIEW
4:07 PM - 10 Feb 2026	Site: Waiohiki / Links Road Intersection
Heavy Vehicle Impact on Vulnerable Bridge	Type: Articulated Truck
Structure_SB	Severity: Articulated Truck
Potential Impact on Waiohiki Bridge Structure	Road User: Articulated Truck
16:00 - 16:14	VIEW
4:39 PM - 10 Feb 2026	Site: Waiohiki / Links Road Intersection
Heavy Vehicle Impact on Vulnerable Bridge	Type: Articulated Truck
Structure_SB	Severity: Articulated Truck
Potential Impact on Waiohiki Bridge Structure	Road User: Articulated Truck
16:30 - 16:44	VIEW
11:29 PM - 10 Feb 2026	Site: Waiohiki / Links Road Intersection
Heavy Vehicle Impact on Vulnerable Bridge	Type:



Protecting a critical structure. Bridge at Waiohiki (8 tonne limit)

The screenshot displays a software interface for monitoring a road network. On the left, a sidebar contains the following controls:

- Sites:** A dropdown menu showing "Waiohiki / Links Road Interse..." with a search icon.
- Select sites...** A text input field.
- Date Range:** A dropdown menu set to "Custom".
- Start Date:** A date picker set to "10-Feb-2026".
- End Date:** A date picker set to "17-Feb-2026".
- Alert Types:** A dropdown menu with "Critical Conflict" selected and a "Select aler..." button.
- Managed Alerts:** A checkbox that is currently unchecked.
- Time Range:** A slider set to "00:00 - 23:59".
- View Type:** A dropdown menu set to "Alert Feed View".
- Buttons:** "LOAD" and "EXPORT CSV" buttons at the bottom.

The main area shows a grayscale camera feed of a road intersection. A red rectangular box highlights a vehicle on a bridge structure in the distance. The timestamp "02:25:26 16 02 2026" is visible in the top left corner of the camera feed.



What made this genuinely different.
Key differentiators

Traditional camera



Needs someone watching

AI-enabled camera



Notifies you automatically



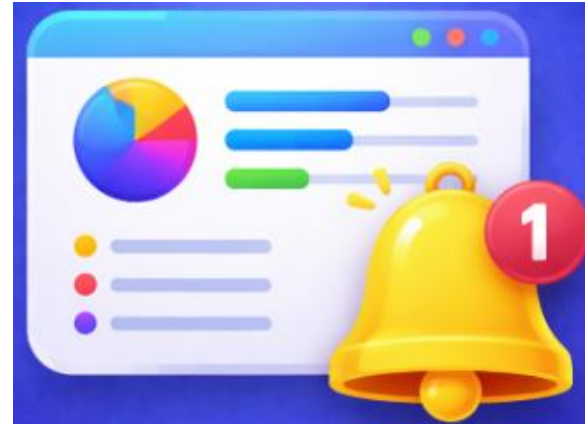
Outcomes and lessons.
What changed because of this

Before



Reactive, limited visibility

After



Earlier, targeted intervention



Where this goes next.
AI is part of standard construction
management



Source: NZ Transport Agency



Steve James (Principal Safety Engineer)

steve@urbanconnection.co.nz



Thank you.

