

PAPER • OPEN ACCESS

Public-Private Partnerships for Transit-Oriented Development: a case study on the potential of Hobart, Australia

To cite this article: P Wong *et al* 2022 *IOP Conf. Ser.: Earth Environ. Sci.* **1101** 052016

View the [article online](#) for updates and enhancements.

You may also like

- [A study of cosmic ray muons above \$10^{13}\$ eV by observation of horizontal air showers](#)
E Bohm and M Nagano
- [Study of high energy \(25-10000 GeV\) interactions with a multiplate cloud chamber using Monte Carlo simulations for energy calibration](#)
R H Vatcha, B V Sreekantan and S C Tonwar
- [Quantum control of photodissociation using intense, femtosecond pulses shaped with third order dispersion](#)
U Lev, L Graham, C B Madsen *et al.*



The Electrochemical Society
Advancing solid state & electrochemical science & technology

243rd ECS Meeting with SOFC-XVIII

Boston, MA • May 28 – June 2, 2023

**Abstract Submission Extended
Deadline: December 16**

[Learn more and submit!](#)

Public-Private Partnerships for Transit-Oriented Development: a case study on the potential of Hobart, Australia

P Wong¹, D Leung² and J Lai³

¹ Department of Law and Business, Hong Kong Shue Yan University, Hong Kong, China

² Master Alliance Consulting Ltd, Hong Kong, China

³ Department of Building Environment and Energy Engineering, The Hong Kong Polytechnic University, Hong Kong, China

ylwong@hksyu.edu

Abstract. Transit-Oriented Development (TOD) has been popular for urban development, especially for cities with transport network expansion. While TOD has been proved effective in facilitating mass transportation and making optimal use of property development, it is hardly a one-stop development strategy for solving issues such as traffic congestion. In this study, the city of Hobart is investigated with reference to the TOD metrics and experiences of public-private partnership (PPP). Hobart authorities have attempted to provide better living and working conditions while facing the problems of economic development and traffic congestion. The TOD metrics are proposed for application at different stages: (1) Travel Behaviour, (2) The Local Economy, (3) The Natural Environment, (4) The Built Environment, (5) The Social Environment, and (6) The Policy Context. Based on a literature review, a set of PPP metrics is proposed for the Hobart's potential TOD framework. Drawn from on-site observations, key transport issues of Hobart are examined with the application of the PPP and TOD metrics. The results of this study could serve as a reference for regional cities in formulating their TOD strategies via PPP.

1. Introduction

As the capital of the Australian island state of Tasmania, Hobart is the most densely populated city in Tasmania [1] ranked the 13th in Australia [2]. The local government determined to develop Hobart as a vibrant, flourishing, sustainable and globally appealing capital city [3]. The ambition of the government is to build a 30-minute city which will: (a) integrate land-use and transport vision; (b) prioritize housing and facilitate urban renewal; (c) deliver a package of planning initiatives for development and providing residents with a greater range of housing choices; (d) and build stronger partnerships and improve coordinated planning [4].

To achieve the above, the government authorities need to consider the following questions:

1. What are the specific needs of Hobart?



2. What are the related economic activities for the specific needs?
3. How to enhance greater accessibility of the Hobart to align relevant people and the economic activities?
4. What are the specific development projects to enhance Hobart's accessibility?
5. How to finance the development projects?

This paper focuses on Questions 3 and 5 above. In investigating the issues of accessibility and the finance of relevant projects, reference was made to literature in the context of this study and assumptions were made on the needs and respective economic activities of Hobart and Tasmania.

As shown in Figure 1, the city of Greater Hobart is made up of four council areas, namely Kingborough, Clarence, Glenorchy and Hobart. According to the census data [2], the largest contributions in gross value to the Greater Hobart area economy are healthcare and social assistance (17 per cent), public administration and safety (11 per cent), financial and insurance services (10 per cent) industries. The main industries of employment are government and hospital: 4.1% of the employed people in Hobart work for State Government and another 4% work in hospitals. It is different from most other state capital cities of Australia. A comparison of the main industries of employment of state cities in Australia is shown in Table 1 [5].



Figure 1a



Figure 1b

Figure 1. The Location of Hobart

Table 1. Comparison of the main industries of employment in state capital cities of Australia

State or territory	Capital	Main industry of employment	Percentage of the main industry's employment
Australian Capital Territory	Canberra	Public administration and safety	12%
New South Wales	Sydney	Professional, scientific and technical services	19.4%

Northern Territory	Darwin	Public administration and safety	19.1%
Queensland	Brisbane	Health care and social assistance	12.9%
South Australia	Adelaide	Public administration and safety	16.6%
Tasmania	Hobart	Health care and social assistance	17.8%
Victoria	Melbourne	Professional, scientific and technical services	17.8%
Western Australia	Perth	Professional, scientific and technical services	17.7%

Hobart is a comparatively small state capital in Australia but with the common problems of old cities like congestion and lack of space for new businesses. These problems are to be discussed in this paper with consideration of the development plans of the local government. We will investigate, following the aim of this paper, why TOD and PPP may revitalize the city and integrate the selected land uses with sustainable transportation.

2. Literature Review

2.1. Transit-Oriented Development (TOD)

Referring to Table 1, health care is one of the big employers in Hobart. There are four hospitals and one clinic in the central business district (CBD) of Hobart: Royal Hobart Hospital (RHH), Hobart Specialist Day Hospital, Christian Homes Tasmania Incorporation, Hobart Private Hospital and RHH Wellington Clinic. RHH is a teaching hospital with the University of Tasmania. It provides services for all southern Tasmanian and has a capacity for 500 beds for patients [6]. Its services generate and attract plenty of traffic to/ from the CBD. The busy traffic in the CBD affects the service of the hospitals, especially the emergency services. With reference to the Guide to Traffic Generating Developments by Roads and Traffic Authority [7], the peak trip generation of traffic = $-22.07 + 1.04 B$, where B is the number of beds. Therefore, the trip generation in traffic of Royal Hobart Hospital during per day = $-22.07 + 1.04 (500) = 498$.

The hospitals are not only big sources of traffic load to the CBD; Pre-hospital emergency traffic requires priority over other traffic. According to a report of the Australian Automobile Association [8], Hobart was the fourth-most congested capital in Australia after Sydney, Melbourne and Adelaide. Despite the comparatively low population of Hobart [9], the traffic congestion in Hobart is serious, as shown in Table 2. With reference to other capital cities, Hobart's economic activities should shift from health care and social assistance to professional, scientific and technical services. As such, the CBD serves as an important centre of economic, community and cultural activity with regional-scale retail destinations. Population density, walkability in the vicinity of public transport station, public transport services frequency and parking are to be considered in the change process [10].

Table 2. State capital cities' congestion Vs the population

State capital cities	Congestion—percentage of free flow*, 2018 (rank according to congestion seriousness)	Estimated Resident Population at 30 June 2020 (rank according to population)
Sydney	92.0% (1)	5,367,206 (1)
Perth	92.9% (2)	2,125,114 (4)
Melbourne	94.5% (3)	5,159,211 (2)
Hobart	95.1% (4)	238,834 (7)
Darwin	95.5% (5)	147,231 (8)
Adelaide	95.8% (6)	1,376,601 (5)
Brisbane	96.6% (7)	2,560,720 (3)
Canberra	97.0% (8)	431,380 (6)

* Percentage of free flow (POFF): Another measure of congestion that compares the recorded average speed by a baseline speed recorded between 12am and 4am.

Apart from relocating some economic activities, moderate expansion of the city is necessary for new businesses. TOD has been applied in many sustainable community's designs. It is defined generally as "a mixed-use community that encourages people to live near transit services and to decrease their dependence on driving" [11]. Beyond its definition, TOD is often applied to address social issues. Many TOD projects include expanding commercial and high-density housing opportunities with good access to efficient public transport networks. These opportunities often come with a protected and integrated natural environment [12]. The same study summarized Perth's TOD experience and suggested a method to evaluate the sustainability of TOD with reference to the following [12]:

1. Travel Behavior
2. Local Economy
3. Natural Environment
4. Built Environment
5. Social Environment
6. Policy Context

With reference to the TOD Implementation Resources & Tools of The World Bank [13], the above six evaluation criteria were incorporated into the five stages of TOD framework: (1) Assess, (2) Enable, (3) Plan and Design, (4) Finance, and (5) Implement. As illustrated in Table 3, each step of the TOD framework should emphasize a different perspective of sustainability.

Table 3. TOD sustainable framework (adapted from The World Bank (2018[13]))

	Travel Behaviour	Local Economy	Natural Environment	Built Environment	Social Environment	Policy Context
(1) Assess	✓	✓	✓	✓	✓	✓
(2) Enable			✓	✓	✓	+
(3) Plan & Design	+ / -	✓	✓	+ / -	✓	✓
(4) Finance		+ / -		+ / -		+
(5) Implement	✓	✓	✓	✓	✓	✓

Legend: ✓ attention required + / - adjustment to be made + support required

In the first stage, all the six items are to be assessed to define the scale and scope of the project. The stakeholders are to be identified for undertaking a TOD project. An enabling environment is to be created in the second stage. Development decisions are mostly made based on political factors. The importance of assessment is to confirm or reject assumptions that local communities or political leaders

make. Further information at this assessment stage can refine TOD goals and objectives and ultimately create better policies [12]. Policy supports are required for enabling a feasible environment. Engineers, surveyors, facility managers and relevant professionals will participate in the third stage for the design of public infrastructure and the provision of public services. Considering the six criteria, different options to formulate TOD plans at various scales will be produced, e.g. transport corridor, station area and project scales [13]. Travel behaviour and built environment may be adjusted or compromised at different extents and different times in terms of urban form variables such as density, diversity and connectivity [14]. The fourth stage is about real estate financing, infrastructure investments and involvement of developers. Financial options include bond, operating revenues (if positive) and property sales [15]. Attention is required about the impact to the local economy. For large TOD projects, public private partnership (PPP) may be an option. The final stage of execution is prioritizing the project alternatives to progress monitoring. For progress and performance monitoring, a facility management benchmarking study with comparable projects should be carried out [16].

2.2. Public-Private Partnerships (PPP)

Hobart city is the second oldest state capital of Australia. TOD development of a historic city usually includes the establishment of transportation corridors and active transportation modals in low- and middle-income areas around the CBD. Transit access is to be improved; aged buildings can be redeveloped or adapted. These infrastructures are big investment to the local government. Participation of private sectors is common for sharing risk and applying latest technology, e.g. intelligent transport system and facilities. In PPP projects, public and private sectors jointly develop products and services and share risks, costs and resources which are connected with these products. Weihe [17] argued that there are various kinds of PPP. In relation to local economic development involving infrastructure approach, private capital is used for the design, construction, operation and maintenance of infrastructure projects. In the following discussion, PPP is defined as an innovative partnership between local stakeholders from both the public and private sectors with a durable character in which actors develop mutual products and/or services and in which risk, costs, and benefits are shared [18]. Some representative examples of PPP in Australia are given in Table 4.

Table 4. Some PPP projects in Australia

State	PPP projects
New South Wales	Chatswood Transport Interchange Parramatta Transport Interchange [19]
West Australia	QEII Medical Centre Car Parking Project Midland Public Hospital Project [20]
Victoria	North East Link Metro Tunnel Project [21]
Tasmania	Paterson Street Central car park and development [22]
Northern Territory	Darwin Correctional Precinct Water Front Redevelopment [23]
South Australia	State swimming centre Regional Police Stations [24]
Queensland	Townsville Industrial Recycling opportunities project [25]

As Table 4 shows, Australia is experienced in applying PPP to various kinds of projects, which range from transport, social services to water and sewerage treatment. In the wide range of PPP, the core services are delivered as specified by relevant policies and guidelines, e.g. teaching, policing, and legal administration. Even though PPP policies of the less populous states (Northern Territory, Western Australia, South Australia and Tasmania) often take the flexible approach with a wider range of services

models [26], Tasmania is the state with the least number of both PPP projects and total project values [27].

In the following sections, the case of Hobart is investigated in view of the unfavorable experience that the transport sector represented most of the unsuccessful PPPs due to the exposure to market demand-based revenues [28].

3. Research Methodology

A qualitative case study involving semi-structured site observations from February 2021 to November 2021 was conducted. It is based on the local government's Central Hobart Precincts Plan, with investigations into the following issues in media: (1) Traffic congestion; (2) Parking; and (3) Public transport services.

To enhance the reliability of the study [29], data collection through on-site observation was conducted twice per week. Both were made during morning peak hours by driving a vehicle along Sandy Bay Road in dual directions between the suburban area and the CBD of Hobart. Some useful insights were provided with reference to Tasmania's state road traffic count [30].

According to the Discussion Paper for Central Hobart Precincts Plan [31], the city will be transformed ambitiously to a commercial, cultural, political and administrative centre for Southern Tasmania in year 2042. The government aims to attract and retain key retail, business, cultural, educational, health and community activities in the long term. With our observation results, it is believed that the government will have a lot to do to achieve its aim. The following research questions, as mentioned earlier, are to be investigated in the next section:

1. How to enhance greater accessibility of the Hobart to align relevant people and the economic activities?
2. How to finance the development projects?

4. Findings and Discussion

From April 2021 to November 2021 (there was no significant traffic impact due to Covid-19 cases in Tasmania during the period), vehicle round-trips were made twice a week from Derwentwater Avenue to Royal Hobart Hospital through Sandy Bay Road, Harrington Street, Macquarie Street and Argyle Street. A car travel time analysis between the Hobart CBD and the suburban area is summarized as follows:

- a. AM peak inward trip: Longest travel time of 17.5 minutes (3.5km)
- b. AM peak outward trip: Longest travel time of 11 minutes (3.5km)

Traffic congestion in the direction to CBD is common during the AM peak hours, as shown in Photo 1. Tasmania's state road traffic count [32] shows that the AM peak traffic along Davey Street, one of the busiest roads in the city, was over 2,200 vehicles in 2019 (Figure 2).



Photo 1. Congestion during the AM peak hours in the direction to CBD, Hobart

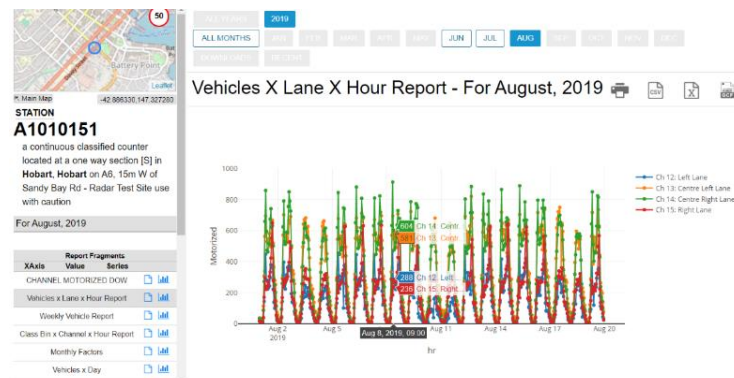


Figure 2. Traffic count of Davey Street, Hobart

Infrastructural works are necessary to solve the traffic problems. For this purpose, Intelligent Transport Systems (ITS) may be applied. Some attempts have been made successfully in Hobart:

1. On-Road Traveller Information System, e.g. Variable Message Signs of speed limit on highways
2. Lane Use Management System, e.g. Reversible lane / tidal-flow lane operation on Tasman Bridge

PPP is a common strategy for applying ITS. Hobart should evaluate the innovative tools with flexible procurement options. The private sector may provide latest technology of ITS. Nevertheless, Lam and Yang [33] pointed out that not all projects are best suited to PPP because there may be divergent views between the public and private sectors; investors who lack knowledge about the project are concerned about the inherent risks. Disclosure and transparency of PPP projects help to achieve a win-win situation. Long-term investors of PPP projects, such as pension funds and sovereign wealth funds, have to convince shareholders with reliable data and information [21]. Carbonara and Pellegrino [34] suggested that government may guarantee the viability of PPP projects provided that optimal values of the revenue floor and revenue ceiling (the excess revenue to be shared) are in a high level of confidence. Cost of traditional infrastructural works, like highways and car park facilities, may be reduced with ITS application. The investment of PPP projects becomes more attractive.

Congestion problem in Hobart persists and comes along with the shortage of parking. The local government attempted to solve the parking inadequacy in Hobart CBD by increasing the parking fee in July 2021. 'Park-and-ride' and public transport were promoted to solve the traffic problems. For instance, Derwent River Ferry has served with a bid to ease congestion across the Tasman bridge, as shown in Figure 3, since August 2021. Two 'park-and-ride' stops are formed at Bellerive Pier and Brooke Street Pier. However, the results were not obvious. In fact, 'park-and-ride' was found to be a complicated solution as additional trips were made. Congestion probably remains at the same level [35]. As suggested in the research, other policies are needed to lessen the congestion problem with 'park-and-ride'. For example, improving the current public transport services so congestion and parking issues may be solved.

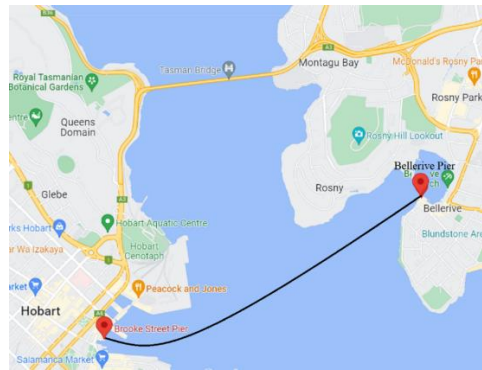


Figure 3. Derwent River Ferry service between Bellerive Pier and Brooke Street Pier
(Source of map: Google Map)

Bus services are the main public transport mode in Hobart. According to the services provider, the bus headway from suburban area to CBD is about 10 to 15 minutes. Our site observation in 2021 shows the same. However, the number of passengers is low. According to the annual report of the sole public bus services provider in Hobart, Metro Tasmania Pty Ltd (Metro) suffered a financial loss of AU\$0.8 million (before income tax) during the financial year 2020/2021 [36]. In the previous year, the loss was AU\$5.07 million. The management reported that the bad results were due to Covid-19. It may be partially true. Before the pandemic, for year 2017/ 2018, the loss was \$1.94 million; in year 2016/2017, the loss was \$3.02 million. During 2017/ 2018, there were 8.29 million passenger journeys in the whole Tasmania state. The taxpayers sponsored AU\$0.23 for each trip in the year. In view of the state population, number of journeys and scale of operation (504 employees and 224 buses in Tasmania), the financial loss was substantial. In the meantime, services improvement should be made to attract more passengers, e.g. installation of air conditioners for all buses. Fare reduction and introduction of competitors should be considered despite the opposition of the trade unions of drivers. A review of the whole transport system is necessary.

With reference to other state cities' experience in Australia, TOD can encourage the use of public transport. For example, TOD started in Brisbane in the 2010s. A trend of developing residential areas with the support of public transport in TOD areas was noted [37]. Higher headway of transport services with competitive fares are important to optimising TOD effectiveness. The research of Kamruzzaman et al. [30] found that Brisbane's TOD experience was satisfactory in terms of employment density, residential density, land use diversity, and public transport accessibility.

5. Conclusions and Further Research

This study examined the current Hobart city's issues: congestion, lack of commercial activities, and uncompetitive bus services. To accomplish the Central Hobart Precincts Plan, the Tasmanian government has to compete with the other states in attracting investors and engaging professionals to work and live in the city. Specifically, a comprehensive TOD plan and its successful execution, which have been proved useful in developing a modern and reasonably populated city (e.g. Perth and Brisbane), are needed. Different stages of a TOD require specific attention to different criteria: travel behavior, local economy, environment, etc. Private investment is important to the success of TOD. PPP should be considered in the design and installation of ITS and public transport services provision. To investigate the feasibility of PPP and TOD for the development of Hobart, for example with reference to interviews with stakeholders and its impacts with other development plans (e.g. relocation of The University of Tasmania to CBD), further research is needed.

References

- [1] Australian Bureau of Statistics 2021 Regional population Statistics about the population and components of change *Avaiable from:*
<https://www.abs.gov.au/statistics/people/population/regional-population/latest-release#key-statistics>
- [2] Australian Bureau of Statistics 2016 Regional population Statistics about the population and components of change *Avaiable from:*
<https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3218.0Main+Features12016?OpenDocument>
- [3] Tasmanian Government 2021 Central Hobart Precincts Plan *Avaiable from:*
<https://www.hobartcity.com.au/Projects/Current-projects/Central-Hobart-Precincts-Plan>
- [4] Tasmanian Government 2021 Hobart City Deal *Avaiable from:*
<https://www.hobartcitydeal.com.au/>
- [5] Australian Bureau of Statistics 2021 Economic profile *Avaiable from:*
<https://economy.id.com.au/>
- [6] Department of Health, Tasmanian Government 2021 Royal Hobart Hospital *Avaiable from:*
<https://www.health.tas.gov.au/hospitals/royal-hobart-hospital>
- [7] Roads and Traffic Authority, NSW 2002 Guide to Traffic Generating Developments. *Avaiable from:*
<https://roads-waterways.transport.nsw.gov.au/business-industry/partners-suppliers/documents/guides-manuals/guide-to-generating-traffic-developments.pdf>
- [8] Australian Automobile Association 2019 Road Congestion in Australia *Avaiable from:*
<https://www.aaa.asn.au/wp-content/uploads/2019/06/Road-Congestion-In-Australia-2019-v.3.pdf>
- [9] Australian Bureau of Statistics 2021 Regional population *Avaiable from:*
<https://www.abs.gov.au/statistics/people/population/regional-population/latest-release>
- [10] Akbari S, Mahmoud M S, Shalaby A and Habib KMN 2018 Empirical models of transit demand with walk access/egress for planning transit-oriented developments around commuter rail stations in the Greater Toronto and Hamilton Area *Journal of transport geography* **68(C)** 1-8
- [11] Carlton I 2009 *Histories of transit-oriented development: perspectives on the development of the TOD concept* (No. 2009 02) Working Paper
- [12] Renne J L 2009 Evaluating transit-oriented development using a sustainability framework: Lessons from Perth's network city *Planning Sustainable Communities: Diversity of Approaches and Implementation Challenges* Ed. Sasha Tsenkova. Calgary: University of Calgary 115-148
- [13] Global Platform for Sustainable Cities and World Bank 2018 *TOD Implementation Resources and Tools* World Bank
- [14] Kamruzzaman M, Baker D and Turrell G 2015 Do dissonants in transit oriented development adjust commuting travel behaviour? *European Journal of Transport and Infrastructure Research* **15(1)** 66-77
- [15] Dumbaugh E 2004 Overcoming financial and institutional barriers to TOD: Lindbergh Station case study *Journal of Public Transportation* **7(3)** 3
- [16] Wong P, Leung SC and Gilleard JD 2013 Facility management benchmarking: an application of data envelopment analysis in Hong Kong *Asia-Pacific Journal of Operational Research* **30(05)** 1350013
- [17] Weihe G 2005 Public-private partnerships: addressing a nebulous concept *Avaiable from:*
<https://core.ac.uk/download/pdf/17277806.pdf>
- [18] Klijn EH and Teisman GR 2004 Public-private partnership: The right form at the wrong moment? An analysis of institutional and strategic obstacles *Ghobadian et al.(szerk.): Public-Private Partnerships, Policy and Experience*
- [19] NSW treasurer 2022 PPP Awarded projects *Avaiable from:*
<https://www.treasury.nsw.gov.au/projects-initiatives/public-private-partnerships/awarded->

- [projects](#)
- [20] Government of Western Australia 2022 Public Private Partnerships *Avaiable from:* <https://www.wa.gov.au/organisation/departement-of-treasury/public-private-partnerships>
- [21] State government of Victoria 2022 Partnerships victoria ppp projects *Avaiable from:* <https://www.dtf.vic.gov.au/public-private-partnerships/partnerships-victoria-ppp-projects>
- [22] Tasmania government 2022 Public and private sector working together to deliver new bus interchange *Avaiable from:* https://www.premier.tas.gov.au/releases/public_and_private_sector_working_together_to_deliver_new_bus_interchange
- [23] Northern Territory government 2022 Darwin Correctional Precinct Public Private Partnership Project *Avaiable from:* https://treasury.nt.gov.au/data/assets/pdf_file/0004/462478/I-DCP-001.pdf
- [24] South Australia government 2022 Public Private Partnership projects *Avaiable from:* <https://www.treasury.sa.gov.au/about/our-minister/public-private-partnership-projects>
- [25] Jacobs 2022 Stage 2 Haughton Pipeline Duplication Project *Avaiable from:* <https://www.infrastructure.gov.au/sites/default/files/migrated/cities/city-deals/townsville/files/final-stage-2-haughton-pipeline-dbc.pdf>
- [26] Malone N 2005 The evolution of private financing of government infrastructure in Australia—2005 and beyond. *Australian Economic Review* **38(4)** 420-430
- [27] Infrastructure Partnerships Australia 2022 Public Private Partnerships by jurisdiction *Avaiable from:* <https://infrastructure.org.au/chart-group/public-private-partnerships-by-jurisdiction/>
- [28] Bianchi RJ, Drew ME and Whittaker TJ 2017 When Public Private Partnerships (PPPS) Turn Sour: Australian evidence *Avaiable from:* https://www.monash.edu/data/assets/pdf_file/0020/2052092/WP2017-03.pdf
- [29] Patton MQ 1999 Enhancing the quality and credibility of qualitative analysis. *Health services research* **34(5 Pt 2)** 1189
- [30] Transmetric America Inc 2022 Tasmania's traffic counts *Avaiable from:* <https://geocounts.com/traffic/au/stategrowth#>
- [31] Hobart City Council 2021 Central Hobart Precincts Plan, Discussion Paper *Avaiable from:* <https://yoursay.hobartcity.com.au/central-hobart-precincts-plan>
- [32] Lam PT and Yang W 2020 Factors influencing the consideration of Public-Private Partnerships (PPP) for smart city projects: Evidence from Hong Kong *Cities* **99** 102606
- [33] Carbonara N and Pellegrino R 2018 Revenue guarantee in public-private partnerships: a win-win model *Construction management and economics* **36(10)** 584-598
- [34] Parkhurst G 1995 Park and ride: could it lead to an increase in car traffic? *Transport policy* **2(1)** 15-23
- [35] Metro Tasmania 2021 Annual Report - Metro Tasmania. *Avaiable from:* <https://www.metrotas.com.au/corporate/publications/annual-report/>
- [36] Yang K and Pojani D 2017 A decade of transit oriented development policies in Brisbane, Australia: Development and land-use impacts *Urban Policy and research* **35(3)** 347-362
- [37] Kamruzzaman M, Baker D, Washington S and Turrell G 2014 Advance transit-oriented development typology: case study in Brisbane, Australia *Journal of Transport Geography* **34** 54-70