

The SmartRail Project

HARDWIRING PLACE THROUGH SMART CITY PLANNING



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RAILSMART PLANNING FOR THE CITY OF WANNEROO

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City of Wanneroo sought to maximise the benefits of heavy rail investment to catalyse employment growth and transit-oriented activity centres.

This sparked a project with PATREC to enhance planning capability through a fit-for-purpose planning tools and a integrated open data platform.

The project won \$1M in Federal Government *SmartCities SmartSuburbs* Program that challenged current modes of rewiring place



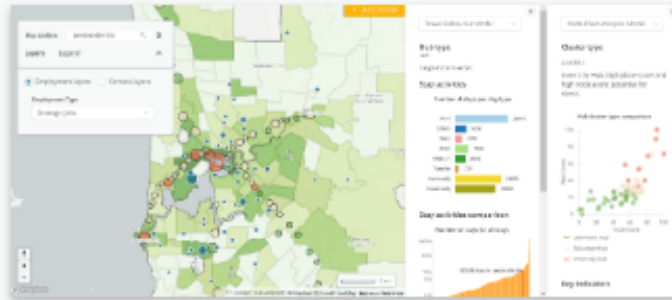
<https://railsmartwa.net.au/>

Welcome to the RailSmart Dashboard

The proof-of-concept RailSmart Planning Support System demonstrates the application of academic research to better inform public decision making. Using evidence-based modelling, future development scenarios in terms of employment creation and public transport patronage in the City of Wanneroo can be tested. These scenarios can be used to better inform the development of new railway stations within the City to maximise public transport patronage and employment self-sufficiency. A cost-benefit analysis tool has also been provided for the Department of Transport, which uses the Australian Transport Assessment and Planning guidelines.

The PSS was developed by a large team of consultants and academics managed by the Planning and Transport Research Centre for the City of Wanneroo and Department of Transport. It is a user-friendly and modular system which can be further extended by future research. Any questions surrounding the tool should be directed to [Dr Linda Robson](#). A [report](#) has been produced as an overview and user manual for the PSS along with a [formal citation](#). The three components that comprise the PSS are:

Metropolitan Analysis: Explore statistical models



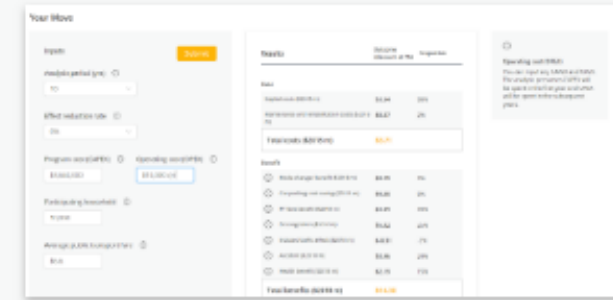
In order to model employment numbers, the design parameters and patronage numbers for the new stations, a detailed analysis of all of the railway stations in the metropolitan area was undertaken, making use of five detailed analytical models and broader GIS analysis.

Scenario Builder: Build future scenarios



The system allows a user to test numerous future development options by choosing which existing Perth station you would like a future station to emulate. The required design parameters to achieve this are listed, as well as the future population and patronage numbers. The scenario builder also allows for detailed employment modelling.

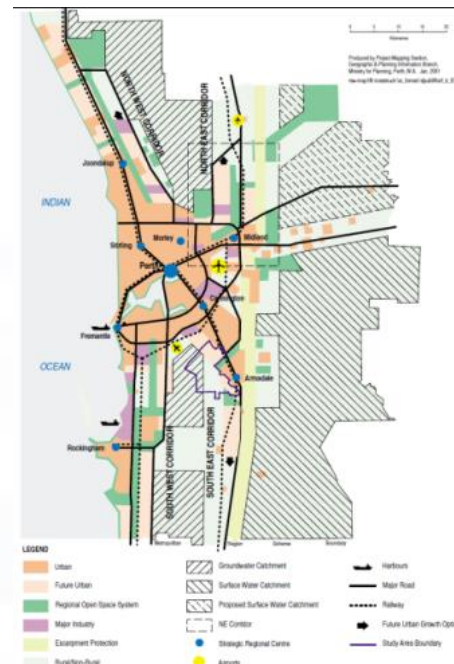
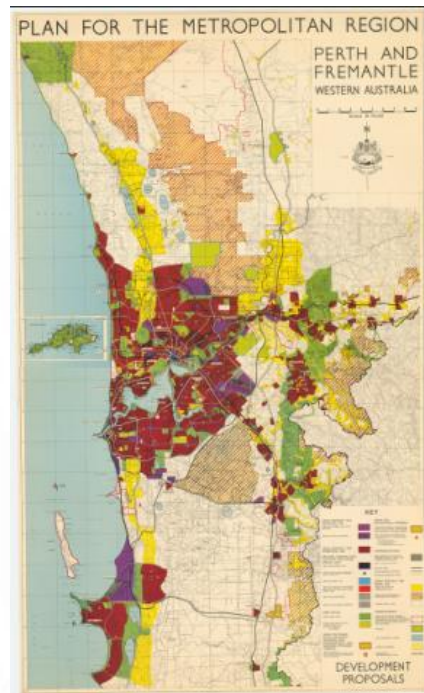
Cost-Benefit Analysis Tool: Explore Cost Benefit analysis



This tool quantifies the anticipated economic, environmental and health impacts of either a travel behaviour change project or an active transport infrastructure investment.

<https://railsmart.patrec.org/>

OVER 60 YEARS OF PLANNING...



Stephenson-Hepburn Plan

The Corridor Plan

Metroplan

Directions 2031 and beyond

1955

1970

1990

2010

... HAS DECENTRALISED PLANNING WORKED?

...biggest issue is access to amenities and opportunities,
... and structural disadvantage....



RESIDENTIAL WEALTH

Figure 3: Mean personal income for Perth and Peel SLAs, 2005

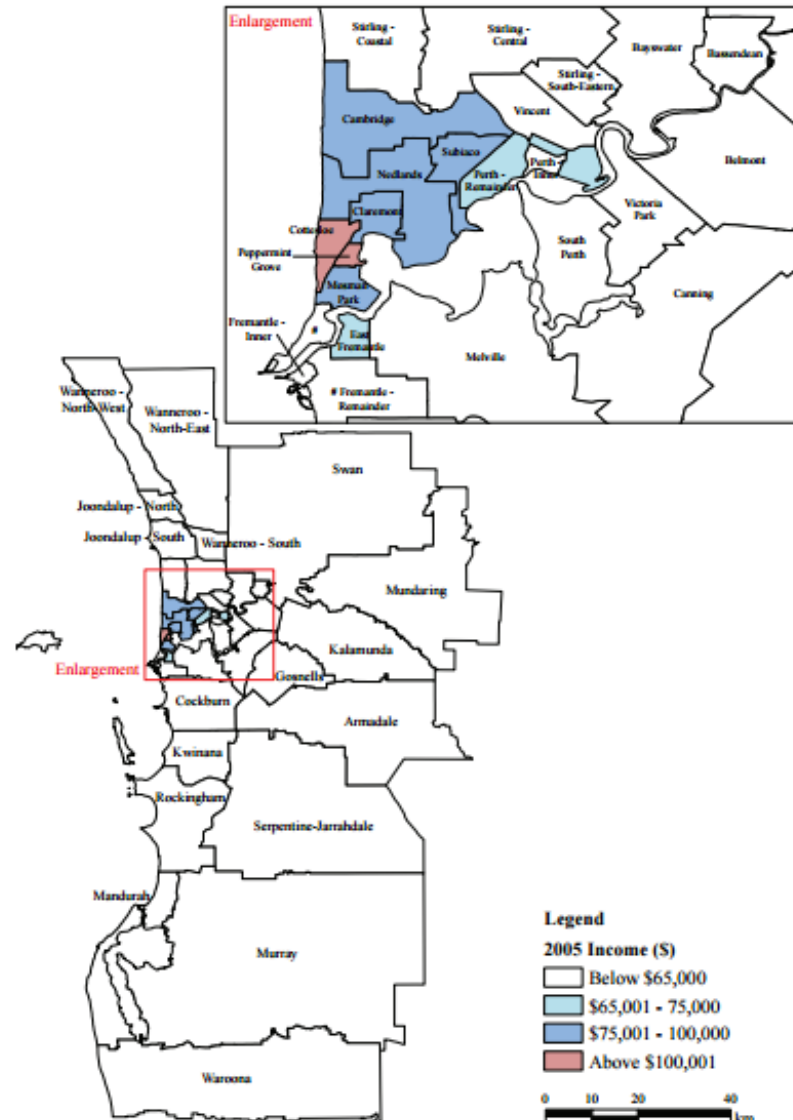
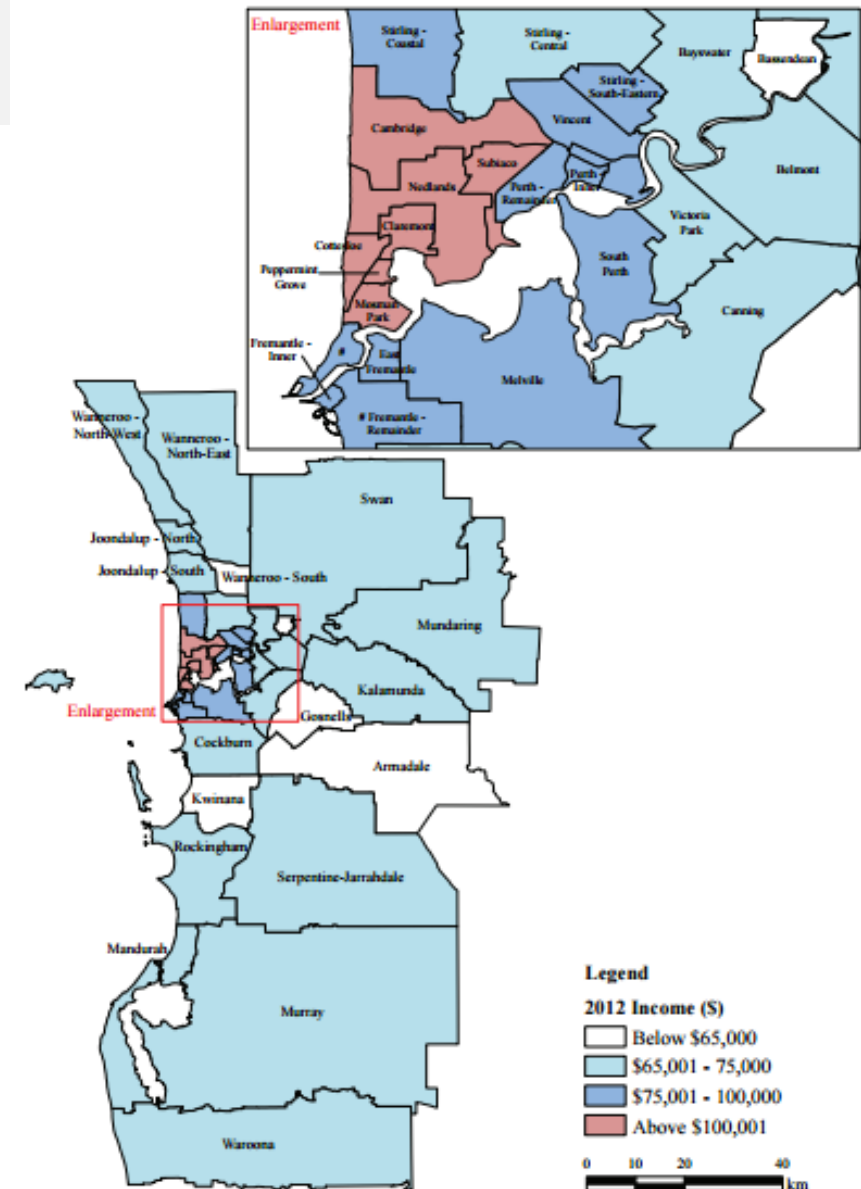


Figure 4: Mean personal income for Perth and Peel SLAs, 2012



THE CHALLENGE: STRUCTURAL DISADVANTAGE ECONOMIC ACTIVITY

Figure 2: Economic activity is most intense in Sydney's CBD and around the "global arc"
Economic activity by location, 2011-12

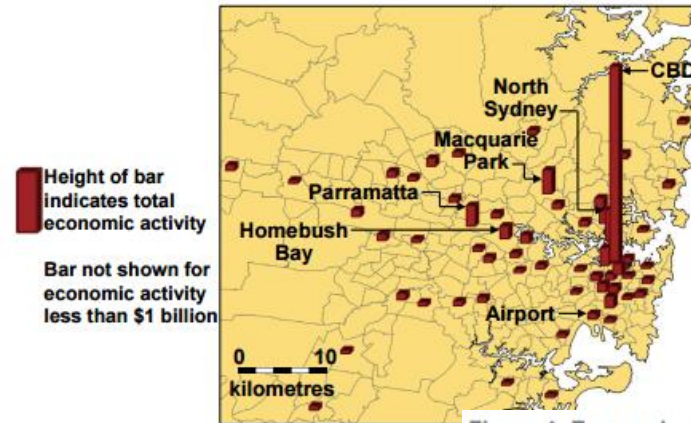


Figure 4: Economic activity is most intense in inner Melbourne
Economic activity by location, 2011-12

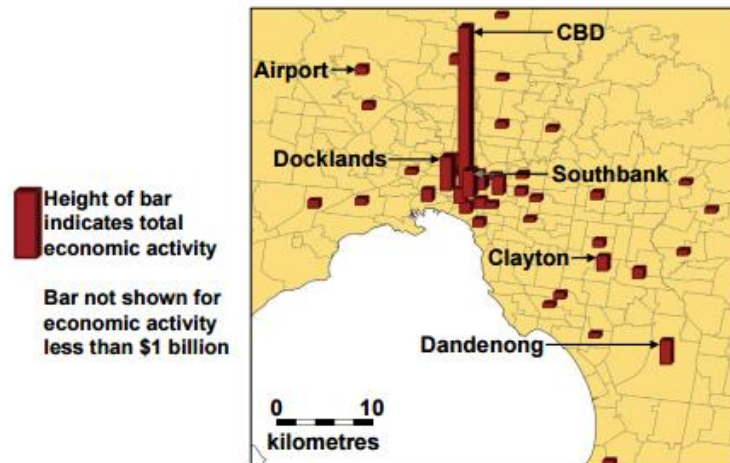


Figure 6: Perth's CBD produces far more than any other part of the city
Economic activity by location, 2011-12

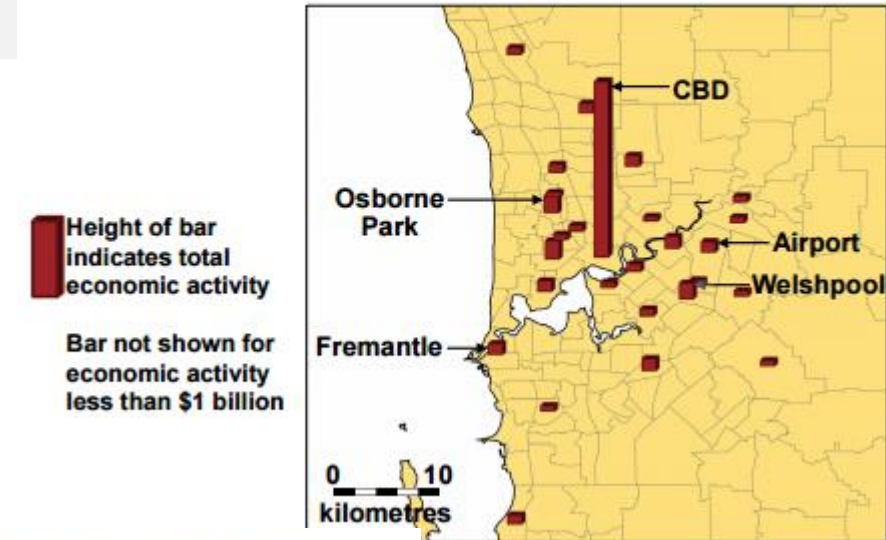
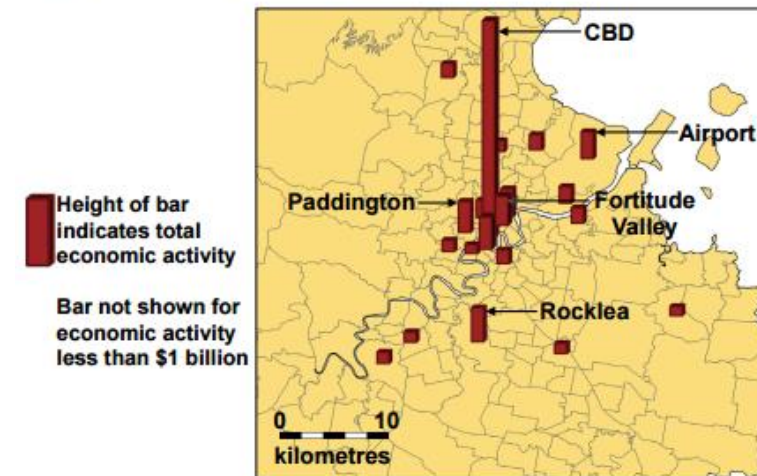
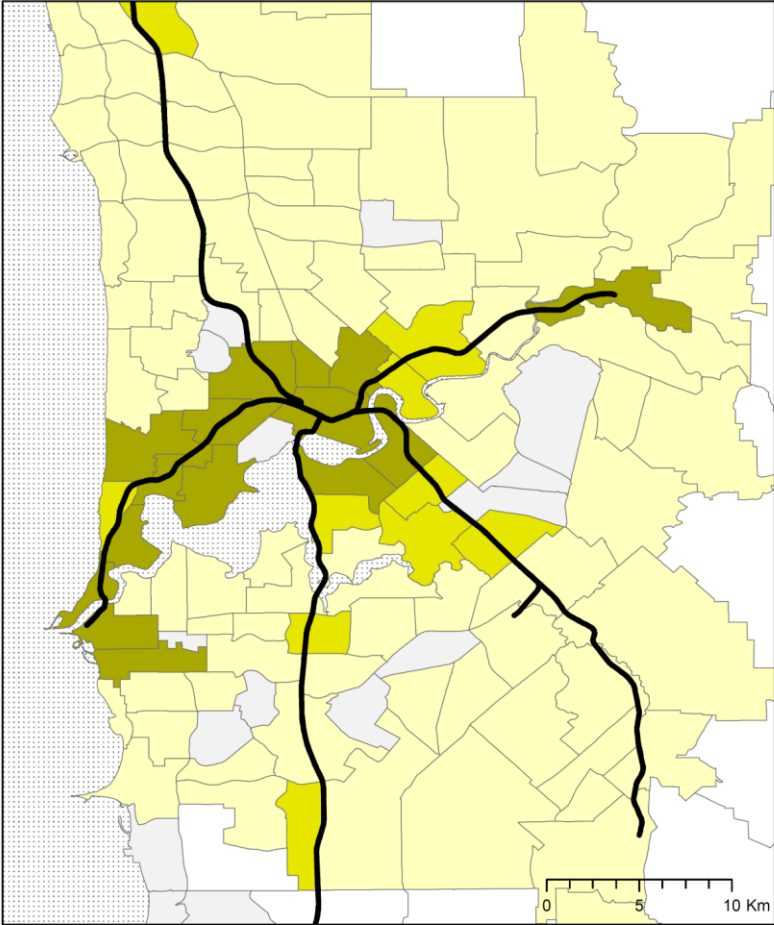


Figure 5: Economic activity is most intense in and around Brisbane's CBD
Economic activity by location, 2011-12





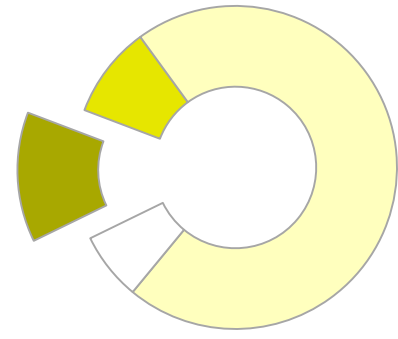
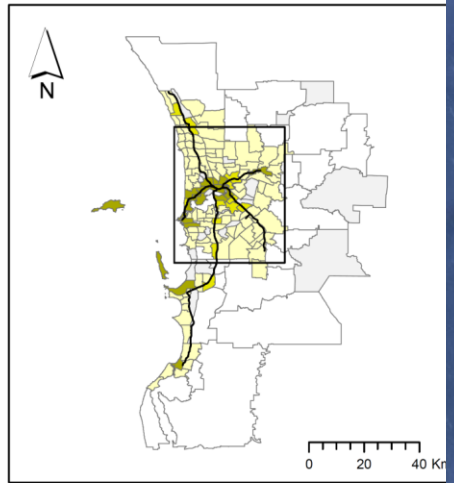
Perth

Transportation Method T8

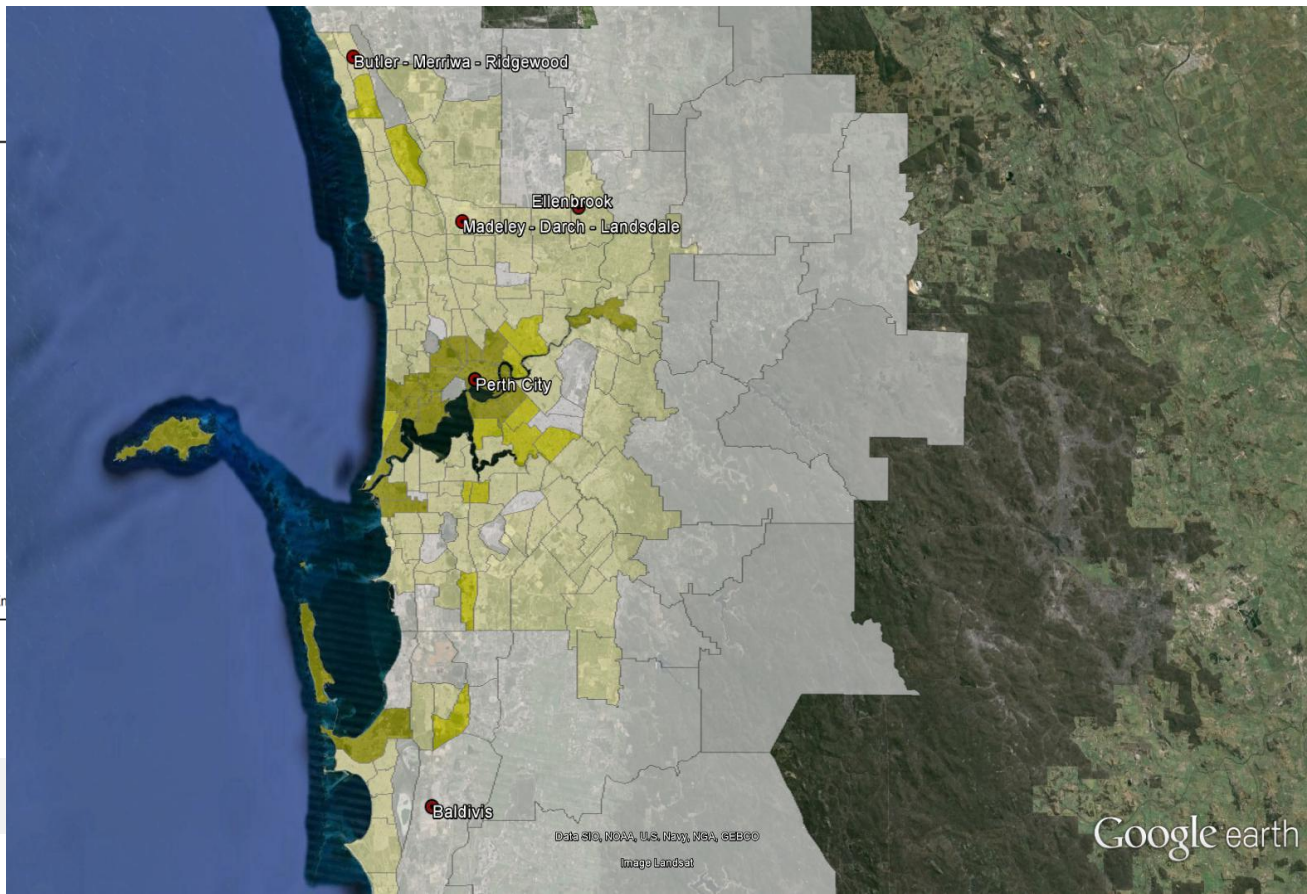
ABS 2011

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Research Assistants:
I Huston & A Sisson



Perth
87%
Suburban



JOBS – TO – WORKERS

Total working population and jobs by LGA, 2011


LGA	Total jobs	Total resident workers	Excess jobs to resident workforce	LGA	Total jobs	Total resident workers	Excess jobs to resident workforce
Armadale	13,101	25,920	-12,819	Mosman Park	1,975	4,353	-2,378
Bassendean	5,675	6,438	-763	Mundaring	7,809	15,603	-7,794
Bayswater	18,199	28,194	-9,995	Murray	5,134	4,951	183
Belmont	33,349	15,108	18,241	Nedlands	17,972	9,025	8,947
Cambridge	10,283	11,688	-1,405	Peppermint Grove	869	553	316
Canning	51,993	38,394	13,599	Perth	123,440	8,496	114,944
Claremont	5,627	4,028	1,599	Rockingham	24,094	41,449	-17,355
Cockburn	29,534	40,863	-11,329	Serpentine-Jarrahdale	3,154	7,608	-4,454
Cottesloe	2,411	3,480	-1,069	South Perth	11,536	19,477	-7,941
East Fremantle	2,010	3,301	-1,291	Stirling	68,181	88,082	-19,901
Fremantle	24,501	12,092	12,409	Subiaco	24,129	8,457	15,672
Gosnells	20,791	44,458	-23,667	Swan	47,208	46,666	542
Joondalup	38,493	73,397	-34,904	Victoria Park	23,548	14,994	8,554
Kalamunda	13,089	23,950	-10,861	Vincent	18,348	16,257	2091
Kwinana	11,447	10,910	537	Wanneroo	31,710	62,495	-30,785
Mandurah	16,843	23,313	-6,470	Waroona	1,980	1,357	623
Melville	31,533	44,136	-12,603	WA Regional	223,765	204,238	19,527

PLANNING MEASURES TO ADDRESS THE IMBALANCE: CURRENT HARDWIRING STRATEGY

Table 2: Perth sub-regional JHB, ESS and ESC ratios (%) 2011-2016 and D2031 and P&P@3.5 ESS actuals and targets as published in plans

	Central		South-East		South-West		Peel		North-East		North-West/PNWS	
Calculations using Australia Bureau of Statistics 2011^ and 2016^^ journey-to-work data (actual)												
	2011	2016	2011	2016	2011	2016	2011	2016	2011	2016	2011	2016
JBH	142%	143%	48%	48%	70%	72%	81%	79%	79%	77%	52%	57%
ESS	60%	58%	67%	65%	66%	64%	82%	79%	53%	53%	79%	77%
ESC	85%	83%	32%	31%	46%	46%	66%	63%	42%	41%	41%	44%
	Targets from State Government planning documents											
D2031 ESS 2031 (target)	121%		5%		70%		80%		75%		60%	
D2031+ ESS 2008 (actual)	124%		42%		60%		71%		63%		41%	
P&P@3.5 ESS* 2050 (target)	140%		(South Metropolitan Peel) 74%						86%		60%	
P&P@3.5++ ESS 2011 (actuals)	140%		(South Metropolitan Peel) 59%						80%		49%	

SMARTAIL: RETHINKING HOW WE HARDWIRE PLACES

 RailSmart Planning Support System

AboutMetropolitan AnalysisScenario BuilderCost Benefit AnalysisLog Out

Map toolbox

Search station or stop

Layers

Legend

☒ Employment layers ☐ Context layers

Employment Type


Select an employment type

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Cost-Benefit Analysis Tool: *Explore Cost Benefit analysis*



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 SMART CITIES AWARDS 2019

 BEST INTEGRATION OF AN INDIVIDUAL TECHNOLOGY

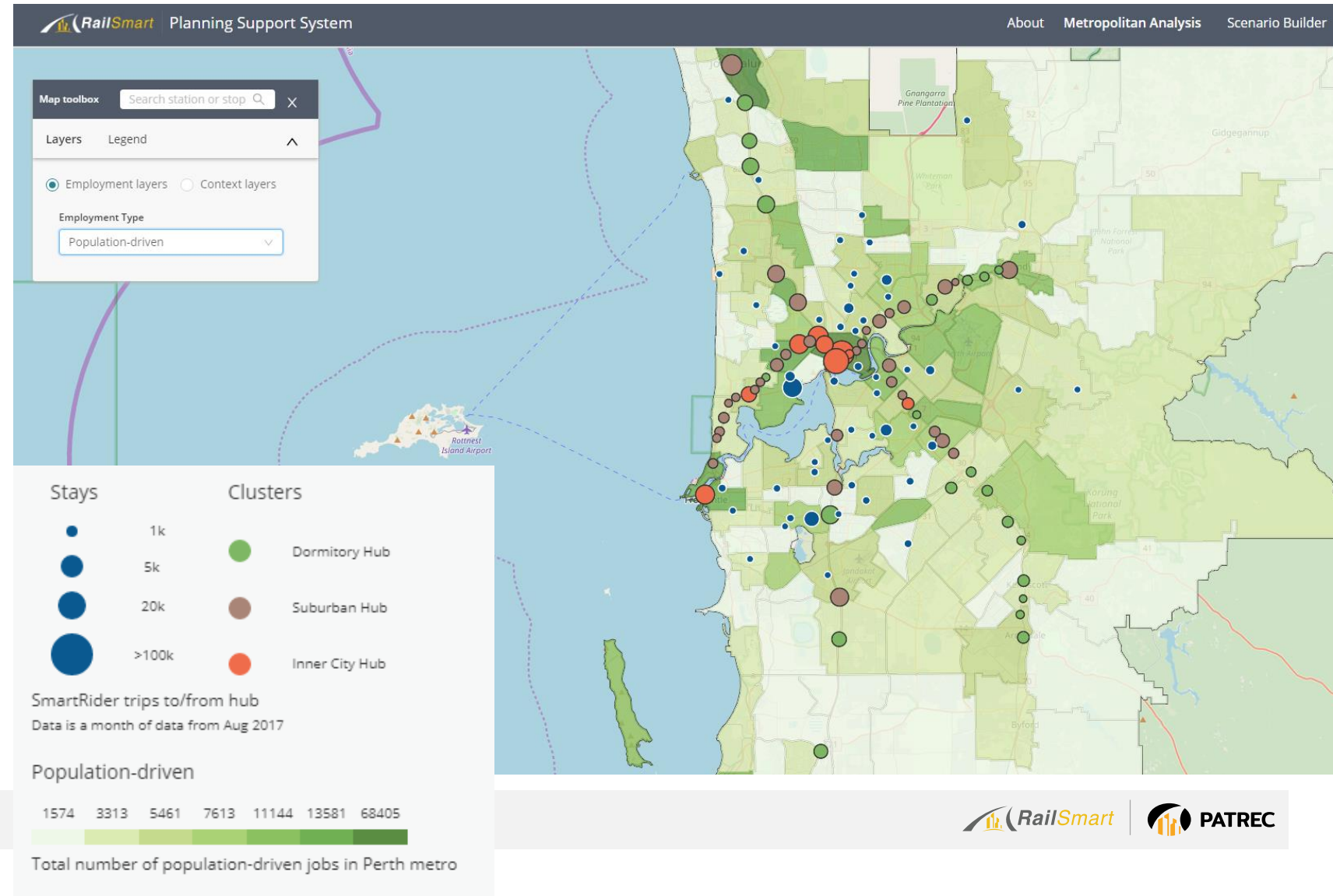
 RESEARCH EXCELLENCE 2019

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DEFINED JOBS: POPULATION-DRIVEN JOBS

... Job growth due to local demand

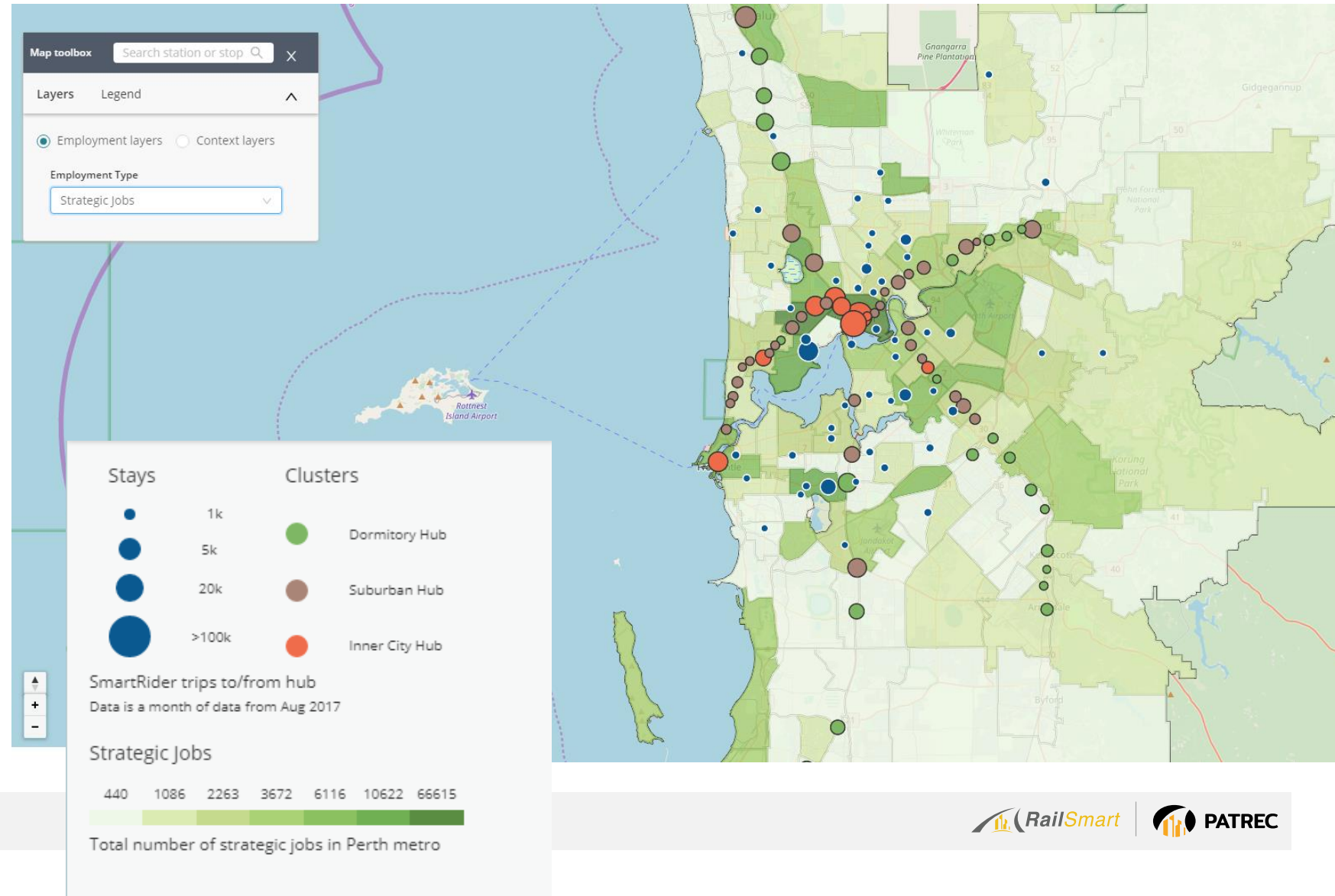
Even with limited intervention, job growth will naturally follow housing development as services are needed for its growing local population.



DEFINED JOBS: STRATEGIC-DRIVEN JOBS

... Job growth due to national or global demand

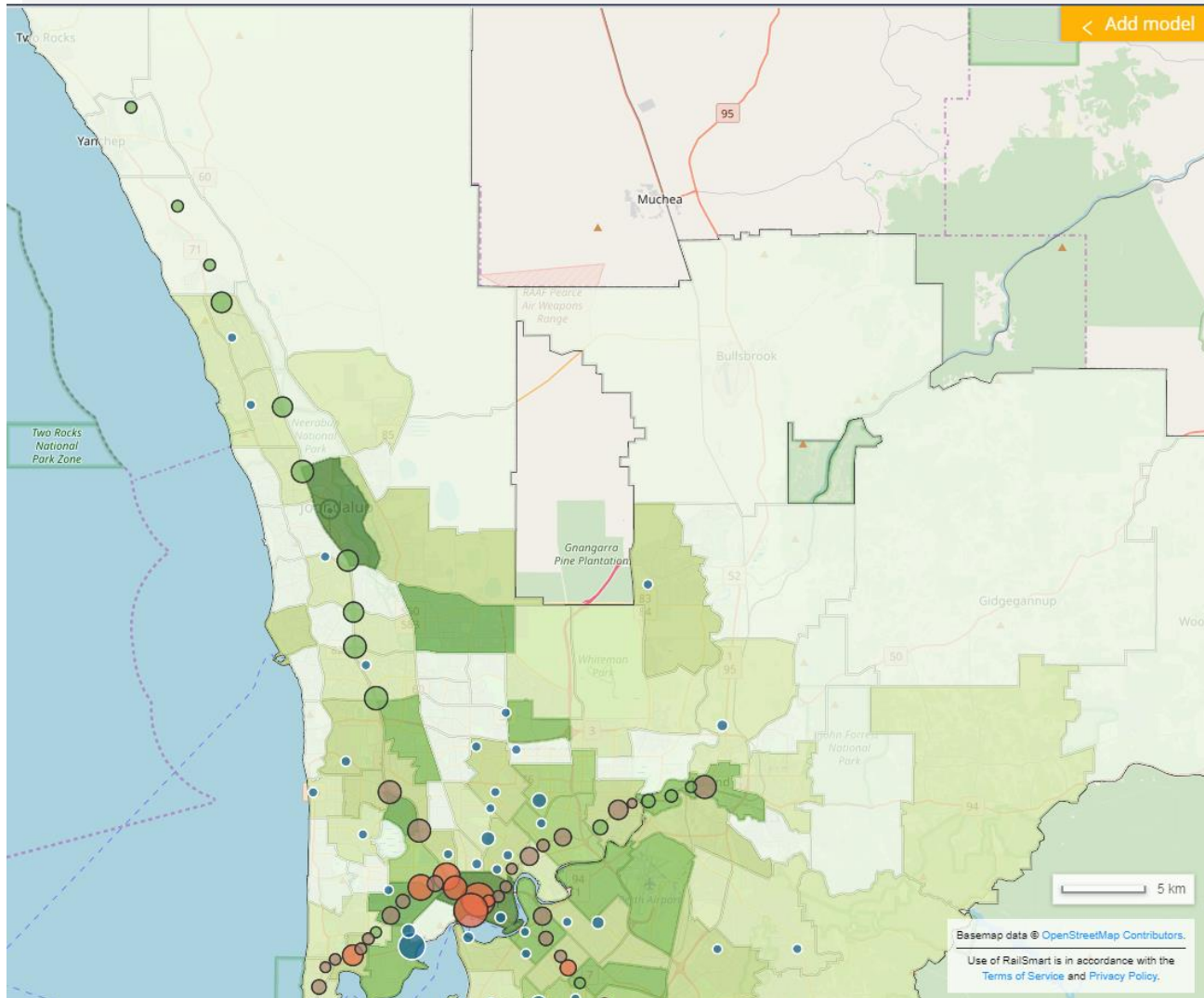
...respond to a more complex set of location and business dynamics. They are not distributed evenly across a city, and increasing them means focusing on fewer but higher quality job growth and multipliers.



A NEW APPROACH...

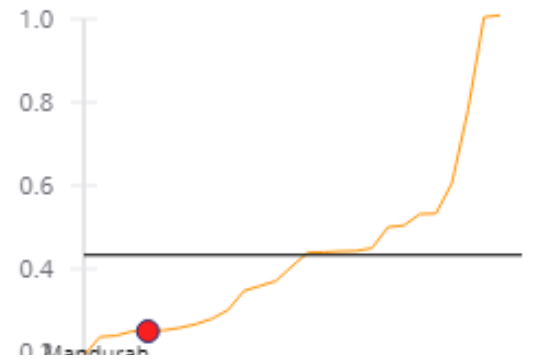
- Planning targets should increase both *population-driven* and *strategic jobs*, but current targets do not distinguish between them.
- This creates greater spatial inequality as strategic jobs are attracted to places with more amenities and infrastructure, such as the CBD and surrounds, air or sea ports, and specialised knowledge districts.
- Outer metropolitan locations will have population-drive jobs, but struggle to attract strategic jobs unless there is a specific strategy to do so.
- More nuanced measures of employment growth are needed to differentiate between these employment types.

HOW THIS WORKS ... AT THE JOONDALUP NODE

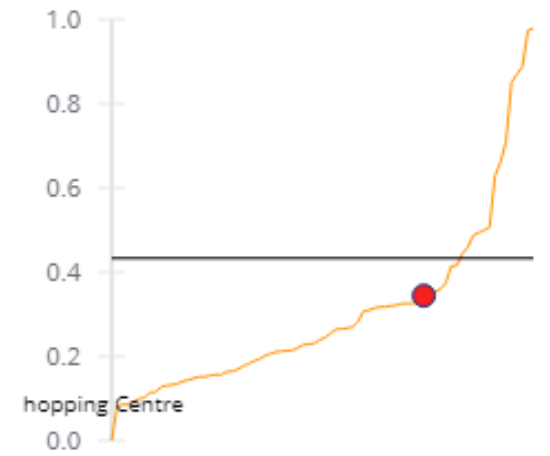


Strategic to population-driven jobs balance

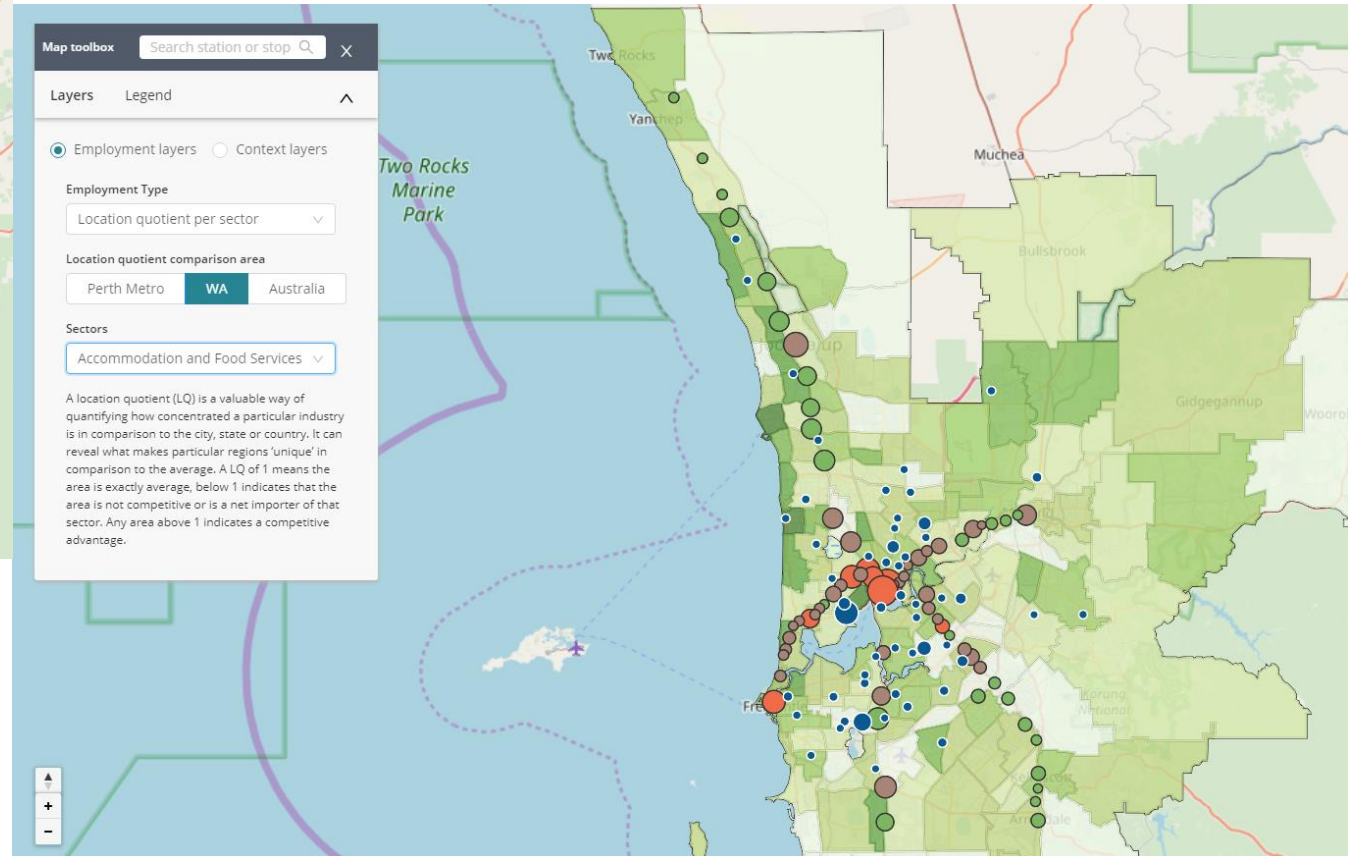
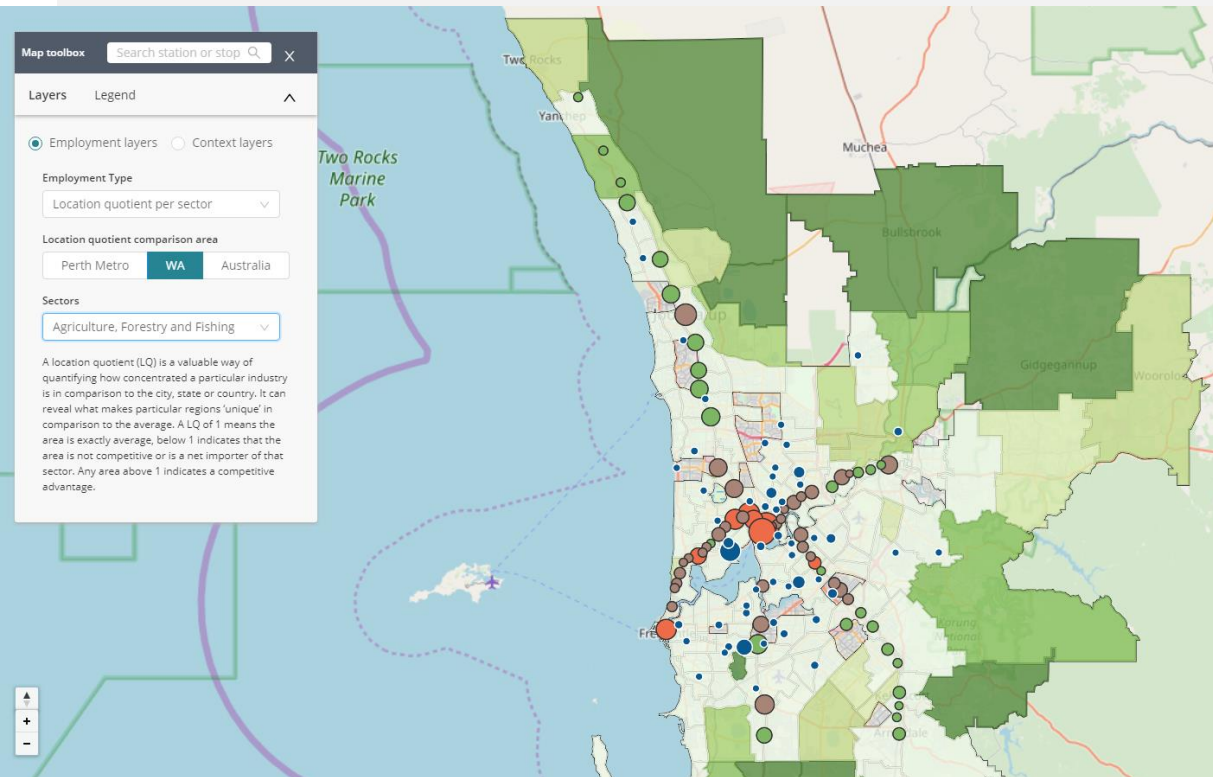
Ratio of strategic to population-driven jobs across all LGAs in Perth metro



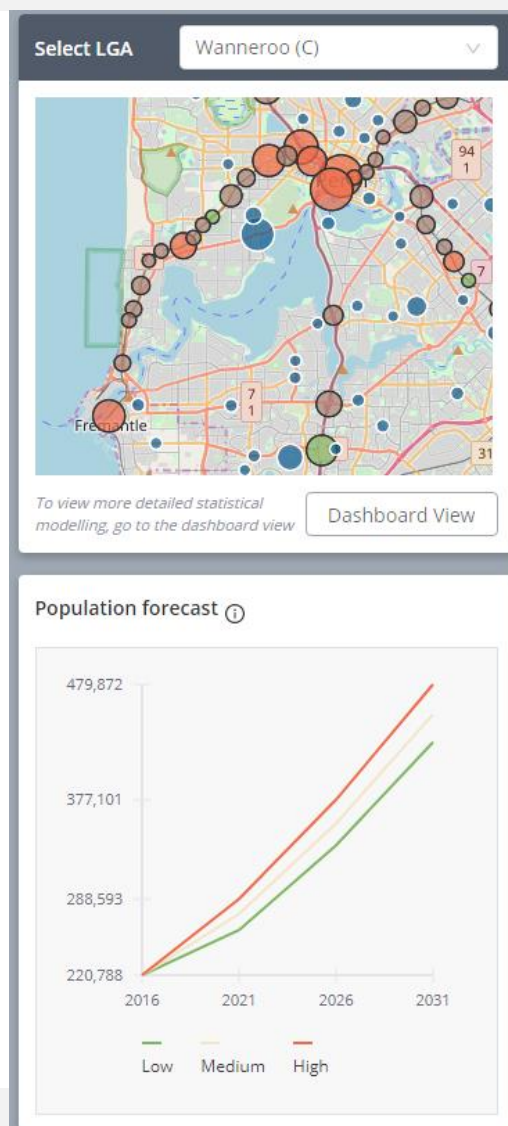
Ratio of strategic to population-driven jobs across all SA2s in Perth metro



MODELLING ECONOMIC DRIVERS: LOCATION QUOTIENTS



CHANGE IN JOBS AT THE LGA LEVEL: AUSTRALIAN I/O TABLES



Create an employment scenario

Calculation of number of jobs needed to service population growth

Population 2032: 355964

Working age population as a % of total: 67.12 %

Existing jobs: 41367

Jobs-housing balance (LGA employment self-sufficiency target): 60 %

Additional employment required: 118534

Employment created in services for population: 87947

Additional strategic employment creation for LGA: 30587

Back to Clusters

Modelling strategic employment creation for Wanneroo (C)

1 Sector Selection: Pick the sectors with the highest impact for strategic job creation

2 Add Jobs: Employment multiplier effect

Reset scenario

Sector	Current	Multiplier	New
Agriculture, Forestry and Fishing	856	2.951	926
Construction	6937	2.144	6987
Manufacturing	4078	2.032	4078
Financial and Insurance Services	543	1.671	573

Back

Increase in employment: 150

Total additional employment including multiplier effect: 364

CONCLUDING COMMENTS

- Current employment targets (SS/SC/JHB) and predictors have not worked, need reframing of how we hardwire places.
- Rethinking jobs (strategic and population driven) and how these are understood comparatively at the metro level.
- Reduction of travel is a limiting objective (as SS/SC/JHB does) - overlooks the spatial disadvantages in access to job opportunities. Better to focus on the creation of quality jobs (rather than quantity).
- Can't continue with business-as-usual model. Need to challenge how **data** is used to construct (and hardwire) real spaces.