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Flexible Workplaces: Achieving the worker's paradise and transport planner's dream in Brisbane

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Abstract

Congestion is a major problem facing large cities across the world. The Flexible Workplace Program – Brisbane Central Pilot was undertaken in Brisbane, Australia during 2009 to test the applicability of a voluntary travel behaviour change program to achieve transport system outcomes, particularly as they related to managing congestion, either through mode shift or peak spreading.

During the one-month Pilot, amongst almost 900 Brisbane CBD workers across 20 private and public sector organisations, shifts of more than 30% out of the morning and afternoon peak travel was recorded. This paper will consider the demographic and travel behaviour patterns of the Pilot participants and compare them to the corresponding patterns existing across the Brisbane CBD Frame.

This paper's conclusion is that it is feasible to run a large scale application that could attract 20,000 workers to participate. If they followed a similar trip pattern change as occurred during the Pilot, the morning peak across the central city area of Brisbane could be suppressed by 3% or more.

1. Objectives and background

1.1 Objectives of this paper

This paper will:

- outline the basic transport challenge and congestion problem in Brisbane
- consider some key factors in trip choice decision making by Brisbanites
- report on the Flexible Workplace Pilot outcomes
- discuss the likely influence of a range of demographic and travel behaviour patterns, in the success of the Flexible Workplace Program – Brisbane Central Pilot in 2009
- estimate the potential congestion management benefit from a large-scale application across the expanded Central Business District of Brisbane.

This paper is a companion piece to *More Flex in the City: A case study from Brisbane of spreading the load in the office and on the road* by Cleary, Worthington-Eyre and Marinelli which was also published in the proceedings of the Australasian Transport Research Forum 2010. That paper describes the Flexible Workplace Program – Brisbane Central Pilot in detail.

1.2 Congestion: a growing problem

Congestion is a major problem facing large cities across the world including Australia. The Australian Bureau of Transport and Regional Economics estimated that the avoidable costs of congestion in all major Australian cities in 2005 was $9.4 billion and that this would likely increase to $20.4 billion in 2020. Brisbane was expected to have the highest growth in congestion costs with a 150% increase from $1.2 billion to $3.0 billion over this time (BTRE 2007, p.13-14).

Over the last decade, both the Queensland Government and Brisbane City Council have invested significantly in new road, public and active transport infrastructure and services across Greater Brisbane, and particularly leading into and through the Central Business District (CBD) and its surrounding frame of suburbs.

In recent years, this general transport effort has been focused more particularly on congestion management through a number of key solution areas such as: land use and planning, travel demand, travel options, efficiency gains and capacity enhancements (Nolan 2009a).

A component of this investment includes a package of initiatives from the Queensland Government "to tackle urban congestion in new and innovative ways" (Bligh 2008). These initiatives were generally to be focused on acute congestion problems in the network. They comprise a spectrum of solutions ranging from 'network fixes', such as heavy lift recovery vehicles, and new legislation to give officers the authority to more quickly remove stricken vehicles through to more systemic approaches such as newer larger scale applications of TravelSmart Communities with more specific congestion management objectives.

Within the Voluntary Travel Behaviour Change (VTBC) spectrum of funded projects was a pilot to test the contribution flexible workplace practices might be able to make to congestion management. The Flexible Workplace Program – Brisbane Central Pilot (the Pilot) was undertaken in Brisbane during June of 2009 (Nolan 2009b). The project was developed and run by the Queensland Department of Transport and Main Roads (DTMR) across 20 public and private sector agencies.

There was evidence available at the time to suggest that flexible work arrangements were a possible way to reduce congestion. For example, the ‘Flex in the City’ project run in Houston, USA in 2006 found savings of 906 peak-commute hours on the targeted freeways, translating to annual user cost savings of $16.8 million through encouraging greater workplace flexibility (City of Houston 2010). A ‘telecentre’ trial in Sydney, Australia in 1999 by the New South Wales Roads and Traffic Authority (RTA) reported shifts in travel time and trip lengths. The teleworkers were able to reduce their average daily work commute by 84% and their average trip length by 88% (RTA 1999, pp. 25-26).

What was not clear however was the applicability of such a program in the Queensland context, particularly within the Brisbane CBD Frame.

2. The basic transport challenge for the Brisbane CBD

2.1 A population and employment hot spot

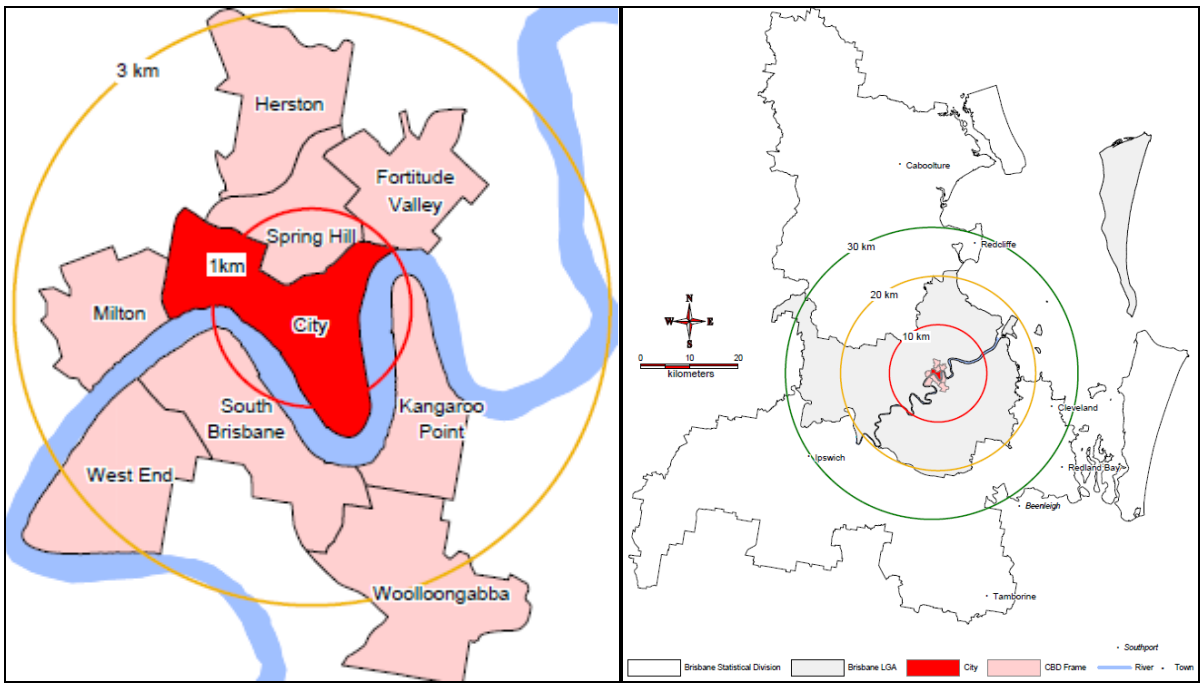
The resident population in the Brisbane City Council area in 2009 was 1.05 million while the resident population in Greater Brisbane (the Brisbane Statistical Division) was 2.0 million (ABS 2010a). The Brisbane CBD and its frame are clustered around the Brisbane River and is the major employment precinct in both Brisbane City Council and Greater Brisbane.

The Brisbane CBD Frame was defined for the purposes of the Flexible Workplace Pilot to include the suburbs of Brisbane City, Spring Hill, Fortitude Valley, Milton, South Brisbane,

Kangaroo Point, Herston, West End and Woolloongabba. In area, the CBD Frame has a radius approaching 3.0kms from its centre and, as is typical for most Australian capital cities, is the radial focal point for most major road and public transport corridors and services in Greater Brisbane.

Underscoring this pivotal and central role that the CBD plays in Brisbane's economic and social fabric is the fact that the 'centre of population' for Greater Brisbane at June 2009 was in the Botanic Gardens on the banks of the Brisbane River (ABS 2010a). The Botanic Gardens are only a few hundred metres south of the Brisbane General Post Office and at the geographic centre of the CBD Frame. Figure 1 below shows the CBD Frame, and its location in Greater Brisbane.

Figure 1 – The Brisbane CBD Frame and its Location within Greater Brisbane



Managers, professional, clerical, sales and service workers made up the vast majority of stated occupations. These occupations tend to work in standard 'Monday to Friday 9 till 5' work pattern. Figure 2 below shows the key occupations in the CBD Frame and their relative share of the workforce in 2001.

Figure 2 – CBD Frame Occupations 2001

Occupation (ASCO 1997)	Share
Managers and Administrators	9%
Professionals	29%
Associate Professionals	16%
Advanced Clerical and Service Workers	6%
Intermediate Clerical, Sales and Service Workers	22%
Other Occupations/Not stated	18%
Total	**100%**

Note of use of 2001 census data:

The consultants to the DTMR project team running the Pilot used coded participant occupations using the Australian Standard Classification of Occupation (ASCO, 1997). This was the classification scheme used in the 2001 Census. To allow easier comparison later in the paper the authors have chosen to use the 2001 Census not the 2006 Census which used the Australian and New Zealand Standard Classification of Occupation (ANZSCO, 2006). It is unlikely that significant occupational change would have occurred in the CBD Frame in the period from 2001 to 2006.

Source data: ABS 2001.

The total number of people working in the CBD Frame in 2006 was 193,239. It has the highest concentration of employment for both Brisbane City Council and Greater Brisbane. Figure 3 below shows employment densities for suburbs within Brisbane City Council and other major employment nodes in Greater Brisbane in 2006. All CBD Frame suburbs (except Kangaroo Point) had job densities of 2,000 jobs per square km or greater.

Five suburbs within the Frame (Brisbane City, Spring Hill, Fortitude Valley, South Brisbane, West End and Woolloongabba) had concentrations greater than 10,000 workers per square km. Most of the rest of these 'high density job suburbs' are within a 10 km radius of the centre and many are contiguous with the CBD Frame (DTMR 2010a).

Figure 3 – Job Density in the CBD Frame, Brisbane and Major Nodes in Greater Brisbane 2006

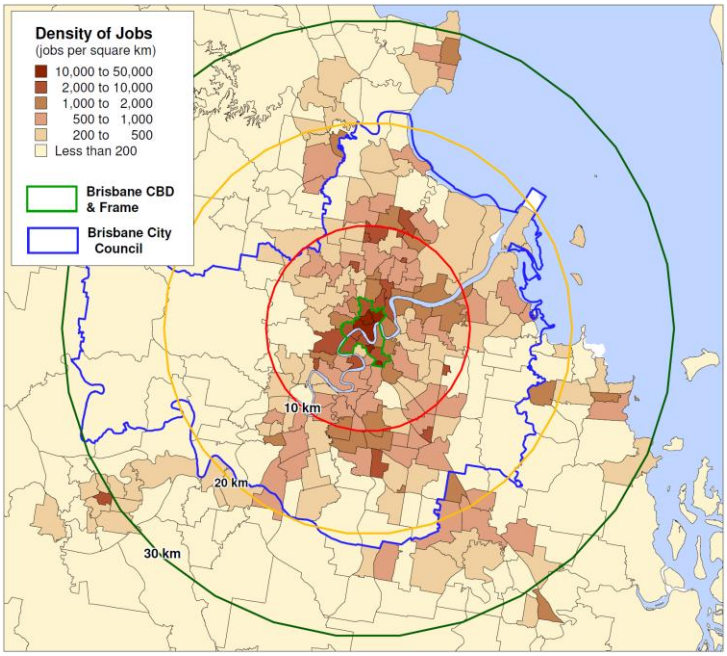


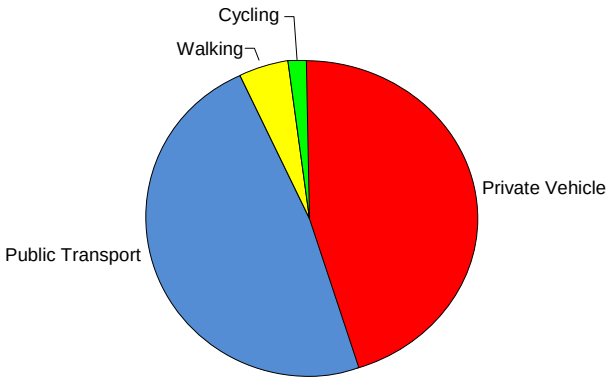
Figure derived from data contained in Queensland Department of Transport and Main Roads (DTMR) 2010a using the ABS Census of Population and Housing 2006 for the Brisbane Statistical Division - Statistical Local Area and Government/Non-Government Employer Indicator by Method of Travel to Work data sets.

2.2 Work Trips and the Super Peak

The South East Queensland Household Travel Survey 2003-2008 (DTMR 2010b) revealed that on an average weekday in 2007 there were approximately 6.5 million private person trips a day in Greater Brisbane across all modes. On average, around 580,000 (about 9%) of these private person trips were to the CBD Frame. Private Vehicle was dominant at 47.0% followed by Public Transport at 43.6%. Figure 4 below shows typical 2007 weekday private journeys to the CBD Frame by mode.

Figure 4 – Typical Weekday Private Journeys to the Brisbane CBD Frame in 2007

Mode	Share
Private Vehicle	47.0%
Public Transport	43.6%
Walking	7.7%
Cycling	1.7%
Total	**100%**



Greater Brisbane follows a typical Australian city pattern of morning and afternoon peaks. Household Travel Survey data for 2006 shows that the AM all trips peak runs from 7:00-9:00am. For commuter trips, the AM peak builds strongly from 6:00am and then tails off quickly after 9:00am with the Peak from 6:30-8:30 with the Super Peak 7:00-8:00am. Education trips do not start building till after 7:00am but then have the sharpest rise of all trip types a shorter sharper one hour peak running from about 7:30-8:30am. The trips also tail off quickly after 9:00am. The overlapping peaks, combined with other trips types that have started to build as the morning progresses (for example, shopping) puts the Brisbane transport system under maximum load from 8:00 to 8:30am (DTMR 2010a).

The situation in the afternoon is not as acute because the peaks of the education and commuter trips are spaced further apart and do not overlap. The education peak runs from about 2:30-3:30pm and then quickly tails off by 4:30pm. The commuter peak commences to build at about 3:30pm. Fortunately, compared to the morning, it has a lower volume Super Peak which runs from 4:30-5:30pm, followed by a long evening tail running till after 7:00pm. Overall, the afternoon Peak and Super Peak aggregated for all trips types are lower (DTMR 2010a).

Focusing now on the Brisbane CBD Frame and aggregating all trip types with an origin or destination in Greater Brisbane, we see that the CBD Frame Morning Peak has the expected inbound flow and runs from 7:00-9:00am. This two hour period accounts for almost 190,000 (33%) of the approximately 579,000 CBD Frame arrivals for the entire 24 hour period. Within the Peak, 114,000 or almost two thirds of the arrivals are concentrated between 7:30 and 8:30am, meaning that 20% of the day's total arrivals are in the one hour Super Peak. Within this Super Peak, Work trips comprise 75% the total with Education or Serve Passenger (mostly school drop offs) combining for another 13% of the total - about 14,800 trips.

By comparison the total arrivals in the combined periods from 6:00-7:00am and 9:00-10:00am are only 68,700 or just 12% of total arrivals.

Intra-Frame movements oscillate between 5,000 and 10,000 trips per hour from about 6:00am to 7:00pm with a peak from 12:00 to 2:00pm. This is most likely associated with lunch time and the predominate mode would be Walking.

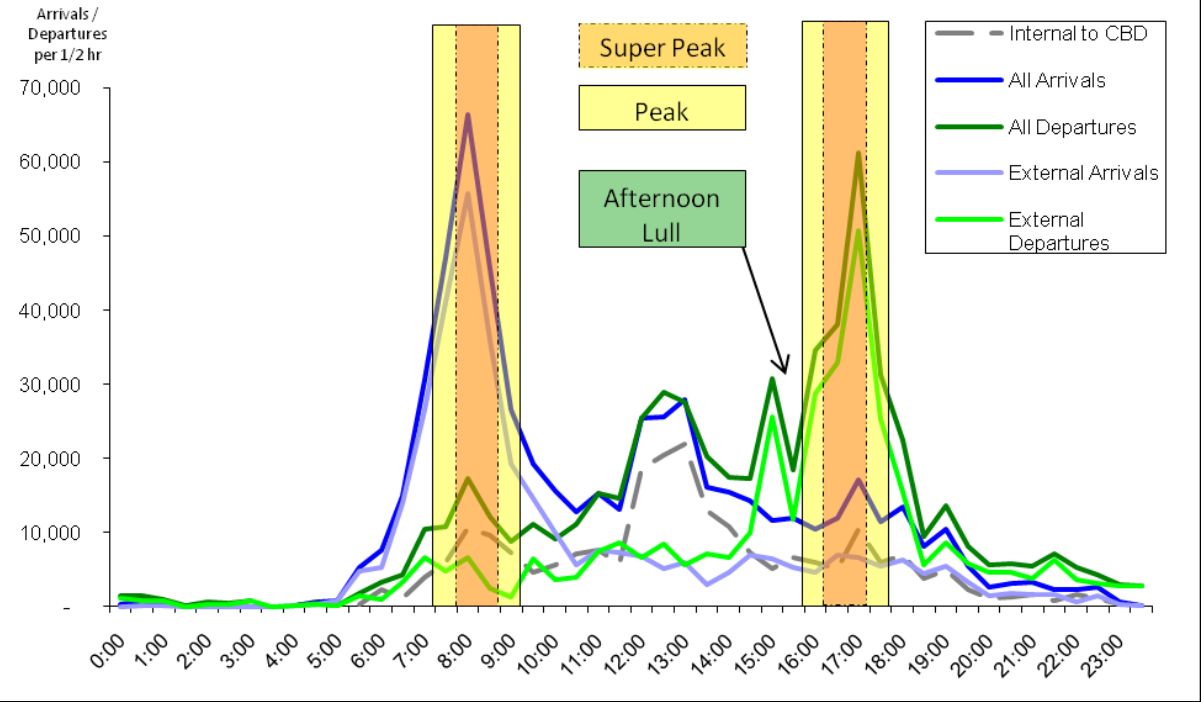
The situation in the afternoon is similar, but as expected given the Greater Brisbane wide pattern mentioned above, not as acute.

The CBD Frame Afternoon Peak has the expected outbound flow and runs from 4:00-6:00pm. This two hour period accounts for more than 165,000 (28%) of the approximately 582,000 CBD Frame departures for the entire 24 hour period. Within the Peak, just over 99,000 departures are concentrated between 4:30 and 5:30pm, meaning that 17% of the day's total departures are in that one hour Super Peak. Within this Super Peak, Work trips comprise a slightly higher 77% of the total but Education or Serve Passenger combined have fallen to only 6% of the total - about 5,300 trips. This drop is to be expected as most school trips would have been flushed out of the CBD Frame system by then, leaving predominantly tertiary education related trips.

By comparison, the total departures in the combined periods from 3:00-4:00pm and 6:00-7:00pm are only about 81,100 or just 14% of total departures.

There is most probably a 'bring forward' of the missing 7% of the 'morning education trips' – about 9,500 trips. This creates an interesting phenomenon in the afternoon with total departures from the CBD Frame in the half hour from 3:00-3:30pm are almost twice as many as departures from 3:30-4:00pm (31,000 compared to 18,500). This 'Afternoon Lull', occurs after the education mini peak (caused by the large number of private and public secondary and primary schools in, or close to, the CBD Frame whom generally finish classes between 2:30 and 3:00pm) has subsided. Figure 5 below shows the Peaks and Super Peaks in more detail.

Figure 5 – Brisbane CBD Frame Typical Weekday Arrivals and Departures (All Modes) 2007



Source data: Queensland Department of Transport and Main Roads (DTMR) 2010b. *Totals are based on survey data pooled from surveys conducted between 2003 and 2008 across the Brisbane Statistical Division. Data has been weighted to 2007 Estimated Resident Population demographic benchmarks.*

2.3 The times are a changing

Across Greater Brisbane, there is evidence that transport system users respond to these peaks and associated losses in travel time and reliability, not to mention increasing stress levels, by choosing to change their journey time. At a system level 'natural' peak spreading has been building over many years. Peak volumes up across the road system and Public and Active Transport networks and the Super Peak, especially on the road and in certain Public Transport corridors, has been occurring earlier in the morning.

The Ipswich Motorway which connects Ipswich (30kms to the west of the CBD Frame) to Brisbane is a good case study to illustrate the point. As traffic volumes continued to rise (in 2003 it was 35,700 vehicles per day while in 2008 it was 37,000 vehicles per day) and average speed reduced (71kph in 2006 dropping to 43kph in 2008), the peak slid forward. Whereas the peak volume on the motorway in 2002 used to occur between 7:00 and 8:00am, by 2008 it was now occurring between 5:00 and 6:00am (DTMR 2010a).

Some more specific guidance on trip choice decisions by transport users of the CBD Frame can be gathered from our knowledge of people's decisions when confronted with a need to change their trip choice. They generally prefer to change route first, followed by a time shift then a mode or frequency shift.

The unplanned closure of the Riverside Expressway for three days in 2006 (due to a suspected structural fault) and the planned closure of an inbound lane of Coronation Drive, a major western suburbs arterial link, for two months in 2009-10 (for road works) provided interesting evidence of preferred choice decisions by 'Affected Brisbanites' (those whom self identified in both circumstances as being affected in any way positively or negatively). Both roads were major links to or through the CBD Frame. Figure 6 below shows behaviour change for 'Affected Brisbanites' in these two circumstances.

Figure 6 – Behaviour Change by Brisbanites during Road System Capacity Constraints

Behaviour Change	Riverside Expressway Closure Affected Brisbanites	Coronation Drive Lane Restriction Affected Western Brisbanites
Changed route	51%	45%
Changed time of travel	38%	29%
Mode change	14%	8%
Frequency (trip postponed/cancelled)	7%	9%

Note on nomenclature and survey samples

The Riverside Expressway 'Affected Brisbanites' data was gathered from telephone surveys of 2,085 residents of the Brisbane Statistical Division.

The Coronation Drive 'Affected Western Brisbanites' data was gathered from telephone surveys of 1,200 residents of selected western suburbs within the Brisbane City Council area.

Totals may exceed 100% as option choice was not exclusive, with some people combining route, time and mode changes.
Table compiled from data contained in Marinelli and Watson 2009, Figure 6 and Enhance 2010, p.27-28.

Analysis of these Brisbanites whom changed time of travel showed clearly that the preference was to move their journey time forward. For example, during the Riverside Expressway closure, 51% of those people who normally travelled between 6:30 and 9:00am actually travelled early by 30 minutes or more (ACNielsen 2007, p. 46). Similar time shift preferences occurred for affected Western Brisbanites during the Coronation Drive restriction with 74% of people whom shifted time going to their destination travelling earlier (most generally a trip from home to work or education in the morning).

More than half of these people shifted their journey forward by less than 30 minutes.

The return trip pattern for these 'morning time changers' however was more diverse. More than half (56%) made no change from their destination (most generally a trip home in the afternoon) while those that did change had an equal preference for an earlier or later time (Enhance 2010, p. 40).

2.4 Regular time travel - theoretically possible and also useful

It is understandable that during the three day 'Expressway crisis' employers, managers and co workers would be more understanding of those needing to start and finish earlier and/or later. Over the two months of the Coronation Drive restriction, however, it would be thought that arrangements more representative of long term or ongoing agreements would need to have been reached.

There was evidence that people changed their time of trip and that those that whom moved their journeys to their destination (typically to work) tended to move the trip forward, typically by up to 30 minutes but rarely beyond one hour. However, for journeys from their destination (typically to home), the majority of people preferred to leave at their normal time. If they did shift time they seemed equally disposed to leaving earlier or later.

One would assume that arrangements useful to employers (business coverage and productivity); the employee (overall hours at work, ability to meet home commitments) and even co-workers (not having to cover for untimely absences) would have started to form and perhaps even become regularised.

This change may be an indicator of the potential or likely behaviour change people would make in a voluntary program as part of regular daily trip choice decision. It is within this space that flexible workplace programs have an opportunity to solve both transport and work life balance challenges.

3. The Brisbane Central Pilot

3.1 Description and objectives of the project

The Pilot sought to promote, encourage and support the use of flexible work arrangements over a four-week period (1-26 June 2009), with the aim of measuring the subsequent and intended impact on travel behaviour change and peak hour congestion (Nolan 2009b).

Participants were encouraged to adopt one or more flexible work arrangements:

- compressed work week/fortnight – participants work standard weekly hours but this is compressed into either four days per week or nine days per fortnight
- flexible work hours – participants start work before 7am or after 9am, and finish before 4pm or after 6pm
- telecommuting – participants work from home.

Almost 900 employees across 10 government agencies and 10 private organisations participated in the four-week Pilot. Participants of the Pilot included employees across a broad range of professions and skill levels, including managers and administrators, professionals, advanced and intermediate clerical workers, and service workers.

A full discussion on the HR and communications challenges and opportunities in creating the Pilot can be found at Cleary, et al. (2010, p. 5-7).

3.2 Flexible Workplace Pilot data gathering

3.2.1 Survey design

The survey design involved a four-stage process, covering quantitative and qualitative data.

- Stage 1 – Online registration of participants
- Stage 2 – Online pre-Pilot survey of participants travel behaviours
- Stage 3 – Online post-Pilot survey of participants travel behaviours in the last weeks of the Pilot
- Stage 4 – In-depth interviews with managers and executive plus focus groups.

The research consisted of two main areas of questioning – measurement of travel behaviour and identification of barriers experienced by working flexibly. The travel behaviour section required participants to record their transport mode for the two weeks preceding the Pilot as benchmarking data, and in the post survey, the two weeks during the Pilot. This enabled mapping of participants' time, frequency and mode shifts, as well as their trip origins and destinations. A full discussion on survey design can be found at Cleary, et al. (2010, p. 8).

3.2.2 Sample size

The online registration for the Pilot was completed by 888 participants across 10 public and 10 private sector organisations. The pre-Pilot survey had a high response rate of 71%, with 770 participants completing. The post-Pilot survey received responses from 630 participants, with the breakdown as follows:

- 238 adopting compressed work weeks/fortnights
- 379 adopting flexible work hours
- 139 adopting telecommuting.

A number of participants chose more than a single flexible work arrangement.

3.2.3 Limitations

It should be noted that neither the participating organisations nor the individual participants were chosen in such a way as to be representative of the general population of workers in the Brisbane CBD Frame and it is not possible to infer that the results recorded would be replicated if a large scale program was rolled out.

See Section 5.1 *Some limitations on interpreting and applying the results* in Cleary, et al. (2010, pp. 14-15) for a more detailed discussion. The potential implications of some of the factors discussed in Cleary, et al. when considering a larger scale application are discussed in Section 5.2.1 below.

Notwithstanding these methodological and applicability limitations, it is important to remember that the Post-Pilot survey sample size of 630 allows for observations on participant behaviour to be made at the whole of group level and sub-group level that were statistically significant.

4.0 So What Were the Pilot Results?

4.1 Transport System Changes

4.1.1 Pick your mode for more or less trips please

The three flexible work practices on offer as part of the Pilot contributed differently to managing the congestion problem.

Telecommuting and compressed work week had system wide and geographic impacts by eliminating journeys from the system and shifting some CBD Frame journeys to other destinations. Prior to the Pilot commencing 82% of participants were destined for the CBD Frame. During the Pilot, this dropped to 74% (Nielsen 2009, p. 35).

The changes both to trips taken and vehicles kilometres travelled (VKT) were generally larger for participants whom undertook the telecommuting and compressed work week options during the Pilot as compared to those whom undertook flexible work hours.

Modally, there were some interesting changes. In the case of Private Vehicle and Public Transport, there were reductions in both trips and vehicles kilometres travelled. Interestingly, trips and vehicles kilometres travelled for Active Transport increased significantly.

Some of the highlight changes across the system were:

- Private Vehicle trips decreased by 8% in the morning and 10% in the afternoon
- Public Transport trips decreased by 12% in the morning and 8% in the afternoon
- Active Transport trips increased by 42% in the morning and 9% in the afternoon.
- Overall for a typical day this translated into VKT changes as follows:
  - 9% decrease for Private Vehicle
  - 12% decrease for Public Transport
  - 25% increase for Active Transport.

Figure 9c in Section 5.2.1 below provides detail on the participants' travel choices by mode before and during the Pilot.

4.1.2 The times have definitely changed thanks

Once the third practice – flexible work hours – is considered, the temporal impacts become apparent.

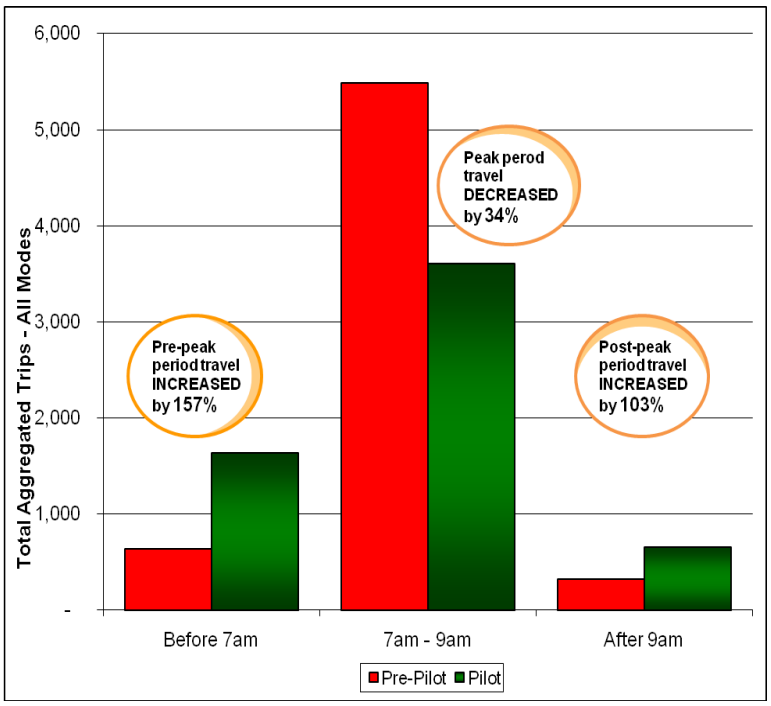
During the Pilot, trips to the CBD Frame by participants during the period from 7:00-9:00am, via all modes, decreased by 34%. The vast majority of the temporal shift in trips moved forward to before 7:00am in a ratio of 2:1 to shifts after 9:00am. This is in line with the pattern undertaken by the 'Affected Brisbanites and Western Brisbanites'.

Focussing in on the two modes putting most stress on the CBD Frame transport system in the morning peak – Private Vehicle and Public Transport – the benefits become more apparent. Private Vehicle trips in the period 7:00-9:00am decreased by 43% with a time shifts split fairly evenly earlier and later (104% to 88%). Public Transport trips in the period 7:00-9:00am decreased by 33% but with a clear preference by Participants to move earlier in a ratio of 2:1 to shifts later (200% to 105%). Figure 4 revealed that these two modes carry more than 90% of the trips to the CBD Frame on a typical weekday. Both are congested during the Peak, particularly the Super Peak.

Based on the discussion in Section 2.2, both would seem to have spare capacity one hour either side of the 7:00-9:00am Peak. These 'shoulder hours' are only carrying between a one third and one half of the average load carried in each of the two morning peak hours. This would be particularly true for road space capacity which is generally fixed throughout the day (scheduled off peak road works being the major planned variable). It is acknowledged that capacity for public transport is variable throughout the day.

No specific inter or intra-day load data was available to the authors; however it is generally accepted by transport managers and users in Brisbane that there are 'spare seats' on trains and buses in the off peak. Figure 7 below provides more detail on the eliminated trips and the temporal shift patterns for the morning periods.

Figure 7 – Change in Morning Trips (All Modes) by Pilot Participants 2009



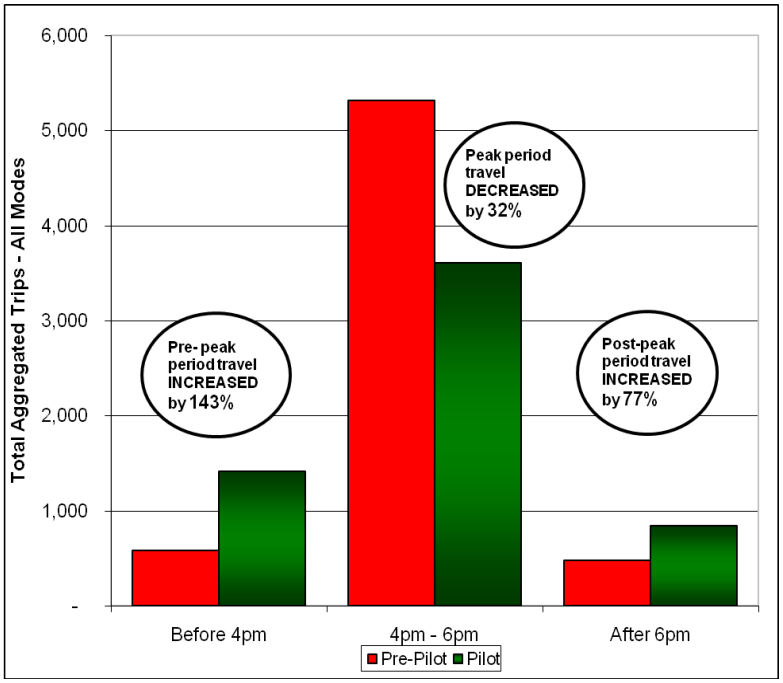
Figures 7 and 8 calculated by comparing total trips by Pilot participants in the Pre Pilot survey fortnight (Monday 18 to Sunday 31 May 2009) compared to the Pilot survey fortnight (Monday 15 to Sunday 27 June 2009). Source data from a working paper to Nielsen 2009, p. 37 and adapted in Table 1 in the Appendix. Figures modified from diagrams in Nielsen 2009, pp. 37-38.

The change in the afternoon Peak also saw significant change. Trips out of the CBD Frame by participants during the period from 4:00-6:00pm, via all modes, decreased 32%. The afternoon shift pattern generally followed the morning shift pattern. The vast majority of the temporal shift was to leave earlier (to depart the CBD Frame before 4:00pm). This was again a ratio of 2:1 (143% to 77%) to the shifts leaving later (after 6:00pm).

This strong forward shift provides the opportunity to fill the 'Afternoon Lull' identified in Figure 5 above and help smooth out the afternoon Peak build up. This forward shift bias might be particularly useful for Public Transport managers as it may allow them to redistribute more of the changed service provision within normal shift hours. Figure 8 below provides more detail on the eliminated trips and the temporal shift patterns for the afternoon periods.

Table 2 in the Appendix provides more detail on the temporal shifts made by Participants before and during the Pilot.

Figure 8 – Change in Afternoon Trips (All Modes) by Pilot Participants 2009



5.0 Applicability for broader implementation in Brisbane

5.1 Finding the right load bearing offices

The impact that flexible work arrangements had amongst participants in the Pilot is striking. This prompts the question: could such results be achieved on a broader scale and what might be achieved?

The Pilot showed that those roles most conducive to flexible work are professionals (45%), managers and administrators (21%), associate professionals (12%) and advanced and intermediate clerical and service workers (21%). It is expected that in a broader scale roll-out, there would be similar take-up by these occupation groups.

Clearly not all roles are suitable to be flexible. Roles that require people to present for frequent face-to-face contact with clients and/or work within set hours are not fitting for flexibility. A future roll-out of the program would likely enhance employers' capability to think creatively to make flexibility work.

From the organisations involved in the Pilot, it is evident that larger organisations find it easier to enable uptake of flexible work policies and can contribute more significantly to reducing congestion. Large companies can typically provide the IT and HR support needed for workplace flexibility and manage a greater number of resources to cover business needs.

Through targeting large organisations, a synergistic effect is likely as smaller organisations seek to become involved. As people in roles most receptive to flexibility utilise such an arrangement, a culture of embedded workplace flexibility could be cultivated, encouraging managers and teams to consider flexibility in other facets of the workplace.

Taken from an organisational management perspective, one of the major considerations in deciding to fund a large scale application of a flexible work place program would be the expected benefit to workforce productivity. At an individual organisational level, this means targeting organisations that can realise meaningful benefits to customers or operations.

5.2 Finding real workers with normal lives

Before considering the applicability of the Pilot results to a large scale application across the CBD Frame, let alone Greater Brisbane, it is important to confirm the representativeness of the Pilot participants to workers in the CBD Frame. Comparisons across six basic demographics relevant to commuter trip choice were carried out. They were: Age, Gender, Place of residence, Occupation, Employer type and Mode choice. Figures 9a-f below compare each of these factors and discuss the likely implications in transferring the results from the Pilot to a large scale application.

Figure 9a – Gender Profile CBD Frame Workers 2006 v Pilot Participants 2009

Gender Profile	CBD Frame Workers	Pilot Participants
Male	48%	38%
Female	52%	62%

Source Data: ABS Census of Population and Housing 2006 and Nielsen, 2009, p.74.

Males were under-represented in the Pilot. They had a higher tendency than females during the Pilot to start work before 7:00am. During a large scale application this factor should increase the shift to pre-peak travel helping suppress the AM Peak and Super Peak.

Figure 9b – Age Profile CBD Frame Workers 2006 v Pilot Participants 2009

Age Profile	CBD Frame Workers	Pilot Participants
18 - 24 years	15%	8%
25 - 34 years	28%	27%
35 - 44 years	25%	26%
45 - 54 years	21%	26%
55 - 64 years	10%	12%
65 years or older	1%	0%

Source Data: ABS Census of Population and Housing 2006 and Nielsen, 2009, p.74.

Generally the age profiles of Participants and CBD Frame workers aligns with an under representation of people aged 18-24.

This group had the lowest take up of telecommuting amongst the Pilot cohorts.

During a large scale application this factor should dampen the expected reduction in total trips and VKT realised but should not greatly affect any potential peak shift.

Figure 9c – Mode Choice CBD Frame Workers 2007 v Pilot Participants 2009

Mode	CBD Frame Workers	Pilot Participants Pre- Pilot	Pilot Participants During Pilot
Private Vehicle	47%	30%	30%
Public Transport	44%	65%	64%
Active Transport	9%	5%	7%

Source Data: South East Queensland Household Travel Survey 2003-2008 and Nielsen, 2009 unpublished data sets to the report.

The significance of this is not clear.

Pilot Participants may in fact be more representative of large scale participants that typical CBD Frame workers. If this is not the case the large scale application should see an even larger shift to pre-peak travel helping suppress the AM Peak and Super Peak and fill in the 'Afternoon Lull'.

Figure 9d – Place of Residence CBD Frame Workers 2006 v Pilot Participants 2009

Sub-region of South East Qld	CBD Frame Workers	Pilot Participants
Inner Brisbane	30%	23%
Outer Brisbane	45%	47%
Moreton	10%	11%
Ipswich	3%	1%
Logan/Beaudesert	5%	4%
Redland	4%	5%
Gold Coast	3%	5%
Sunshine Coast	1%	2%
Other	0%	3%

Source Data: ABS Census of Population and Housing 2006 and Nielsen, 2009 unpublished data sets to the report.

Generally the residency profiles of Participants and CBD Frame workers align. There is a slight under representation of Inner Brisbane workers. It is not clear how this factor would impact on a large scale application. It might possibly boost the proportion of those choosing flexible work hours as inner city workers are better served by the transport system (road networks, public transport and active transport). During the Pilot those whom chose Flexible Hours had lower Public Transport use and higher private Vehicle Use compared to those whom chose Telecommuting and Compressed Work Week. Public Transport users in the Pilot had a greater tendency than Private Vehicle users to shift both their morning and afternoon trips forward.

If this relationship held true during a large scale application this factor should increase the shift to pre-peak travel helping suppress the AM Peak and Super Peak and fill in the 'Afternoon Lull'.

Figure 9e – Public/Private Sector Employer CBD Frame Workers 2006 v Pilot Participants 2009

Employer	CBD Frame Workers	Pilot Participants
Public	31%	79%
Private	69%	21%

Source Data: ABS Census of Population and Housing 2006 and Nielsen, 2009, pp.39-40.

Private Sector workers were under represented in the Pilot. During the Pilot they were more likely to start before 7:00am and finish after 6:00pm.

If this occurs during a large scale application this factor should increase the shift to pre and post-peak travel. This would further suppress the AM and PM Peak and Super Peak given the larger contribution of private sector workers to the travel task.

Figure 9f – Selected Occupations CBD Frame Workers 2001 v Pilot Participants 2009

Occupation (ASCO 1997)	CBD Frame Workers	Pilot Participants Total	*Participants Compressed Work Week*	*Participants Telecommuting*	*Participants Flexible Work Hours*
Managers and Administrators	**9%**	**21%**	*21%*	*30%*	*21%*
Professionals	**29%**	**45%**	*43%*	*48%*	*46%*
Associate Professionals	**16%**	**12%**	*8%*	*14%*	*14%*
Advanced Clerical and Service Workers	**6%**	**11%**	*17%*	*3%*	*9%*
Intermediate Clerical, Sales and Service Workers	**22%**	**10%**	*11%*	*5%*	*10%*
Other Occupations/Not stated	**18%**	**1%**	-	-	-

There is not a high degree of match in occupation profile between Participants and CBD Frame workers. Accepting the drawback of comparing 2001 data with 2009 data, but recognising that significant occupation change in the CBD frame over the 8 years was unlikely, some observations can still be drawn.

Amongst Pilot Participants, occupation only seemed to have a moderate influence on the selection of flexible work practice. Managers and Administrators tended to have a higher preference for telecommuting, thus accentuating a suppression of total trips and VKT. However their share of total occupations (and therefore workers) in the CBD Frame is around 10%. Their influence would therefore only have a moderate impact on the overall selections in a large scale application. Targeting organisations or precincts with high numbers of managers and professionals could be an important way to build momentum in the early years of a large scale application.

Source Data: ABS Census of Population and Housing 2001 and Nielsen, 2009 p.76.

5.3 Finding the right pool of participants

Taken from a purely transport management perspective, one of the major considerations in deciding to fund a large scale application of a flexible work place program would be the expected benefit to the transport system generally (for example, reduction in trips and VKT) and congestion management in particular (for example, suppression of the peaks).

The discussion in Section 5.2 above provides support for the view that the Pilot participants were fairly representative of workers in the CBD Frame and that at an individual level similar travel choice behaviours would be exhibited.

In terms of general transport system changes, there is some strong evidence that the trip and VKT changes achieved during the Pilot are obtainable at a large scale. In Australia, TravelSmart typically achieves VKT reductions ranging from 4% to 15% (Australian Greenhouse Office 2005, p.5). Of more direct comparison, the 70,000 household *TravelSmart Brisbane North Project* carried out in 2006 achieved reductions in Car as driver trips and VKT of 13% as well as increases for Walking of 49% and Cycling of 58%, albeit from low bases (Socialdata Australia Pty. Ltd. 2007, p.5).

With respect, people's willingness to make significant temporal shifts in large enough numbers the experiences of the 'Affected Brisbanites and Western Brisbanites' clearly showed that, in a real life, large scale semi-voluntary behaviour change program, large numbers of people were willing to undertake temporal shifts in the 30-60 minute range, particularly if it is leaving home or work earlier.

Having accepted that some level of large scale change is likely, in fact probable, understanding the quantum will be useful for program planning purposes. However extrapolating the Pilot results to a large scale application, even confined to the Brisbane CBD Frame, is somewhat problematic.

However, a simple analysis of the potential shift in the CBD Frame AM Peak of 7:00-9:00am provides some understanding of the benefits on offer if a realistic pool of workers to participate can be identified and engaged.

5.3.1 Calculating a pool of workers using Work Schedule

Shaz and Corpuz (2009) in their analysis of the potential efficacy of flexible work practices in spreading the morning peak in Sydney identified Work Schedule as an important factor. This has been used as a guide in estimating of potential to change the Brisbane CBD Frame transport system operations has been developed. The key assumptions to focus in on the potential Brisbane CBD Frame target pool of workers are:

- include only workers making direct commute trips. The filter removes trips such as Education or Serve Passenger (including dropping children at school) that have little scope for flexibility
- include only workers with current fixed or flexible hours at a permanent work location outside the home. - This filter focuses in on office workers and excludes workers in construction, transport, logistics, mobile sales, front line health, education, emergency services and those self employed in the service sector such as trades and domestic services
- apply the same mode choice splits that Pilot participants demonstrated as opposed to the wider CBD Frame mode choice targets. This assumes that Pilot Participants, whom had higher Public Transport and less Private Vehicle use, are more representative of large scale participants than typical CBD Frame workers. If this is not the case the large scale application should see an even larger shift to pre-peak travel
- assume a participation rate of 35%:
    - Despite the numerous examples of pilot or larger scale flexible workplace programs in existence, very little quantifiable data on true participation rates in evidence. Numbers of participants are usually reported but the actual pool of workers meaningfully offered an opportunity to participate, but decided not to, is hard to determine. This was true even for the Brisbane Central Pilot.
    - As discussed above, despite generalised information and even high profile support, 'offers to participate' were in a practical sense made by local managers, whom had varying degrees of information and support about the Pilot. The participation rates found in some large scale TravelSmart applications in Australia have been used as a proxy to replicate the likely level of political support and heightened awareness of a geographically focused high profile flexible workplace program. Recent large scale TravelSmart projects have been getting 'Active Participation' rates amongst households in excess of 50%.
    - The selection of a 35% predicted participation rate for a large scale flexible workplaces program, is considered to be conservative given that the program would be working with an already targeted group that should have the motivation and the means to get involved. This is in contrast to many TravelSmart programs that initially target all households in an area. Table 3 in the Appendix provides more detail on the range of 'Active Participation' of the selected TravelSmart projects.

Starting with 193,239 workers in the CBD Frame in 2006 (refer to Section 2.1 above), the above filters give us a participation pool of about 13,300 workers, highly likely to want to use flexible work practices if given the opportunity. Table 4a in the Appendix provides more detail on the calculation methodology to arrive at this figure.

5.3.2 Calculating a pool of workers using Occupations

An alternate method of calculating a likely pool is to consider those occupations that have historically used flexible work practices. In the Pilot the three highest participation occupations were Professional, Managers and Administrators, and Associate Professionals. They comprised 79% of the total participants in the Pilot.

However as discussed in Figure 9f, the Pilot participants' occupation profile did not match the CBD Frame occupations profile. These three occupations only comprise 54% of the CBD Frame workforce. Using the same logic of only including commuter direct trips and a 35% participation rate, a participation pool of almost 27,400 workers is generated. Table 4b in the Appendix provides more detail on the calculation methodology to arrive at this figure.

5.3.3 Calculating a pool of workers using Working Time Arrangements

A consideration of general working time arrangements across Australia reveals that in November 2009, there were 8.6 million employees aged 15 years and over (ABS, 2010b p.6). Of these employees:

- 43% had some say in their start and finish times
- 39% were able to work extra hours in order to take time off.

This indicates that around 40% of employees have some input in to deciding their working hours and have some meaningful capacity to act on any resultant discussions with managers. Using this approach and again only focussing on workers making direct commute trips and a participation rate of 35%, a participation pool of almost 20,300 workers in the Brisbane CBD Frame is generated. Table 4c in the Appendix provides more detail on the calculation methodology to arrive at this figure.

5.4 Spreading the load on the road

5.4.1 The right pool can make a bit of a splash

All three methods are estimations and provide participation pools ranging from about 13,300 to almost 27,400 workers. Given this, it is reasonable to use the average of all three methods. This gives a figure of about 20,300.

For the purposes of the following analysis, a target pool of 20,000 workers participating in a large scale application in the Brisbane CBD Frame was chosen.

Applying the same changes that Pilot participants made some of the key impacts on the actual CBD Frame transport system in a typical weekday morning would be:

- a 3% (or 5,700 trip) reduction in the total inbound trips for all modes and activity types (over 191,000 trips) in the 7:00-9:00am Peak, comprised a reduction in Public Transport trips of about 3,750 and Private Vehicle trips of about 1,950
- increases of more than 13% and 7% respectively for Public Transport and Private Vehicle trips prior to 7:00am, with the vast majority of these occurring in the 6:00-7:00am period.

Similar changes would occur in the afternoon. Table 5 in the Appendix provides more detail on the predicted CBD Frame changes applying the Pilot results and the above assumptions.

5.4.2 Cheaper Peaks

The suppression of AM Peak by 3%, although modest, could provide tangible and ongoing relief for parts of the transport system under maximum stress, at significantly less cost than the infrastructure or service enhancement solutions needed to achieve the same outcome.

To provide some contrast, the reduction in Public Transport trips over the two hour Peak is equivalent to the same carrying capacity as 100 buses or 5 six-car set suburban trains. The reduction in Private Vehicle trips in this same period is 'equivalent' to one extra in-bound lane on a major arterial road. Naturally, the trips would be arriving on multiple corridors so the real effect would be diffuse. A more practical outcome would probably be in delayed intersection upgrades. None of these solutions would leave program funders much, if any, change out of $100m capital program, not to mention ongoing operating costs.

A flexible workplace program with 20,000 participating workers in a relatively defined area contactable and manageable via a few hundred organisations could be run for a few million dollars – very small in transport budget terms. For example, the current round of TravelSmart Communities project across South East Queensland are funded for $22.6m over 4 years and have a target to involve over 320,000 households (Nolan 2009a and Bligh 2010 and TravelSmart Queensland Website 2010).

The above calculation has taken a simple but conservative approach to estimating benefits for the transport system. A more considered look at the possible flexible workplace program would look at other factors such as the role of enforced staggered start and finish times for Fixed Hour workers; full time/part worker ratios by location; any underutilised transport system capacity either geographically or temporally; the availability of alternate modes, or if a particular precinct is being targeted, how minor infrastructure (for example, an active transport bridge over a creek) or minor service upgrades (for example, 15 minute bus shuttle from a rail station to a particular precinct) could be deployed as part of the program.

Applications outside the CBD Frame, such as its contiguous suburbs or other town centres would need further research to ensure the most efficacious program design.

Its role as part of a wider transport planning and management applications, such as in TravelSmart Workplaces or as part of sustainable transport plans for new town centres and work precincts, also needs further consideration to ensure that that its congestion management focus is not lost in the more diffuse transport system sustainability logic.

6.0 Conclusions

Congestion is a major problem facing Brisbane and this is predicted to get significantly worse in the next decade Brisbane. The combination of a relatively concentrated CBD Frame, radial transport system and standard hours of work concentrated in the '9 till 5 weekday' results in Brisbane's major road arterials and public transport services continue suffering heavy congestion in two concentrated periods – generally 7:00-9:00am and 4:00-6:00pm.

From a transport planning perspective, there exists many of the necessary factors to better manage congestion in the CBD Frame (and Brisbane generally) using an exceptionally low cost behaviour tool. The transport system generally has some spare capacity during periods of the day that seem convenient for users, based on their previous behaviours when presented trip choice change options.

The Pilot demonstrated that if adopted widely, flexible work practices can make a positive impact on congestion levels in South East Queensland.

A consideration of a range of demographic factors for workers and trip pattern analysis for transport system users demonstrated that it would be feasible to expect that 20,000 workers in the wider city centre of Brisbane would participate in a large scale flexible workplace program. Furthermore, the resultant changed behaviour would have a meaningful influence in obtaining transport system benefits including suppressing the Peak and Super Peak, particularly in the morning.

For maximum transport benefit to be realised, the challenges with increasing the uptake of flexible work arrangements due to organisational barriers would need to be overcome. The companion paper, *More Flex in the City: A case study from Brisbane of spreading the load in the office and on the road,* identified enablers for removing these barriers to greater participation.

Thus, a future flexible workplace program designer, if they can locate and attract the right organisations and workers in large enough numbers, could reasonably expect to see change on the transport system that could be detected and actually have a measurable impact in managing congestion.

7.0 References

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Appendix - Tables

Table 1 – Travel Choices by Mode by Participants Before and During the Flexible Workplace Program - Brisbane Central Pilot

			Before Pilot				During Pilot				Change	
Time of day	Flex Practise	Travel Mode	Trips	%	km	%	Trips	%	km	%	Trips	VKT
Morning (in-bound)	Compressed Work Week	Private Vehicle	588	25%	10,308	23%	557	26%	9,858	24%	5% Decrease	4% Decrease
		Public Transport	1,739	73%	33,546	76%	1,510	70%	30,420	74%	13% Decrease	9% Decrease
		Active Transport	71	3%	499	1%	98	5%	773	2%	37% Increase	55% Increase
	Telecommute	Private Vehicle	403	33%	10,072	31%	323	32%	7,334	30%	20% Decrease	27% Decrease
		Public Transport	772	63%	22,104	68%	625	63%	16,510	69%	19% Decrease	25% Decrease
		Active Transport	45	4%	387	1%	49	5%	206	1%	10% Increase	47% Decrease
	Flexible Hours	Private Vehicle	967	34%	15,548	34%	913	34%	15,918	36%	6% Decrease	2% Increase
		Public Transport	1,686	60%	29,097	64%	1,554	57%	26,732	60%	8% Decrease	8% Decrease
		Active Transport	170	6%	1,128	2%	258	9%	1,821	4%	52% Increase	61% Increase
	All	Private Vehicle	1,958	30%	35,928	29%	1,793	30%	33,110	30%	8% Decrease	8% Decrease
		Public Transport	4,198	65%	84,747	69%	3,689	63%	73,663	67%	12% Decrease	13% Decrease
		Active Transport	286	4%	2,014	2%	406	7%	2,800	3%	42% Increase	39% Increase
Afternoon (out-bound)	Compressed Work Week	Private Vehicle	552	23%	10,010	22%	481	22%	9,148	22%	13% Decrease	9% Decrease
		Public Transport	1,700	72%	34,933	76%	1,549	71%	31,512	75%	9% Decrease	10% Decrease
		Active Transport	112	5%	818	2%	137	6%	1,095	3%	23% Increase	34% Increase
	Telecommute	Private Vehicle	395	33%	10,671	33%	271	30%	7,030	30%	31% Decrease	34% Decrease
		Public Transport	722	61%	21,389	66%	592	64%	16,156	69%	18% Decrease	24% Decrease
		Active Transport	66	6%	494	2%	55	6%	247	1%	16% Decrease	50% Decrease
	Flexible Hours	Private Vehicle	926	33%	14,832	32%	924	33%	16,054	35%	0% Decrease	8% Increase
		Public Transport	1,703	60%	29,860	65%	1,643	59%	28,257	62%	4% Decrease	5% Decrease
		Active Transport	200	7%	1,229	3%	219	8%	1,564	3%	9% Increase	27% Increase
	All	Private Vehicle	1,872	29%	35,512	29%	1,677	29%	32,232	29%	10% Decrease	9% Decrease
		Public Transport	4,124	65%	86,182	69%	3,784	64%	75,925	68%	8% Decrease	12% Decrease
		Active Transport	378	6%	2,541	2%	412	7%	2,907	3%	9% Increase	14% Increase
All day	Compressed Work Week	Private Vehicle	1,140	24%	20,317	23%	1,038	24%	19,006	23%	9% Decrease	6% Decrease
		Public Transport	3,439	72%	68,479	76%	3,059	71%	61,932	75%	11% Decrease	10% Decrease
		Active Transport	183	4%	1,317	1%	235	5%	1,868	2%	28% Increase	42% Increase
	Telecommute	Private Vehicle	797	33%	20,743	32%	594	31%	14,364	30%	25% Decrease	31% Decrease
		Public Transport	1,494	62%	43,493	67%	1,217	64%	32,666	69%	19% Decrease	25% Decrease
		Active Transport	111	5%	881	1%	105	5%	454	1%	6% Decrease	49% Decrease
	Flexible Hours	Private Vehicle	1,893	33%	30,380	33%	1,838	33%	31,973	35%	3% Decrease	5% Increase
		Public Transport	3,389	60%	58,957	64%	3,197	58%	54,990	61%	6% Decrease	7% Decrease
		Active Transport	370	7%	2,357	3%	477	9%	3,385	4%	29% Increase	44% Increase
	All	Private Vehicle	3,830	30%	71,440	29%	3,470	30%	65,342	30%	9% Decrease	9% Decrease
		Public Transport	8,322	65%	170,929	69%	7,474	64%	149,588	68%	10% Decrease	12% Decrease
		Active Transport	664	5%	4,555	2%	817	7%	5,707	3%	23% Increase	25% Increase

Source Data: Pre-Pilot (n=770) and Post-Pilot (n=630) surveys carried out in May and July 2009 by Nielsen, 2009.

Table 2 – Actual change in AM and PM Trip Patterns by Mode by Participants Before and During the Flexible Workplace Program - Brisbane Central Pilot

		Before pilot		During pilot	
Travel Mode	**Travel Period**	**Trip Totals**	**% of period**	**Trip Totals**	**% of period**
Private Vehicle	Before 7am	326	16.6%	666	37.1%
	7am - 9am	1,484	75.8%	848	47.3%
	After 9am	148	7.6%	279	15.6%
Public Transport	Before 7am	286	6.8%	858	23.3%
	7am - 9am	3,759	89.6%	2,520	68.3%
	After 9am	152	3.6%	312	8.5%
Active	Before 7am	22	7.8%	107	26.4%
	7am - 9am	243	85.1%	237	58.5%
	After 9am	20	7.1%	61	15.1%
All Modes	Before 7am	634	9.8%	1,631	27.7%
	7am - 9am	5,486	85.2%	3,605	61.2%
	After 9am	321	5.0%	652	11.1%
Private Vehicle	Before 4pm	232	12.4%	531	31.6%
	4pm - 6pm	1,434	76.6%	782	46.6%
	After 6pm	207	11.0%	364	21.7%
Public Transport	Before 4pm	324	7.9%	803	21.2%
	4pm - 6pm	3,594	87.2%	2,608	68.9%
	After 6pm	205	5.0%	374	9.9%
Active	Before 4pm	25	6.6%	80	19.4%
	4pm - 6pm	288	76.0%	222	54.0%
	After 6pm	66	17.4%	110	26.6%
All Modes	Before 4pm	581	9.1%	1,413	24.1%
	4pm - 6pm	5,316	83.4%	3,612	61.5%
	After 6pm	478	7.5%	847	14.4%

Source Data: Pre-Pilot (n=770) and Post-Pilot (n=630) surveys carried out in May and July 2009 by Nielsen, 2009.

Table 3 – Participation Rates in Selected Australian TravelSmart Applications

Urban Area, State, Year	Contacted Households	Participating Households	Active Participation Rate
South Perth, Western Australia, 2000	14,400	7,795	54%
Redlands, Queensland, 2004	10,100	5,425	54%
Brisbane North, Queensland, 2006	71,219	37,699	53%

Notes to the Table: 'Active Participation' means that the household at the very minimum filled out a service request sheet and took delivery of information materials regarding travel options.
Source Data: Australian Greenhouse Office, 2005, p.6; TravelSmart Queensland Website; Socialdata Australia Pty. Ltd. 2007, p.17.

Table 4a - 'Work Schedule' Calculation Methodology to estimate Participation Pool of Workers for a Brisbane CBD Frame large scale application of a Flexible Workplace Program

Item	Factor	Participant Pool
Brisbane CBD Frame Workers 2006		193,239
Simple Trip Patterns = 1 potential trip per worker	1	193,239
75% of Brisbane CBD Frame Trips are Direct Commute only	0.75	144,929
Sydney Fixed Hour workers = 35%	0.35	50,725
Of these Sydney Fixed Hour workers 69% have a fixed work location outside home	0.69	35,000
Potential Pool of Fixed Hour Brisbane CBD Workers		35,000
Sydney Flex Hour workers = 3%	0.03	4,348
Of these Sydney Flex Hour workers 71% have a fixed work location outside home	0.71	3,087
Potential Pool of Flex Hour Brisbane CBD Frame Workers		3,087
Total Pool of Likely Participants		**38,087**
35% participation rate based on TravelSmart 'Active Participation' rates	0.35	13,331
Target Pool of Participants		**13,331**

Source Data: Table1 in Shaz and Corpuz, 2009 p.3; South East Queensland Household Travel Survey 2003-2008; Table 3 above

Note to the Table. Sydney factors have been used in to assign Fixed and Flex Hour workers to the pool as the Sydney Household Travel Survey employs a full interview process. This allows more specific demographic and travel data to be captured. Neither the South East Queensland Household Travel Survey nor the Census classify Brisbane workers in this way.

Table 4b - 'ASCO 1997 Occupation' Calculation Methodology to estimate Participation Pool of Workers for a Brisbane CBD Frame large scale application of a Flexible Workplace Program

Item	Factor	Participant Pool
Brisbane CBD Frame Workers 2006		193,239
Simple Trip Patterns = 1 potential trip per worker	1	193,239
75% of Brisbane CBD Frame Trips are Direct Commute only	0.75	144,929
54% of Brisbane CBD Frame Workers 2006 are Managers and Administrators; Professionals or Associate Professional	0.54	78,262
Total Pool of Likely Participants		**78,262**
35% participation rate based on TravelSmart 'Active Participation' rates	0.35	27,392
Target Pool of Participants		**27,392**

Source Data: ABS Census of Population and Housing 2001; South East Queensland Household Travel Survey 2003-2008; Table 3 above

Table 4c - 'Working Time Arrangements' Calculation Methodology to estimate Participation Pool of Workers for a Brisbane CBD Frame large scale application of a Flexible Workplace Program

Item	Factor	Participant Pool
Brisbane CBD Frame Workers 2006		193,239
Simple Trip Patterns = 1 potential trip per worker	1	193,239
75% of Brisbane CBD Frame Trips are Direct Commute only	0.75	144,292
40% of employees have some input in to deciding their working hours and have some meaningful capacity to act on any resultant discussions with managers	0.4	57,972
Total Pool of Likely Participants		**57,972**
35% participation rate based on TravelSmart 'Active Participation' rates	0.35	20,290
Target Pool of Participants		**20,290**

Source Data: ABS Working Time Arrangements, Australia, November 2009; Table 3 above

Table 5 – Predicted change in AM Weekday CBD Frame Trip Patterns by Mode from a Large Scale 20,000 Person Application of Flexible Workplace Program

		Before Program		After Program		CBD Frame Change		
Travel Mode	**Travel Period**	**Trip Totals**	**% of period**	**Trip Totals**	**% of period**	**Trip Change**	**Total Trips**	**Change**
Private Vehicle	Before 7am	1,012	17%	2,099	37%	1,087	14,811	7.3%
	7am - 9am	4,607	76%	2,675	47%	-1,933	89,197	-2.2%
	After 9am	461	8%	880	16%	419	48,346	0.9%
Public Transport	Before 7am	889	7%	2,702	23%	1,813	13,739	13.2%
	7am - 9am	11,677	90%	7,938	68%	-3,740	82,745	-4.5%
	After 9am	473	4%	982	8%	509	44,848	0.6%
Active Transport	Before 7am	69	8%	338	26%	269	2,962	9.1%
	7am - 9am	749	85%	748	59%	-1	17,839	0.0%
	After 9am	62	7%	193	15%	131	9,669	1.4%
All Modes	Before 7am	1,970	10%	5,133	28%	3,163	31,512	10.0%
	7am - 9am	17,034	85%	11,349	61%	-5,685	189,781	-3.0%
	After 9am	996	5%	2,054	11%	1,058	102,863	1.0%
Totals		**20,000**		**18,536**		**-1,464**		

Source Data: Calculated based on the original data sets contained in Table 2.