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How Greater Brisbane's 'four types of commuters' were distributed from a spatial and gender perspective in 2021

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Abstract

The population of Australia's largest cities are expected to grow significantly in the coming decades, and this has been reinforced by the recent above average intake of immigration since re-opening of international travel following the COVID-19 pandemic lockdowns. This will challenge the ability to maintain adequate levels of accessibility as cities grow, particularly if the increasing call by planners for urban areas to embrace '15-minute' or '30-minute' cities and/or regions is to be met in the process. To achieve this a logical approach is to ensure cities planned with a focus on transforming to a more localised movement system, characterised by urban areas with people living closer to the jobs, services and recreation needs of the future. This will have the effect of people and goods having the ability to move in more efficient and sustainable ways while in the process ease the burden and need for more expensive large-scale infrastructure.

To assist with planning for such a transformation, Peter Seamer, former CEO of Victoria's Planning Authority, highlighted there are 'four types of commuter' trips in our metropolitan areas being 'inward', 'short', 'circumferential' and 'contraflow'. The initial analysis of these types of trips for Melbourne highlighted the city's work commuter trips move spatially in a polycentric form, yet most of the infrastructure investment has been mostly established in catering for the 'inward' radial trips to the inner-city areas via road and rail. In doing so the transport network prioritises benefits for approximately 58% of commuter trips daily.

The spatial distribution of 'four types of commuters' per the categorised definition of Seamer were analysed and established for each SA2 of the Greater Brisbane area as part of an ATRF paper in 2023 (Hayward, et al. 2023).

This paper analysed ABS Journey to Work data from the 2016 Census which reflects travel patterns prior to the COVID-19 Pandemic which commenced in early 2020. This event had a dramatic effect on restricting the movement of people across the world for many trip purposes through the significant government mandated lockdowns. Coming out of lockdowns, companies have adapted to enable workers to continue working from home on a part-time basis with more regularity prior to the COVID-19 pandemic which will permanently alter peak period commuting demands and patterns in Australia's cities.

Analysis of equivalent Brisbane commuter trip patterns has highlighted similar trends and challenges for the region as per those highlighted by Seamer for Melbourne. This provides insights for areas where there is significant commuter demand for relatively short and circumferential trips across the network with limited supply in the form of attractive active and public transport facilities. To this end, transport infrastructure and technology investments can be assessed and viewed through a different lens with this analysis to support transport network improvements as the city grows to 3.9 million in 2046.

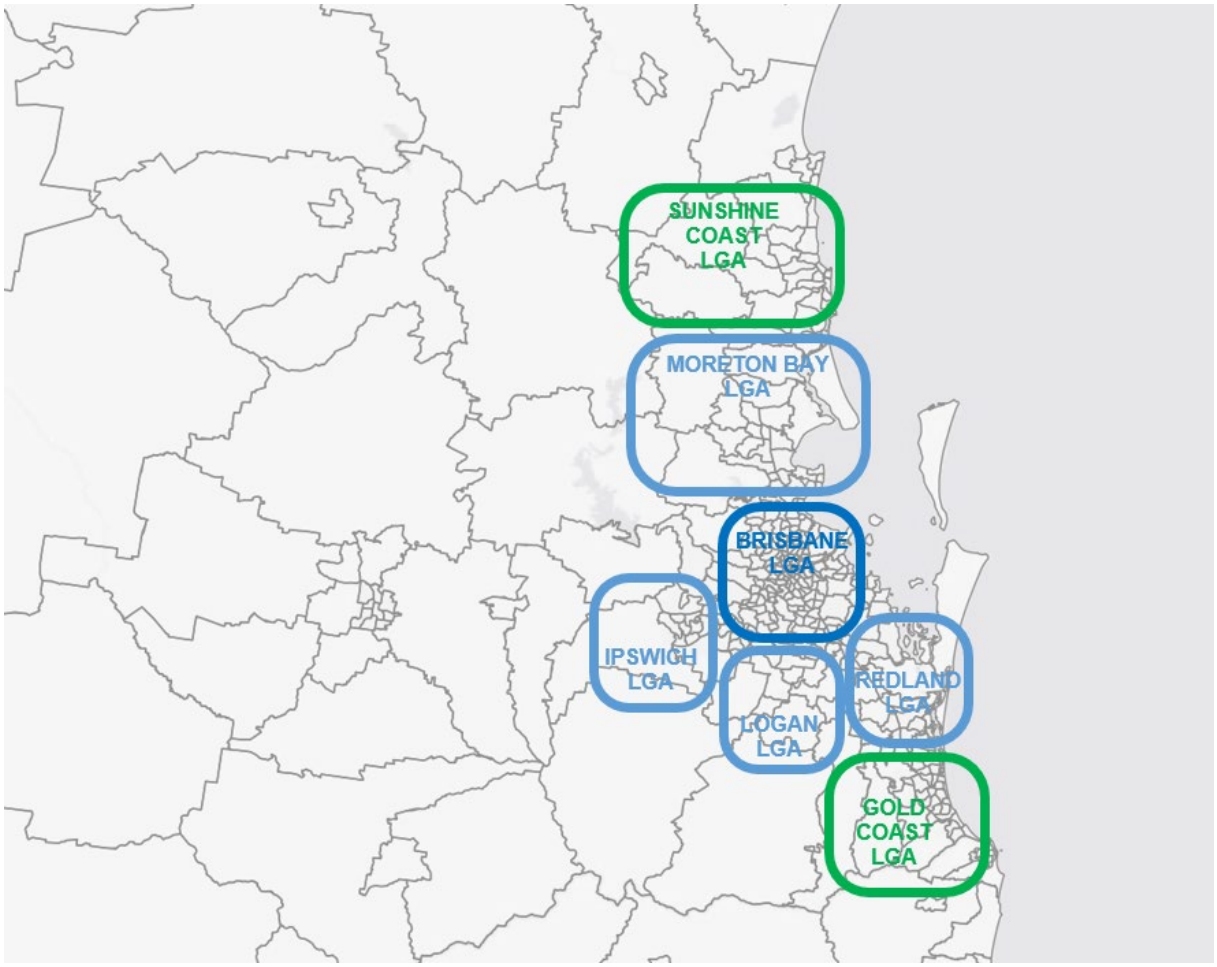
The 2021 ABS Census was the first national survey that provided a snapshot of how travel patterns are evolving in the post-COVID pandemic era, particularly with respect to changes to the level of people working from home spatially through Greater Brisbane.

This type of segmentation can support bespoke and tactical transport planning strategies to better plan transportation system infrastructure investments at the local and regional level throughout South East Queensland, ensuring projected population growth is accommodated in the most efficient and sustainable form.

1 Introduction

The revised SEQ Regional Plan released in December 2023 outlined the planned population growth for Greater Brisbane to increase from approximately 2.5 million in 2021 to 3.9 million in 2046 (DSDILGP, 2023). As presented in Figure 1, Greater Brisbane comprises of the Local Government Areas of Brisbane, Ipswich, Logan, Moreton Bay and Redland. The non-Brisbane LGA's are typically located beyond a 20km radius of the Brisbane CBD to the north (Moreton Bay), south (Logan), east (Redlands) and west (Ipswich).

Figure 1 – Greater Brisbane SA2 map and indicative Local Government Areas



With respect to recent base trendline traffic patterns and performance of Greater Brisbane, the daily travel characteristics included 6.54 million trips, at an average trip length of 10.02km and an average journey time of 24 minutes. These daily trips were an increase of 5% for trip lengths and a 10% increase on average journey times compared to 2011 (TMR, 2023a).

The work commuting trip purpose is the primary contributor to longer trip lengths in Greater Brisbane, with the average trip length being 16.4km in 2017 (TMR, 2023b). Work trips account for approximately 25% of all trip purposes, with the remaining 75% of trip purposes including 'education', 'shopping / personal', 'social / recreation', and 'pickup / drop-off / delivery' ranging between 7.1km to 9.8km in length on average (TMR, 2023c). Greater Brisbane work trip purposes have increased by 7% in length from 15.3km in 2011, while the average time travelled has increased from 30 minutes in 2011 by 13% to 34 minutes in 2017 (TMR, 2023d).

A key challenge with this planned population growth is the respective spatial allocation of employment zones across the Greater Brisbane urban area. Whereby 67% of the population growth (921,200 people) will occur within the outer Local Government Areas of Greater Brisbane, while these areas will only accommodate 36% of the employment growth (239,300 jobs) (DSDILGP, 2023). This planned demographic growth across Greater Brisbane will result in continuing increases in work trip lengths through to 2046. In doing so, this will continue to place additional demand and pressure on the transport system, particularly during the peak traffic periods of the morning and evening where work trips can account for up to 37% of all trip purposes on the network (TMR, 2023e). Historically this type of large-scale urban form will reinforce additional longer than average car based demand travel on the radial road network which already experiences the most traffic congestion during peak commuter periods.

These transportation related challenges are not exclusive to Greater Brisbane. As highlighted by Infrastructure Australia's paper in 2018, 67% of Australia's 24 million population in 2016 was located within the four largest cities of Sydney, Melbourne, Brisbane and Perth (IA, 2018). Of the additional 11.8 million people residing in Australia between 2016 and 2046, 8.9 million people will reside in these four cities (75%) (IA, 2018). The paper indicates population growth will have an impact on the function and liveability of these four cities in the future. Equipping industry with analysis, insights and tools to address these challenges is vitally important.

Many potential measures to support governments managing sustainable population growth for Australia's major cities were outlined by Peter Seamer in 2019. Seamer hypothesised an effective solution for future urban and transport planning lies in embracing a non-radial approach to transport infrastructure network upgrades, by way of encouraging the growth of business and jobs closer to where people live, to move the flow of people and goods away from the Melbourne CBD (Seamer, P. 2019c).

To gain a stronger appreciation for current work travel patterns and demands across Melbourne, Seamer grouped commuting trips into four spatial forms (Seamer, P. 2019d):

1. 'Inward' – trips that travel towards the CBD.

2. 'Short' – trips within their local area of residence.

3. 'Circumferential' – trips with a direction that is broadly perpendicular to the radial direction.

4. 'Contraflow' – trips that are in the opposite direction to the CBD from their place of residence.

The analysis of Melbourne work trips highlighted that 58% of trips are 'inward', 9% are 'short', 24% 'circumferential', and 9% 'contraflow' (Seamer, P. 2019e). This highlights a majority of work trips in Melbourne that are radial (while not all of these are job destinations in the CBD) which is likely a significant contributor to peak period congestion. Therefore, there is potential to ease congestion in the future through increasing the proportion of the other three types of commuting trips. For example, 'short' commuting trips are candidate trips for active travel modes, while residual capacity in the transport system and network can be achieved through aligning and/or increasing 'circumferential' and 'contraflow' commuter trips.

This paper seeks to understand the equivalent 'four types of commuters' for the Greater Brisbane area in 2021, and how they are distributed both from a spatial perspective and by gender. In doing so, this aims to provide insights and analysis that support governments in sustainably managing people's ability to access jobs, services and other activities of the future within the spectrum of significant planned population growth of the region.

2 Method

The primary data source to analyse the 'four types of commuters' for the Greater Brisbane area is the Australian Bureau of Statistics' (ABS) Table Builder of 'Census – employment, income and education' (ABS, 2024) from the 2016 and 2021 Census. This interactive dataset allows users to summarise journey to work between Statistical Area Level 2 (SA2) regions across Australia, including the provision of aggregated travel mode shares for each SA2.

The definition applied for each of the 'four types of commuters' using the ABS SA2 data set is outlined below and presented in Figure 2:

1. *'Inward'* – work trips that travel to the Brisbane – Inner City SA3 and the equivalent 'inner north / south / east / west' SA3 between the CBD and subject SA2

2. *'Short'* – work trips that travel within its SA2 or adjoining SA2

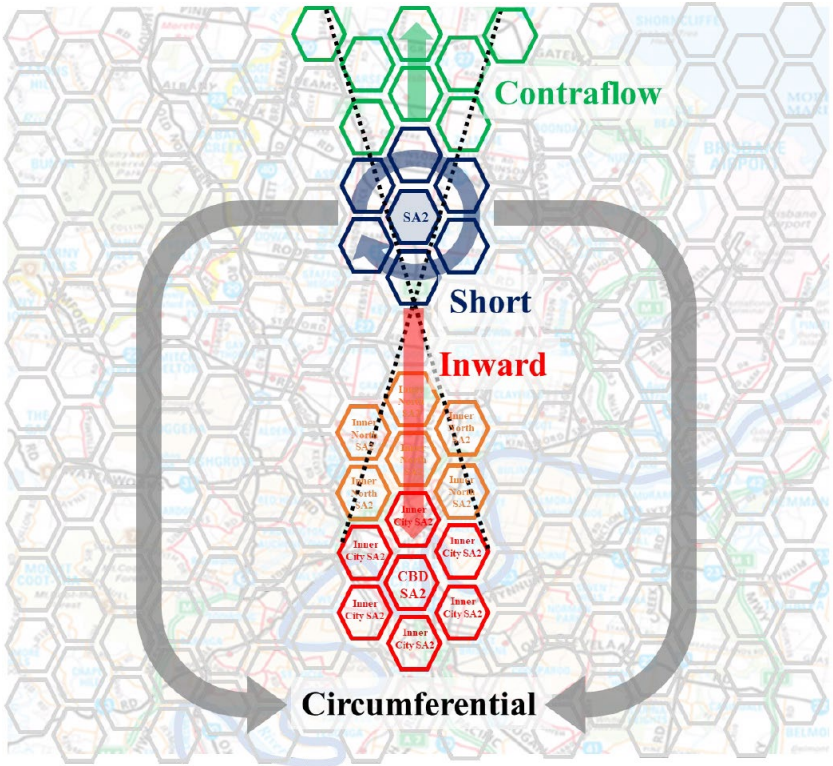
3. *'Contraflow'* – work trips that are in the opposite direction to the Brisbane – Inner City SA3 from their SA2 place of residence

4. *'Circumferential'* – sum of all remaining work trips

The data was collected from the ABS Table Builder dashboard and processed within various spreadsheets. Measurements of distance to CBD for each SA2 were conducted using Google Maps referencing the spatial centre of each SA2 and the General Post Office within the Brisbane CBD.

This analysis adopts a different geographic scale compared to Seamer's analysis. The purpose of selecting SA2 as the geographic scale for this analysis was to align it with the available ABS interactive mapping while also to capture a broader appreciation for commuting trips that occur in the local area to where people reside.

Figure 2: Schematic definition of 'four types of commuters' for Greater Brisbane by SA2



2.1 Sample limitations of ABS Census data

It is acknowledged that commuting trips account for approximately 25% of total daily trips in South East Queensland. ABS data provides a comprehensive sample of the work trip purpose for Greater Brisbane for the Census date of Tuesday 10 August 2021. Consequently, there are limitations the representativeness of the data in that it accounts for approximately 25% of total daily trips and is for a single non-school holiday weekday rather than an average non-school holiday weekday in 2021.

Other observed person trip data sources such as TMR's Household Travel Survey were considered for this research. While the Household Travel Survey collects data for most trip purposes, the sample coverage is not as complete as ABS's Census for the work trip purpose.

2.2 Influence of COVID-19 pandemic travel restrictions on Census data

Both 2016 and 2021 ABS Census data have been analysed to understand various travel patterns with and without the impacts of the COVID-19 pandemic and associated government lockdown policies at the time. This data allows comparisons to be drawn to understand the effects for the COVID-19 lockdowns and 'new-normal' travel patterns to better support future transport planning initiatives.

There were no government enforced COVID-19 travel restrictions for Greater Brisbane at the time of the 2021 Census, with a lockdown for South East Queensland ending two days prior on 8 August 2021. However, other there were 'lockdowns' enforced at the time of the 2021 Census for states such as New South Wales and Victoria. This included a border closure for travel between New South Wales and Queensland, approximately 90km to the south of the Brisbane CBD.

A secondary reason for initially analysing the 2016 ABS data set was to ensure a more robust comparison of Seamer's analysis of Melbourne's equivalent travel patterns.

2.3 Definition of travel mode types

For the purpose of this analysis, the type of travel modes grouped from ABS data are summarised in Table 1.

Table 1: Definition of travel mode types for 'four types of commuter' analysis

Travel mode type	ABS Census data method of travel to work type(s)
Active travel	Bicycle, walked
Public transport	Train, bus, ferry, tram/light rail
Car	Car (driver), car (passenger)
Other	Taxi/ride-share service, truck, motorbike/scooter, other mode
Worked from home (WFH)	Worked at home
N/A	Did not go to work, not stated

3 Four types of commuters – Greater Brisbane average (2021)

Analysis of ABS Journey to Work data from 2021 indicates the Greater Brisbane area has a breakdown of the 'four types of commuters' as outlined in Table 2, including comparison to 2016.

Table 2: Greater Brisbane area 'four types of commuter' breakdown (2016 & 2021)

Type of Commuter	2016 Proportion	2021 Proportion
Inward	26.9%	22.9%
Short	26.1%	26.8%
Outward	8.4%	9.1%
Circumferential	38.7%	41.2%

The analysis highlights 2021 commuter travel patterns in Greater Brisbane on average have more people working locally within their SA2 or adjoining SA2 as there are in the inner city SA3s where a significant proportion of employment is clustered in SEQ.

In comparison to 2016, the 2021 'inward' commuter trips reduced by 4.0% while 'short' commuter trips remained relatively the same at approximately 27%. 'Outward' and 'circumferential' commuter trips recorded increases as a result of fewer 'inward' commuter

trips. This discrepancy can be attributed to in part by an increase of people working from home in 2021 (16%) compared to 2016 (5%).

Many of the 'short' work trips in Greater Brisbane would be less than 6km, which makes them attractive candidate trips for active transport with the average walk to work trip length in 2017 being 1.0km and work bicycle trip lengths being 6.7km (TMR, 2023f). The proportion of 'short' work trips is relatively consistent with Queensland household travel survey analysis which indicated the following proportion of total car trips being less than 6km in length (TMR, 2023g):

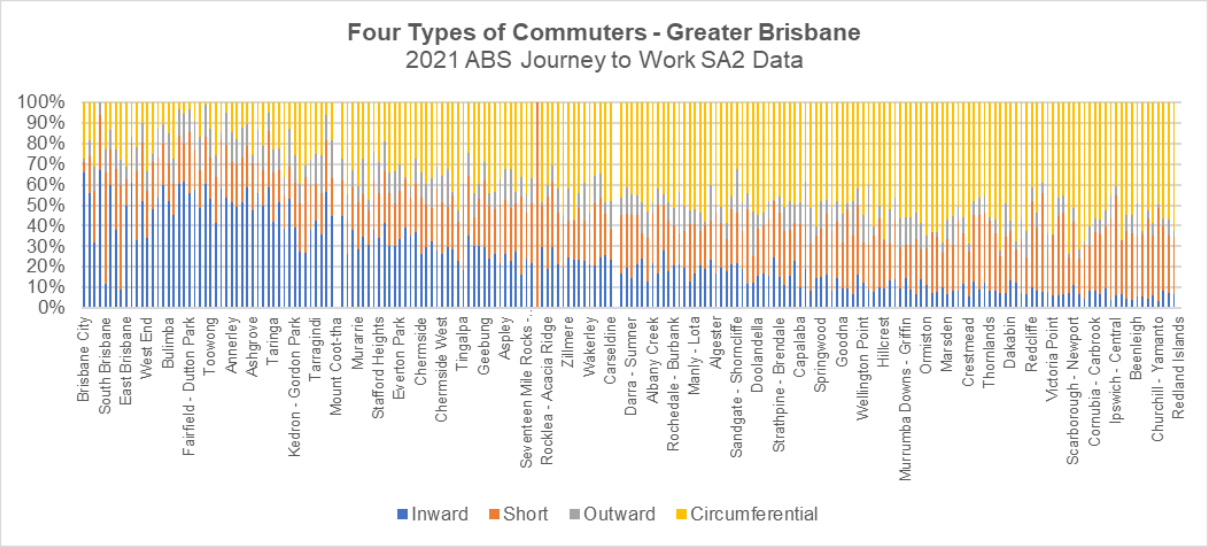
- Brisbane LGA – 29%
- Moreton Bay LGA – 44%
- Ipswich LGA – 42%
- Logan LGA – 38%
- Redland LGA – 41%

The data is also relatively consistent with almost 16% of total car trips in Greater Brisbane being less than 2km (all trip purposes).

4 Four types of commuters by Greater Brisbane SA2s (2021)

The 'four types of commuters' for Greater Brisbane by SA2 is presented in Figure 3, sorted by distance to CBD from left to right (shortest from left to longest at right). This chart provides insights on how the proportions change for the 'four types of commuter' throughout Greater Brisbane by SA2.

Figure 3: 2021 Greater Brisbane area four types of commuters by SA2



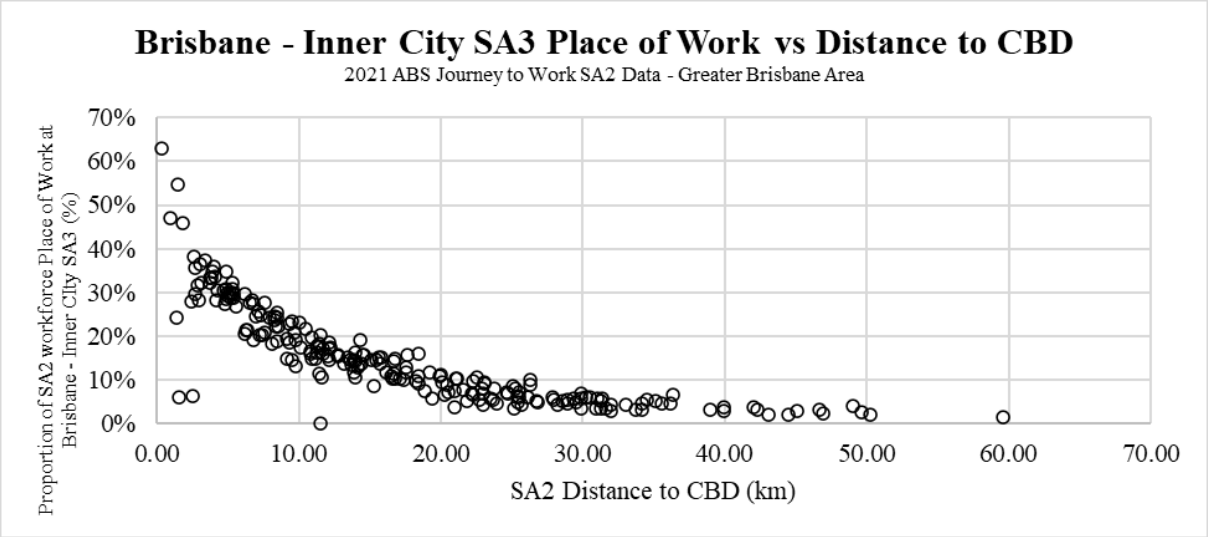
The proportion of 'inward' work trips for Greater Brisbane mostly range between 40-60% for SA2s within 9km of the CBD. This reduces to approximately 10-20% on average for 'inward' trips for SA2s between 20km and 40km from the CBD.

There is a general consistency in the proportion of 'short' and 'contraflow' trips based on distance to CBD. The main change occurs for 'short' trips for SA2s between 30km to 50km from the CBD where they range between 20-40%.

The highest proportion of 'circumferential' work trips in Greater Brisbane occurs for SA2s located between 30km and 50km from the CBD with an average of approximately 44% (compared to 34% overall average).

Presented in Figure 4 is the proportion of workers by Greater Brisbane SA2 whose job is in the Brisbane – Inner City SA3.

Figure 4: 2021 Greater Brisbane area four types of commuters by SA2



This chart highlights for workers residing in SA2s further than 20km from the CBD, it is likely that less than 10% of the SA2 workforce work in the Brisbane Inner SA3.

This context highlights a significant challenge for the transport network of the future given a significant proportion (66%) of Greater Brisbane's population growth is planned for the LGA's 20km from the CBD, including Moreton Bay, Ipswich and Logan.

At a Principal Regional Activity Centre level, the 'four types of commuter' proportions are presented in Figure 5 for four centres surrounding the 10km radius of Brisbane's CBD. These four centres include Indooroopilly (located 6.5km to south-west of CBD), Chermside (located 9km north), Carindale (located 10km east), and Upper Mount Gravatt (located 11km south).

Figure 5: 2021 'four types of commuter' patterns for four Principal Regional Activity Centres

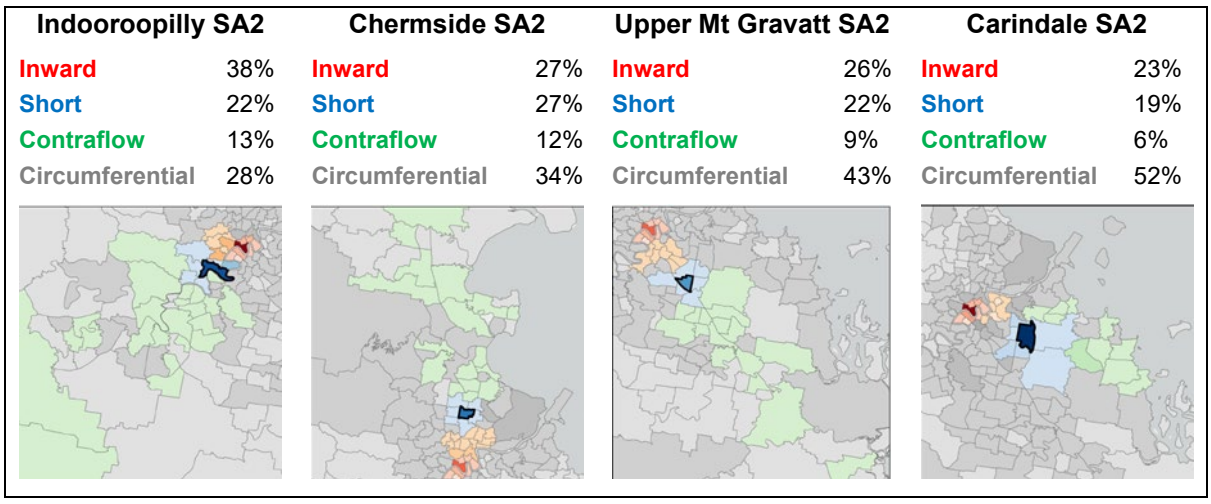


Figure 5 presents the 'inward' commuter trip proportions of the four Principal Regional Activity Centres to range between 23-38% with Indooroopilly achieving the largest proportion. Given Indooroopilly is located closest to the CBD of the four centres, it is consistent with the trends of Figure 4. Chermside recorded the largest proportion of 'short' trips with 27%, which could be attributable to it being the only SA2 of the four which is proximate to a hospital.

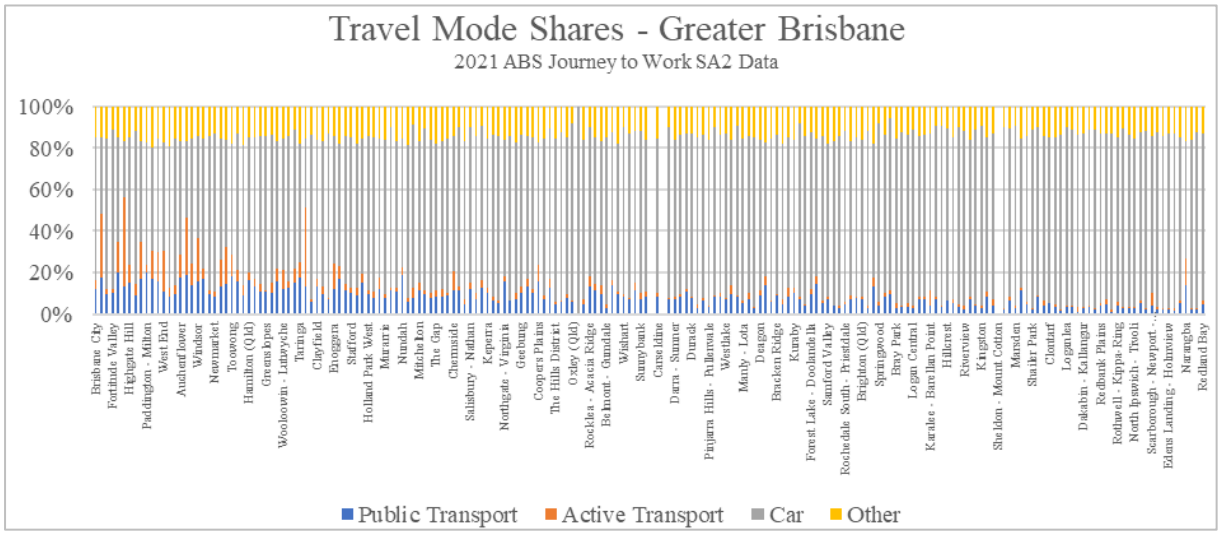
5 Four types of commuters by Greater Brisbane SA2s (2021)

Presented in Figure 6 are the average commuter travel mode shares by SA2 for Greater Brisbane SA2s, with data sorted by distance to CBD (shortest from left to longest at right). For context the average commuter travel mode share proportions for Greater Brisbane in

2021 were 75% for private cars, 8% for public transport, 4% for active transport, and 14% for other modes.

Further to this, a more detailed analysis has also been completed for active travel and public transport in isolation to better understand the relationship between the 'four types of commuter', surrounding transport infrastructure, and distance to the CBD at the SA2 level.

Figure 6: 2021 Greater Brisbane area travel mode shares by SA2



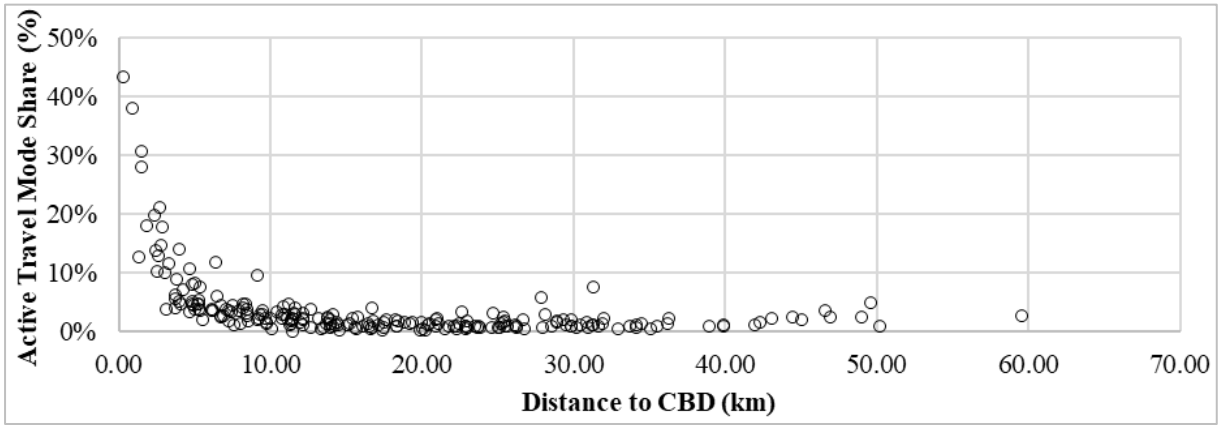
This analysis highlights that combined active travel and public transport mode shares are mostly more than 40% for SA2s located within 3km of the CBD. This proportion reduces to approximately 10% on average for SA2s located between 20km and 40km from the CBD.

Car mode shares are mostly between 70-80% for SA2s located more than 10km from the CBD while active travel mode shares account for approximately 2% of work trips on average. Given 'short' work trips are in the order of at least 20% for these SA2s, this indicates that cars are significantly more attractive to commuters in these areas of Brisbane even when the commuting distance is conducive to active travel.

5.1 Journey to Work active travel mode shares by Greater Brisbane SA2

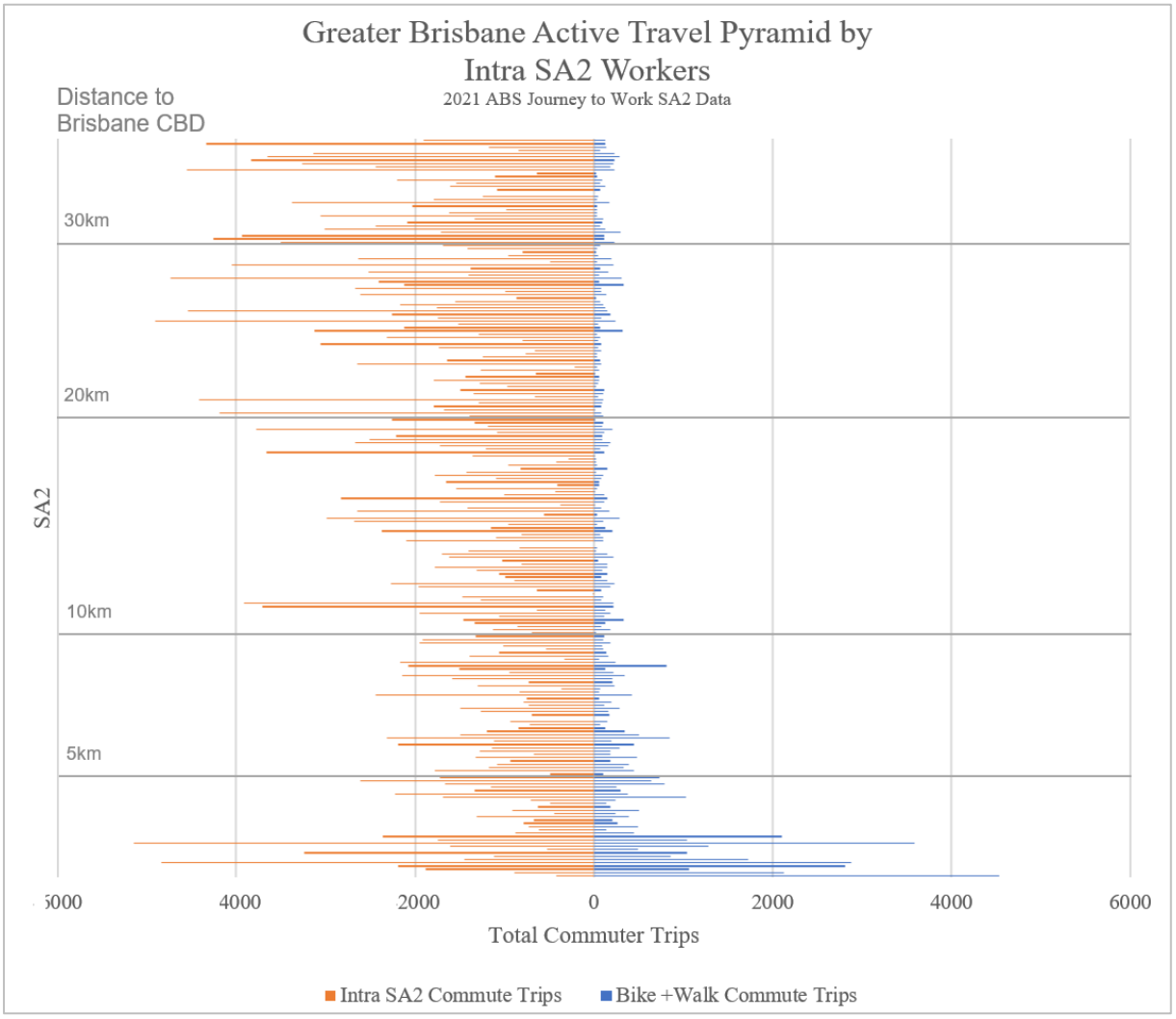
To further emphasise the above patterns, the active travel mode shares of each Greater Brisbane SA2 by distance to the CBD are summarised in Figure 7.

Figure 7: 2021 Greater Brisbane active travel mode shares by SA2 and distance to CBD



Active travel mode shares for work trips decline dramatically the further residents are from the CBD, particularly beyond the 10km CBD ring. This is highlighted in Figure 8 through an active travel pyramid chart comparing the total daily active travel work trips by SA2 with the total daily work trips within the SA2 (sorted by closest SA2 distance to Brisbane CBD at the bottom of the y-axis, to longest SA2 distance to Brisbane CBD at the top of the y-axis).

Figure 8: 2021 Greater Brisbane SA2 active travel commuters vs intra SA2 commuters pyramid



The largest adoption of active travel modes occurs within the Brisbane CBD 5km radius, with a similar amount of people working within their SA2 compared to people commuting via active travel modes. SA2s beyond the 5km radius recorded more than four times the people working within their SA2 compared to the amount of people electing to walk or ride to work.

It is acknowledged that the areas of SA2 increase with distance from the Brisbane CBD. This would result in longer intra SA2 commuting trip lengths for SA2s beyond the 5km radius of the Brisbane CBD compared to SA2s within the 5km radius. Consequently, these longer intra SA2 commuting distances likely make walking and bike riding to work less attractive for SA2s beyond the 5km radius, especially if the SA2 has inferior active travel facilities.

Intra SA2 commuter trips for Greater Brisbane in 2021 totalled 173,355 trips, representing approximately 12% of total commuter trips. For context, there are approximately 36,500 fewer intra SA2 commuters (equating to 17%) than the total Brisbane Inner SA3 commuters. The amount of intra SA2 commuter demand is significant, and given they comprise of relatively short trip distances they are ideal candidate trips for active travel modes if safe and connected infrastructure are provided within the SA2.

5.2 Journey to Work public travel mode shares by Greater Brisbane SA2

Presented in Figure 9 is the public transport mode shares of each Greater Brisbane SA2 by distance to the CBD. Public transport mode shares mostly range between 10-25% for SA2s located between 5km and 20km from the CBD with a gradual decline the further away from the city. This mode share declines to 5-10% for SA2s located between 20km to 40km from the CBD.

Figure 9: 2021 Greater Brisbane public transport mode shares by SA2 and distance to CBD

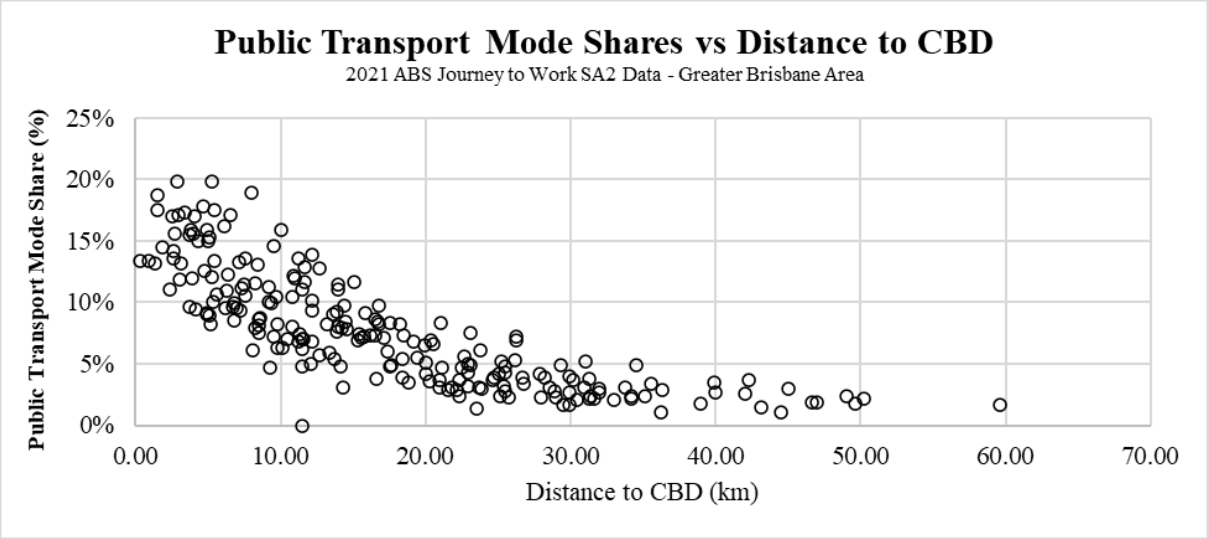
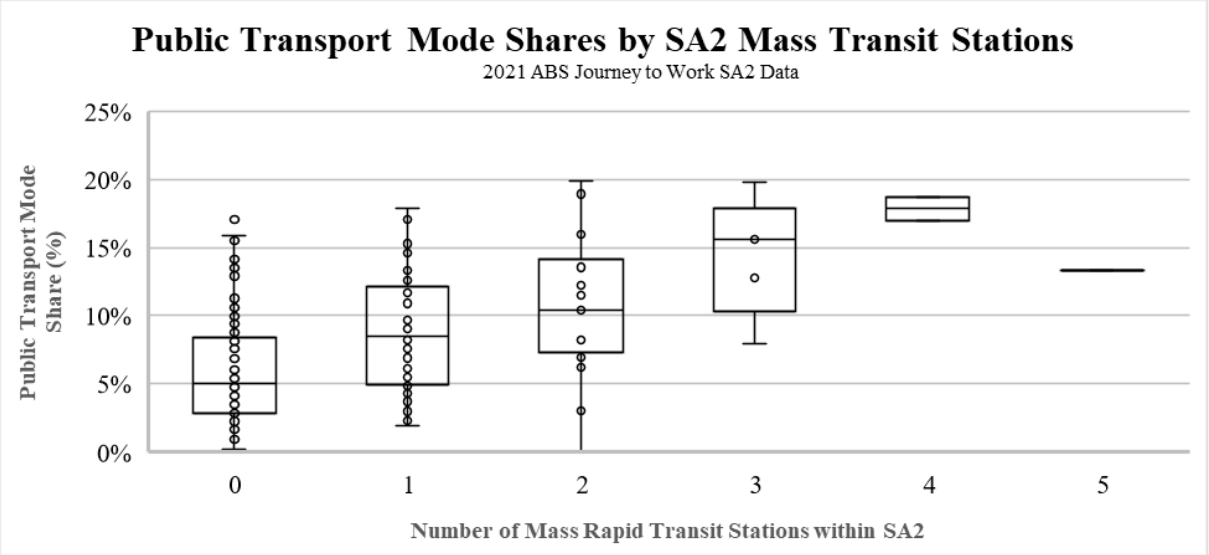


Figure 9 highlights that most SA2s more than 30km from the CBD achieve a public transport mode share for work trips of less than 5%.

Public transport mode shares for SA2s can vary across Brisbane for similar distances to CBD, primarily due to level of access to mass rapid transit stations. Presented in Figure 10 is a summary of public transport mode shares for each Greater Brisbane SA2 compared to respective provision of mass rapid transit stations within the respective SA2 (includes rail and busway stations).

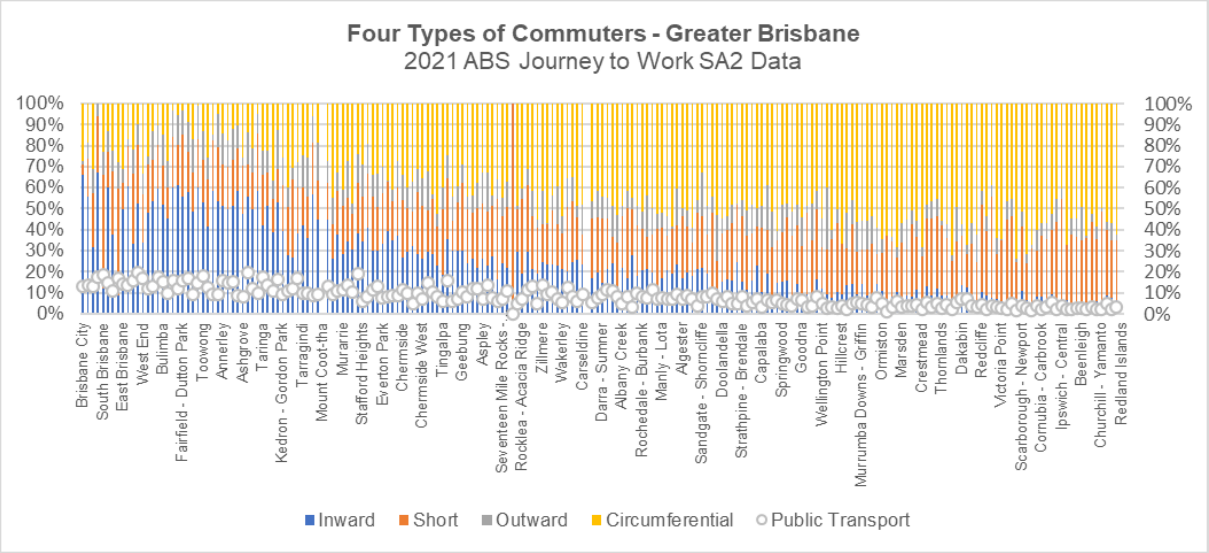
Figure 10: 2021 Greater Brisbane PT mode shares by mass rapid transit stations within SA2



This figure highlights an increasing of public transport mode shares at SA2 with increased mass rapid within the SA2. For SA2s with no mass rapid transit stations, the median public transport mode share was approximately 5%. The median public transport mode share for SA2s with one mass rapid transit station increased to approximately 8% and approximately 10% for SA2s with two stations. Mode shares increased to a median of approximately 16% and 18% for SA2s with three and four mass rapid transit stations respectively.

Overlaying the public transport travel mode shares on the ‘four types of commuters’ for each respective SA2, as presented in Figure 11, highlights how public transport predominately services the ‘inward’ work trips throughout Greater Brisbane. Most SA2s ‘inward’ work trip proportions are greater than the public transport mode share, indicating a potential limited adoption of public transport for the other ‘short’, ‘circumferential’ and ‘contraflow’ work trips.

Figure 11: 2021 Greater Brisbane SA2 public transport mode shares vs the four types of commuters



Based on the analysis of travel mode shares for commuters of each SA2 across Greater Brisbane, the following trends and patterns existed in 2021:

- Work trip car mode shares are 80-90% for SA2s more than 10km from the Brisbane CBD
- Public transport mode range between 5-20% for SA2s within 10km of the Brisbane CBD, and decline the further the SA2 is located from the Brisbane CBD (at a slower rate of decline compared to the decline of 'inward' work trips)
- Active transport mode shares range between 10-50% for SA2s within 3km of the Brisbane CBD, and decline to mostly under 5% for SA2s more than 5km from the CBD

6 Greater Brisbane's Four types of commuters by gender (2021)

6.1 2021 Greater Brisbane 'four types of commuter' by gender

User characteristics are important considerations in transport planning to ensure transport facilities and services adequately cater for the needs of all people. To support this, the 'four types of commuters' have been analysed to determine the breakdown by gender as presented in Table 3.

Table 3: Breakdown of the 2021 'four types of commuter' by gender

Type of Commuter	All People	Female	Male
Inward	22.9%	23.7%	19.8%
Short	26.8%	28.6%	25.2%
Outward	9.1%	9.4%	8.9%
Circumferential	41.2%	38.4%	46.3%

Proportionally more females commute in the short travel and inward travel directions compared to males, while males have a greater propensity to in a circumferential direction than females. In total, females had greater proportions of 'inward' and 'short' commuting trips amounting to 52.3% compared to 45.0% for males. While males recorded a larger proportion of 'circumferential' commuting trips in the order of 46.3% compared to 38.4% for females.

6.2 2021 Greater Brisbane Journey to Work travel mode shares by gender

The 2021 commuter travel mode shares for Greater Brisbane by gender are presented in Table 4.

Table 4: Travel mode shares of 2021 Greater Brisbane commuters by gender

Travel Mode	All People	Female	Male
Car	74.8%	71.5%	78.1%
Public Transport	7.6%	8.5%	6.7%
Active Travel	3.6%	3.3%	3.9%
Other	14.0%	16.8%	11.3%

The analysis presented in Table 4 indicates females have a greater propensity to travel on public transport (8.5%) compared to males (6.7%). This may be related to the finding in Table 3 that females proportionally have more jobs located in the 'inward' direction, with the Brisbane's public transport system typically having a radial structure.

Proportionally approximately 8% more males use private car for commuting compared to females. This may be related to males having a higher proportion of 'circumferential' commuter trips compared to females as presented in Table 3. The logic behind this trend may be related to 'circumferential' trips not being serviced as well by public transport compared to 'inward' trips.

6.3 2021 Greater Brisbane Principal Regional Activity Centre travel by gender

The four Principal Regional Activity Centres surrounding the Brisbane CBD 10km radius recorded the 'four types of commuter' results by gender in 2021 as presented in Table 5.

Table 5: 2021 summary of 'four types of commuter' by gender for four Greater Brisbane Principal Regional Activity Centres

SA2	Inward			Short			Outward			Circumferential		
	All People	Female	Male	All People	Female	Male	All People	Female	Male	All People	Female	Male
Indooroopilly	38%	39%	38%	22%	25%	18%	13%	12%	13%	28%	24%	30%
Chermside	27%	28%	25%	27%	31%	24%	12%	13%	11%	34%	27%	40%
U. Mt Gravatt	26%	32%	21%	22%	24%	20%	9%	8%	9%	43%	36%	50%
Carindale	23%	23%	22%	19%	22%	17%	6%	6%	6%	52%	49%	55%
Greater Brisbane	**23%**	**24%**	**20%**	**27%**	**29%**	**25%**	**9%**	**9%**	**9%**	**41%**	**38%**	**46%**

The largest differences in the 'four types of commuter' by gender for the Principal Regional Activity Centre compared to the Greater Brisbane average results occurred for 'circumferential', 'short' and 'inward' trips.

For 'circumferential' trips, proportionally there were fewer females than males especially within the Chermside and Upper Mount Gravatt SA2s. Females recorded higher proportions than males for 'short' commuter trips, particularly in the Indooroopilly and Chermside SA2s. For 'inward' commute trip types, females (32%) recorded significantly higher proportions than males (21%) in the Upper Mount Gravatt SA2 compared to the respective average proportions across Greater Brisbane.

'Outward' commuter trip proportions were relatively consistent for females and males for the four Principal Regional Activity Centres.

The travel mode shares of the four Principal Regional Activity Centres surrounding the 10km radius of the Brisbane CBD by gender in 2021 as presented in Table 6.

Table 6: 2021 summary of 'four types of commuter' by gender for four Greater Brisbane Principal Regional Activity Centres

SA2	Public Transport			Active Travel			Car			Other		
	All People	Female	Male	All People	Female	Male	All People	Female	Male	All People	Female	Male
Indooroopilly	17%	16%	18%	6%	6%	6%	59%	54%	63%	18%	24%	13%
Chermside	11%	12%	10%	9%	10%	8%	65%	61%	70%	14%	17%	11%
U. Mt Gravatt	12%	16%	9%	4%	4%	4%	69%	62%	75%	15%	18%	11%
Carindale	8%	9%	7%	2%	2%	2%	77%	73%	81%	13%	17%	10%
Greater Brisbane	**8%**	**9%**	**7%**	**4%**	**3%**	**4%**	**75%**	**72%**	**78%**	**14%**	**17%**	**11%**

Car and other travel mode share use encountered the largest differences between males and females for the four Principal Regional Activity Centres of Greater Brisbane. Car travel modes shares for females had the largest difference less than males in Upper Mount Gravatt and Indooroopilly SA2s. While Indooroopilly SA2 had the largest difference of increased 'other' travel mode use by females compared to males.

Active travel mode shares were relatively consistent for males and females for each of the Principal Regional Activity Centres. While public transport travel mode use experienced a noticeable difference for the Upper Mount Gravatt SA2 where females had a higher use proportionally compared to males.

7 Conclusions

The analysis of the 'four types of commuters' for the Greater Brisbane area of 2021 ABS data determined the following breakdown across the region as a weighted average of all SA2s:

- Inward – 22.9%
- Short – 26.8%
- Contraflow – 9.1%
- Circumferential – 41.2%

Approximately two-thirds of work trips across Greater Brisbane are 'short' and 'circumferential' type, which generally increases the further the SA2 is located from the Brisbane CBD. In turn, the further SA2s are located from the Brisbane CBD, the more likely the work trip will be taken by a car.

Further, in comparison to 2016, the 2021 'inward' commuter trips reduced by 4.0% while 'short' commuter trips remained relatively the same at approximately 27%. 'Outward' and 'circumferential' commuter trips recorded increases as a result of fewer 'inward' commuter trips. This discrepancy can be attributed to in part by an increase of people working from home in 2021 (16%) compared to 2016 (5%).

Differences were also identified from a gender perspective for both the 'four types of commuter' and commuter travel mode shares. Females had greater proportions of 'inward' and 'short' commuting trips (52.3% in total) compared to males (45%), with males having a larger proportion of 'circumferential' commuting trips (46.3%) compared to females (38.4%).

From a travel mode share perspective, proportionally more females used public transport (8.5%) compared to males (6.7%) for commuting trips. This could be related to radial structure of public transport services and the spatial type of commuter trip proportions whereby 23.7% of females commute in the 'inward' direction compared to 19.8% of males.

As sought by Infrastructure Australia in 2018, the 'four types of commuter' analysis can be utilised as a tool and process that equips governments to deliver the planning, policy, regulation and funding required to successfully respond to the planned population growth for Greater Brisbane.

Ultimately, there lies a significant challenge ahead for governments in planning for adequate levels of accessibility for cities that will experience the nation's largest population growth. For Greater Brisbane, average trip lengths have increased over the past decade, and work trips will continue to lengthen in the future with planned spatial distribution of population and employment (i.e. 66% of 2041 population growth located in outer suburbia, where only 34% of the employment growth will occur).

This significant daily travel demand component presents a clear opportunity to address these future transport planning challenges. Two key elements in combination that can contribute to address these challenges are through the better catering for 'short' and 'circumferential' trips by active and public transport infrastructure and services and connecting to strategically positioned employment hubs throughout suburbia. In turn this has the potential to take significant pressure off the vehicle road-based transport network of Greater Brisbane in the future and produce enhanced outcomes in terms of the safe and efficient movement of people and goods.

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