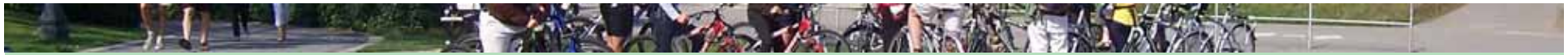
ENTR 614
Sustainable Transport Planning

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Advanced Cycle Design

Lecture Outline



- Separated Bikeways
  - Types of Separators
  - Design Issues
- Neighbourhood Greenways
  - Typical Elements
- Path Width Estimations

"AAA" Routes for All Ages & Abilities

www.8-80cities.org

This Means Either…

UC UNIVERSITY OF CANTERBURY

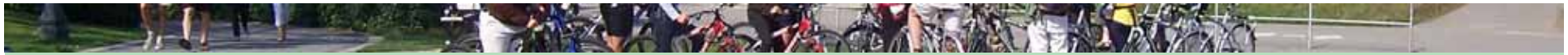
…Or…

UNIVERSITY OF CANTERBURY

Separated Bikeways

UC UNIVERSITY OF CANTERBURY

How to Separate



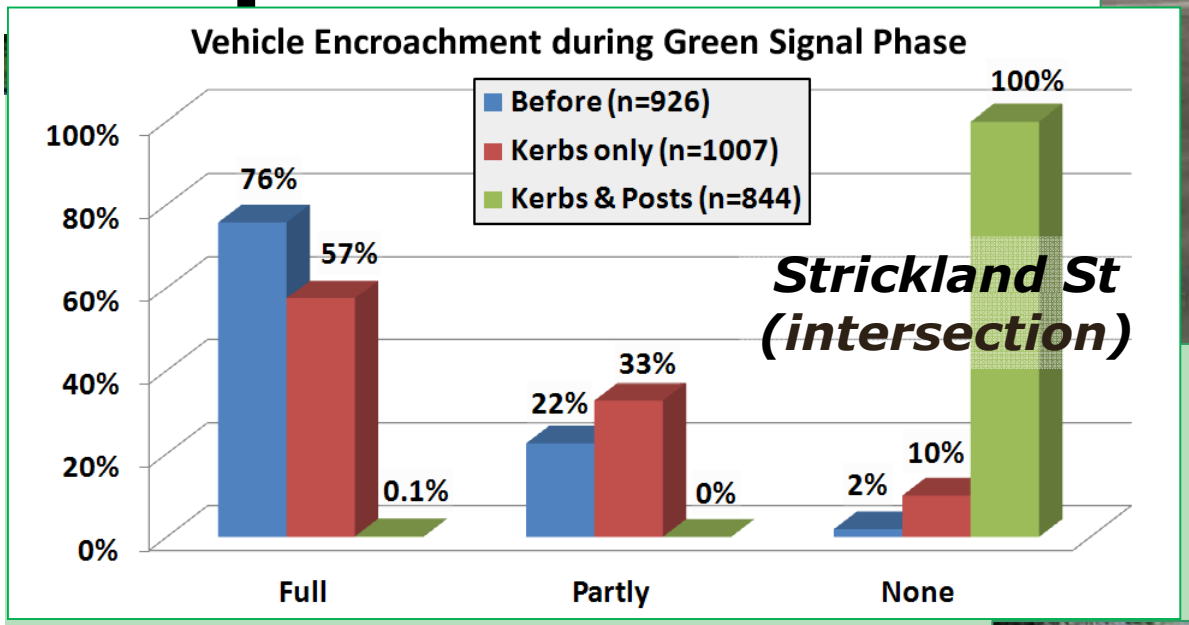
- Concrete Islands
- Small raised Delineators
- Raised Kerbs
- Grass Berms
- Vertical Posts
- Parked Cars
- Planter Boxes
- Painted Hatching

Or a combination…

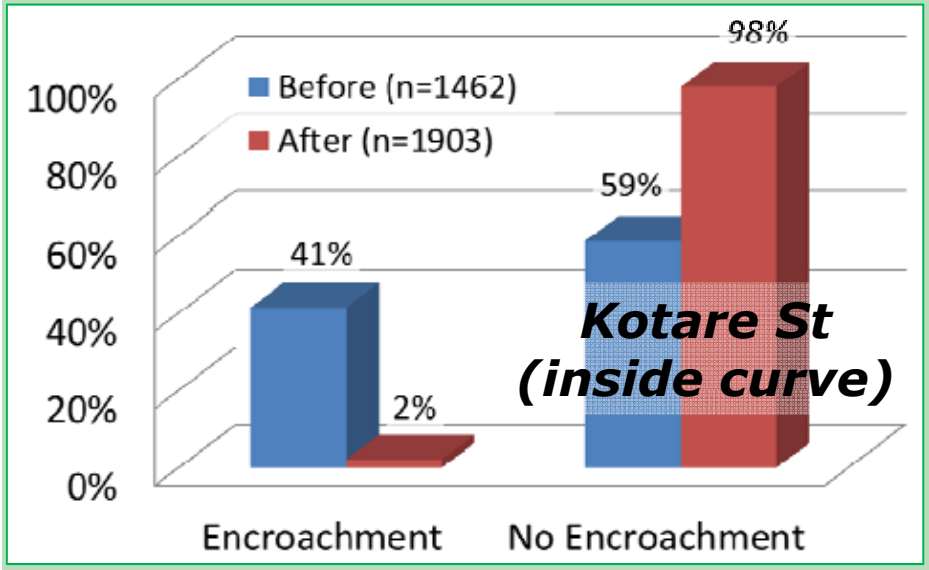
Try things out First using a "PPP" Approach...

UC UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

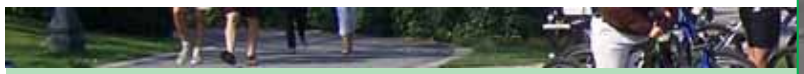
Already Trialling Separation Here



Koorey G., Wilke A., Aussendorf J. (2013), "Assessment of the Effectiveness of Narrow Separators on Cycle Lanes", IPENZ Transportation Group Conference, Dunedin, 14-16 Apr 2013.



Protected Bike Lanes

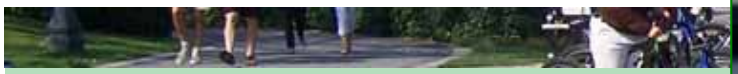


Protected Bike Lanes

Portland OR, US

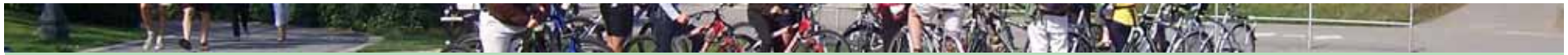
Albert Street, Melbourne

Brisbane, Australia

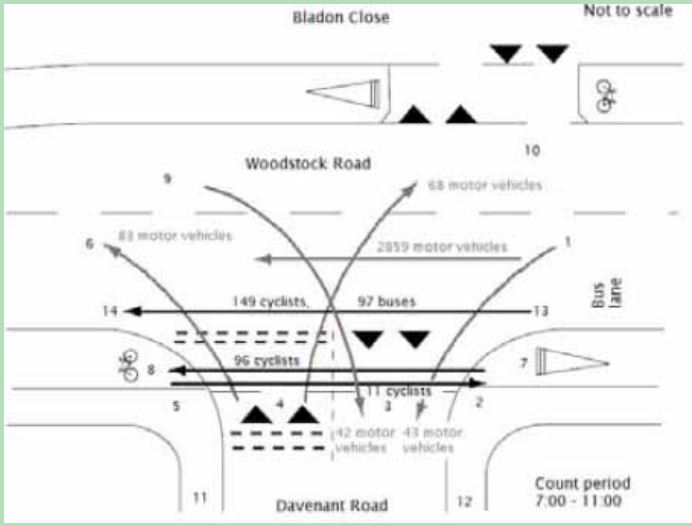


9th Ave, New York City
(One-Way Street)

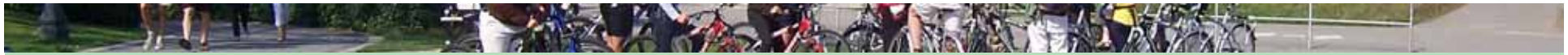
The Debate Over Separated Bike Facilities



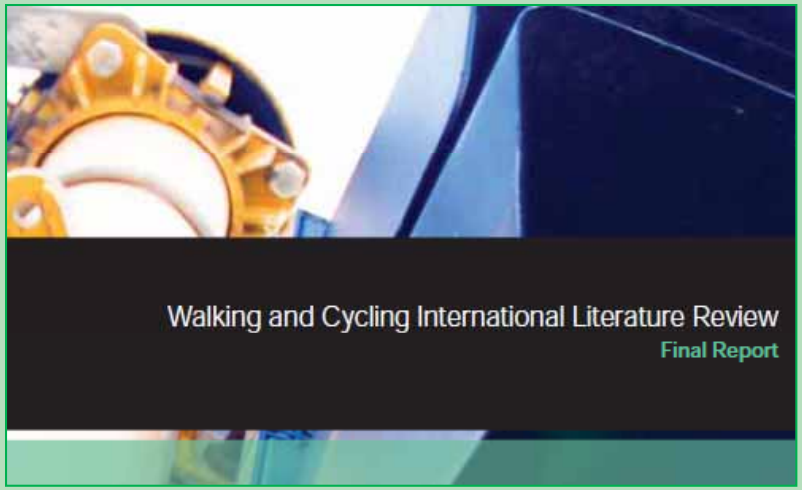
- SBFs are **less safe** for the individual user
  - The viewpoint of many vehicular cycling / skills training advocates
  - Based on research by Pedley (2000) at a poorly designed intersection
  - NZTA report 389 *Cycle Safety: Reducing the Crash Risk* (Beca, 2009)
- Often more to do with
  - Poorly built (foot)paths
  - Intersection crashes (esp. wrong-way paths)



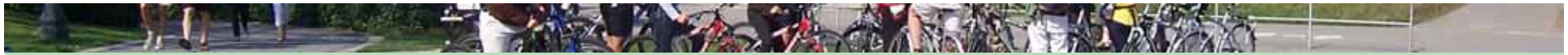
The Debate Over SBFs cont'd



- SBFs are **more safe** due to the "safety in numbers" effect
  - Viewpoint of sociologists and researchers of public preferences
  - Walking and cycling international literature review (Krizek et al. 2009) *www.transport.vic.gov.au*
- *So long as safety issues are addressed, extra cycle numbers can improve behaviour*

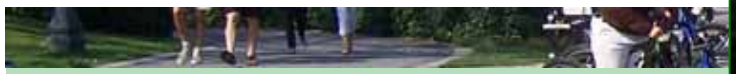


Potential Issues to Resolve



- How to access from opposite side
  - Hook Turns?
  - Gaps in Separators
- Turning Conflicts at Intersections
  - Separate Phasing? Ban Turns?
  - Return Bikeway to road ahead of Inters'n?
- Maintenance
  - Separators with gaps
  - Wider Bikeway or Narrow Maintenance Vehicle
- Loss of Parking?

Driveway / Sideroad Treatment



Vancouver, Canada

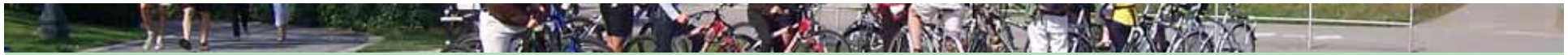
Path v. Side Road – Ambiguity

Pavement continuity indicates side road / driveway gives way to path, but limit lines retrofitted despite RUR

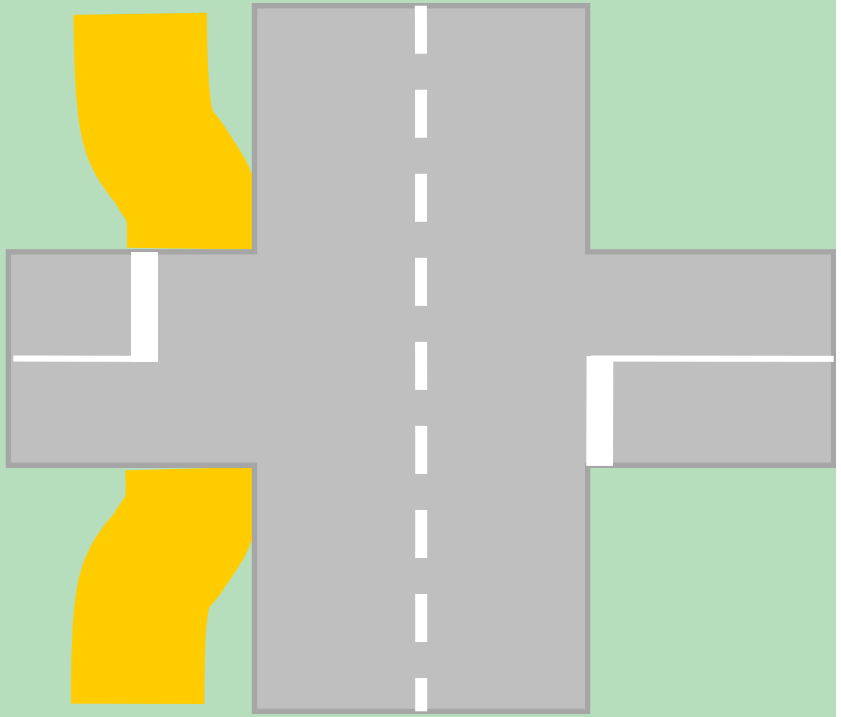
Side road or driveway?

- Path : Side volumes = 1000 : 160
- RCA may erect Give Way signs on side road or pathway

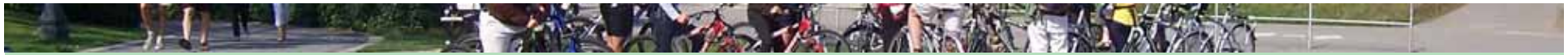
Path at Intersection - Path bends In



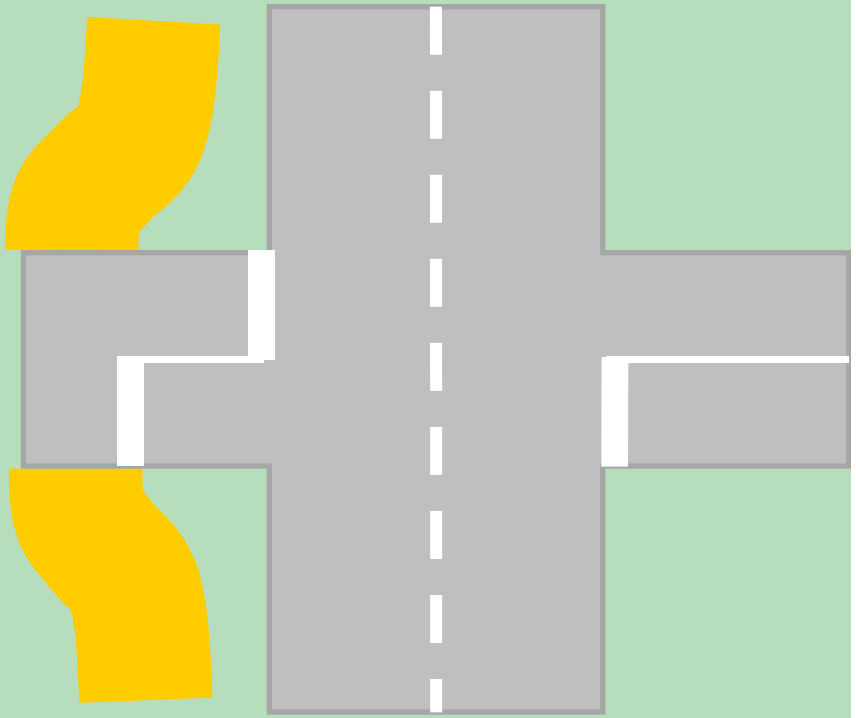
- Improves inter-visibility between path users and turning vehicles
- Conflict points closer
  - Entering traffic may not give way
- Traffic not always looking for "wrong-way" bikes



Path at Intersection - Path bends Out



- Separates conflict points
  - Motorists have negotiated intersection and can then concentrate on checking for path users
- Vehicles may have increased speed and not be ready to brake for path users



Neighbourhood Greenways

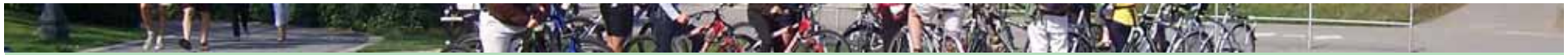
UC UNIVERSITY OF CANTERBURY

Vancouver, Canada

aka "Bike Boulevards" or "Local Street Bikeways"

Eugene OR, US

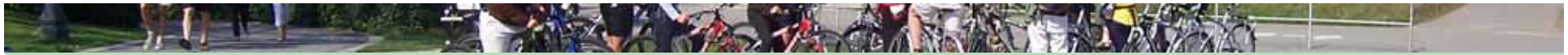
Why "Neighbourhood Greenways"?



- They provide advantages for people cycling *and* walking in their neighbourhood
- They provide access for locals to a range of neighbourhood facilities
  - e.g. shops, schools, parks
- They often incorporate "green" aspects to the route
  - e.g. plantings, swales, raingardens

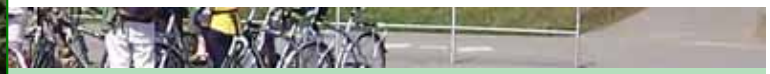
Key Tools of Neighbourhood Greenways

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND



- Comprehensive **signage**
  - Make people aware of route and its destinations
- Intersect'n controls that **slow/divert** traffic
  e.g. mini-roundabouts, one-way entrances
- Facilities to assist **crossing** busy roads
  e.g. central islands, traffic signals
- **Lower speed** limits along route (30-40k)
  - Mid-block devices to slow down or restrict traffic, e.g. humps, islands
- Where necessary, short lengths of pathway or cycle track to help "join the dots"

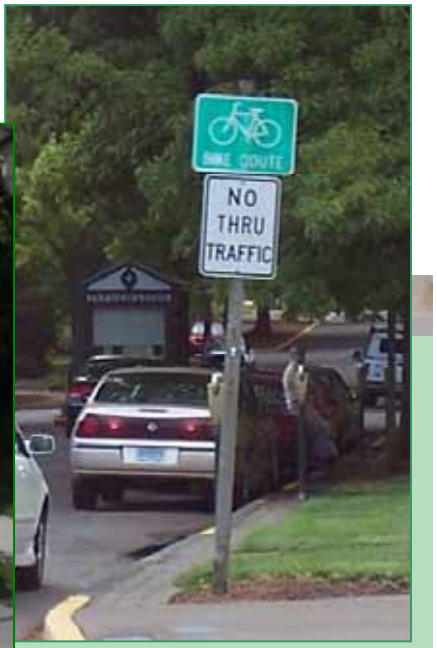
Low Speeds and Volumes



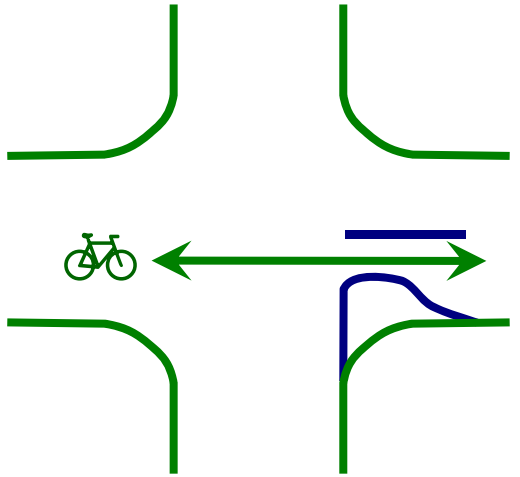
Portland OR, US

Traffic Restrictions

Vancouver, Canada



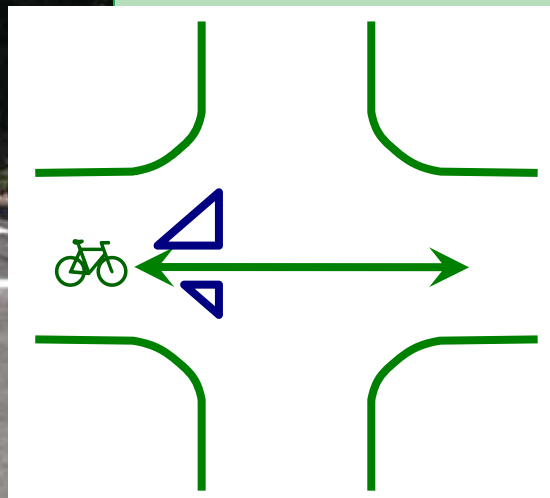
Eugene OR, US



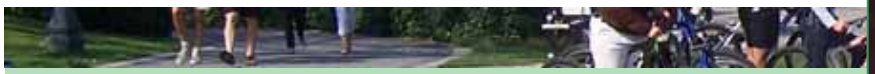
Traffic Restrictions cont'd

Vancouver, Canada

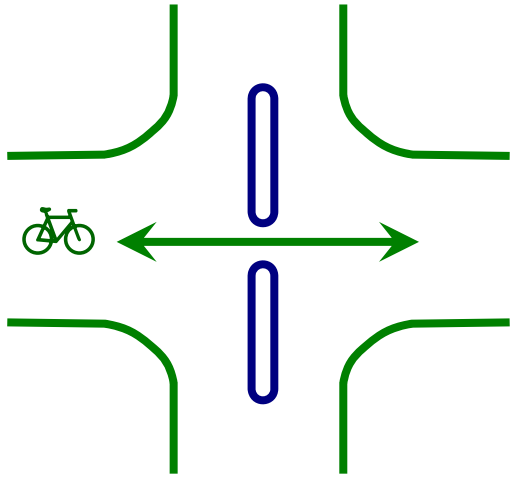
Portland OR, US



Traffic Restrictions cont'd

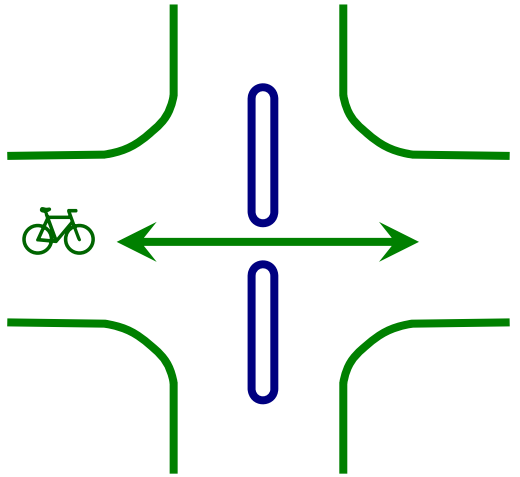


Vancouver, Canada

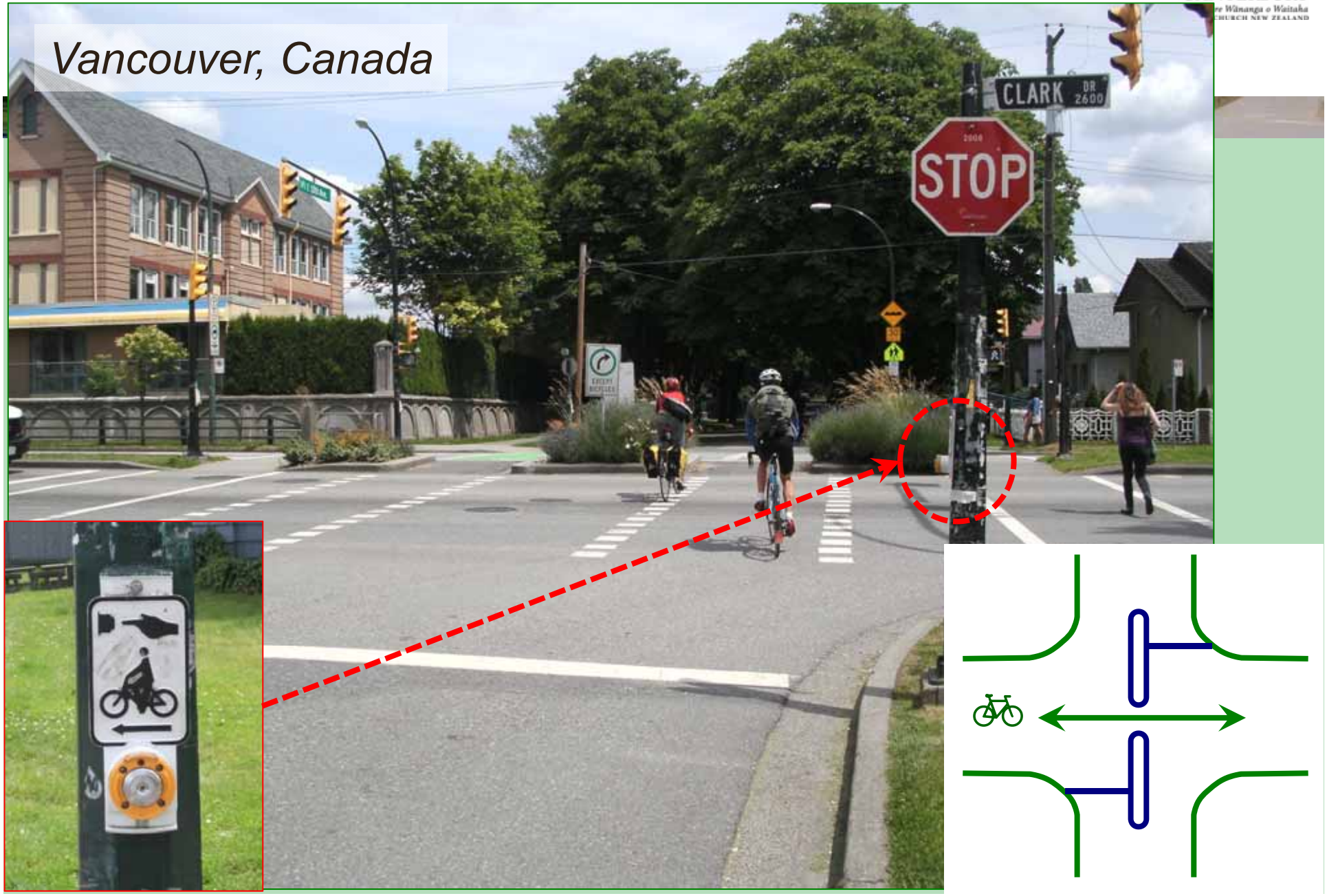


Major Road Crossings

Portland OR, US

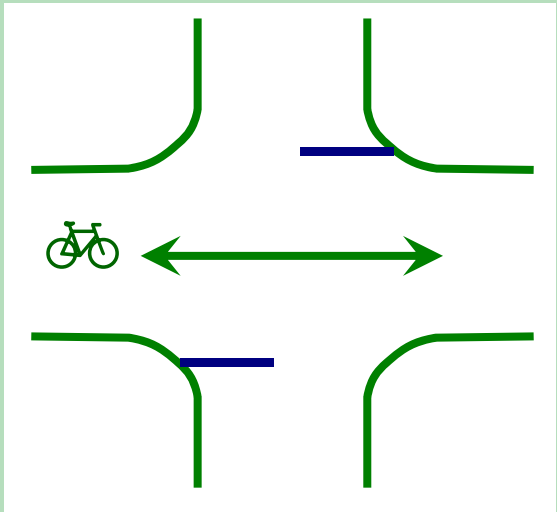


Major Road Crossings



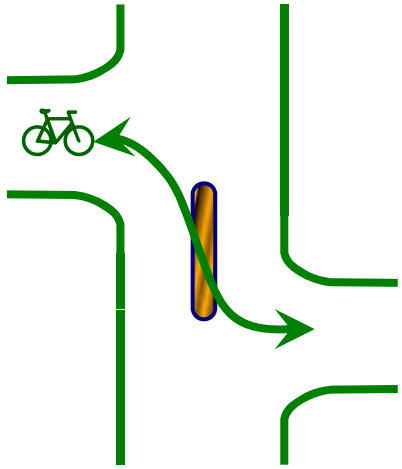
Major Road Crossings

Portland OR, US



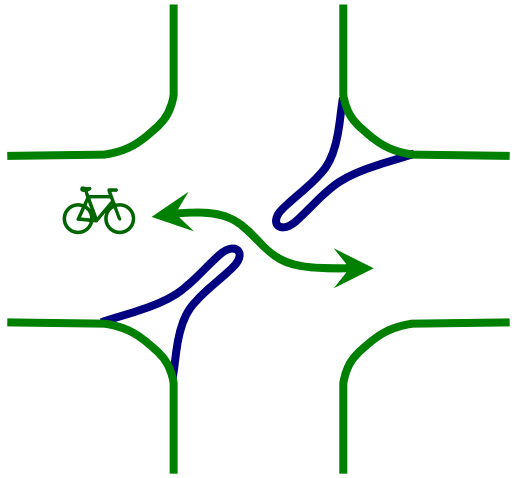
Offset Connections

Portland
OR, US

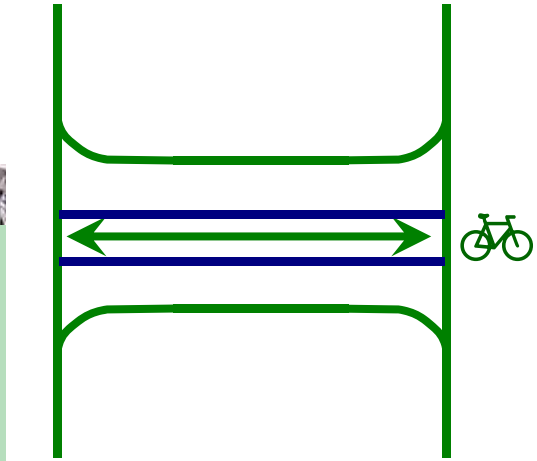


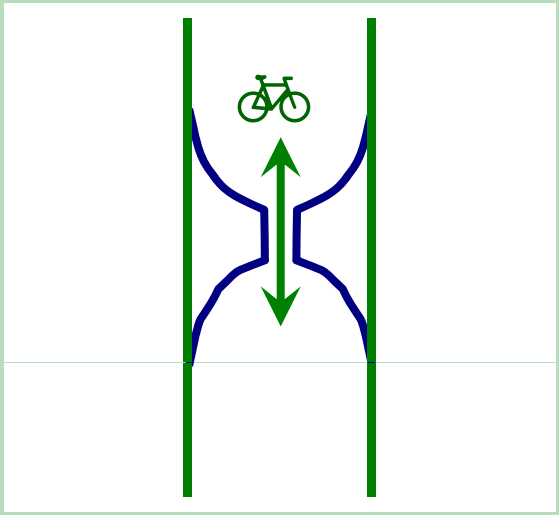
Ped/Bike Bypasses

Vancouver, Canada



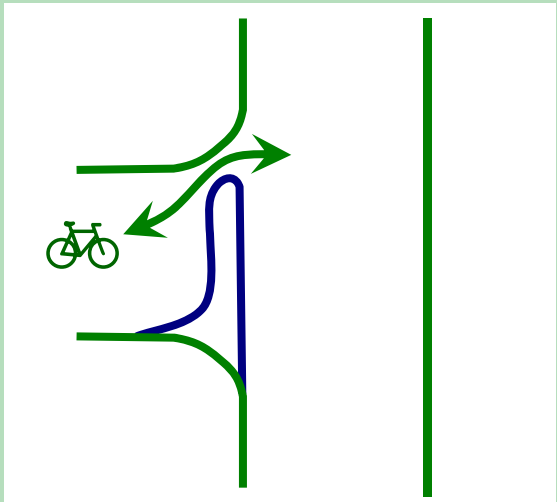
Bicycle Bypasses



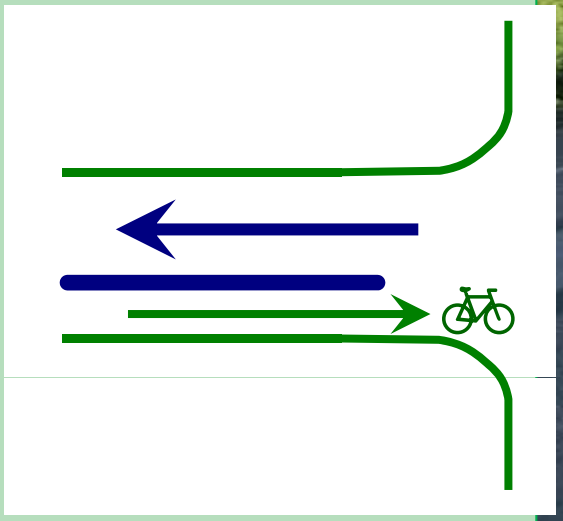


Bicycle Bypasses cont'd

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND



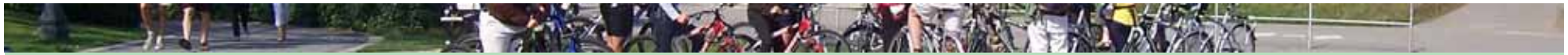
Contra-Flow Bikeways



The "Greenway" Bit...

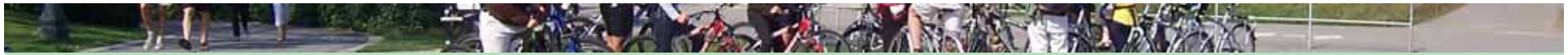
Portland OR, US

Planning for Greenways



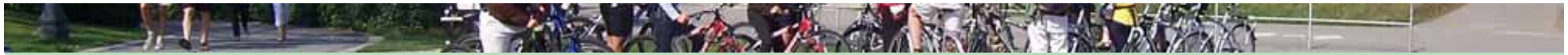
- Generally cost a lot less than conventional cycleways
  - Largely low-key treatments
- Work best in grid networks
  - Motorists can use parallel routes
- Tend to provide benefits for all road users
  - Speed-reduction benefits
- Opportunity to add to property values
  - Trade-off reductions in access?

Path Width Estimations

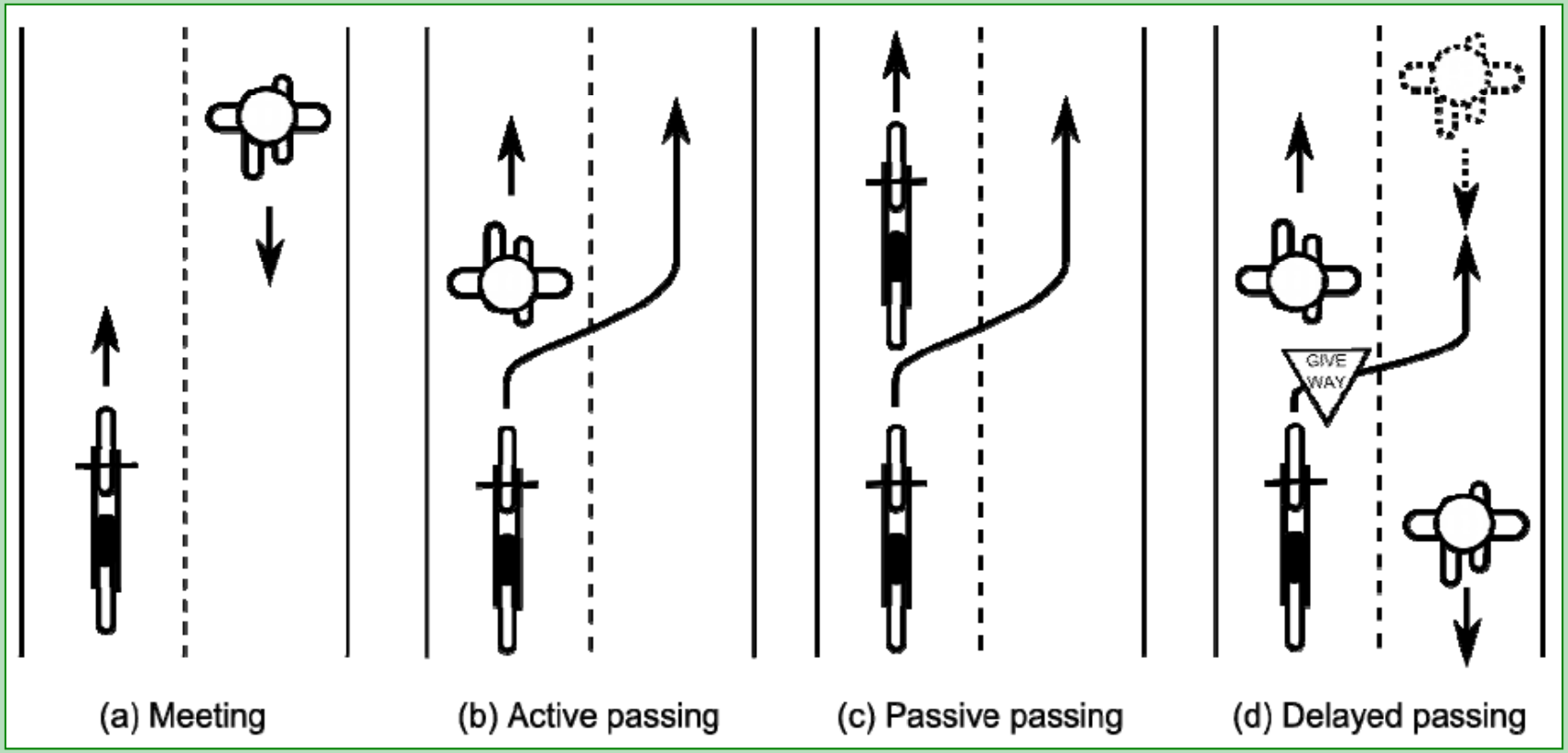


- Required Path Width obviously depends on volumes
  - Pedestrians and Cyclists
- Also inherently reliant on:
  - User characteristics (speed etc)
  - Directional split of volumes
  - Target LOS

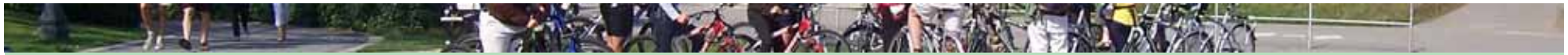
Path Width Research
(VicRoads Cycle Note 21)



- Best available research
  - Based on Interactions of path users



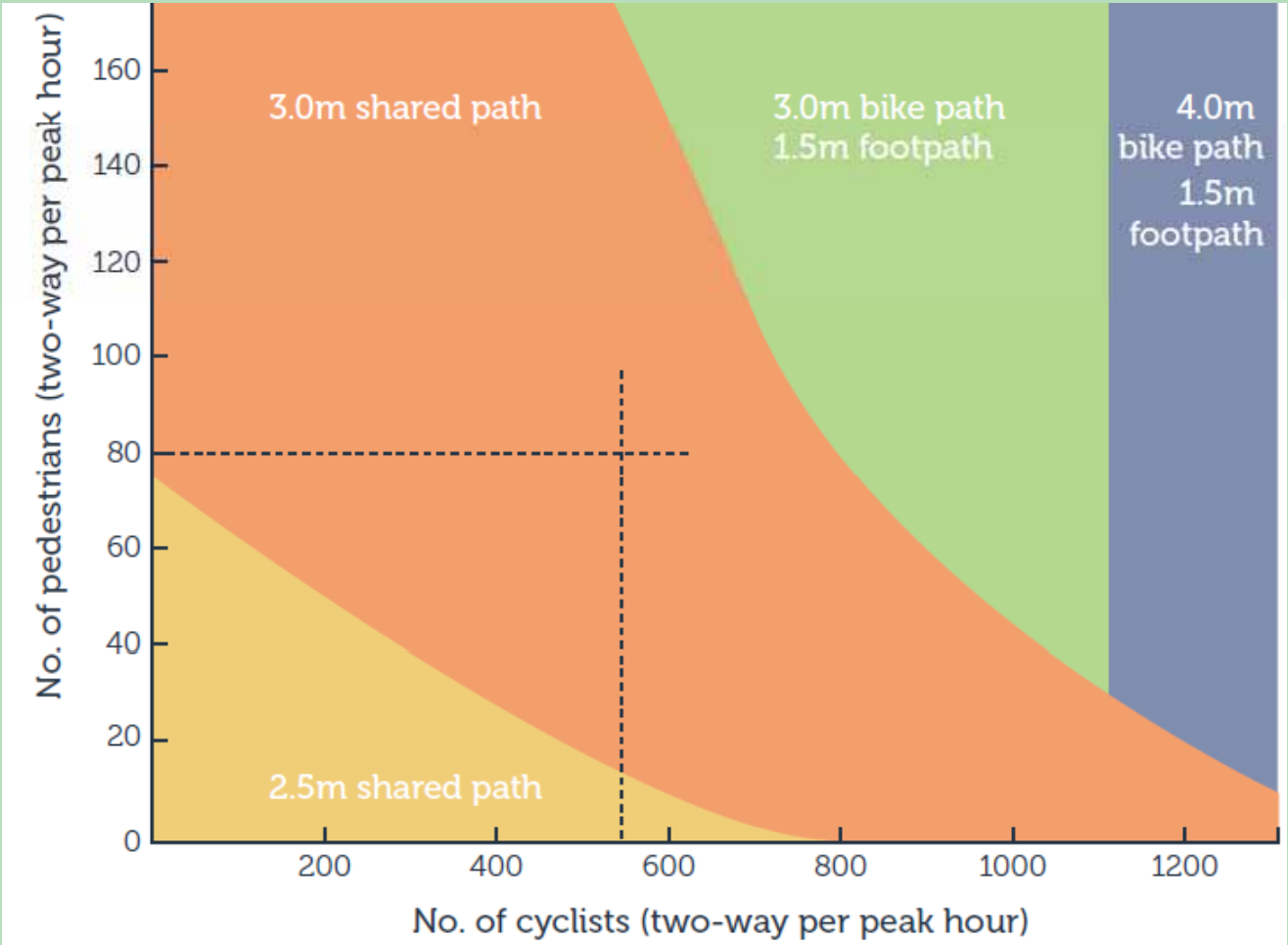
Path Width Research



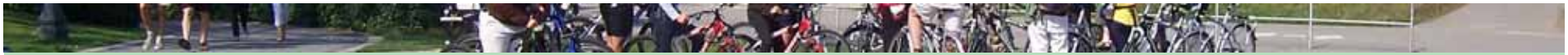
Commuter Path – Directional Split 90/10 example:

- 550 cyclists, 80 peds on AM peak

➔ 3.0m shared path required



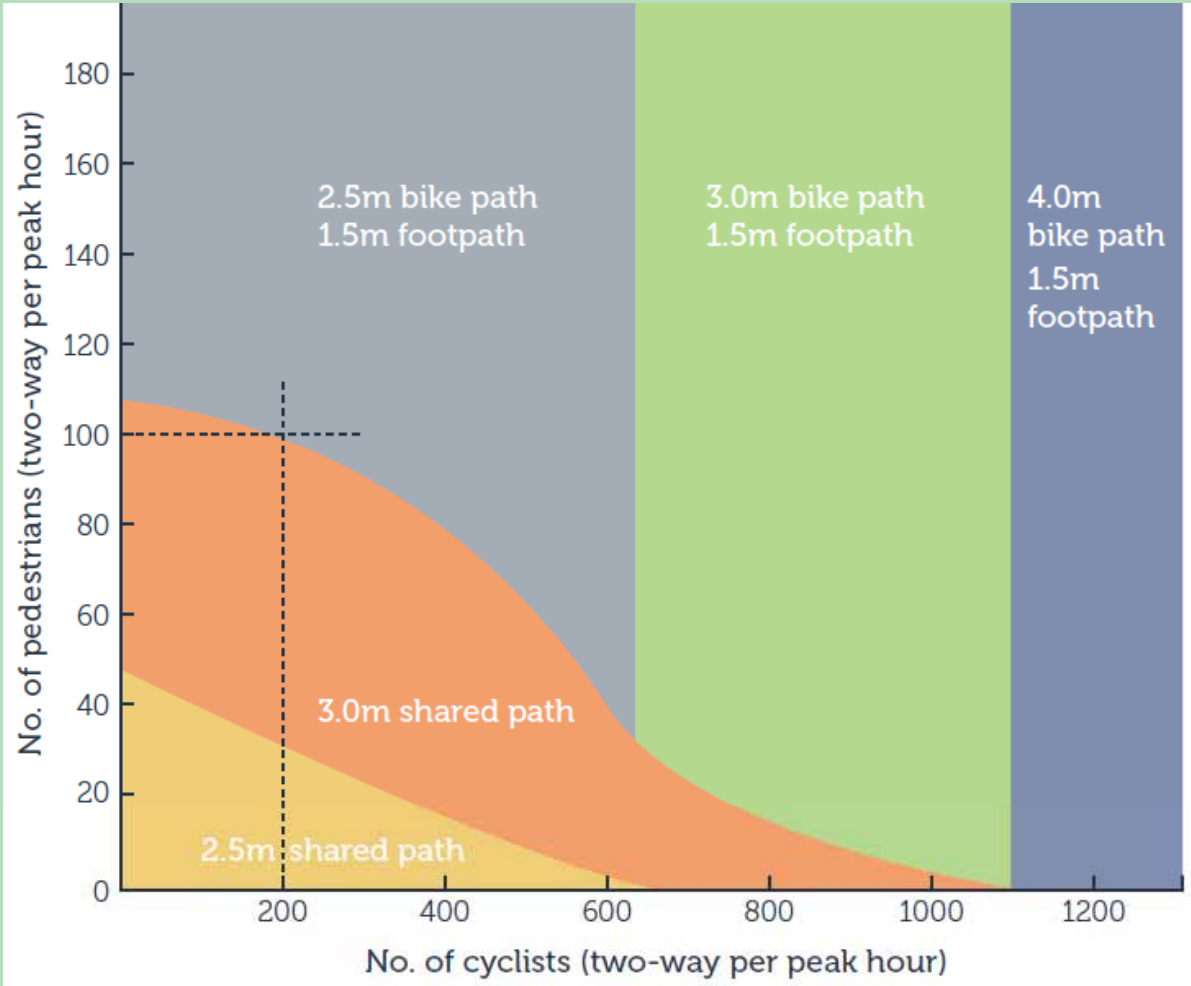
Path Width Research



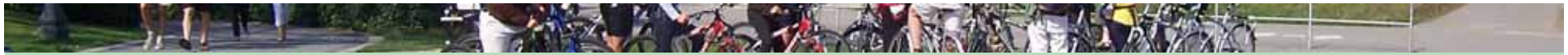
Recreational Path – Directional Split 50/50 example:

- 200 cyclists, 100 ped'ns during weekend peak hour

➔ 2.5m bike and 1.5m footpath is suitable



Conclusions



- Some Level of Bikeway Separation attracts the widest range of Cycle Users
  - Need to address Visibility & Intersection Issues
  - Lots of Options for Temporary Trials
- Neighbourhood Greenways provide "Invisible" Cycling Infrastructure
  - Also benefit other Road Users and Residents
- Adequate Width is the key to Shared Paths
  - Sometimes also need to be separated