Challenging Barriers to Activity Hastings: Model Community

Angus Bargh

Access ≠ utilisation?

Example: If you make my walk to school easier I will walk to school more often?

No, not necessarily because

this is an ASSUMED CAUSATION

Don’t take my word for it…

- Stepping towards causation: Do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity? Lawrence Douglas Frank, Brian E. Saelens, Ken E. Powell, James E. Chapman (2007)
- Built Environments INFLUENCE Travel Behaviour
- How do we measure causation for active mode barriers?
- “THE SELECTION PROBLEM”

- Do prisoners who reoffend do so because they are influenced by their neighbourhoods? Or do they return to their neighbourhood specifically to commit more crime?
- What do you measure to answer this?... Selection Problem?

As Engineers we:

- See this:

- Build this:

- And Get This:

- Causation is a simpler problem to solve

- Do people walk and cycle more because the infrastructure encourages it? Or do people who like to walk and cycle move to areas which offer better infrastructure?...

- The prisoner reoffending problem?... Hurricane Katrina showed that a prisoner was nearly twice as likely to recommit crime if released back into the same neighbourhood.

- Epidemiologists are looking at the Christchurch Earthquake to determine the relationship between activity and infrastructure

Model Communities?

- We don’t understand causation relationships of walking and cycling
- To achieve change we have to understand the real barriers and constraints to travel options
- Represent existing (model), predict future (model) and assess perception and opinion

NZTA Model Community

- NZTA announced $7m funding available to become New Zealand's first walking and cycling model community
- 22 Councils submitted expressions of interest
- Hastings and New Plymouth selected as model communities

NZTA Model Community Funding

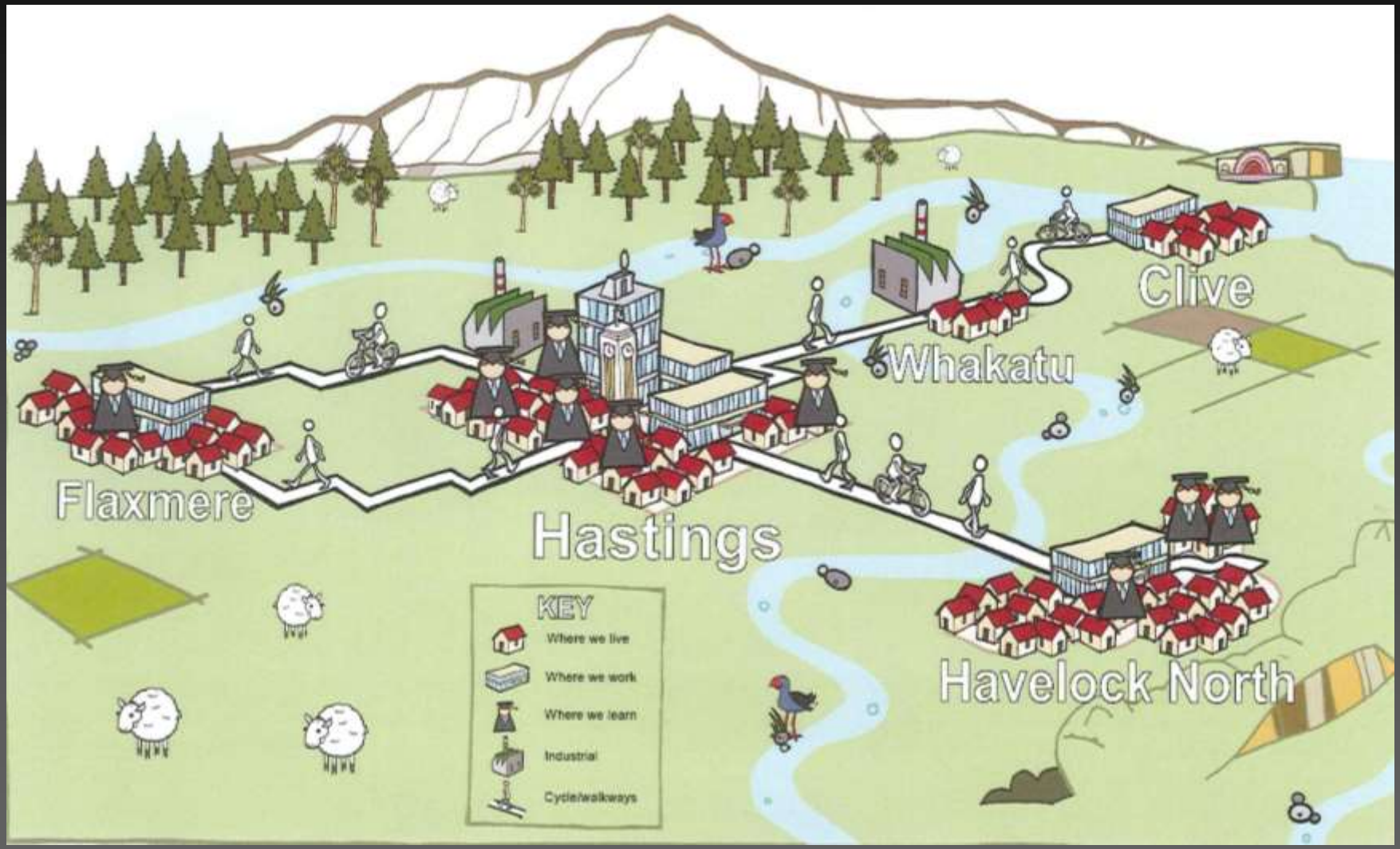
- Funding to be provided over financial years 2010/11 and 2011/12

- New Plymouth: $3.71m
- Hastings: $3.57m

"The purpose of this investment is to help create an environment that will make walking and cycling easy transport choices."

Ms Jenny Chetwynd, Central Regional Director, NZTA
25 June 2010

HDC Vision


Clive
Whakatu
Flaxmere
Hastings
Havelock North
KEY
Where we live
Where we work
Where we learn
Industrial
Cycle/walkways

HDC Vision:
Making Walking and Cycling Irresistible

Four target user groups:

- Walk and Cycle to Work
- Walk and Cycle for Fun
- Walk and Cycle to Shop
- Walk and Cycle to School

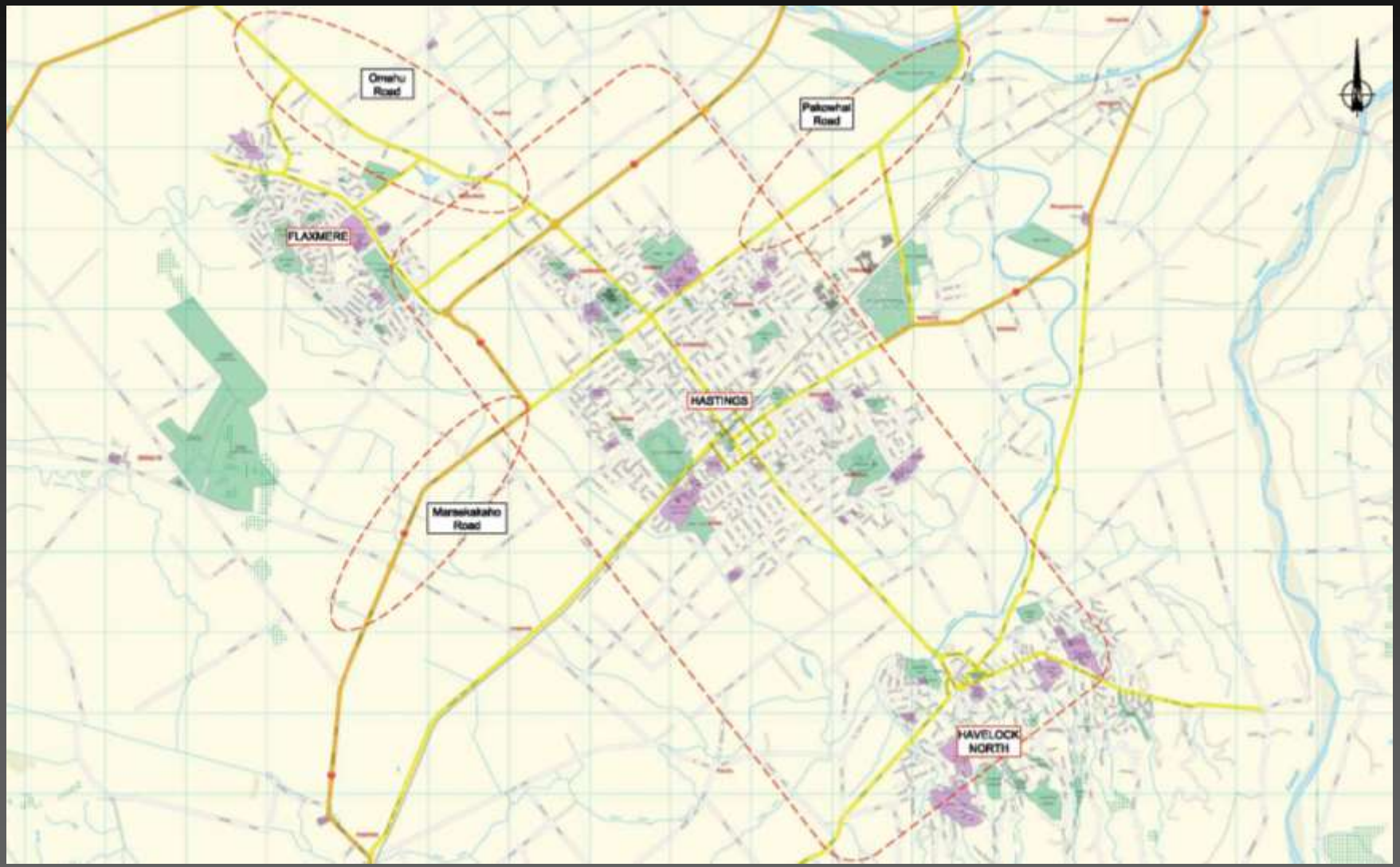
Hastings Area Transportation (HAT) Model

- Commissioned by HDC in May 2009
- Stakeholder Group led by HDC and included NZTA & HBRC
- Multi modal model – Cars, heavy vehicles, buses, cycles and pedestrians
- AM & PM Peak Period Models

HDC Model Communities Application: Utilisation of HAT (traffic) Model

- Select link analysis at several key locations
- Trip length distribution by land use
- Determine proportion of trips along key routes within target distance for mode shift to walking or cycling

Study Area



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Hastings Area Transportation (HAT) Model

Three parts to model:

- Microsimulation model for cars, HGV and PT



- GIS interface used to analyse cycle network

- Pedestrian activity at key crossing points

Model Network

HAT Model: Pedestrians

- 15 unsignalised pedestrian crossings modelled (Zebra)
- Replicate random arrival of pedestrians
- Frequency and duration of pedestrian calls based on survey information from HDC

HAT Bicycle Model

- Theoretical model – no physical interaction with vehicles
- Shows most likely route choice by cyclists based on distance, prevailing traffic conditions and cycle network infrastructure
- Used to assist with strategic planning of cycling infrastructure

Bicycle Compatibility Index (BCI[1])

- The form of the BCI model is given below:
- BCI = C + a1*BL + a2*BLW + a3*CLW + a4*CLV + a5*OLV + a6*SPD + a7*PKG + a8*AREA + AF

Where:

BL **= Presence of a Bicycle Lane or Paved Shoulder**
BLW **= Bicycle Lane or Paved Shoulder Width**
CLW **= Curb Lane Width**
CLV **= Curb Lane Volume**
OLV **= Other Lane Volume**
SPD **= 85th Percentile Speed of Traffic**
C **= Constant**
PKG **= Presence of a Parking Lane With More Than 30% Occupancy**
AREA **= Presence of Residential Roadside Development**
AF **= ft+fp+fn**
ft **= Adjustment Factor for Truck Volumes**
fp **= Adjustment Factor for Parking Turnover**
fn **= Adjustment Factor for Right Turn Volumes**

And:

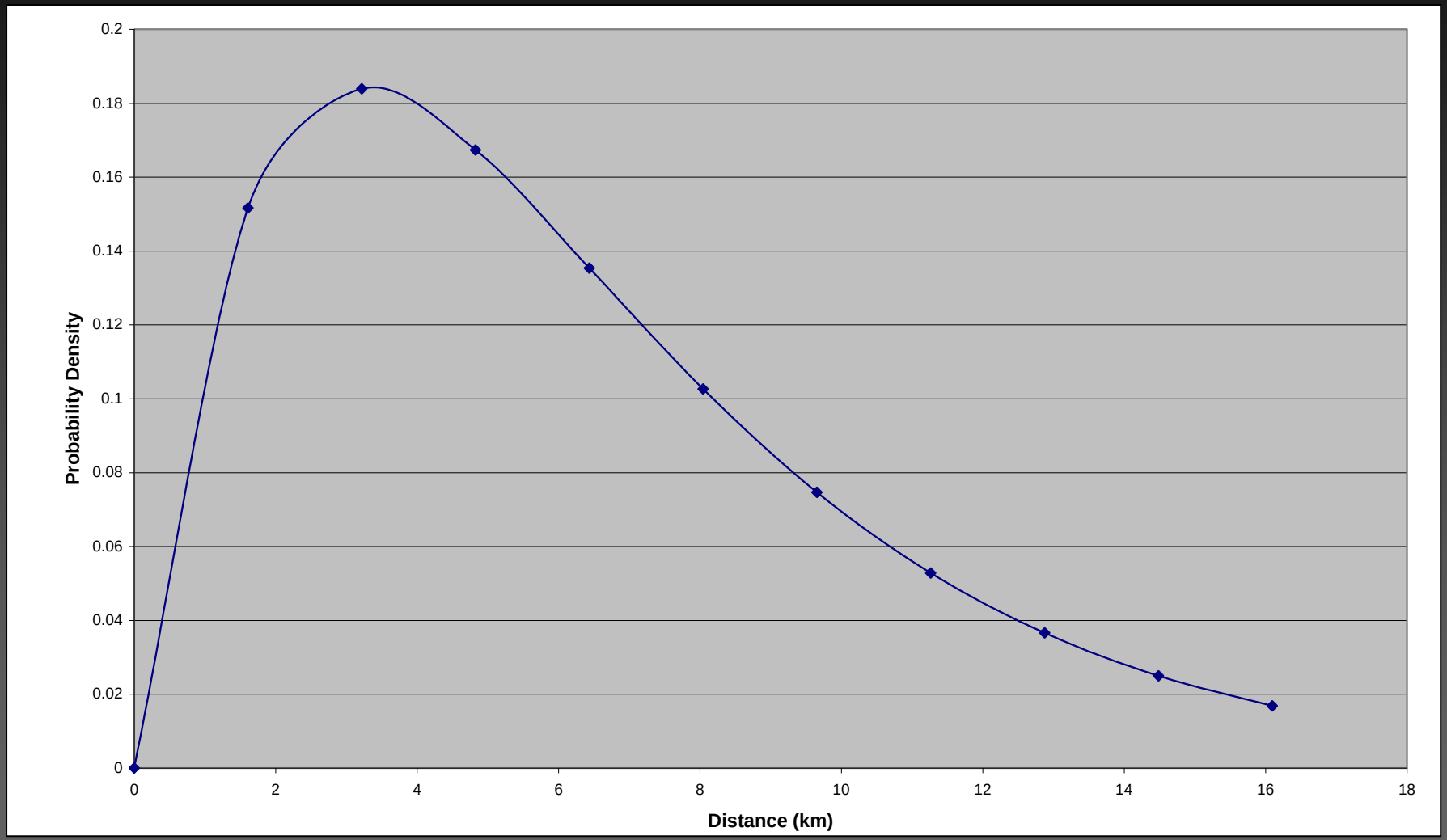
C = 3.67
a1 =-0.966
a2 = -0.125
a3 = -0.152
a4 = 0.002
a5 = 0.0004
a6 = 0.035
a7 = 0.506
a8 = -0.264

[1] Federal Highway Administration by the Highway Safety Research Center at the University of North Carolina (Harkey et al., 1998).

HAT Bicycle Model

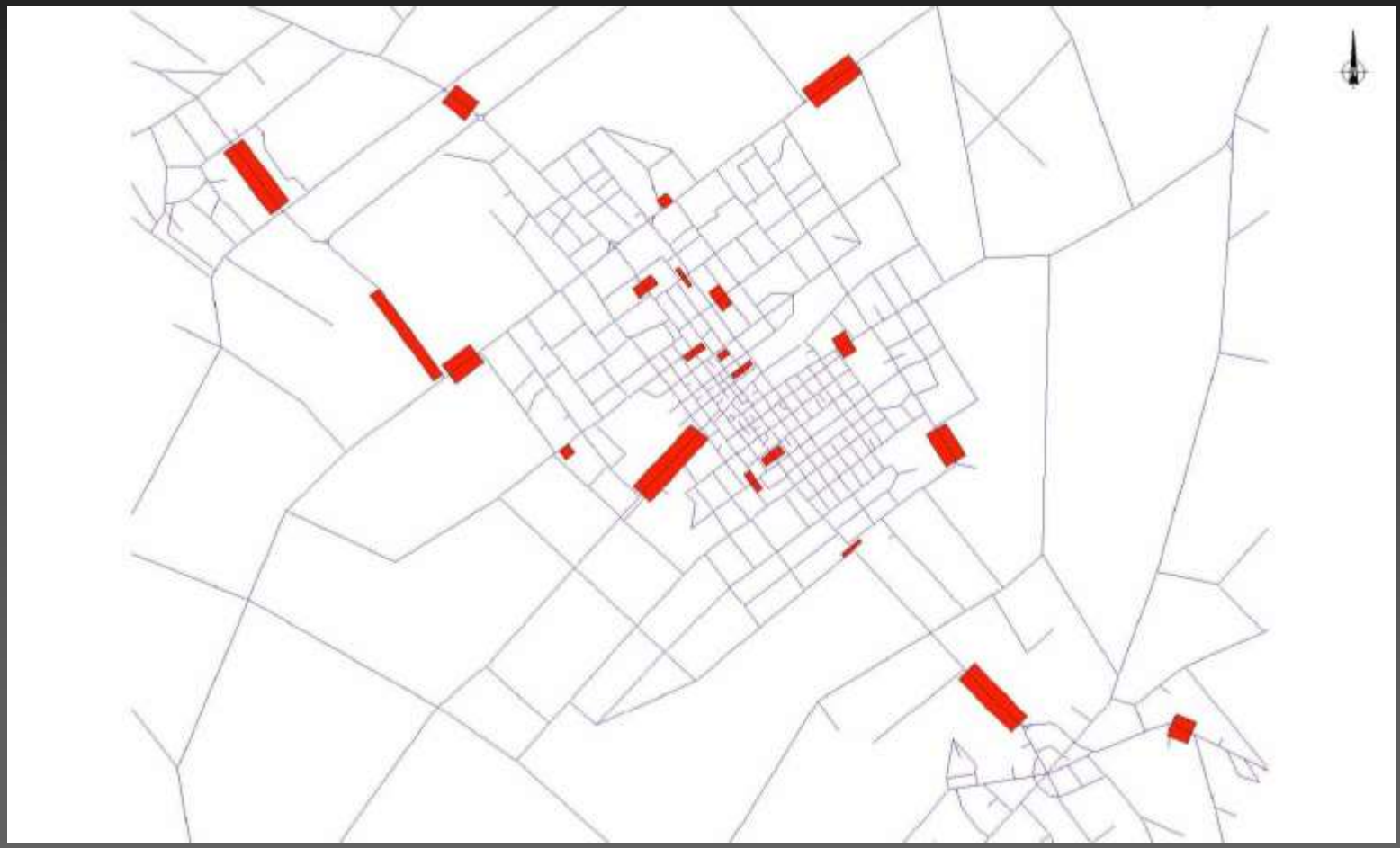
- Calculated BCI for each link is applied as a link cost factor in Paramics Bicycle Model
- Bicycle trip length distribution follows probability density function (gamma function) described in BCI paper.
- All link speeds set to 20kph

BCI Bicycle Trip Length Distribution

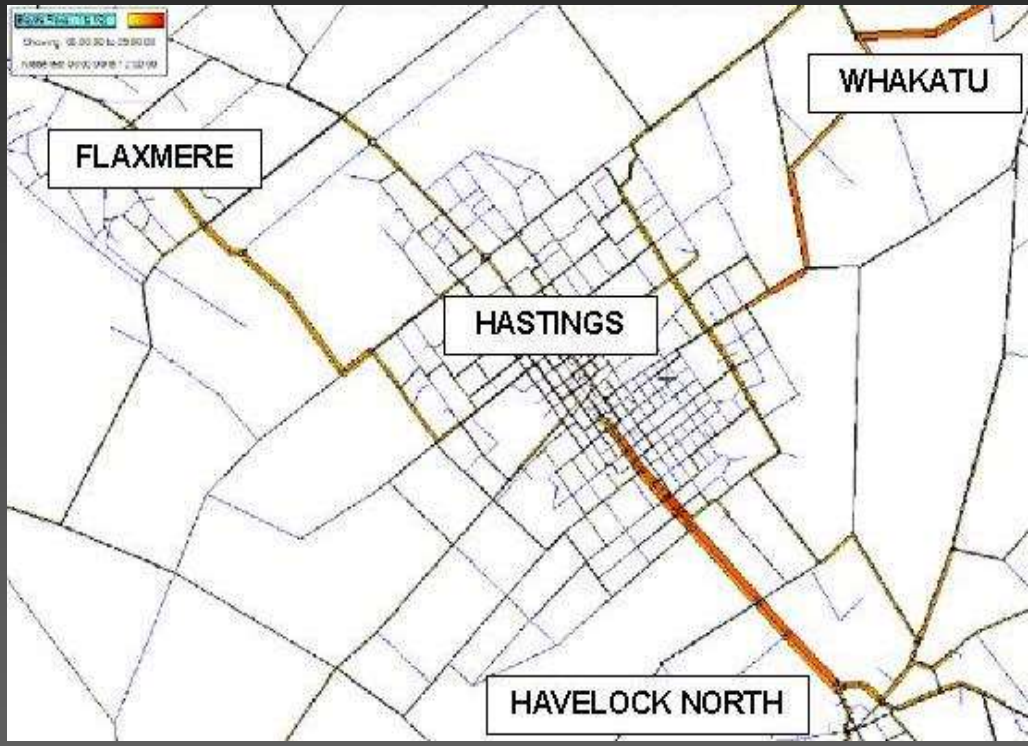


Bicycle Count Locations

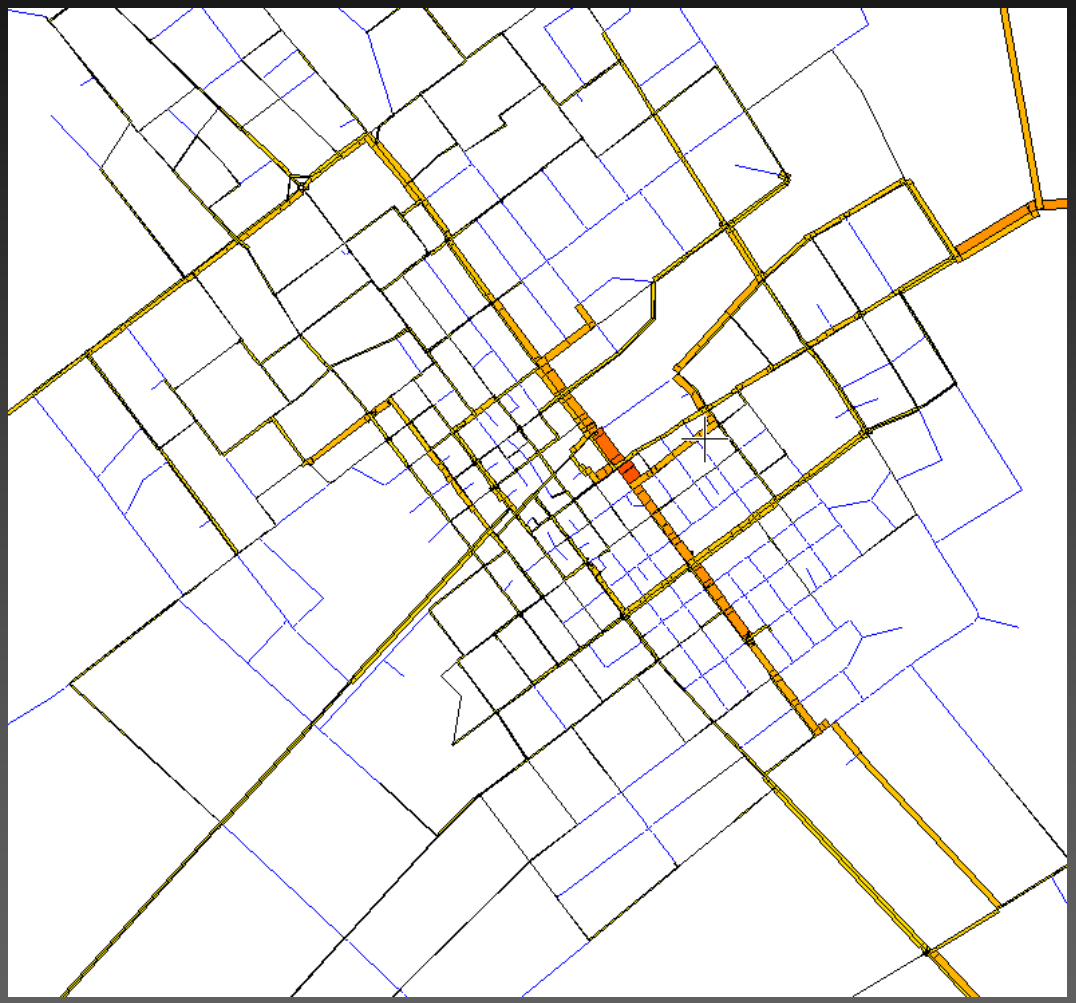
23 Two-Way Counts



Linking Model Outputs with the Model Community Network

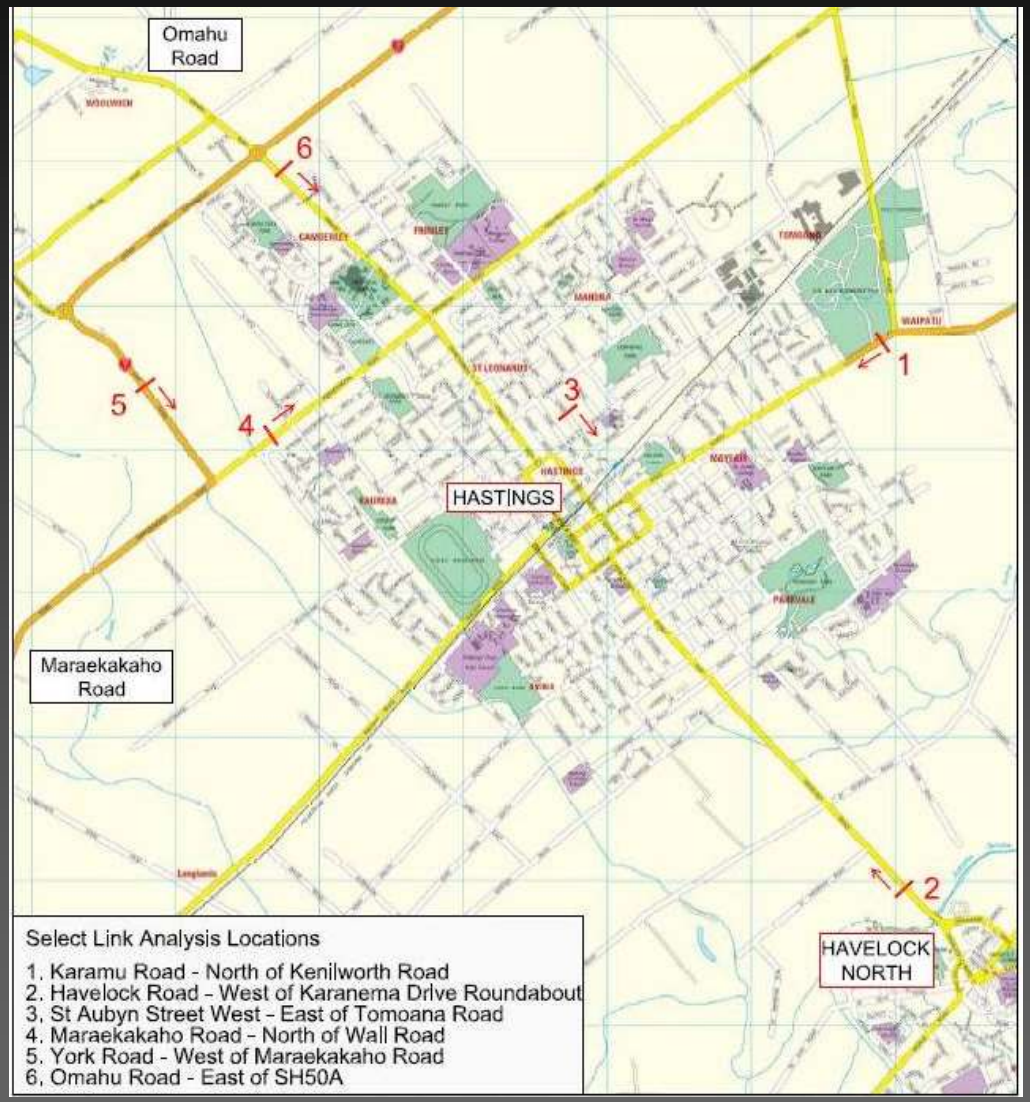


Option Test: Upgrade of St. Aubyn Street



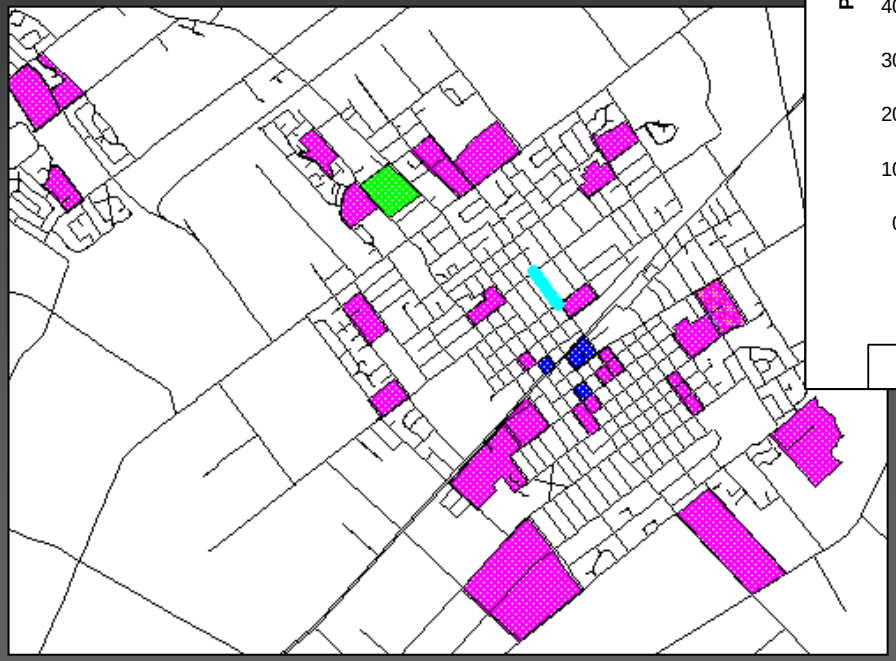
PM Peak Option Test Bicycle Flows

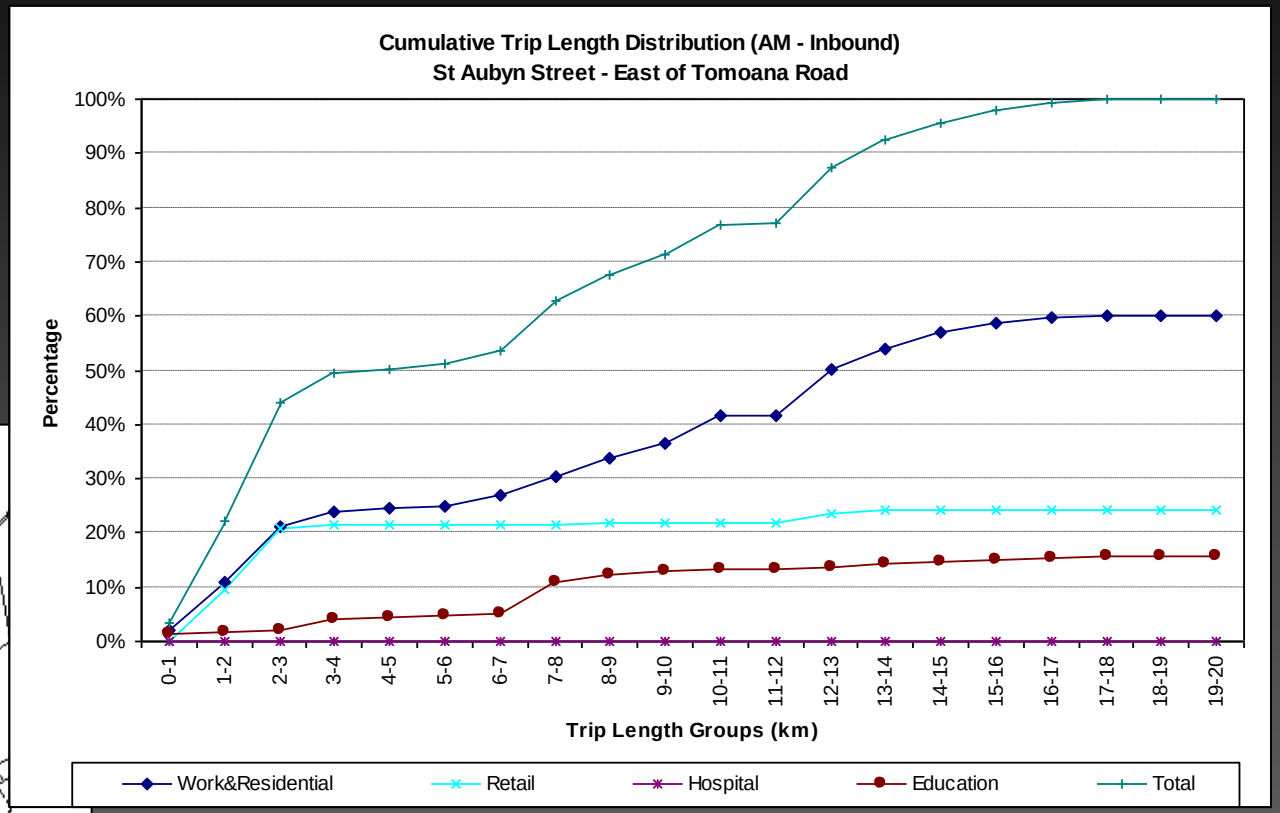
Select Link Locations



St. Aubyn Street – East of Tomoana Rd

- Pink = Schools
- Blue = Retail
- Green = Hospital





HAT Model Purpose

- Enable HDC to plan for the sustainable growth of Hastings in the immediate and long term future
- Build a multi-modal modelling platform
- Determine the functionality of existing Hastings urban roading network

How are we challenging activity and behaviour in Hastings

- Represent real world constraints… through regional land-use model (vehicle ownership, income levels, household compositions etc)
- Determine detailed distribution and assignment (microsimulation model)
- Assess who travels less than 8km and what their trip purpose is
- Levy organisations with specific targets for activity
- Analyse where $ is best put for optimal cycle routing

Conclusion: Encouraging Activity
(Until our health professionals tell us otherwise)

- Identify Who To Target
- Engage Them in Process

Many thanks to Hastings District Council

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