VIASTRADA
TRANSPORT PLANNING AND DESIGN

Countculture

PEDESTRIAN & MICRO-MOBILITY MONITORING DEPLOYMENT IN NORTHLAND

John Lieswyn & Adam O'Connor

Smart Cities APAC | Adelaide | 6 August 2024

SmartCitiesCouncil

Summary | abstract

- Northland is building an urban and rural network of shared pathways for people walking, biking, and scooting.
- In the largest city, Whangārei, planners and engineers had collected uptake data using only a 2-hour annual “cordon count” and occasional intercept surveys.
- A more robust dataset on usage and emissions reduction estimates is required to support further investment in the transportation network.
- From the initial deployment of computer vision cameras at seven sites in October 2022, the city now has ten continuous count sites across various facility types (paths, on-road bike lanes and crossings) and geographies (central city and suburban).
- Four additional permanent sites are being added now, and new low-power solar Count Pods will be installed over the coming months.
- This presentation covers the technology, implementation strategies, dashboard capabilities, and use cases.

Agenda

- Why count & Northland use case
- Typical counting methods for active modes
- Automated count problems and solutions
- Northland system deployment

Why count?
and
Northland use case

? ? ? ?

If we don’t count,
it doesn't count.

or...

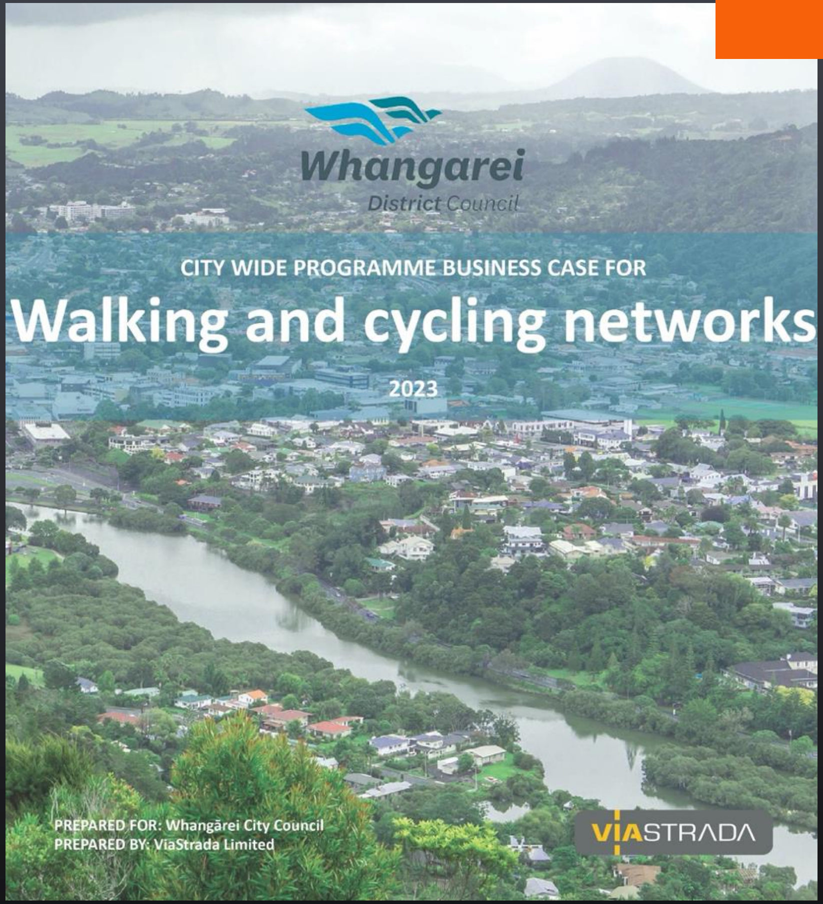
***what we count informs
what we build***

VIASTRADA
TRANSPORT PLANNING AND DESIGN

Countculture

Benefit calculations require user estimates from models validated by existing counts

Benefits Source	Benefits (NPV)
Walking health benefits – new users	$ 122,150,000
Cycling health benefits – new users	$ 122,230,000
Total Benefits	$ 244,380,000
Capital costs	$ 32,140,000
Maintenance and operating costs	$ 9,540,000
Community engagement and TDM	$ 10,250,000
Total Costs	$ 51,930,000
BCR (total costs)	4.7
BCR (capital & maintenance only)	5.9



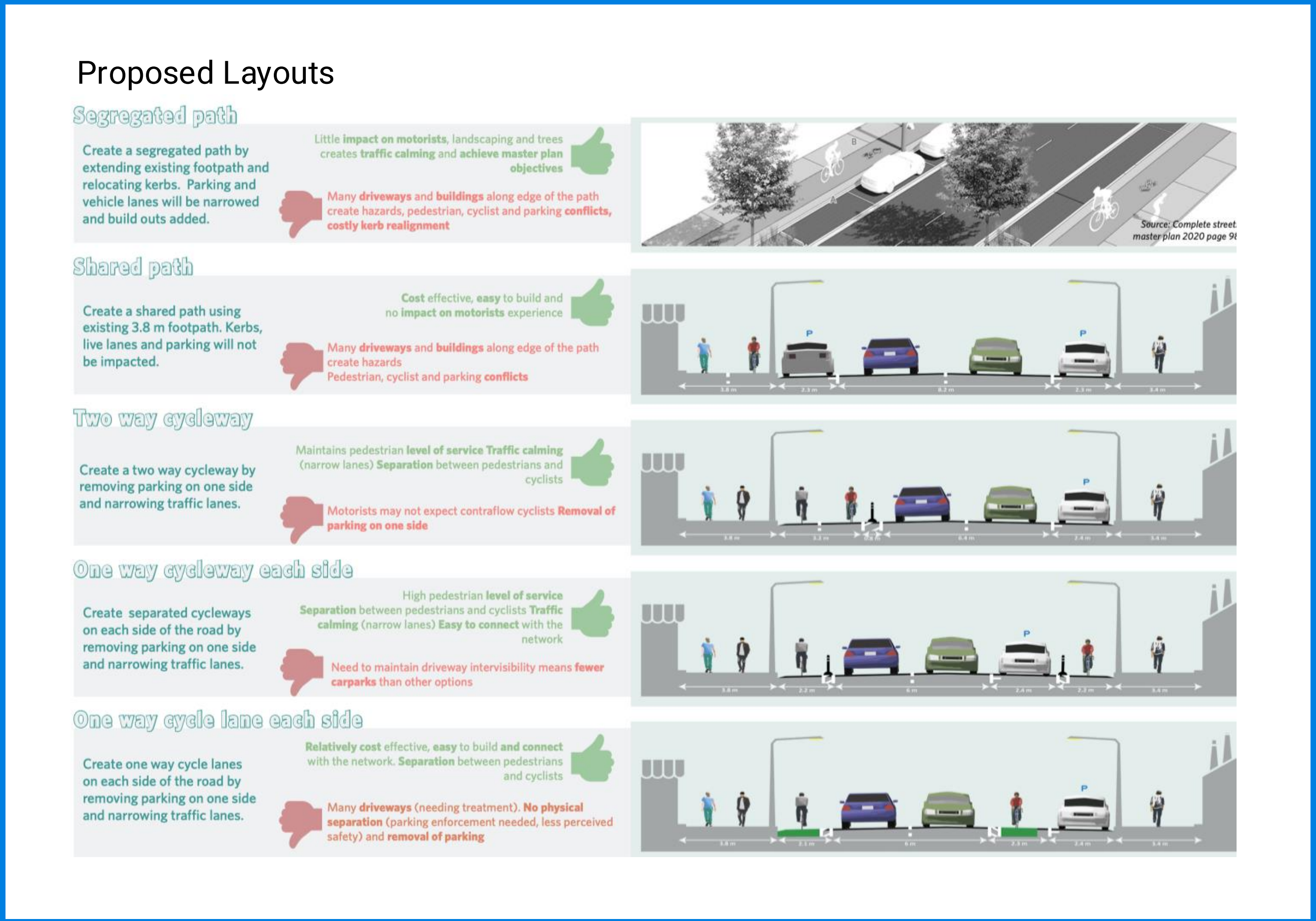
PBC existing count data used in validation of the model

Mode	6 mo.	ADT
Pedestrians	496,927	2,730
Micro-mobility	197,879	1,087

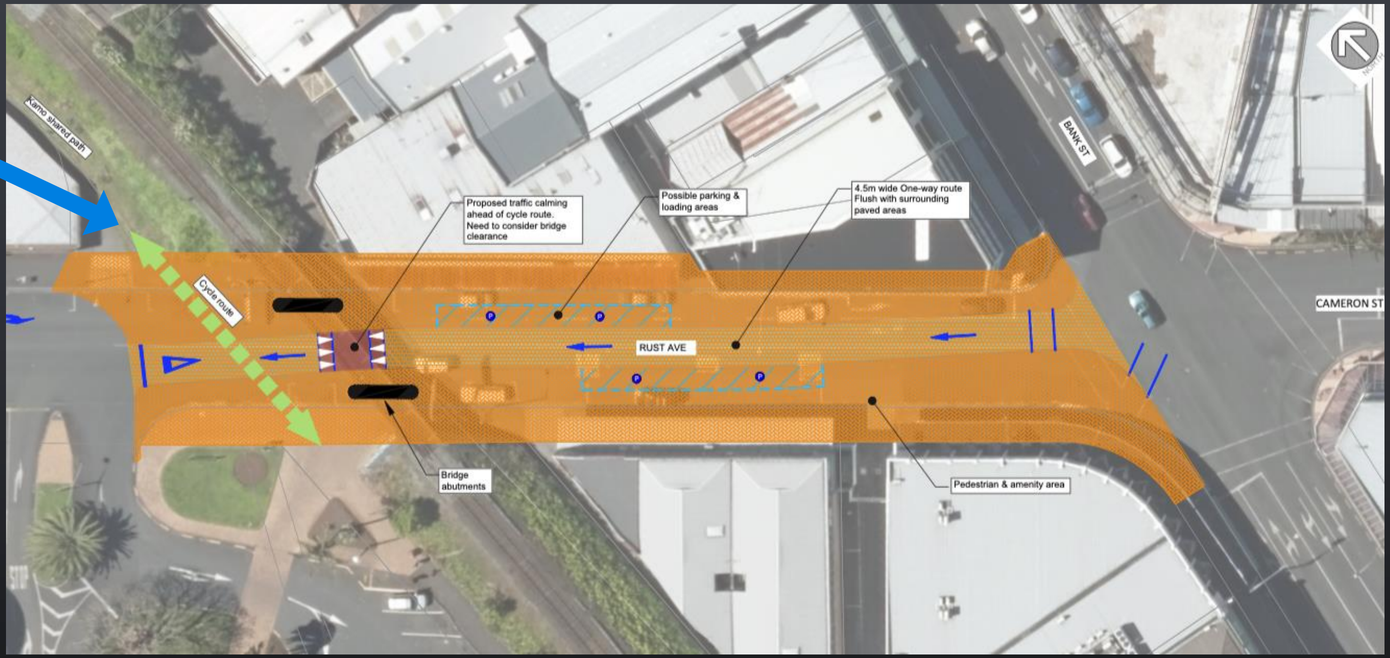
Count data shows existing demand as input to route prioritisation

Count data informs design options

- E.g., relative use by pedestrians / cyclists currently up to 4:1
  - But recognise suppressed demand especially for cycling



…design options (2)



Counting methods

345.

12.

74.

9.

Active mode monitoring technologies overview

Manual (human observer)
Duration: 2 hr

Portable machine
Duration: 24 hr – 2+ mo

Permanent machine
Duration: continuous

Types of automatic (machine) sensors

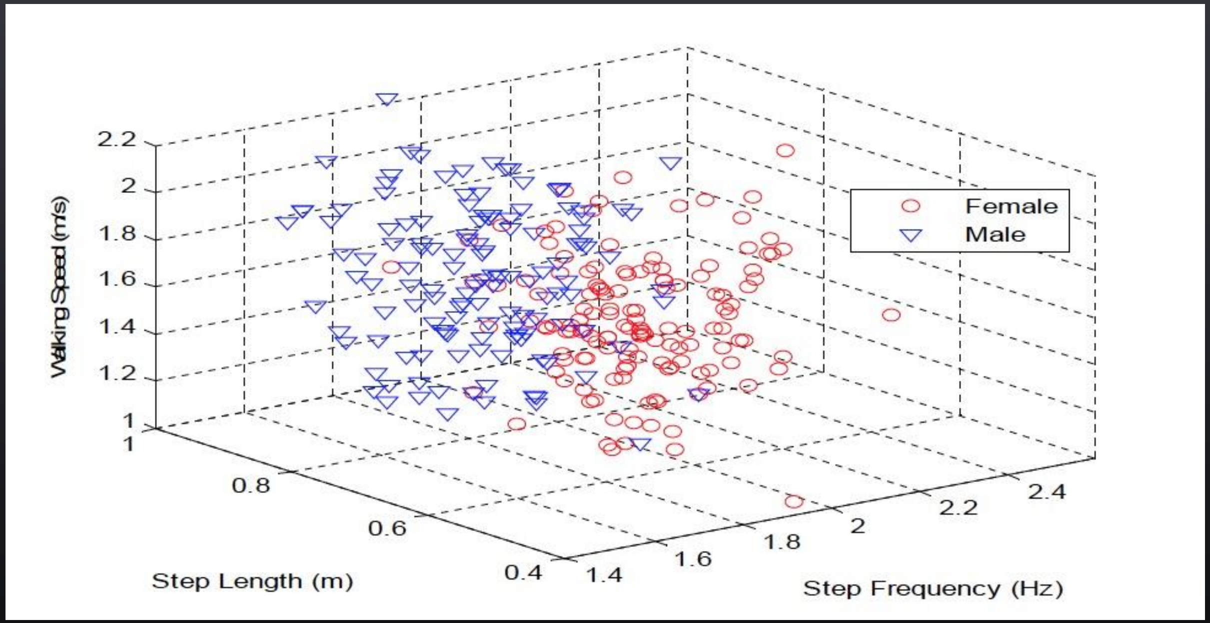
Code	Type of sensor	Code	Type of sensor
9	Multiple	S	Sonic/acoustic
H	Human observation	T	Tape switch
I	Passive infrared	3	Pressure sensor/mat
2	Active infrared	U	Ultrasonic
K	Laser/lidar	**V**	**Video (automatic processing)**
L	Inductive loop	1	Video (manual processing)
M	Magnetometer	W	Microwave (radar)
P	Piezoelectric	X	Radio wave (radar)
Q	Quartz piezoelectric	Z	Other
R	Pneumatic air tube		

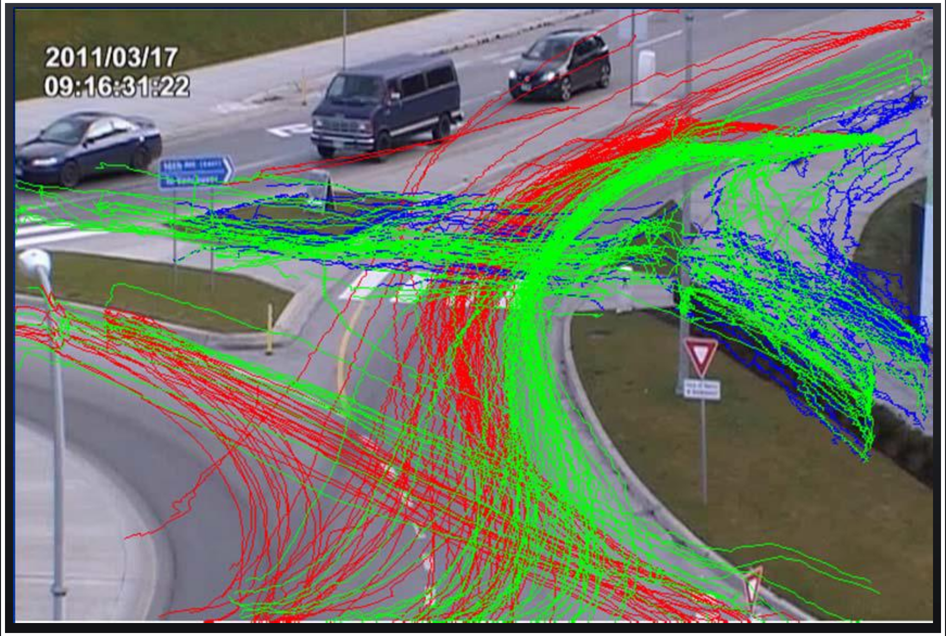
Source: FHWA (2016) Coding Nonmotorized Station Location in the 2016 Traffic Monitoring Guide Format

First developed in 2005…

Dynamic movement mechanisms THE UNIVERSITY OF BRITISH COLUMBIA

- Pedestrians: ambulation (gait)
- Cyclists: pedalling
- Vehicles: linear movement



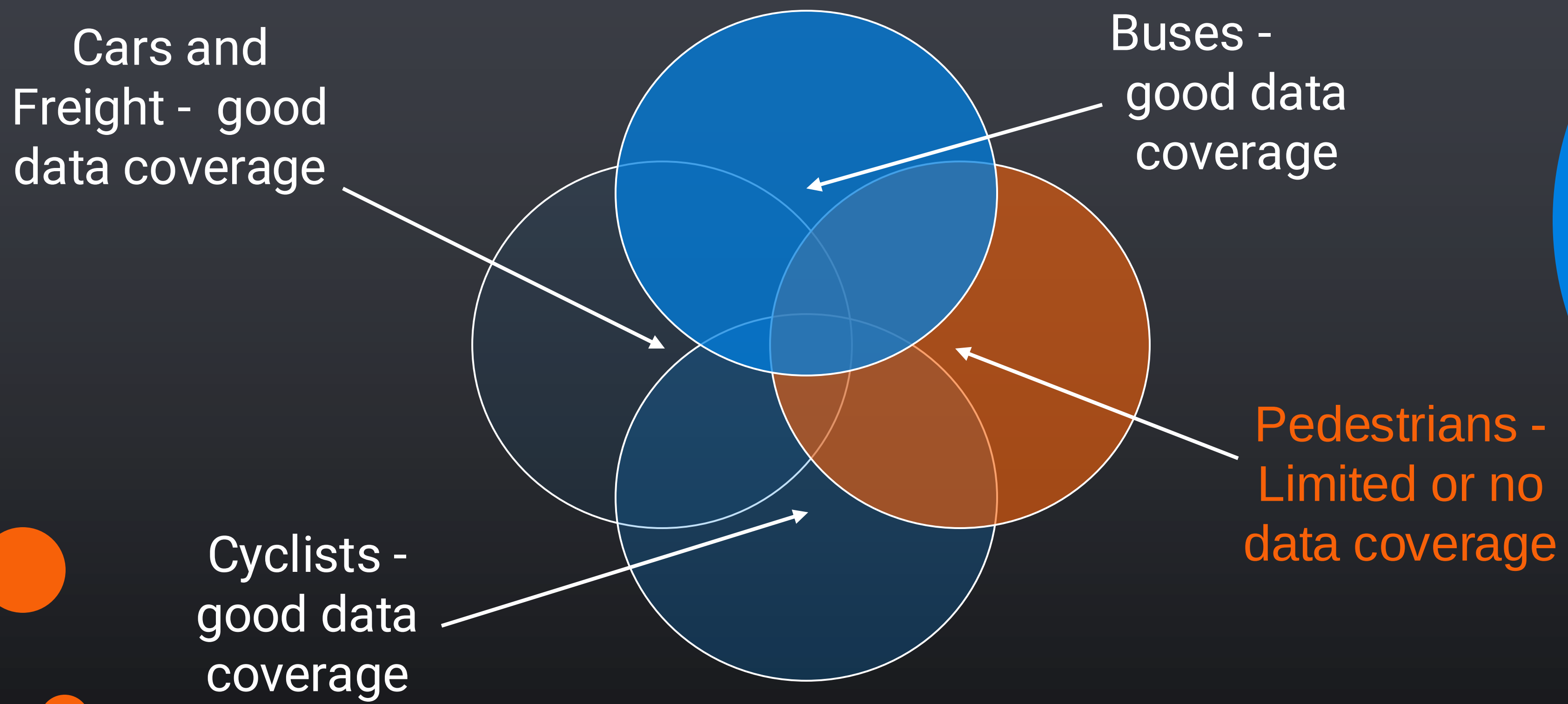


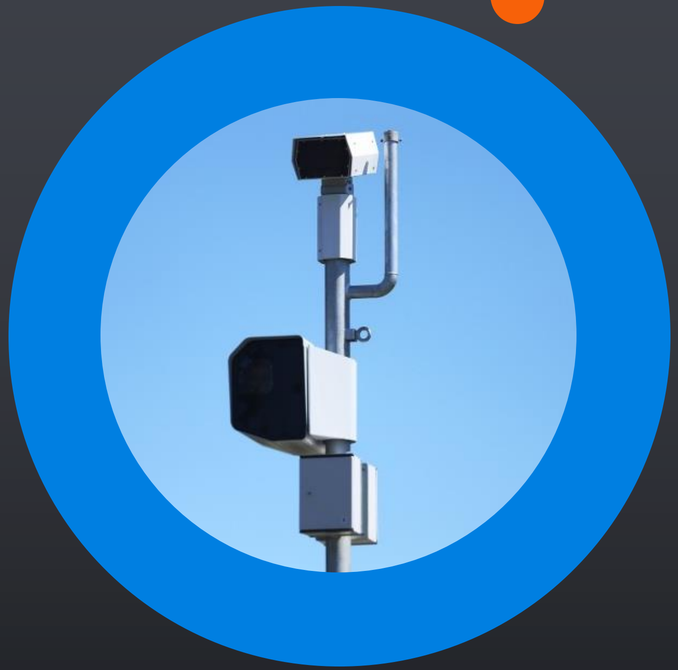
CCTV cameras have potential but also limitations

VIASTRADA
TRANSPORT PLANNING AND DESIGN

Countculture

Traffic signal cameras also limited…





Automated count problems and solutions

Problem	Solution
Insufficient demographic data	Algorithms to classify age and gender of users
Power requirements increase deployment cost and limit where devices can go	Low power device with solar option
Network issues can lead to data gaps	Automated alarms and remote monitoring
Inaccuracies due to sunlight, shadowing, and variable lighting conditions	Combined AI and background subtraction algorithms
Active modes heavily influenced by weather	Dashboard overlays of temperature and rainfall

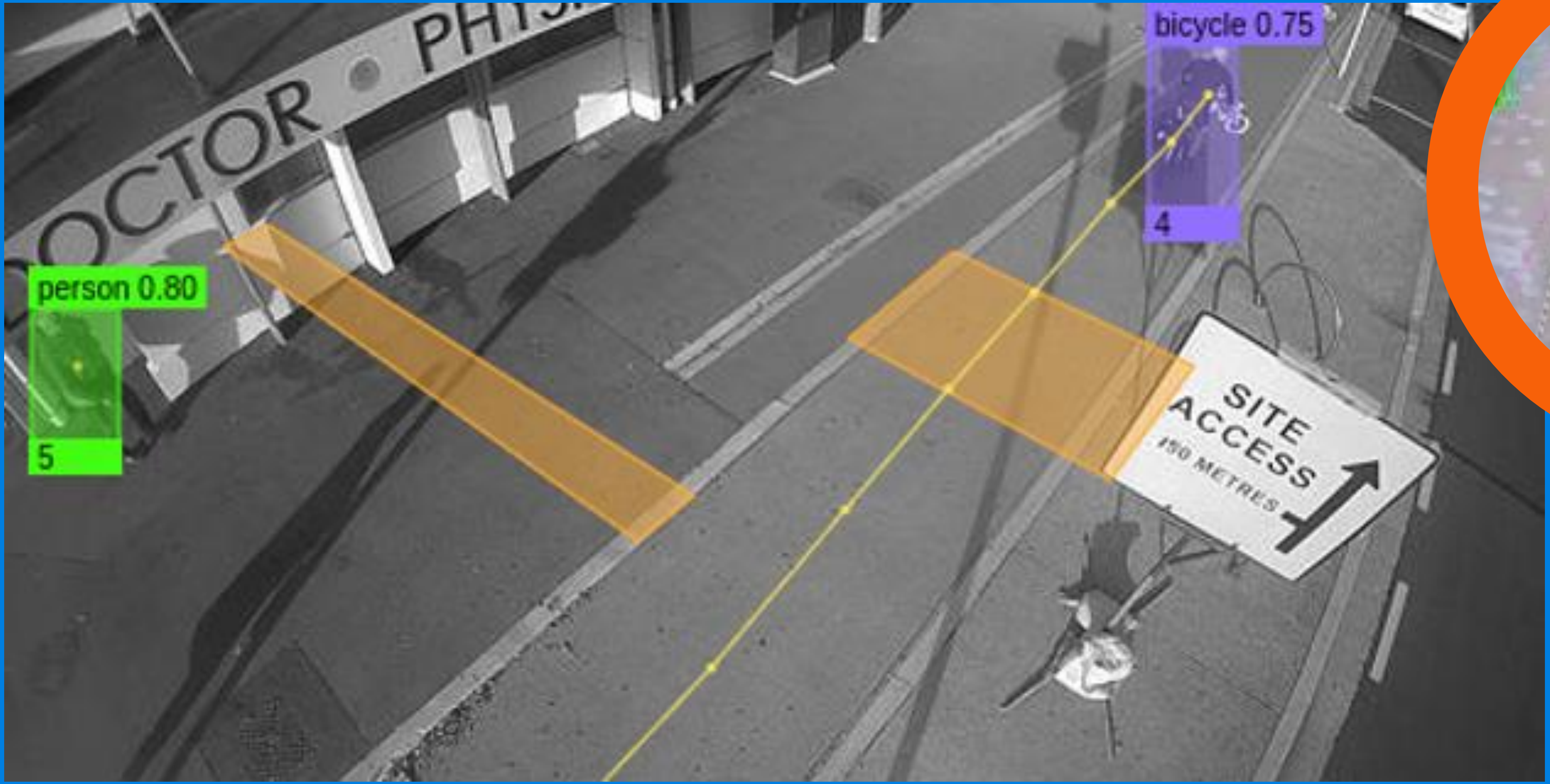
Camera and counter mounted on a pole (streetlight or independent dedicated pole)

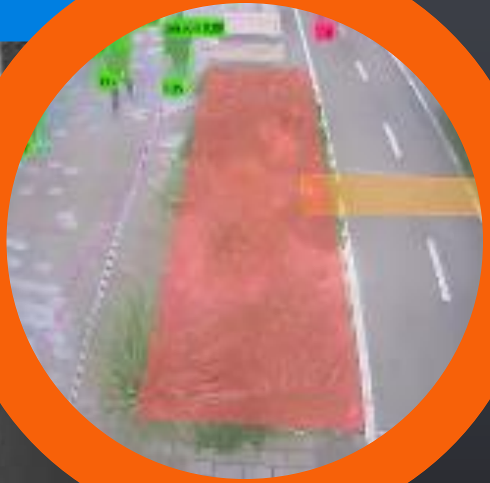
Detection zones illustrated in green

Count Pod

by Countculture

Trajectory, detection zones and classification





Thank you to Northland Transportation Alliance

Installation

- Asset owners preferred electrical contractor
- Remote installation support
- Remote configuration, tuning, and accuracy report creation

Power options

- 24x7 Mains
- Pole Mount Solar Unit
- Recharge Off The Street Lighting Network

Emissions Calculations

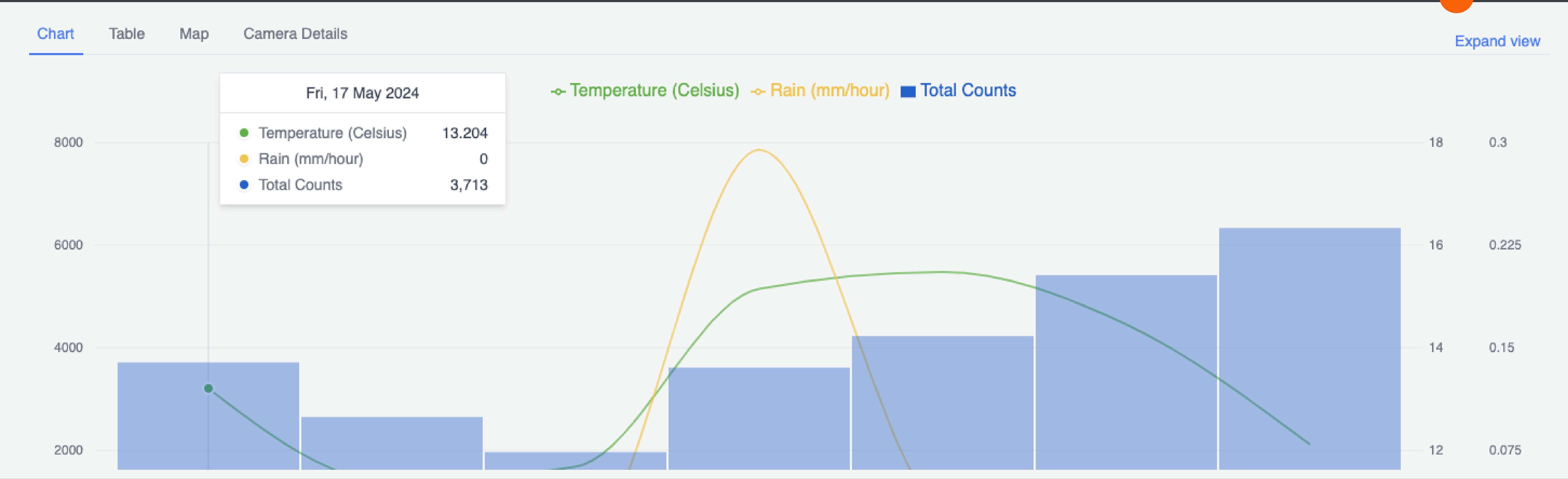
By allowing some key variables to be configured at each sensor, Count Central can help estimate the amount of emissions savings each commute is contributing to.

Some of the variables which can be configured globally or per sensor are:

- Which time ranges do we consider counts to be commuters, e.g. 7-9 am and 4-6 pm, on all weekdays?
- How many kilometres does each commute roughly equate to?
- How many grams of CO_2 per kilometre will be saved by each commute?

Count Central
by Countculture

Impact of temp, rainfall & day of week



VIASTRADA
TRANSPORT PLANNING AND DESIGN
Countculture

Pedestrian 56.1%	Scooter 14.8%	Bicycle 22.8%	Unclassified 6.3%	Total
64,857	17,104	26,409	7,305	115,675
36,409 commutes for 19,508.5km	6,575 commutes for 4,118.5km	10,011 commutes for 6,197km	2,462 commutes for 1,400km	55,457 commutes for 31,224km
Saved 3.14 tonnes CO_2	Saved 0.66 tonnes CO_2	Saved 1.00 tonnes CO_2	Saved 0.23 tonnes CO_2	Saved 5.03 tonnes CO_2





Displaying 4 weeks ... s and all cameras

Chart Table Map **Camera Details** Expand view

Camera Site Details 1-riverside-drive

Cancel

Camera	Location				Total Count	Actions
1-riverside-bike-lane	1 Riverside Drive, Whangarei				2,030	Image Site Details
1-riverside-drive	1 Riverside Drive, Whangarei				19,742	Image Site Details
13-manse-st	13 Manse Street, Whangarei				48,466	Image
15-maunu-road	15 Maunu Road, Whangarei				6,991	Image
151-riverside-drive	151 Riverside Drive, Whangare				4,547	Image Site Details
16-rust-ave	16 Rust Avenue, Whangarei				14,718	Image
20-rust-ave	20 Rust Avenue, Whangarei				6,606	Image
60-matipo-pl	60 Matipo Place, Whangarei	60 Matipo Place	Classifying	Included	3,878	Image
61-fisher-terrace	61 Fisher Terrace, Whangarei	61 Fisher Terrace	Classifying	Included	3,977	Image
63-jack-st	63 Jack Street, Whangarei	63 Jack Street	Classifying	Included	3,995	Image
hatea-drive-reserve	Hatea Drive Reserve, Whangarei	Hatea Drive Reserve	Classifying	Included	725	Image

VIASTRADA TRANSPORT PLANNING AND DESIGN

Countculture

Conclusions

- Active mode user data is needed for
  - investment planning
  - design decisions
  - building social licence
- Hardware advances
  - more affordable for wide deployment
- Software advances provide
  - mode, age, gender
  - weather impact analysis
  - emissions reduction estimates

Tēna koutou katoa | Thank you

John Lieswyn
Director | ViaStrada
john@viastrada.nz

VIASTRADA
TRANSPORT PLANNING AND DESIGN
Delivering safer and more innovative transport choices for everyone

Adam O'Connor
CEO | CountCulture |
adamo@countculture.com

Countculture
We use AI to deliver micro-mobility data to transport professionals