City of Melbourne: social needs, gaps in transit

Dr James Reynolds

2024-10-15

In Victoria, public transport is managed by the state government, although Local Government Authorities (LGAs) may have some influence on service levels through planning processes, advocacy etc. However, not much is known about how much transit is supplied or whether social needs for transport are being met within each LGA's boundaries. This note explores social needs-gaps in the City of Melbourne, using the Currie and Sendbergs (2007) methodology[1]. It is part of a series examining each LGA in Greater Melbourne[2].

Methods

This note maps transport supply and a composite needs indicator based on Australian Bureau of Statistics (ABS) data. The methodology is as per Reynolds, Currie and Qu (in drafting)[3]. The Transit Supply Indication (SI) scores are based on the frequency of service and how much of an area is within walking distance of stops/stations[4], are reported for the ABS' Statistical Area 1s (SA1s), and are categorized into seven groups based on the average scores for SA1s across the Melbourne Greater Capital City Statistical Area (GCCSA).

Results

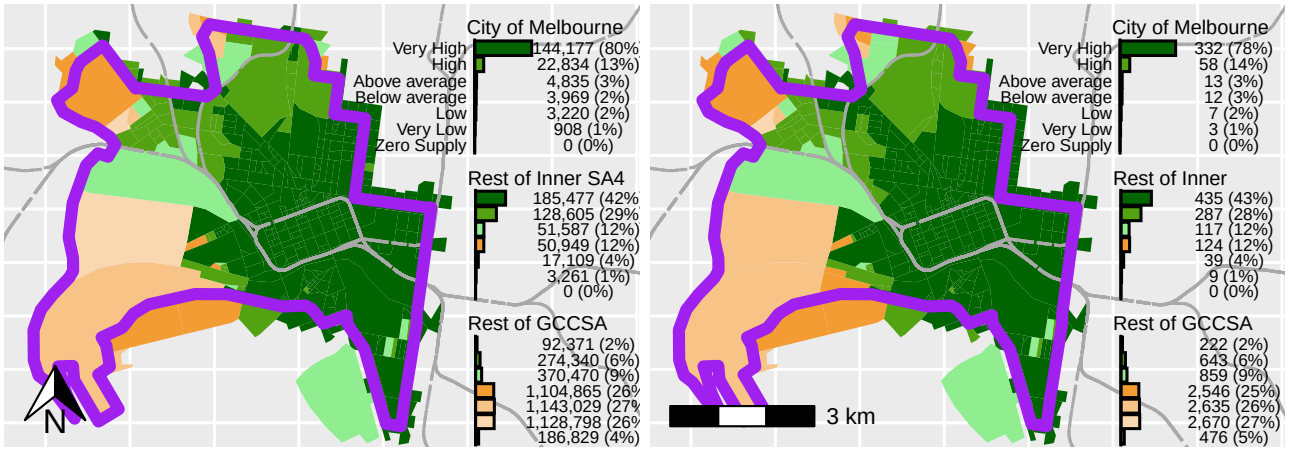

Figure 1: Transport Supply 2021 (left, by population) and 2023 (right, by SA1)

In 2021 most of the City of Melbourne's population lived in SA1s with Very High levels of transit (Figure 1, left)[5]. However, as shown

[1] Graham Currie and Zed Senbergs, "Identifying Spatial Gaps in Public Transport Provision for Socially Disadvantaged Australians: The Melbourne 'Needs Gap' Study," 2007; Graham Currie, "Quantifying Spatial Gaps in Public Transport Supply Based on Social Needs," *Journal of Transport Geography* 18, no. 1 (2010): 31–41.

[2] See `https://github.com/James-Reynolds/gtfssupplyindex_melbounre_LGA_2024` but lookout, I misspelled "Melbourne"

[3] Forthcoming hopefully, but using the *gtfssupplyindex* R package (see `https://github.com/James-Reynolds/gtfssupplyindex`) to process the Victoria GTFS feed. Note that results represent what is in the GTFS feed for August 2021 and 2023, which may not match services provided.

[4] 400m for tram and bus, 800m for train.

[5] Differences between the City of Melbourne and the Rest of the Inner SA4, by SA1, are statistically significant in 2021 ($\chi^2(5) = 172.67$, $p < .001$) and 2023 ($\chi^2(8) = 128.03$, $p < .001$). Differences with the rest of Melbourne are also statistically significant (2021: $\chi^2(6) = 4984.42$, $p < .001$, 2023:$\chi^2(10) = 270.48$, $p < .001$).

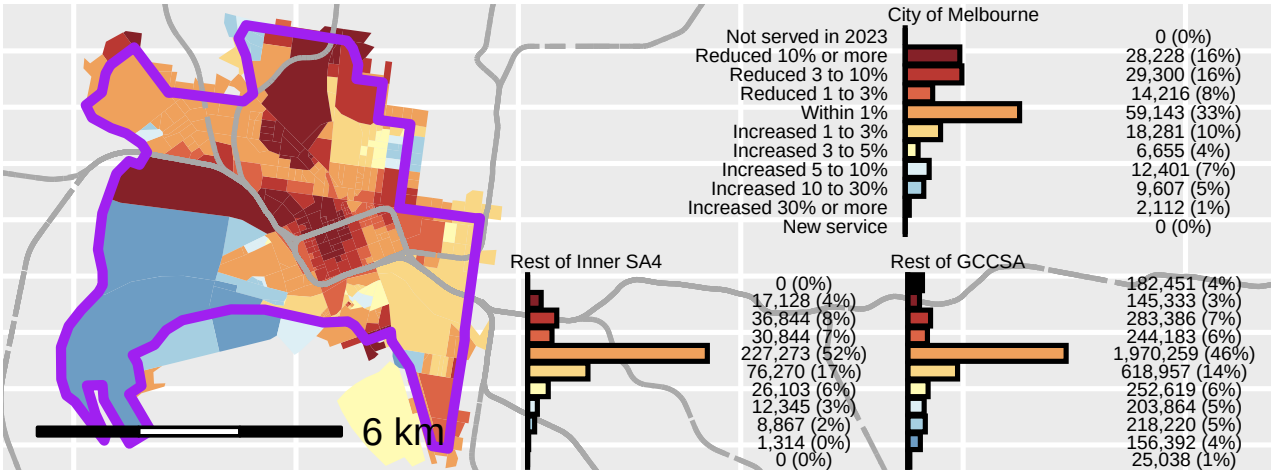

Figure 2: Change in SI score between 2021 and 2023 by SA1 and population

in Figure 2[6], the coverage and frequency of transit service appears to have reduced by 2023 more for those in the City of Melbourne.

[6] Differences are statistically significant (rest of the Inner SA4: $\chi^2(8) = 128.03$, $p < .001$, & rest of GCCSA: $\chi^2(10) = 270.48$, $p < .001$)

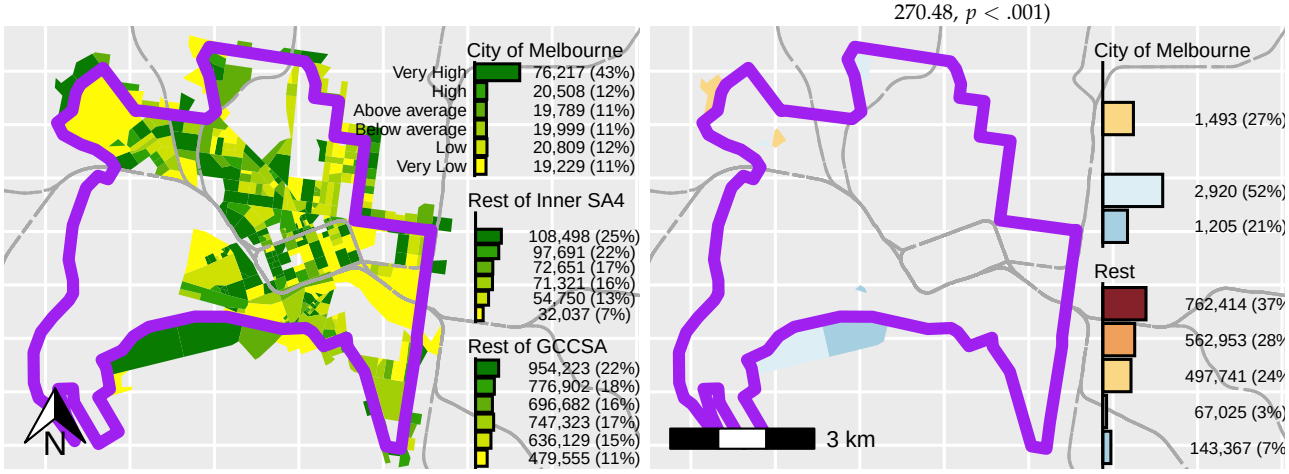

Figure 3: 2021 needs (left) and change in SI to 2023 for those SA1s with needs above average, but below average supply (by 2021 populations, right)

Social needs for transport in the City of Melbourne in 2021 were High or Very High for more than half the population (Figure 3, left), more than for other parts of Melbourne[7]. Figure 3 (right) shows how transit service levels changed between 2021 and 2023 for those who were living in SA1s with needs above, but supply below the GCCSA average[8]. Those SA1s with the largest gaps in the City of Melbourne in 2021 mostly have similar levels of, or more, transit in 2023.

Overall, the City of Melbourne appears well supplied with transit and, compared to other parts of Greater Melbourne, has lower gaps between social needs and transit supply[9]. Those with the largest needs-gaps in 2021 appear to have similar or more transit in 2023.

[7] Statistically significant for City of Melbourne vs rest of Inner:$\chi^2(5) = 54.15$, $p < .001$, and vs rest of GCCSA $\chi^2(5) = 56.43$, $p < .001$).

[8] Fisher's tests show no significant differences between the City of Melbourne and the rest of the Inner SA4 (p = 2.55e-11) or the Rest of the GCCSA (p = 8.55e-17).

[9] Only 3.1% of City of Melbourne residents had above average social needs for transport but below average transit supply, compared with 10.5% in the rest of the Inner SA4 and 46.2% across the rest of Melbourne.

```
##  transit_supply City of Melbourne Rest of Inner SA4
##        Very Low                 4                 9
##             Low                 9                39
##   Below average                 9               121
##   Above average                13               124
##            High                53               292
##       Very High               337               426
```

```
##  transit_supply City of Melbourne Rest of Inner SA4
##        Very Low          3.847493          9.152507
##             Low         14.206128         33.793872
##   Below average         38.474930         91.525070
##   Above average         40.546657         96.453343
##            High        102.106546        242.893454
##       Very High        225.818245        537.181755
```

```
##  transit_supply City of Melbourne Rest of Greater Melbourne
##     Zero Supply                 0                       489
##        Very Low                 4                      2679
##             Low                 9                      2643
##   Below average                 9                      2561
##   Above average                13                       838
##            High                53                       629
##       Very High               337                       212
```

```
##  transit_supply City of Melbourne Rest of Greater Melbourne
##     Zero Supply          19.83820                  469.1618
##        Very Low         108.84641                 2574.1536
##             Low         107.58877                 2544.4112
##   Below average         104.26212                 2465.7379
##   Above average          34.52415                  816.4758
##            High          27.66800                  654.3320
##       Very High          22.27234                  526.7277
```

```
##  transit_supply City of Melbourne Rest of Inner SA4
##        Very Low                 3                 9
##             Low                 7                39
##   Below average                12               124
##   Above average                13               117
##            High                58               287
##       Very High               332               435
```

```
##  transit_supply City of Melbourne Rest of Inner SA4
##        Very Low          3.551532          8.448468
##             Low         13.614206         32.385794
##   Below average         40.250696         95.749304
```

```
##   Above average         38.474930         91.525070
##            High        102.106546        242.893454
##       Very High        227.002089        539.997911
```

```
##  transit_supply City of Melbourne Rest of Greater Melbourne
##     Zero Supply                 0                        476
##        Very Low                 3                       2670
##             Low                 7                       2635
##   Below average                12                       2546
##   Above average                13                        859
##            High                58                        643
##       Very High               332                        222
```

```
##  transit_supply City of Melbourne Rest of Greater Melbourne
##     Zero Supply          19.31081                  456.6892
##        Very Low         108.44072                 2564.5593
##             Low         107.18309                 2534.8169
##   Below average         103.77530                 2454.2247
##   Above average          35.37610                  836.6239
##            High          28.43881                  672.5612
##       Very High          22.47518                  531.5248
```

```
##           ratio_binned City of Melbourne Rest of Inner SA4
##  Increased 30% or more                 7                 2
##    Increased 10 to 30%                20                20
##     Increased 5 to 10%                25                31
##      Increased 3 to 5%                18                61
##      Increased 1 to 3%                44               179
##              Within 1%               142               521
##        Reduced 1 to 3%                38                71
##       Reduced 3 to 10%                61                84
##    Reduced 10% or more                70                42
```

```
##           ratio_binned City of Melbourne Rest of Inner SA4
##  Increased 30% or more          2.663649          6.336351
##    Increased 10 to 30%         11.838440         28.161560
##     Increased 5 to 10%         16.573816         39.426184
##      Increased 3 to 5%         23.380919         55.619081
##      Increased 1 to 3%         65.999304        157.000696
##              Within 1%        196.222145        466.777855
##        Reduced 1 to 3%         32.259749         76.740251
##       Reduced 3 to 10%         42.914345        102.085655
##    Reduced 10% or more         33.147632         78.852368
```

```
##           ratio_binned City of Melbourne Rest of Greater Melbourne
##            New service                 0                        59
```

```
##  Increased 30% or more                7                       342
##    Increased 10 to 30%               20                       497
##     Increased 5 to 10%               25                       482
##      Increased 3 to 5%               18                       562
##      Increased 1 to 3%               44                      1436
##              Within 1%              142                      4629
##        Reduced 1 to 3%               38                       565
##       Reduced 3 to 10%               61                       665
##    Reduced 10% or more               70                       338
##     Not served in 2023                0                       476
```

```
##           ratio_binned City of Melbourne Rest of Greater Melbourne
##            New service          2.393566                   56.60643
##  Increased 30% or more         14.158553                  334.84145
##    Increased 10 to 30%         20.974131                  496.02587
##     Increased 5 to 10%         20.568442                  486.43156
##      Increased 3 to 5%         23.529973                  556.47003
##      Increased 1 to 3%         60.042001                 1419.95800
##              Within 1%        193.554315                 4577.44569
##        Reduced 1 to 3%         24.463058                  578.53694
##       Reduced 3 to 10%         29.453036                  696.54696
##    Reduced 10% or more         16.552119                  391.44788
##     Not served in 2023         19.310806                  456.68919
```

```
##  composite_needs City of Melbourne Rest of Inner SA4
##         Very Low                86                119
##              Low                64                166
##    Below average                53                183
##    Above average                45                164
##             High                41                191
##        Very High               106                170
##               NA                30                 18
```

```
##   City of Melbourne Rest of Inner SA4
## 1          58.33934          146.6607
## 2          65.45389          164.5461
## 3          67.16138          168.8386
## 4          59.47767          149.5223
## 5          66.02305          165.9769
## 6          78.54467          197.4553
```

```
##  composite_needs City of Melbourne Rest of Greater Melbourne
##         Very Low                86                      1831
##              Low                64                      1805
##    Below average                53                      1799
##    Above average                45                      1469
```

```
##             High                41                      1445
##        Very High               106                      1401
##               NA                30                       301
```

```
##   City of Melbourne Rest of Greater Melbourne
## 1          74.63923                  1842.361
## 2          72.77033                  1796.230
## 3          72.10843                  1779.892
## 4          58.94825                  1455.052
## 5          57.85806                  1428.142
## 6          58.67570                  1448.324
```

```
##                ratio_binned_less City of Melbourne Rest of Inner SA4
##          Increased more than 20%                 2                  0
##     Increased between 12 and 20%                 5                  2
##      Increased between 1 and 12%                 0                 24
##                Increased up to 1%                2                 40
##  Reduced or not serviced in 2023                 0                 19
```

```
##                ratio_binned_less City of Melbourne Rest of Inner SA4
##          Increased more than 20%         0.1914894          1.808511
##     Increased between 12 and 20%         0.6702128          6.329787
##      Increased between 1 and 12%         2.2978723         21.702128
##                Increased up to 1%         4.0212766         37.978723
##  Reduced or not serviced in 2023         1.8191489         17.180851
```

```
##                ratio_binned_less City of Melbourne Rest of Greater Melbourne
##          Increased more than 20%                 2                       241
##     Increased between 12 and 20%                 5                       114
##      Increased between 1 and 12%                 0                       861
##                Increased up to 1%                2                       964
##  Reduced or not serviced in 2023                 0                      1332
```

```
##                ratio_binned_less City of Melbourne Rest of Greater Melbourne
##          Increased more than 20%         0.6211304                  242.3789
##     Increased between 12 and 20%         0.3041750                  118.6958
##      Increased between 1 and 12%         2.2007952                  858.7992
##                Increased up to 1%         2.4691849                  963.5308
##  Reduced or not serviced in 2023         3.4047146                 1328.5953
```