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Public transport as catalyst for social interactions: how it works in low-density environment?

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Background – low mobility and social disadvantage

- 'while it is clear that there have been substantial increases in personal mobility since the 1950s, it is also clear that these increases have not been equally spread around society' Tight et al. (1999)
- Social disadvantage can affect mobility, which in turn can adversely affect one's ability to access social networks (Currie & Stanley, 2008; Currie & Delbosc, 2010; and Dodson et. al, 2007).

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Background – barriers to mobility

- Barriers in our physical environment such as; long commute distances and/or times, poor walkability in suburbs (Tranter & Whitelegg, 1994; Speck, 2012), poor public transport.
- Access to services and employment in car dominated cities requires the purchase of an expensive 'membership' (in the form of a car, a licence, and fuel) to enjoy the advantages of mobility (Nash, 2013).

Many challenges in low-density environment

Research question

- How does public transport could help social interactions in low-density environment?
- How transit induced social interactions contribute to building of social capital?
- What is the role of public transport in the context of building social interaction and how do these factors affect quality of life?

Method

Barriers examined by

- Satisfaction with the public transport services
- Distance to work
- Public transport commute times
- Neighbourhood walkability
- Combined barriers to mobility (service frequency, commute distance and walkability)
- Social disadvantage

Data

- ACTION Bus passenger travel data (Myway card), Census 2011 (j-t-w),(no travel diary data, no national transport survey)
- Quality of life in your city questionnaire survey

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MyWay card data

Passenger travel in June 2012, all rountes

- Origin date time
- Origin bus stop
- Passenger type (Senior, Adult, Student, Concession, Pensioner, over 75)
- Destination date, time
- Destination stop

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Quality of life in your city and living environment questionnaire survey

2012 May – Aug
Online questionnaire + mail（sent to appro 3,000 households）
648 responses collected (on-line: 278; mail: 370)

Male 230: 37.4%; Female 385: 62.6%

- Satisfaction with access to closest bus stop
- Satisfaction with the quality of public transport
- Daily travel behaviour
- Willingness to change travel behaviour

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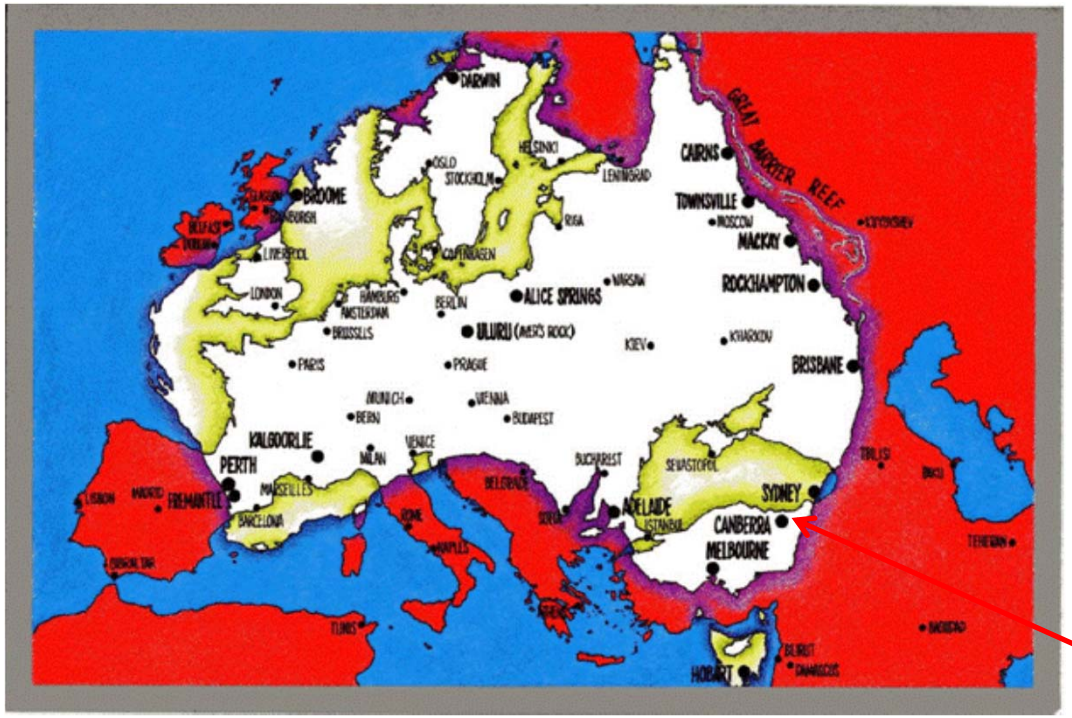
Canberra



Population 365,621 (Census 2011)
Urban population density 452.2 persons/km^2

Canberra

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Canberra in Australian context

City	Persons/ km^2	Area (km^2)
Canberra (0.37 mil.)	454.8	807.6
Sydney (4.5 mil.)	379.6	12133.7
Melbourne (4.2 mil.)	533.7	7697.4
Brisbane (0.95 mil.)	349.8	5954.2
Adelaide (1.2 mil)	659.7	1826.6
Perth (1.9 mil)	324.1	5382.4

Canberra – a planned city

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Canberra (Bush capital) - Garden City principle

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"Canberra, Federal Capital of Australia, Preliminary Plan" - "Walter Burley Griffin's Plan of Canberra as Finally Revised and Accepted"
Source Reproduction of plan from Supplement to "Building and Real Estate Magazine" first published 12 December 1913

Griffin's Amended Plan 1918

Source: Collection: National Capital Authority Library & Information Services

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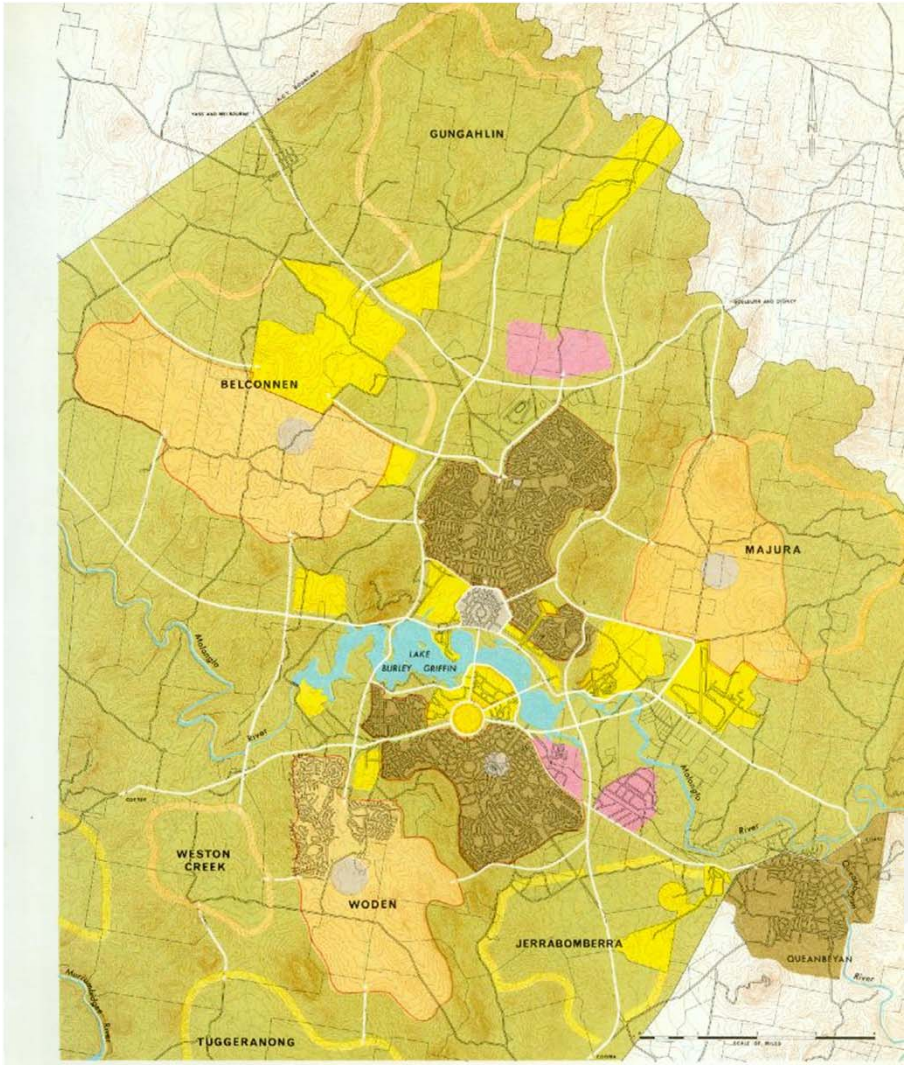
Canberra Outline Plan 1965

Population 10,000 (1939)
50,000 (1960)



CANBERRA OUTLINE PLAN TO 250,000 POPULATION

Source: Collection: National Capital Authority Library & Information Services

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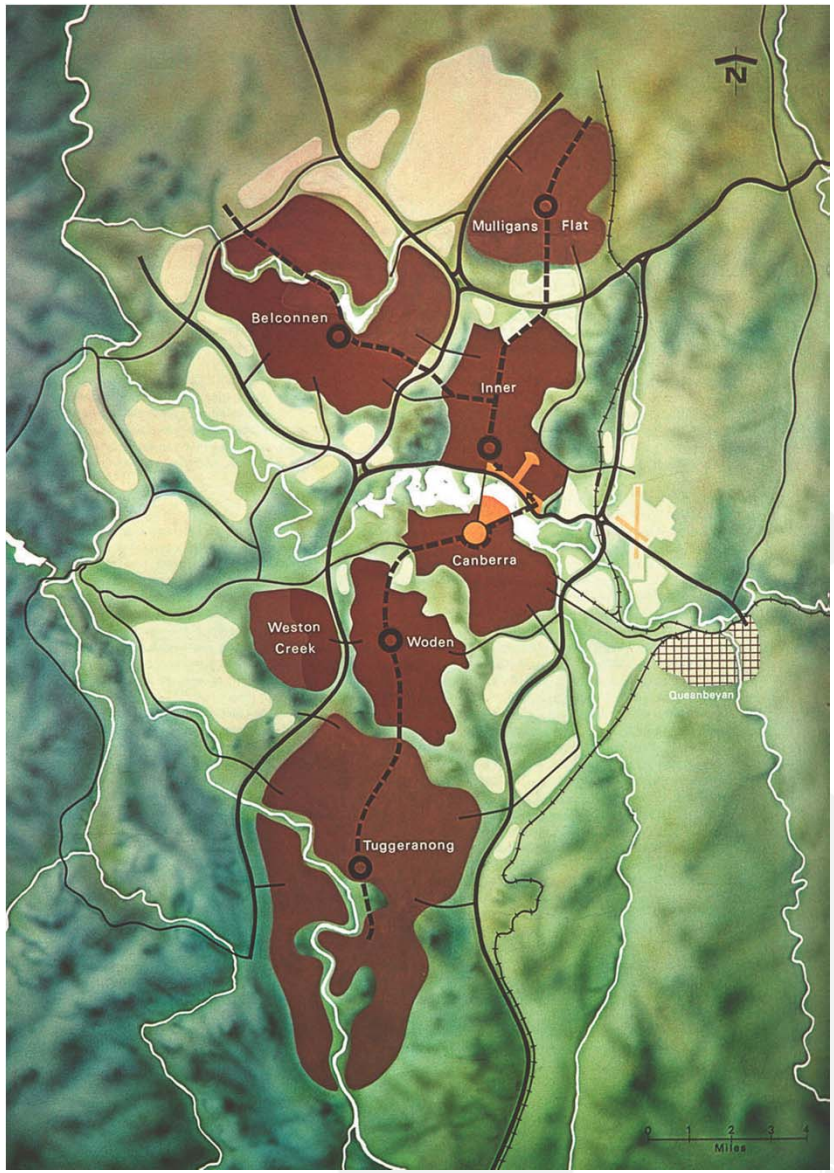
Y Plan
1970

Population 200,000 (1976)
270,000 (1988)



Source: Collection: National Capital Authority Library & Information Services

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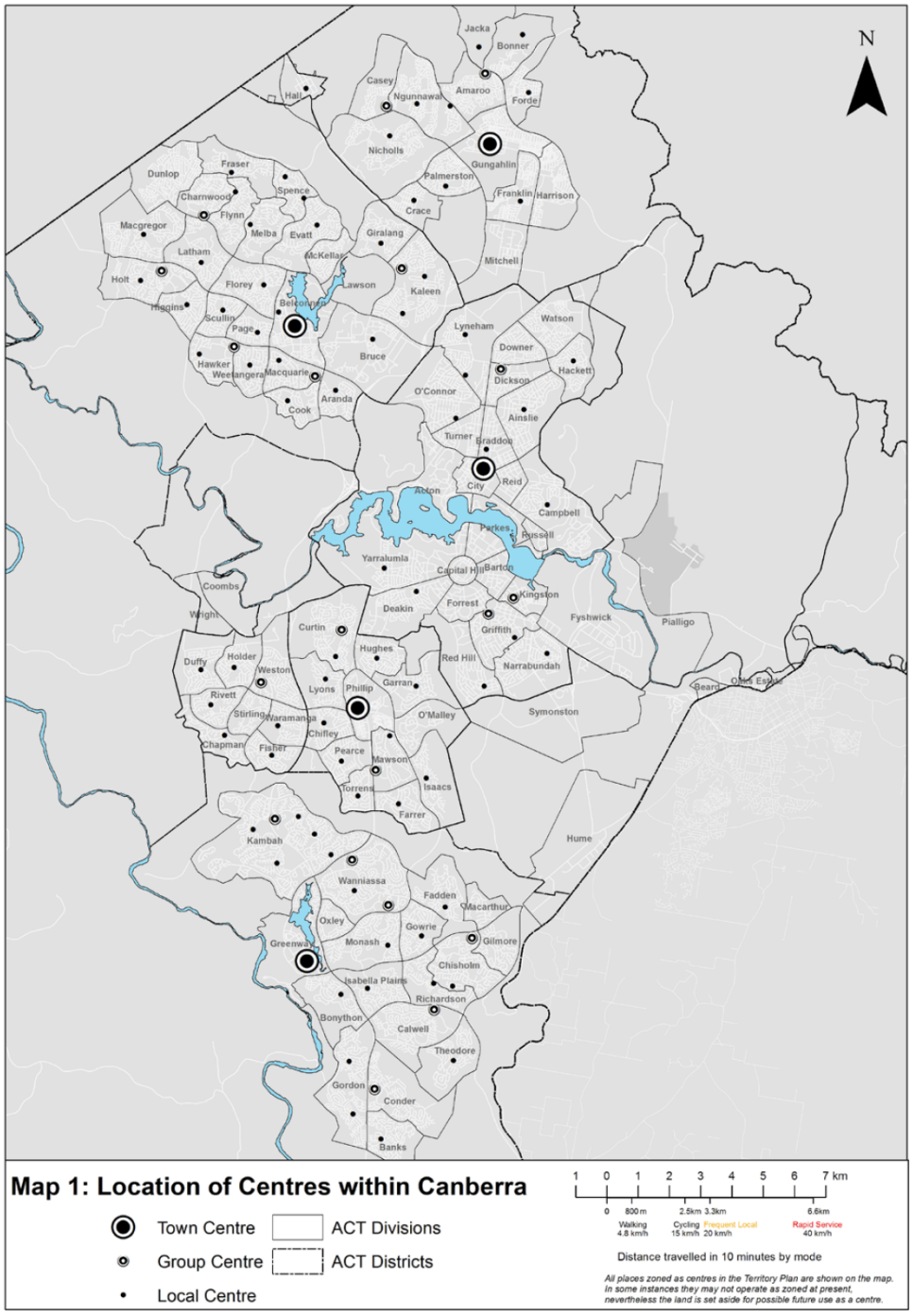
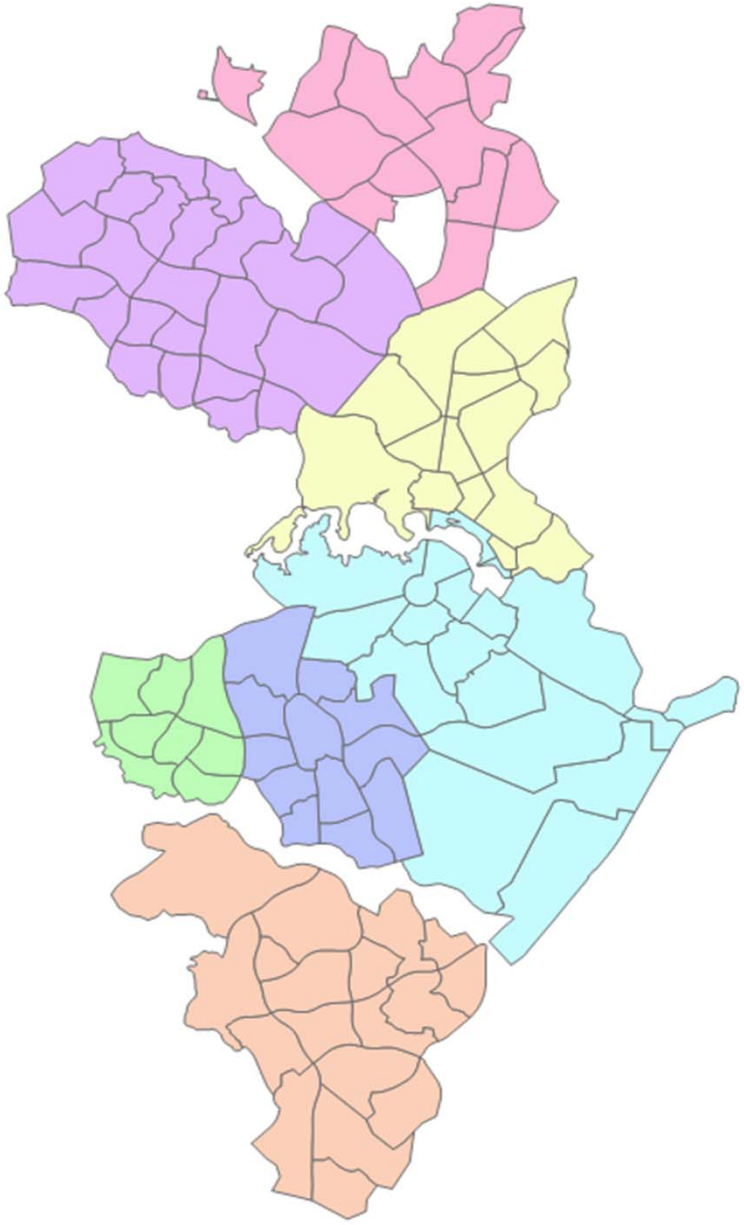
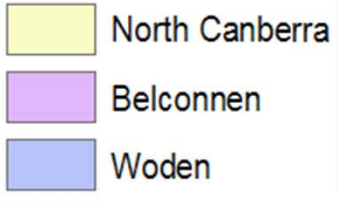
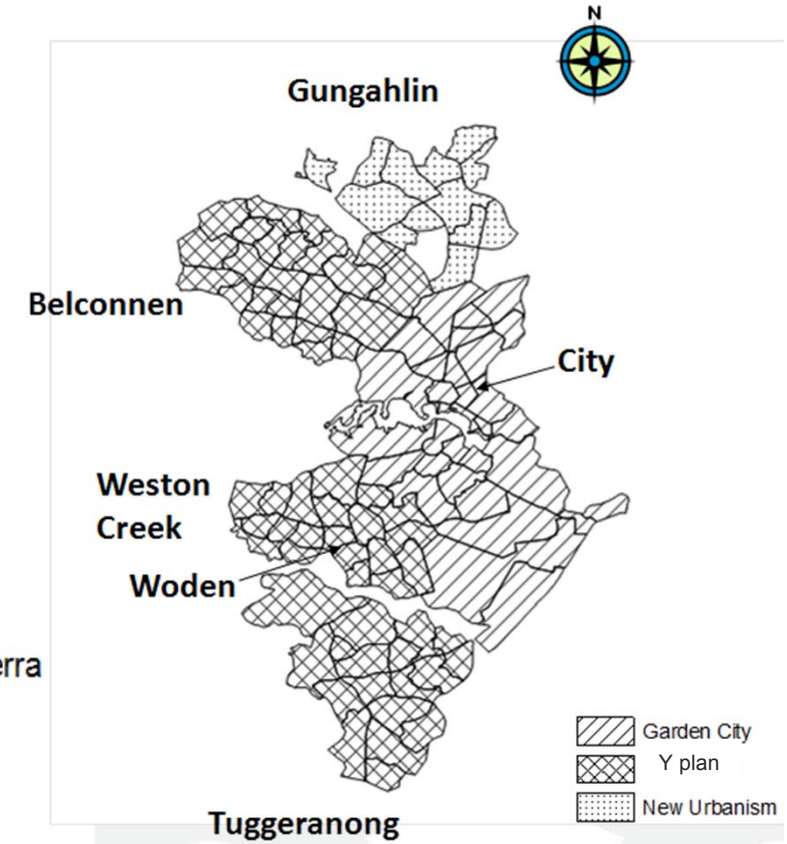


Transport for Canberra 2012




District
North Canberra
Belconnen
Woden
Weston Creek
Tuggeranong
South Canberra
Gungahlin


N
Gungahlin
Belconnen
City
Weston Creek
Woden
Tuggeranong
Garden City
Y plan
New Urbanism

(Census 2011)

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Density by neighbourhood type

	Garden City (North Canberra, South Canberra)	Y Plan (Belconnen, Weston Creek, Tuggernong, Woden)	New Urbanism (Gungahlin)
Gross population density (person/ha)	7.85	13.54	15.61
Net residential density (person/ha residential land)	30.18	46.93	47.31
Open space density (person/ha open space)	156.92	170.12	173.46

Canberra – high car dependent transportation

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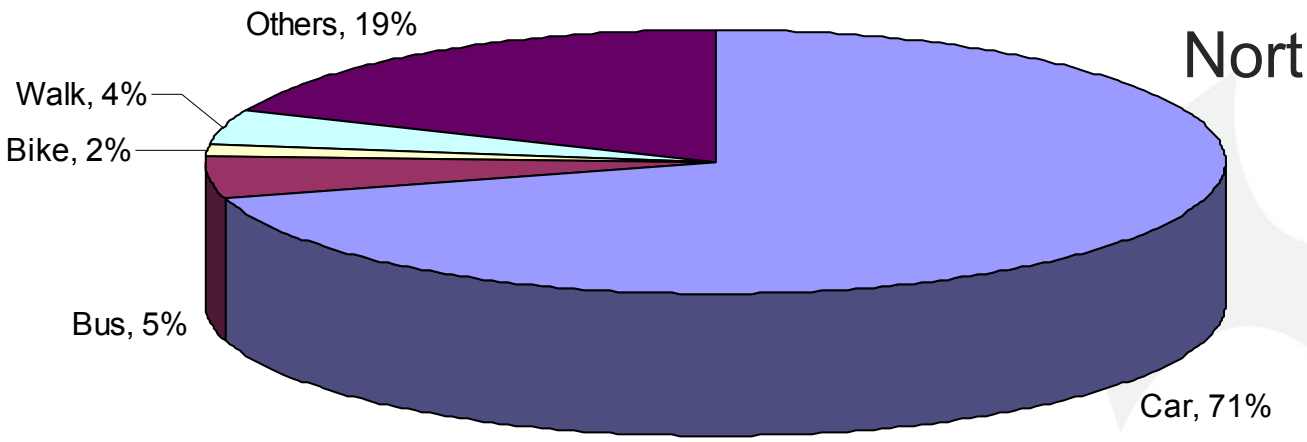
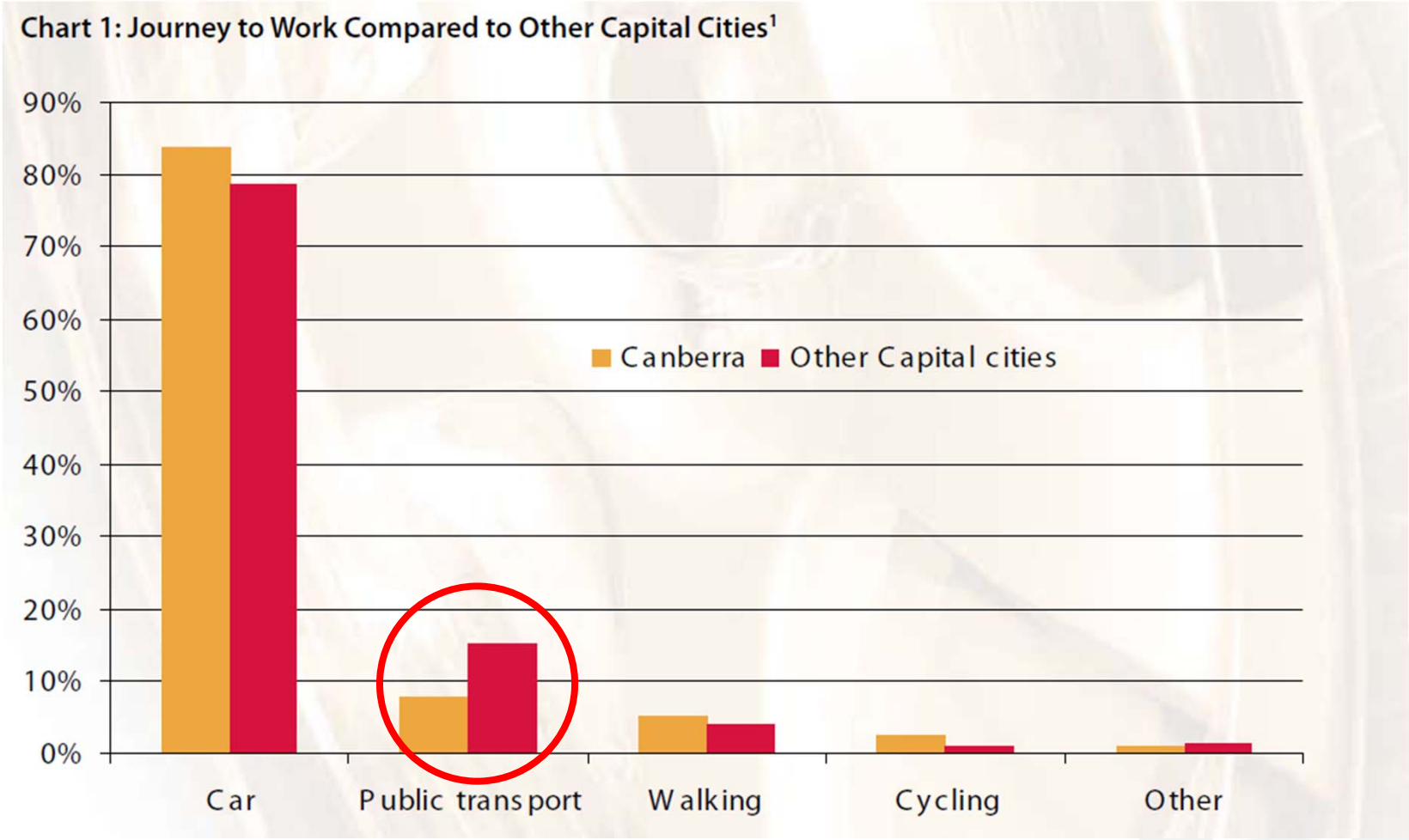
Modal share in J-T-W 2006



Northbourne Ave.

Source data: Census 2006, ABS

J-T-W Compared to Other Capital Cities



Source: ACT Government Integrated Transport Framework, 2008

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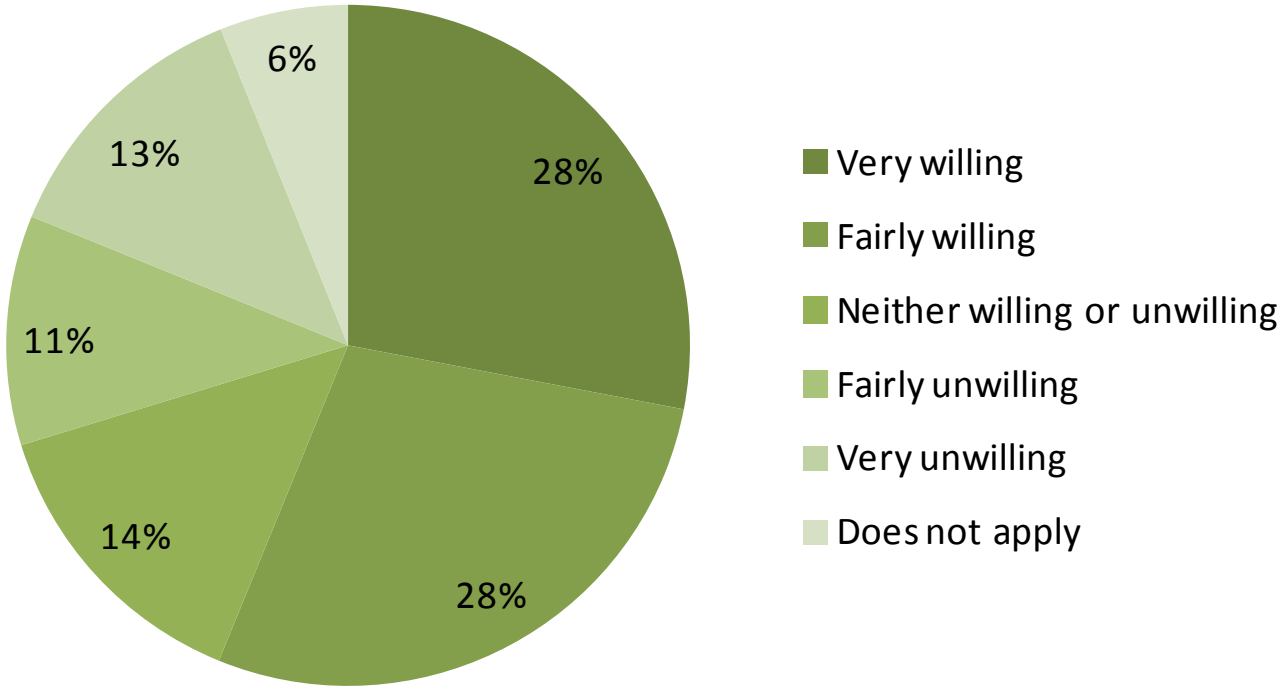
Mode of transport and travel time (from questionnaire survey)

	Car	Bus	Cycle	Walk	Motorbike	0-10 min.	11-30 min.	31-60min.	over 60 min.
Work	76%	7%	10%	7%	0%	17%	63%	20%	0%
Shopping	87%	3%	0%	11%	0%	60%	37%	0%	2%
Leisure	66%	3%	10%	20%	1%	17%	52%	22%	10%
Other journey	74%	5%	7%	14%	0%	13%	42%	21%	24%

Willingness to reduce one car journey per week



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Public Transport in Canberra

- ACTION Bus (ACT Internal Omnibus Network)

Two rapid routes (every 5-15 min.) and 73 routes (weekdays)

One rapid route (every 15 min.) and 42 routes (weekend)

Transport Disadvantage in Canberra

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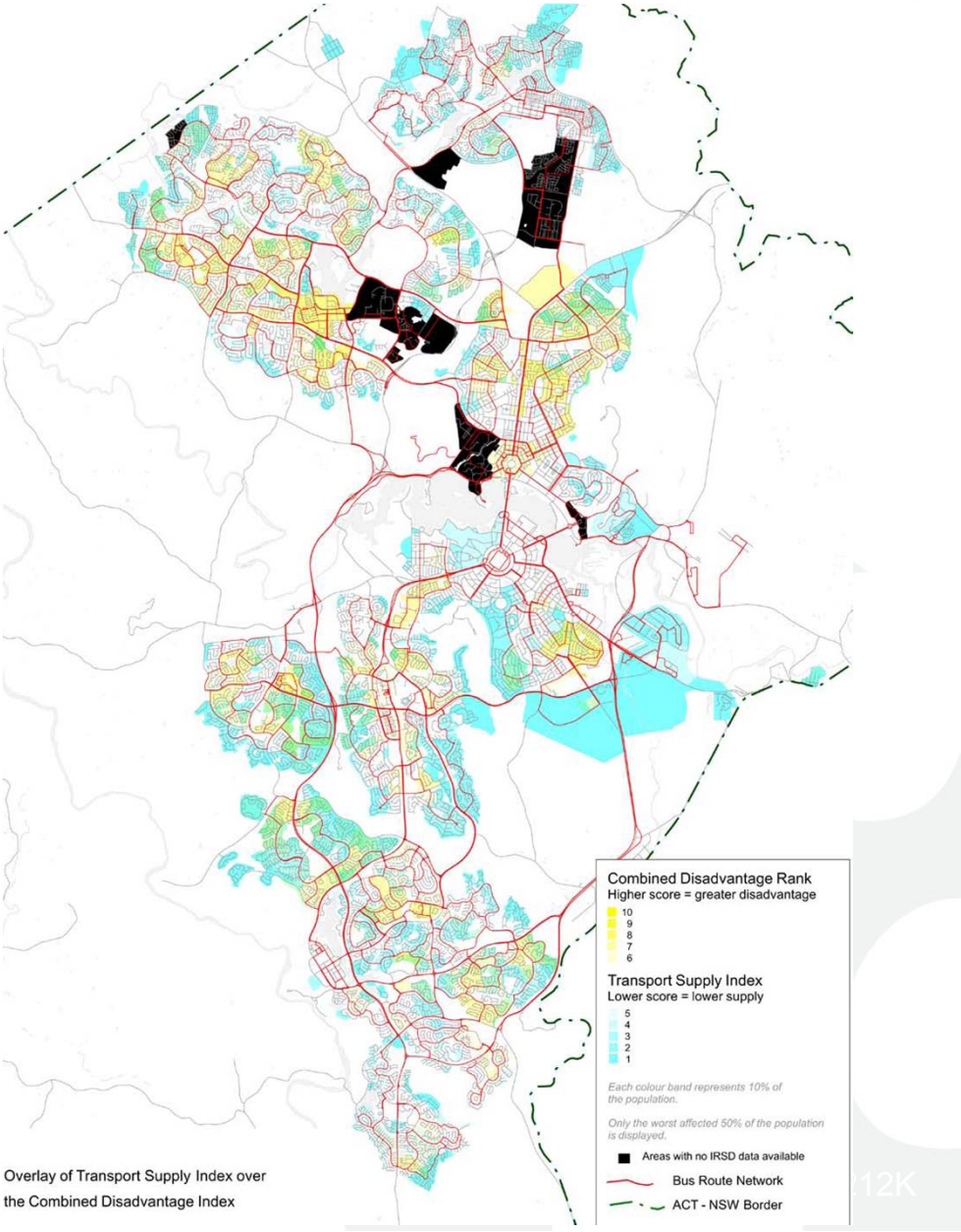
Transport disadvantage
= shades of green



Overlay of Transport Supply Index over the Combined Disadvantage Index

Public transport usage by suburb

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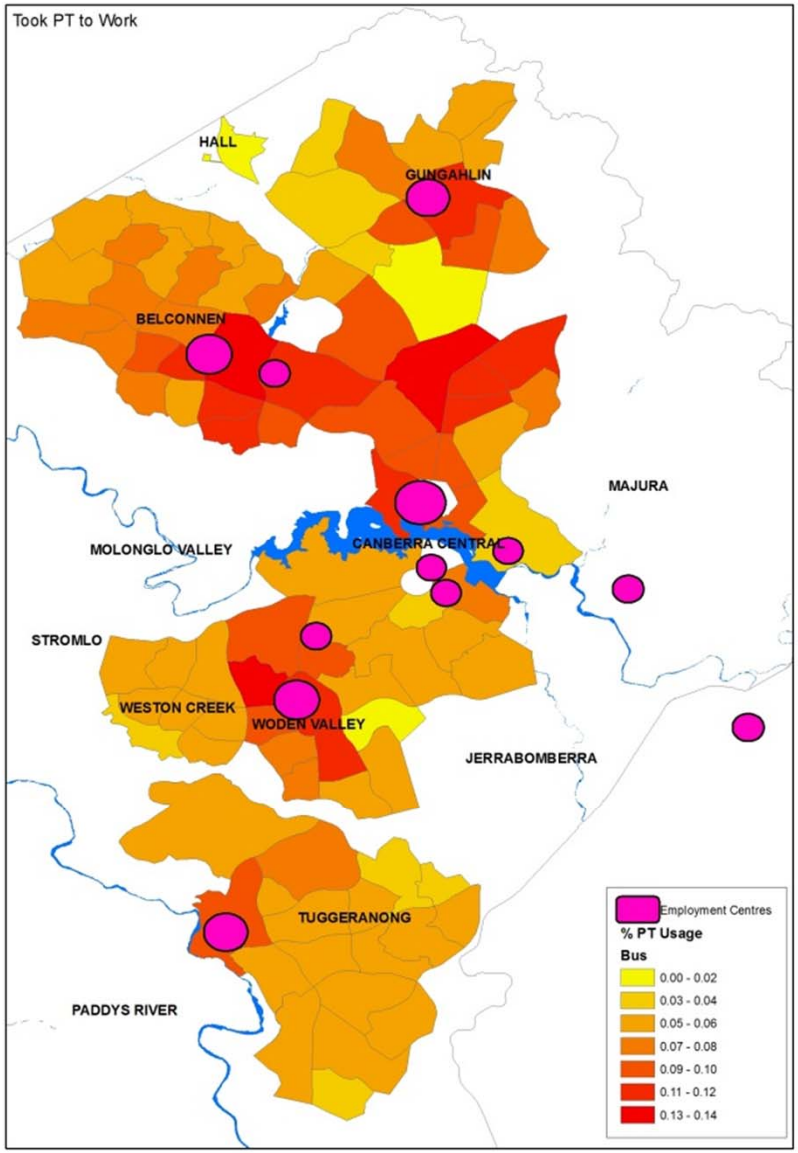
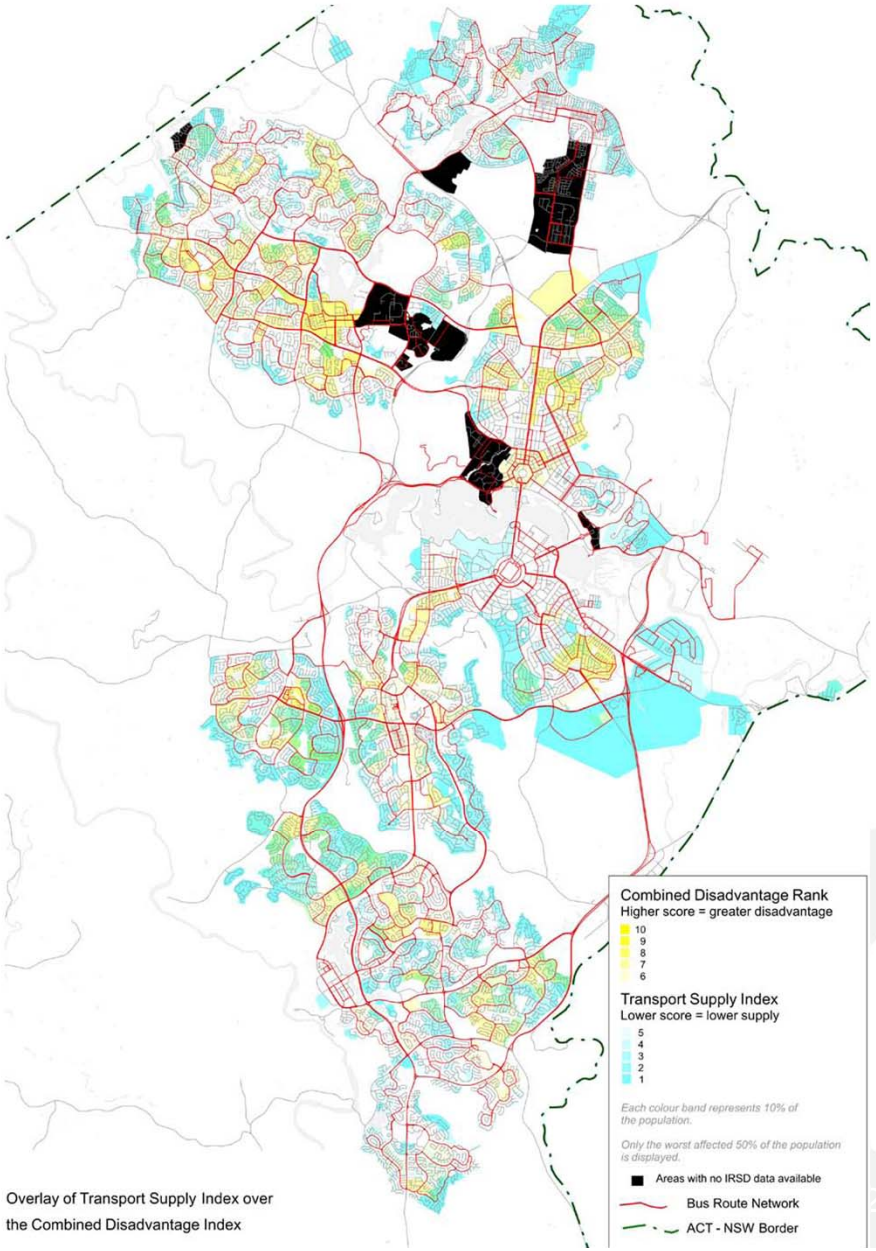
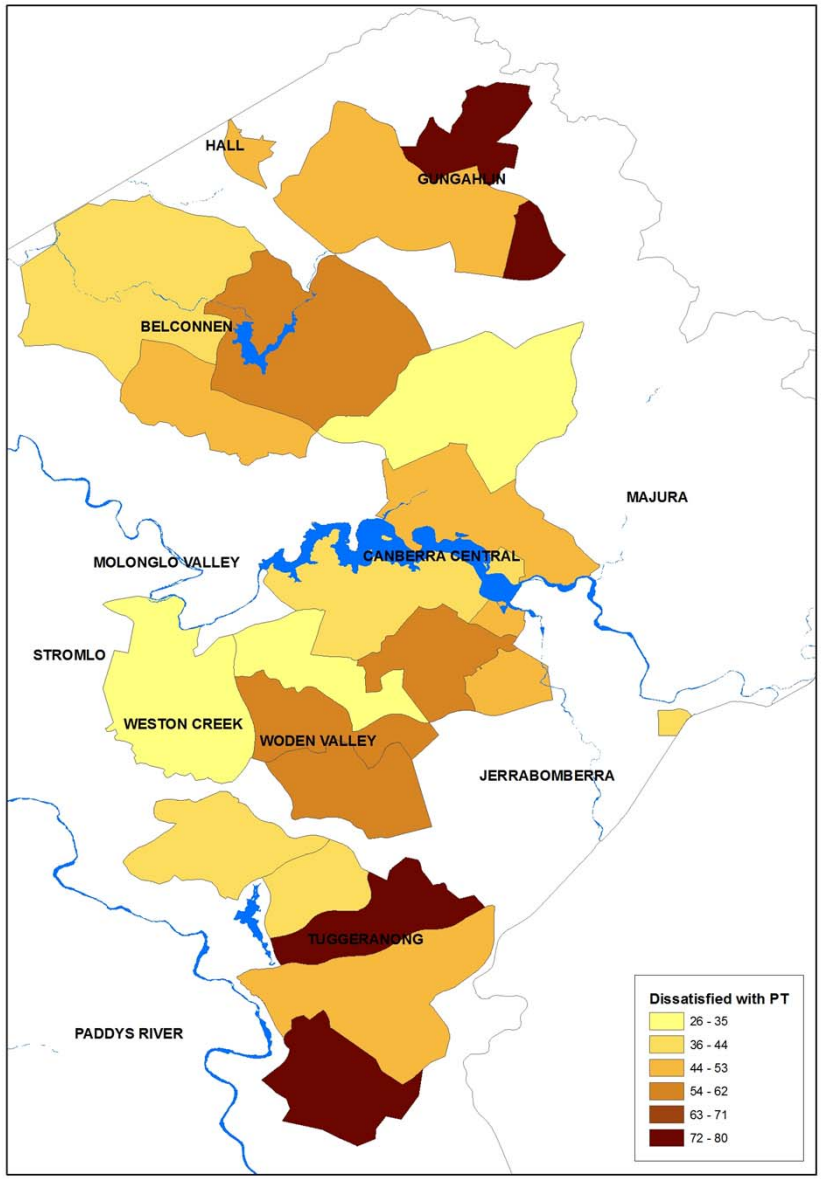
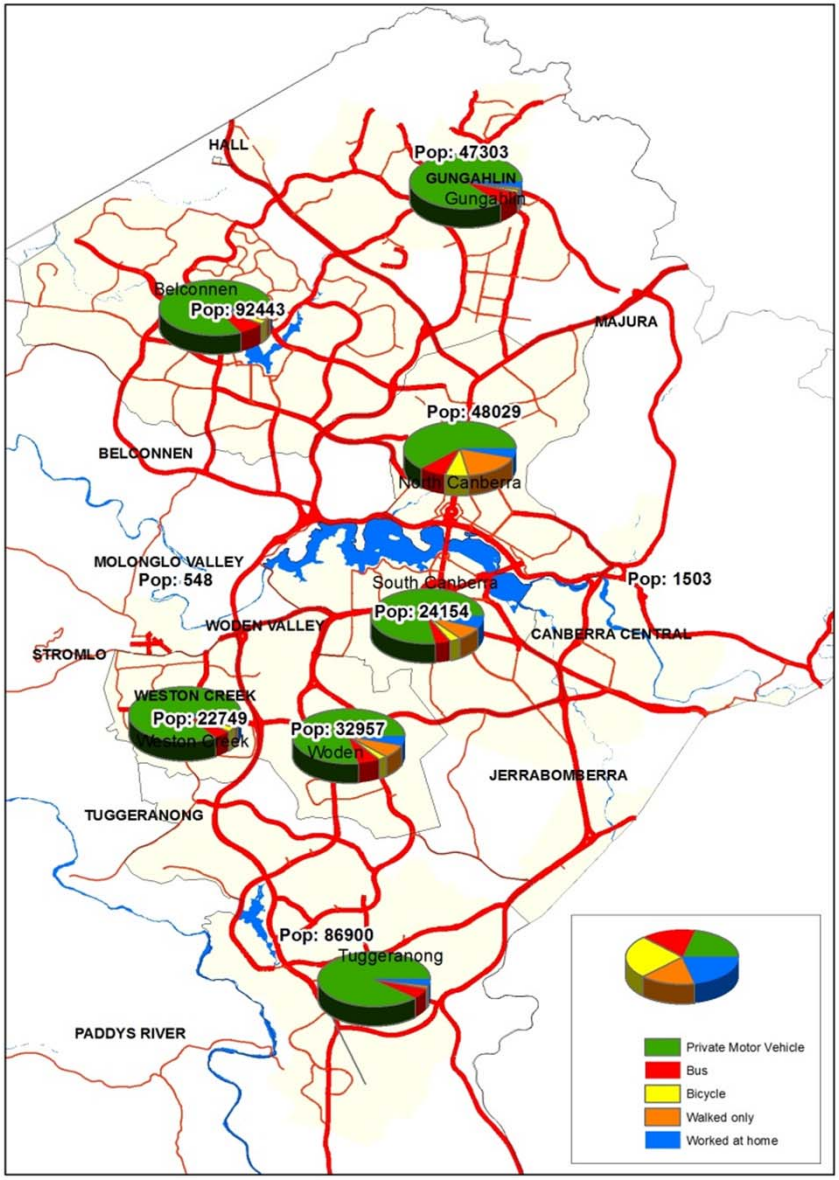




Overlay of Transport Supply Index over the Combined Disadvantage Index

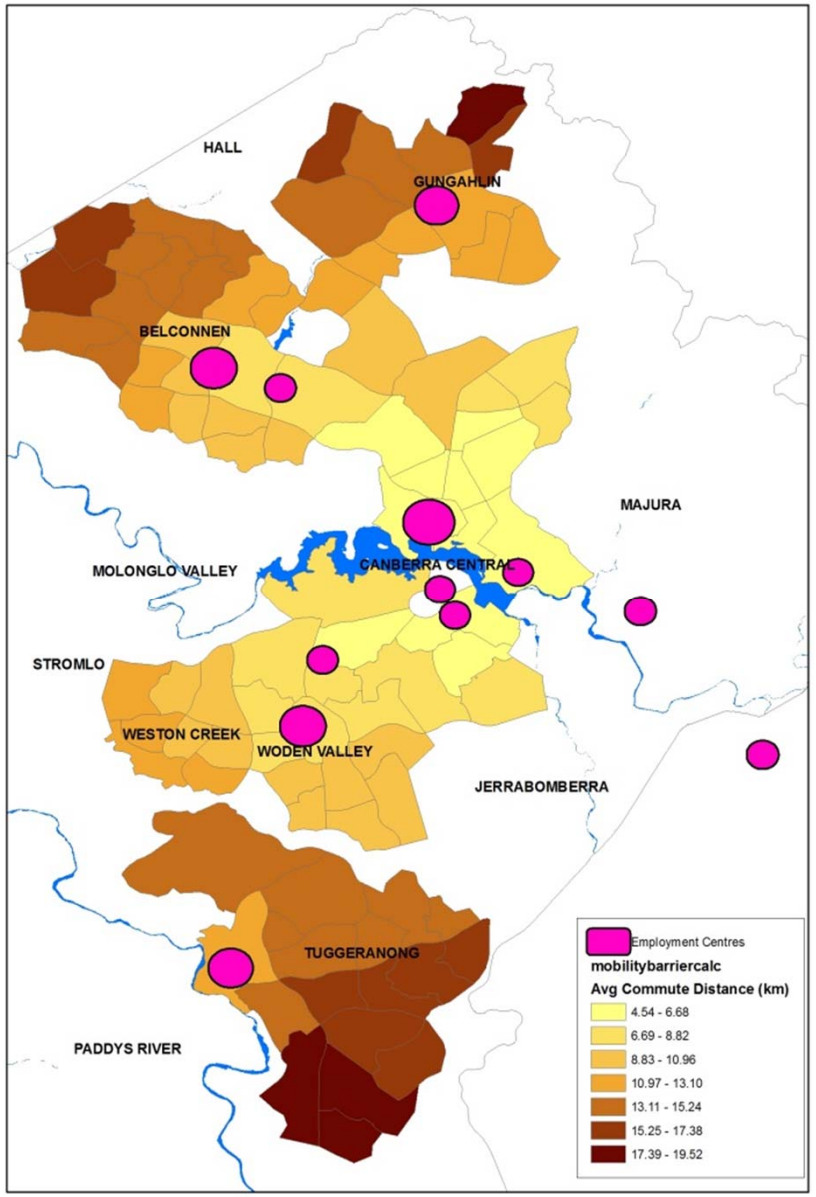
Satisfaction with public transport and PT use





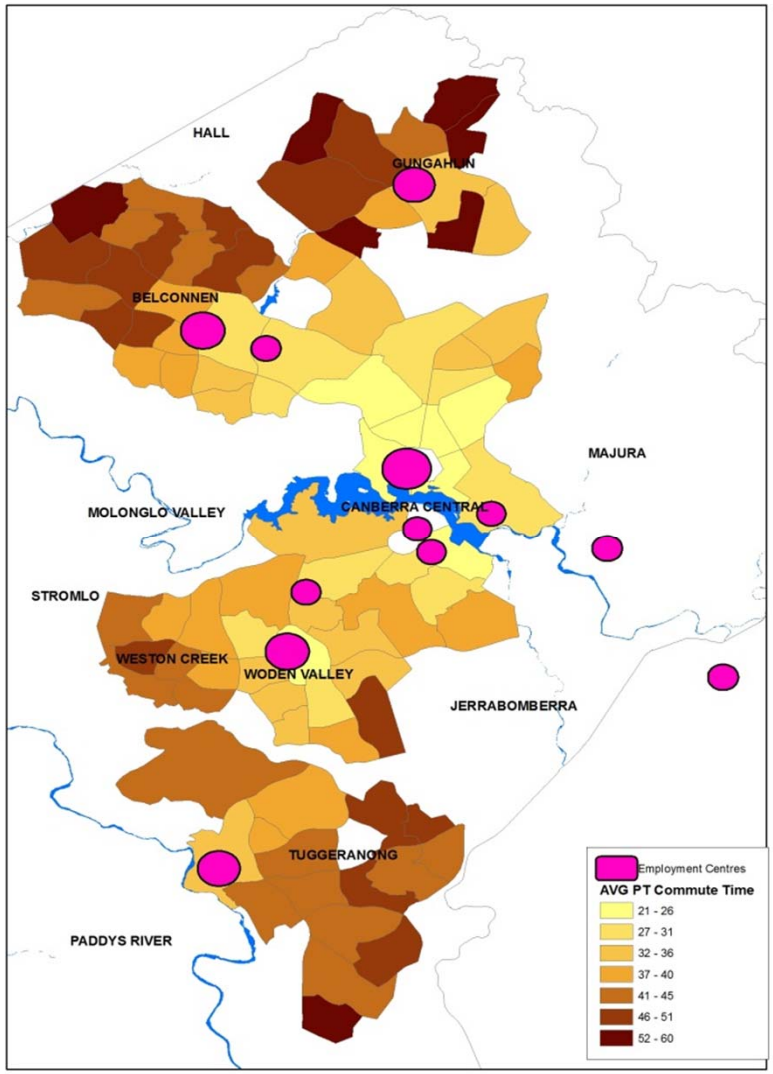
Distance to work

AVGDIST = ∑(% working at employment centre x distance to employment centre)



Public transport commute times

AVGDIST = ∑(% working at employment centre x distance to employment centre)



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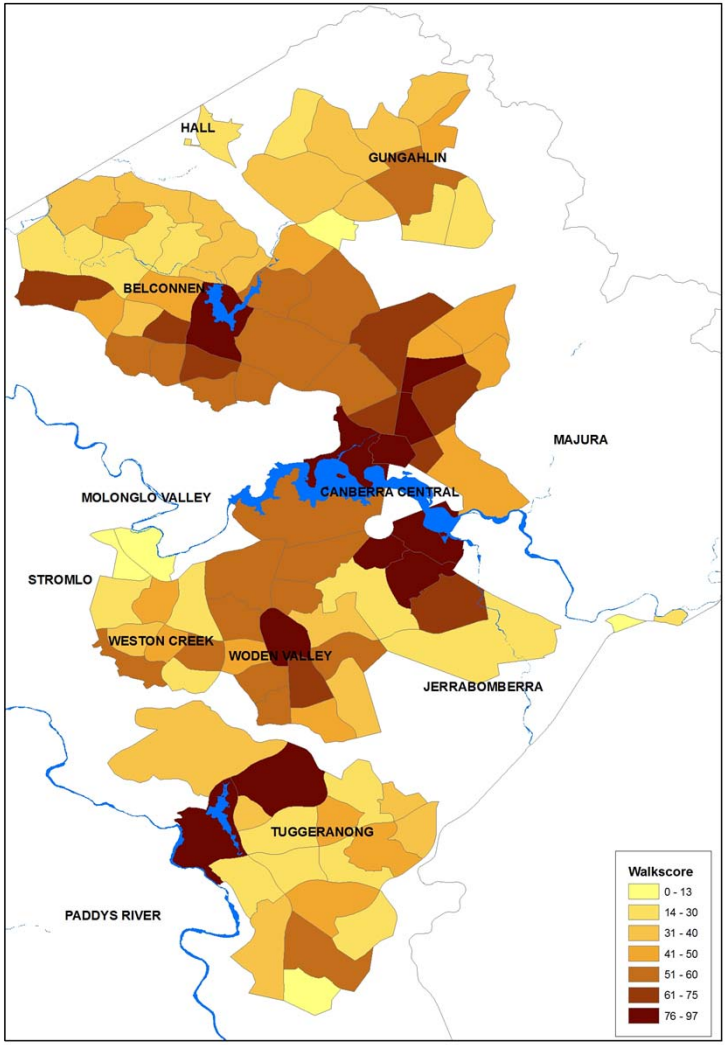
Neighbourhood walkability

based on the proximity of services, facilities and open space to an area with 100 being the highest possible score



Combined barriers to mobility (service frequency, commute distance and walkability)

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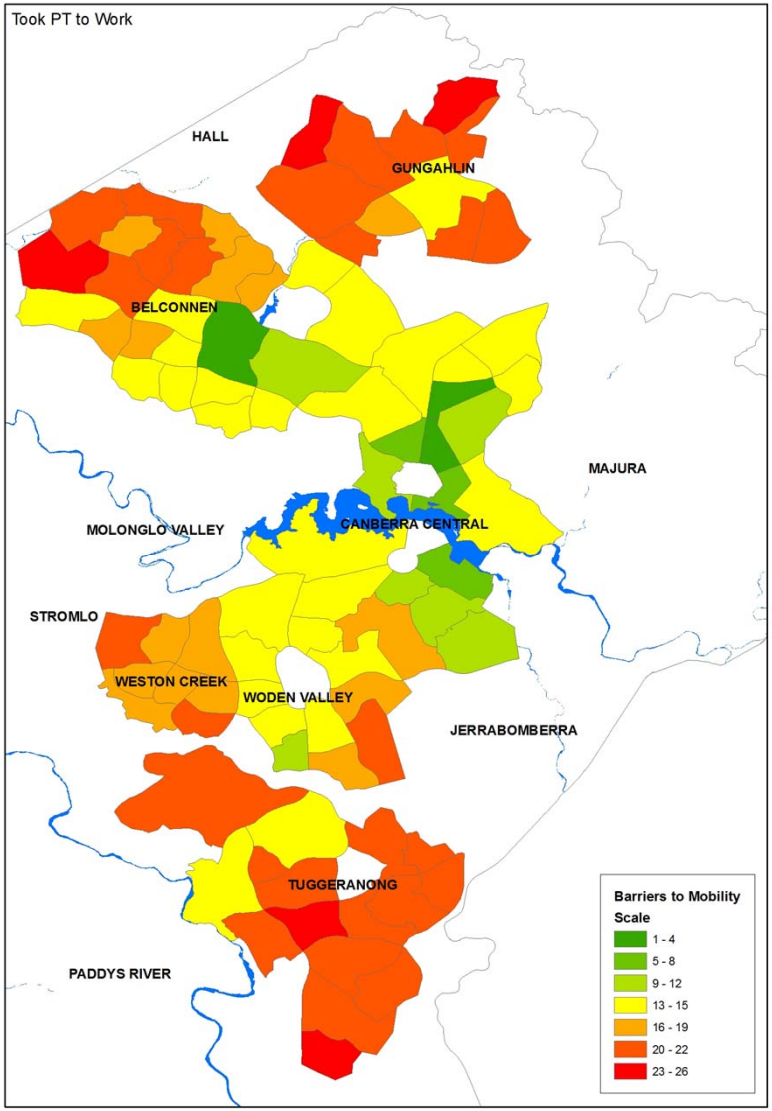
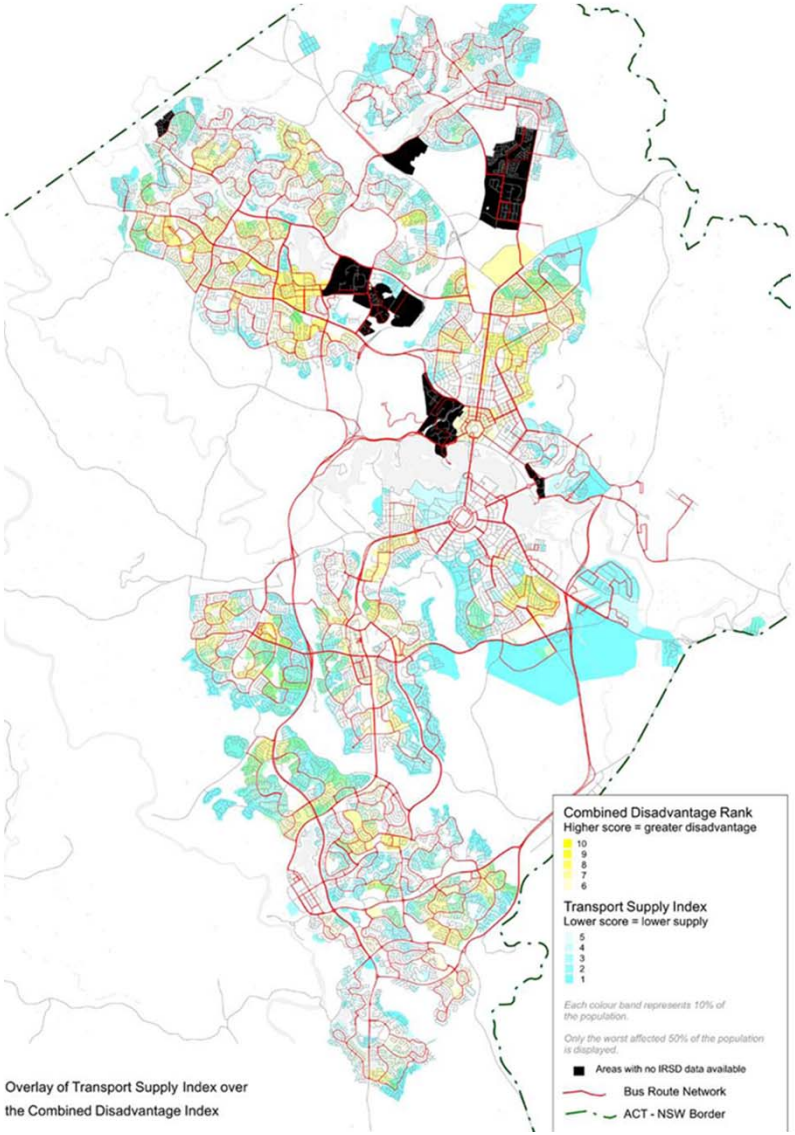
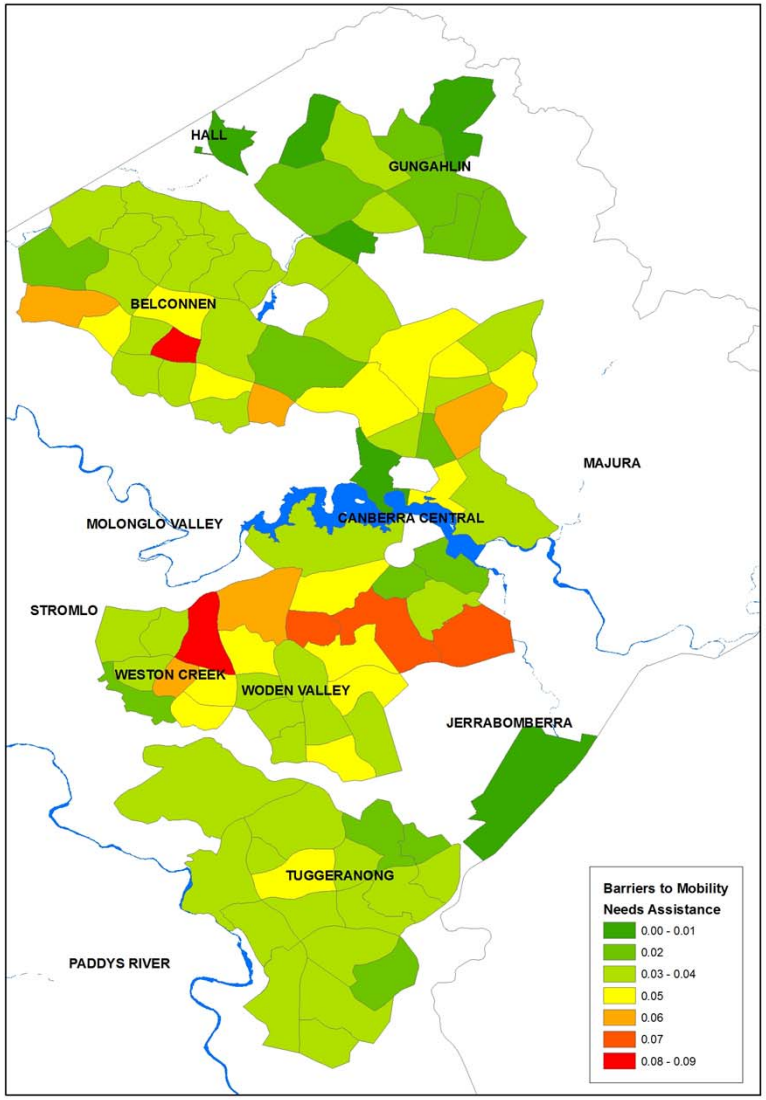


Social Disadvantage
spatial distribution of individuals over 60 and those requiring assistance with core activities



Overlay of Transport Supply Index over the Combined Disadvantage Index



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Ongoing work

- Myway data analysis
  understand how the public transport is used

- Why not choose public transport?
  What is the factors that affect mode choice - individual circumstances?
  qualitative analysis

- Explore how public transport increases social interaction (currently car is the main contributor) and how it relates to quality of life

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Thank you!

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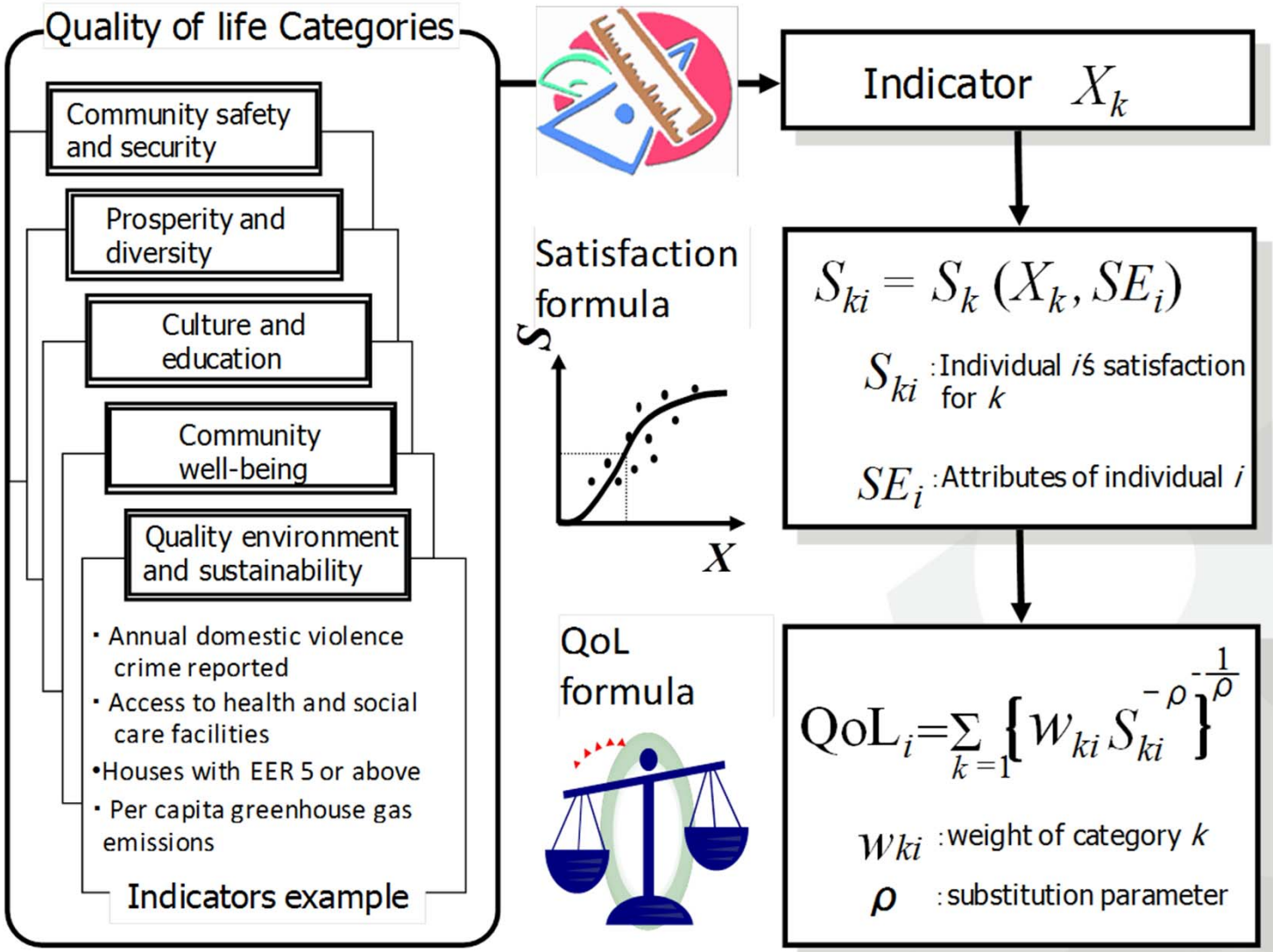
Quality of life Categories
Community safety and security
Prosperity and diversity
Culture and education
Community well-being
Quality environment and sustainability
• Annual domestic violence crime reported
• Access to health and social care facilities
•Houses with EER 5 or above
• Per capita greenhouse gas emissions
Indicators example
Indicator X_k
Satisfaction formula
S
X
$S_{ki} = S_k(X_k, SE_i)$
S_{ki} : Individual i's satisfaction for k
SE_i : Attributes of individual i
QoL formula
$QoL_i = \sum_{k=1} \{ w_{ki} S_{ki}^{-\rho} \}^{-\frac{1}{\rho}}$
w_{ki} : weight of category k
ρ : substitution parameter