

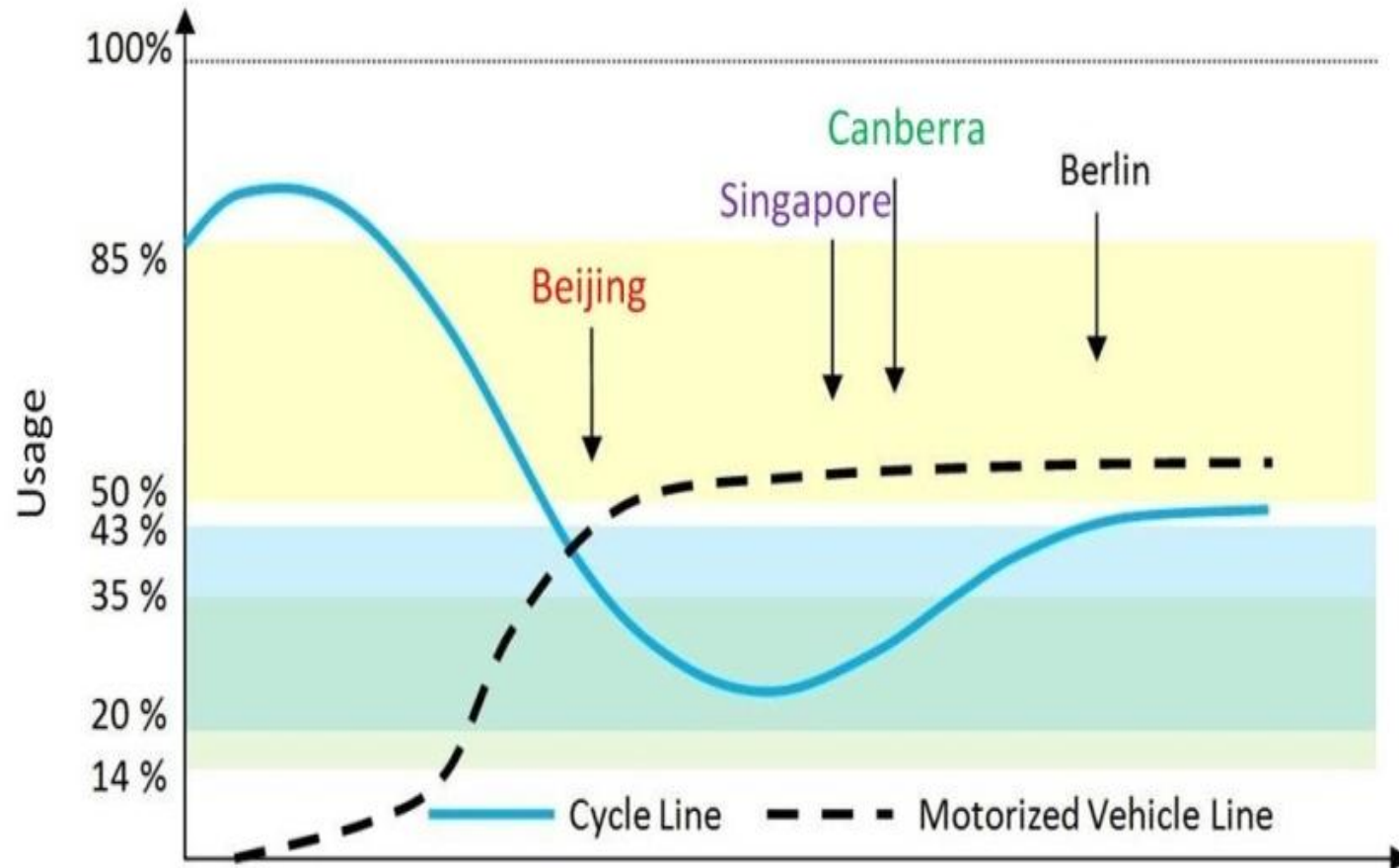


# Developments of shared walking-cycling infrastructure in Singapore

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ICSC2014, Gothenburg, Sweden, 18-19 Nov 2014

# Cycling evolution in Singapore: vibrancy (50's-70's) to decimation (70's-90's), & revival (90's- )



Koh, P.P. and Wong, Y.D., "The evolution of cycling in Singapore", Journeys (ISSN 1793-494X), November 2012, LTA Academy, Land Transport Authority, Singapore, pp. 39-50.

Meng, M., Koh, P.P., Wong, Y.D. and Zhong, Y.H., "Influences of urban characteristics on cycling: Experiences of four cities", Sustainable Cities and Society, Vol. 13, 2014, pp. 78-88.

## Ecosystem (in relation to transport mobility)

- 84% residents in high-rise cluster housings, gathered around compact residential townships; quarter-fold increase in population (to 6.9 millions) by 2030
- Roads occupy 12% land footprint; little new space for roads ahead
- Road vehicles growth is highly restrained
- Rail to be doubled to 360km by 2030; 8 in 10 homes to be within 10-minute walk to a rail station → very conducive for walking/cycling



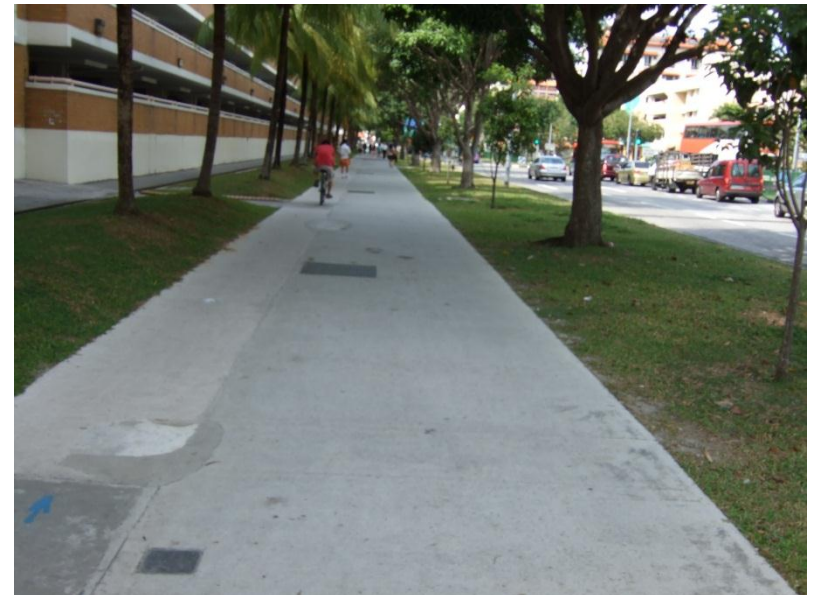
## Street-scape (in relation to walking and cycling)

- Streets mainly 50 km/h, closely-spaced lanes, tight swept paths
- Footpaths alongside almost all roads/streets; off-road cycling tracks in some estates; no “on-road” bicycle lane to date

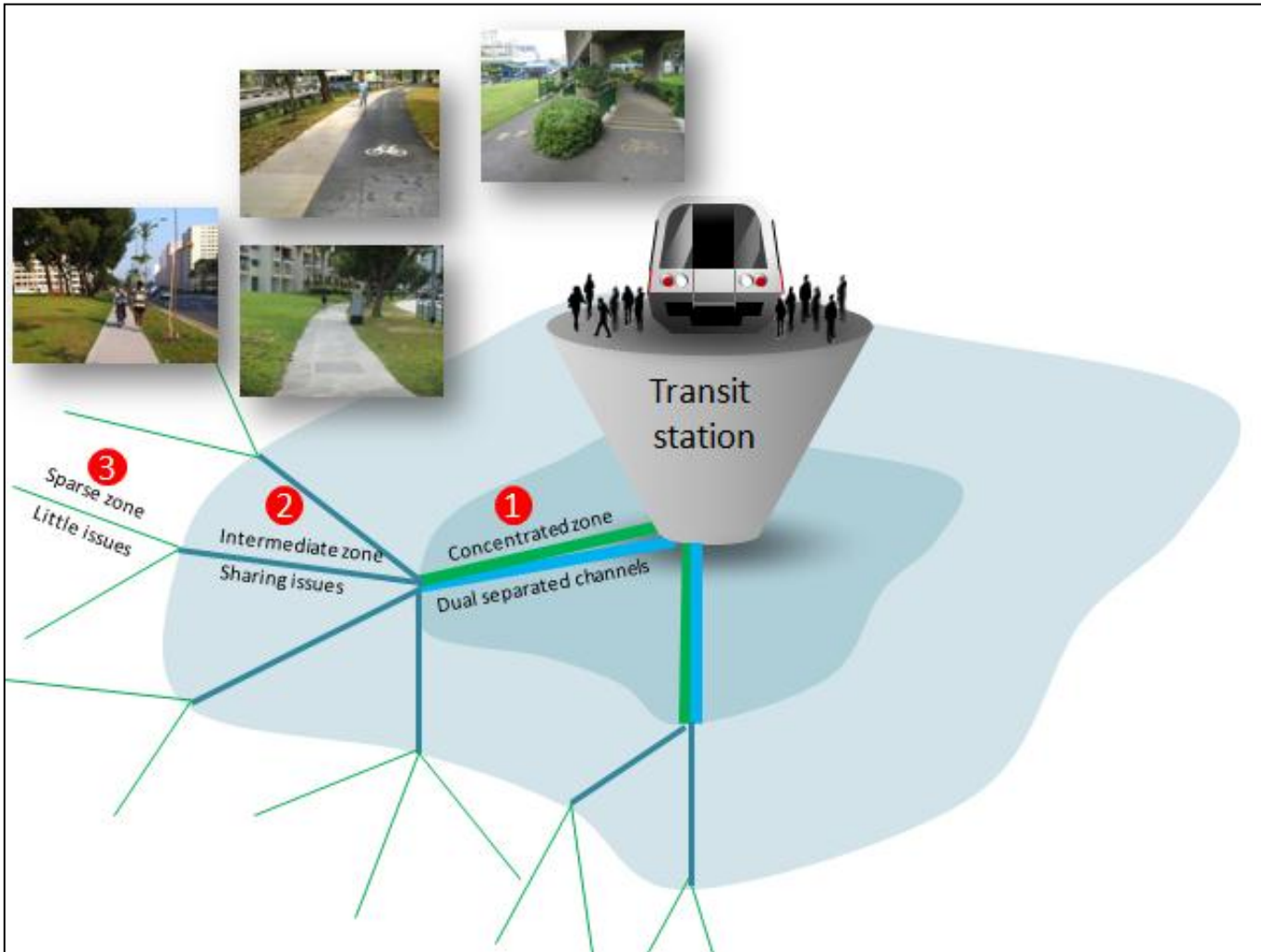


# Cyclists and pedestrians sharing footways

- cycling revival started on shared walking-cycling park connectors, but rapid growth in intra-town cycling (first/last mile, run errands etc.)
- 1 in 2 households has an adult bicycle
- 2 in 3 utilitarian cyclists riding on side-walks (safer, leisurely, shady), and cross-walks at signalised junctions



# Shared non-motorised transport (NMT) network emanating from transit station



**1** – CO-LOCATION of segregated footway & cycle-way

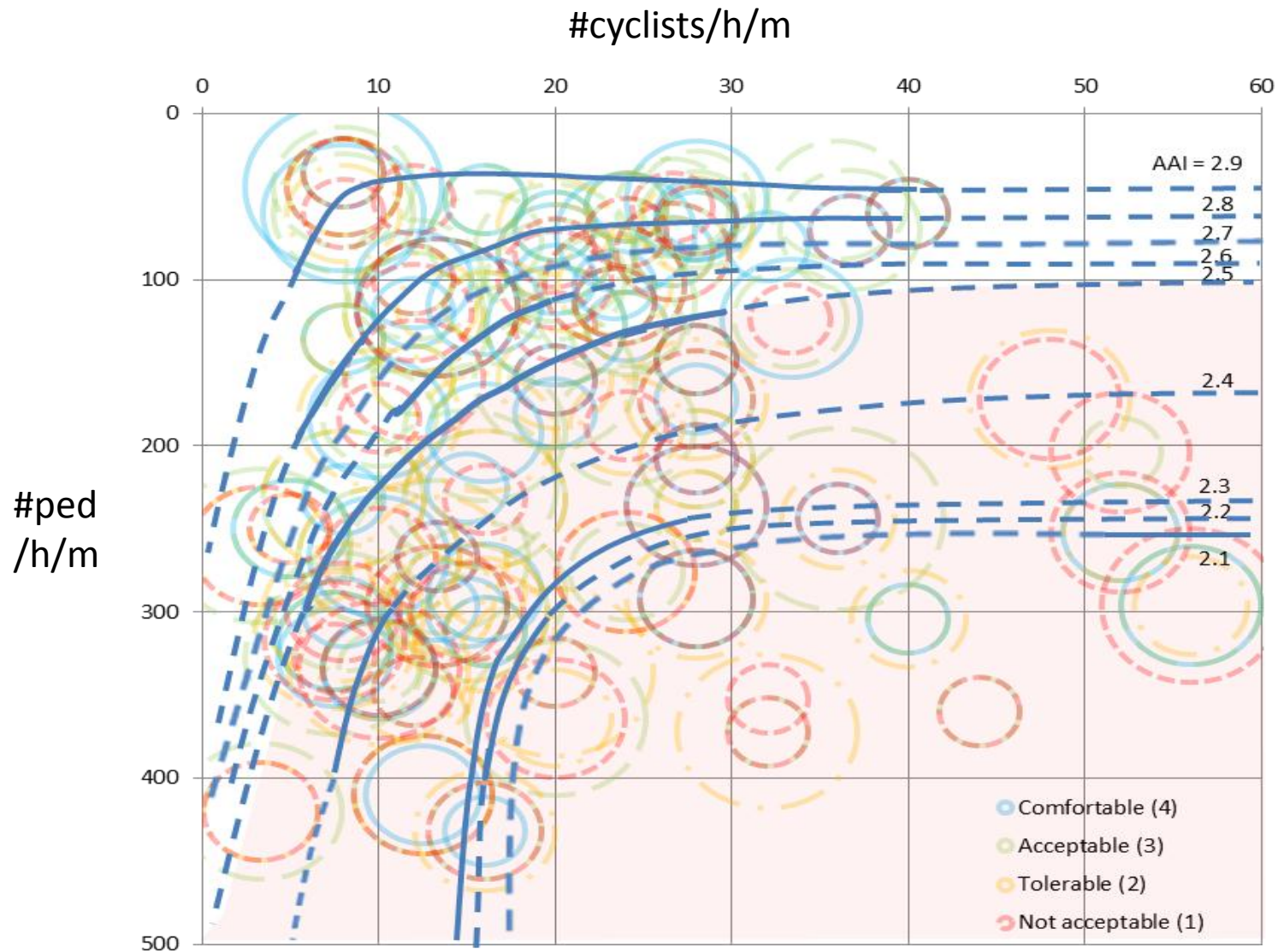
**2** – SHARING of widened pathway

**3** – SHARING of existing footways

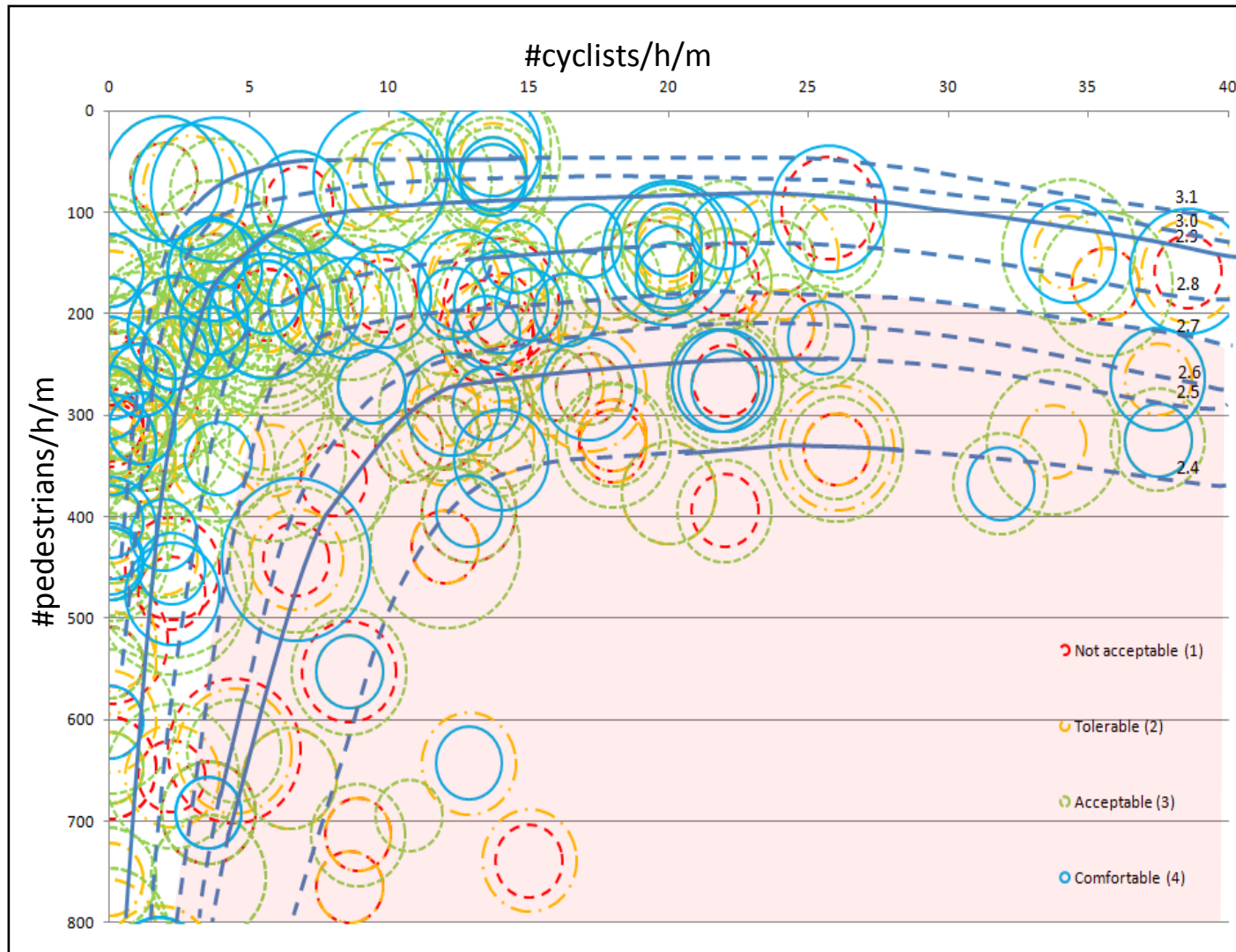
# Interviewing the pedestrians: target frame and positioning of interviewers



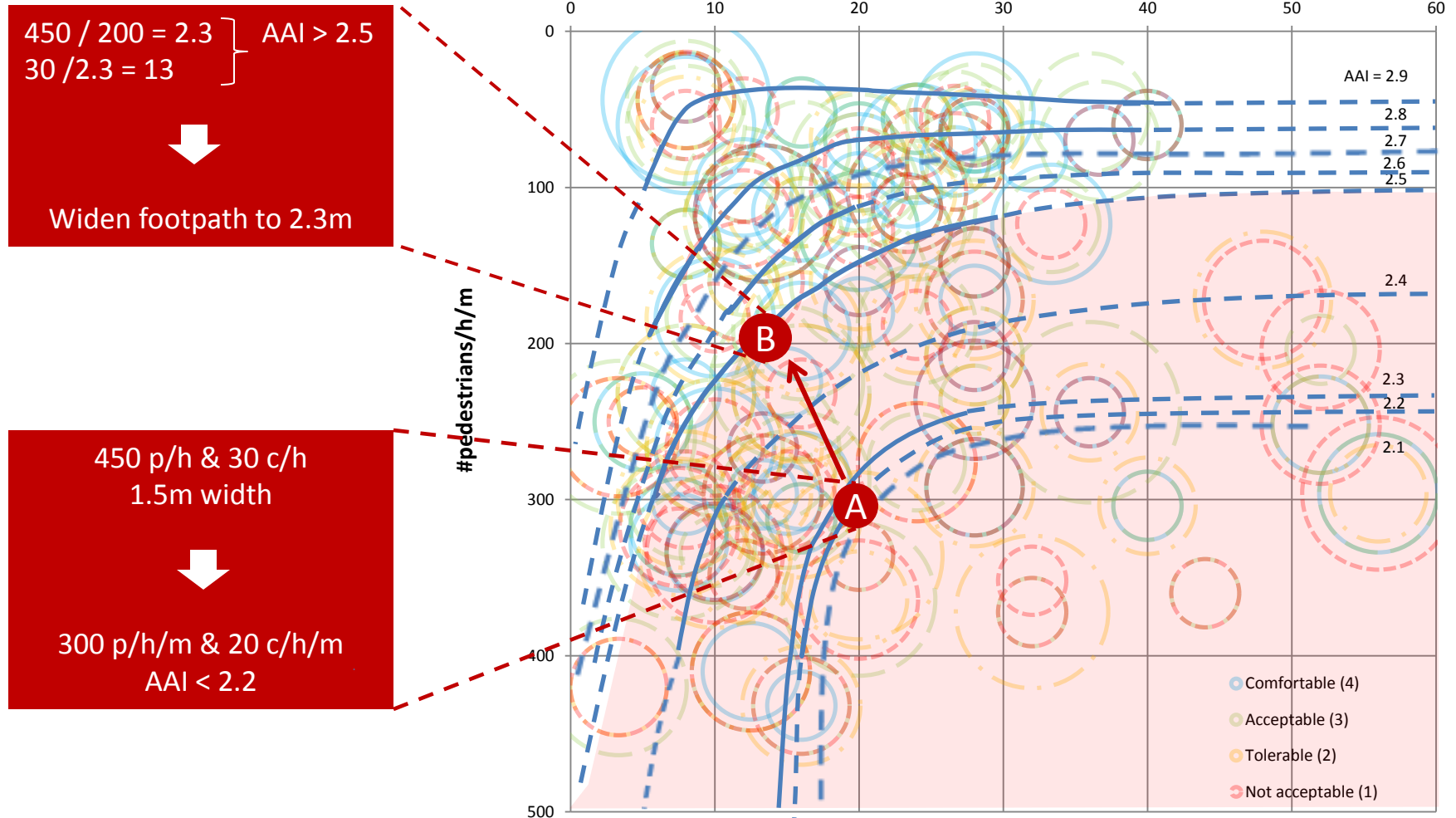
# LOSAM graph (for side-walk)



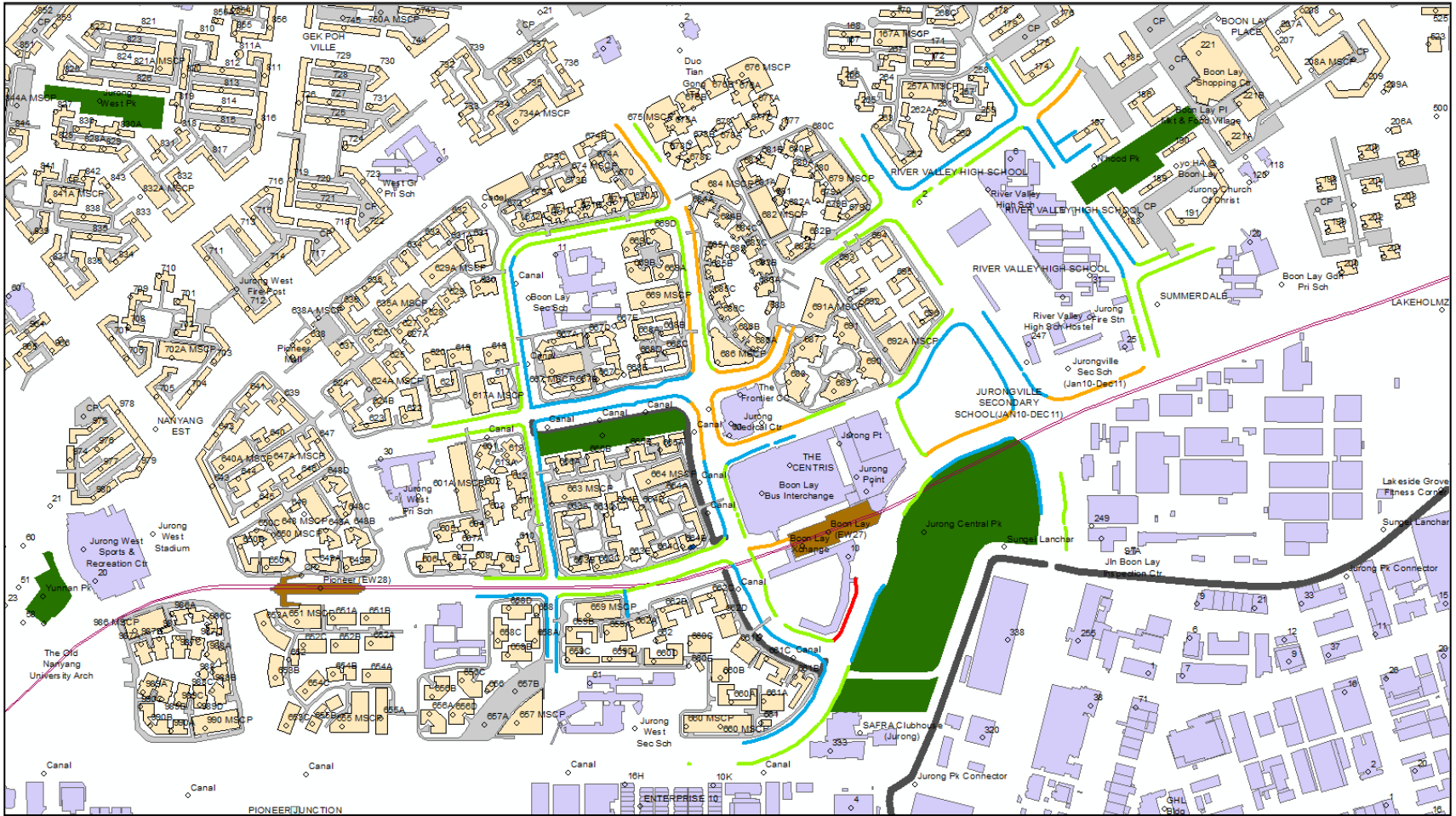
# LOSAM graph (for signalised cross-walk)



# Application of LOSAM on the side-walk



# LOSAM-audited NMT network (Boon Lay MRT Station catchment )



## Concluding remarks

- LOSAM allows design & audit-retrofit to specified level of serviceability
- LOSAM to be calibrated as conditions evolve
- Footway sharing can facilitate vulnerable users (young and old) coming onto the NMT network
- New space by way of elevated, multi-deck channels (more portable bikes, scooter board, etc.)

Next up: Walking/cycling on elevated environmental deck (E-deck) linking mixed-use activity centres



# Our developments ahead:

--- R&D programmes into walking/cycling on elevated infrastructure (E-Decks) network including bicycle simulator, driving simulator, etc.

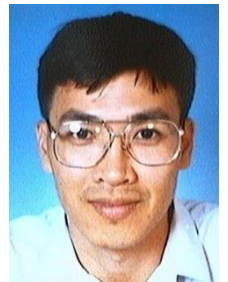
--- Research manpower

- ➔ Tenure-track Assistant Professor position in Urbanisation – search
- ➔ Post-doc Research Fellow positions on walking & cycling - search
- ➔ PhD candidatures with scholarship – search (4Qtr 2014/ 1Qtr 2015)
- ➔ Visiting Scientists – 2015/2016



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