Dandenong (South-Eastern Metropolitan) State Electoral Division: social needs, gaps in transit

Dr James Reynolds

2024-11-15

This note is part of a series examining transit social needs-gaps in Greater Melbourne[1]. In Victoria, public transport is the responsibility of the state government, which is formed from among Members of Parliament elected to represent individual State Electoral Divisions (seats). However, it is unclear how much transit is supplied or how well social needs for transport are met within each seat. Using the Currie and Sendbergs (2007) methodology[2], this note explores social needs for transport, and transit provision in 2021 and 2023, in the Dandenong (South-Eastern Metropolitan) State Electoral Division,

Methods:

Scores for transit supply and transport needs were calculated based on the Victorian GTFS feed[3] and Australian Bureau of Statistics (ABS) data using the *gtfssupplyindex* R package[4] as per Reynolds, Currie and Qu (in drafting)[5]. Results are shown for the ABS' Statistical Area 1s (SA1s), categorized based on averages across the Melbourne Greater Capital City Statistical Area (GCCSA).

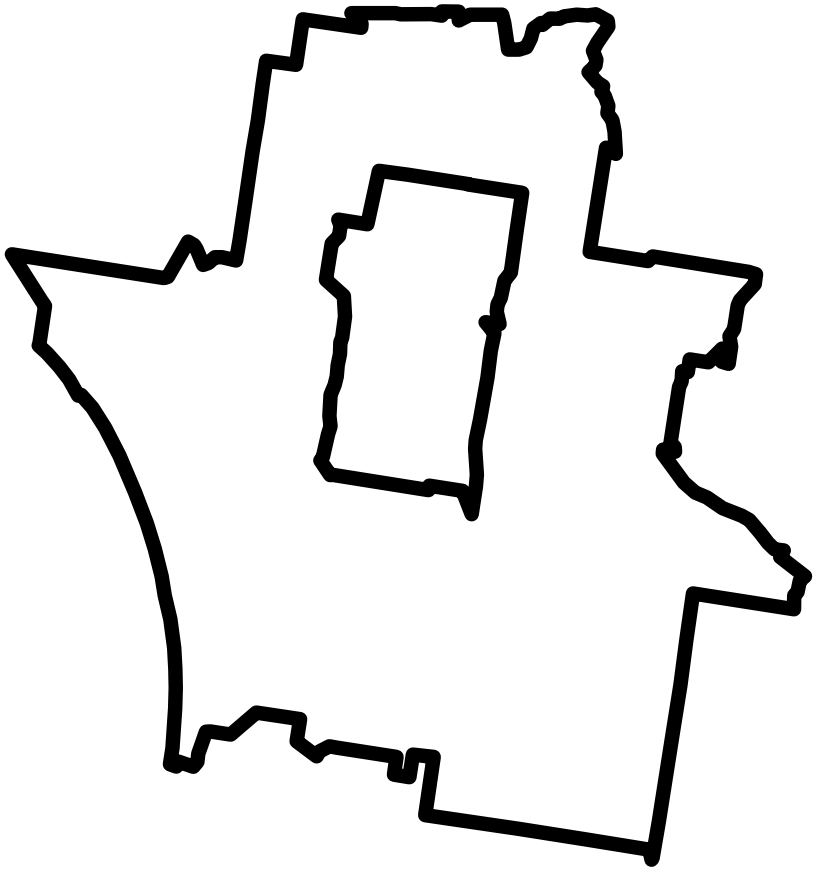
[1] See `https://tinyurl.com/4rctaxfc`

[2] 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.

[3] Results are based on GTFS feeds for August 2021 and 2023, so may not match services run.

[4] See `https://github.com/James-Reynolds/gtfssupplyindex`

[5] James Reynolds, Graham Currie, and Yanda Qu, "Social Needs for Transport and Gaps in Transit Service: New GTFS Tools," *In Drafting*, 2024.



Results: Figure 1 compares social needs for similarly located seats[6], and for the rest of Greater Melbourne with those for the Dandenong (South-Eastern Metropolitan) State Electoral Division.

Needs were higher than the Melbourne average for 50.0% of the seat of Oakleigh's population[7].

Figure 2 shows the distribution of transit service in 2021 and 2023. Service levels were below the Melbourne average for 83.9% of Dandenong (SE Metro) residents in 2021, which is lower than for surrounding seats (93.2%)[8] or for the rest of Melbourne (70.9%)[9]. The distribution of transit supply, categorised with respect to the Melbourne average, appears similar in 2023 (Figure 2, right). Figure 3 directly compares 2021 and 2023 service levels.

Transit levels increased by 1% or more by 2023 in SA1s that were home to 22.8% of Dandenong (SE Metro) residents in 2021, which is a larger share than for similarly located seats (41.4%)[10] or the rest of Greater Melbourne (32.6%)[11]. 39.1% of the Dandenong (SE Metro) population lived in SA1s with *needs above, but supply below* the Melbourne averages in 2021[12]. However, for 79.5% of this cohort service levels increased 1% or more[13].

[6] Mulgrave, Rowville, Narre Warren North, Narre Warren South, Cranbourne, Carrum and Keysborough

[7] Differences between the seat of Oakleigh and similarly located seats, or with the rest of Greater Melbourne were not statistically significant ($\chi^2(5) = 8.44$, $p = .133$)($\chi^2(5) = 7.12$, $p = .212$)

[8] Differences were statistically significant ($\chi^2(6) = 42.00$, $p < .001$

[9] Differences were statistically significant ($\chi^2(6) = 68.04$, $p < .001$).

[10] Differences were statistically significant ($\chi^2(10) = 157.48$, $p < .001$).

[11] Differences were statistically significant ($\chi^2(10) = 112.36$, $p < .001$).

[12] Shown with black in Figure 3. This compares to 55.8% of residents of similarly located seats and 39.3% of those elsewhere in Melbourne.

[13] Differences were no statistically significant with similarly located seats (Fisher test p = 0.133). or rest of Greater Melbourne were not statistically significant (Fisher test p = 0.212).

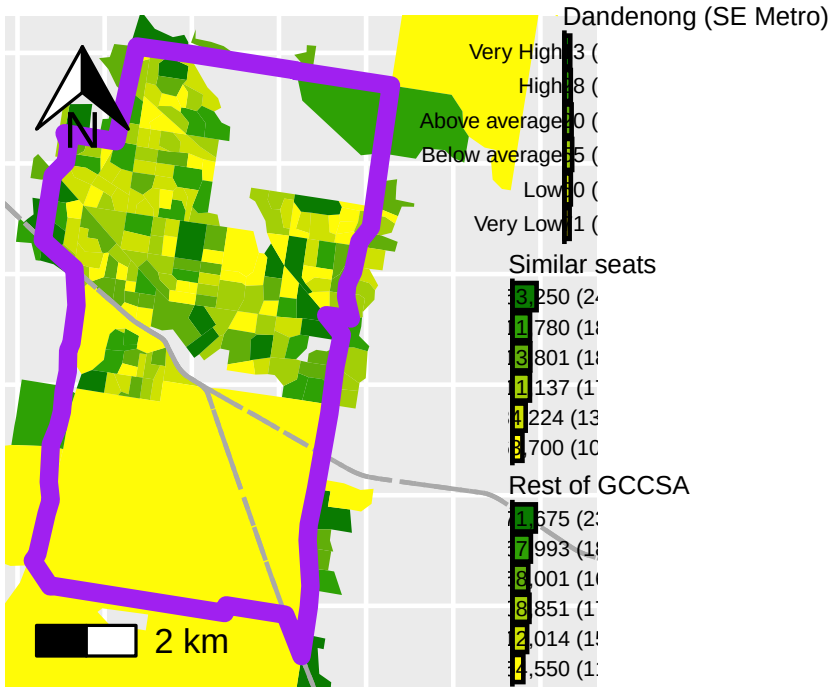
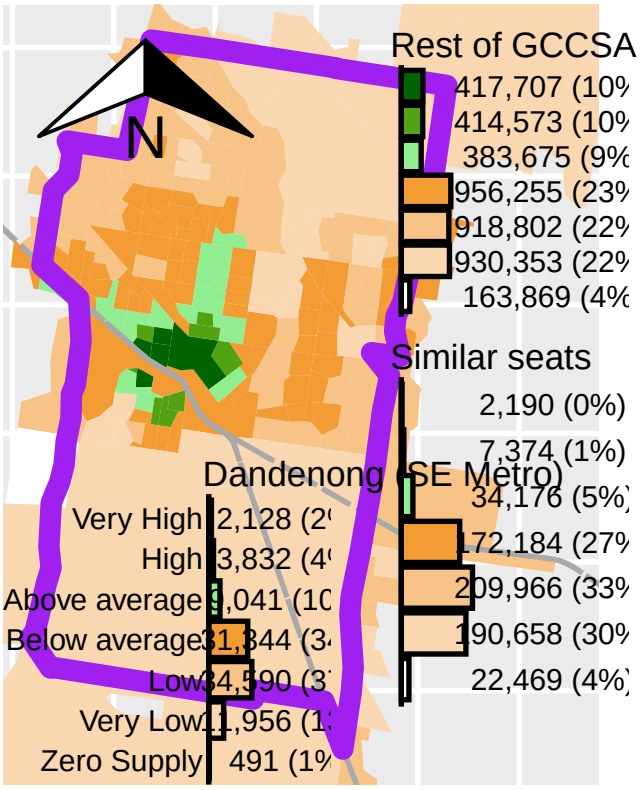


Figure 1: Needs in 2021 by population, with suburban railways shown in grey



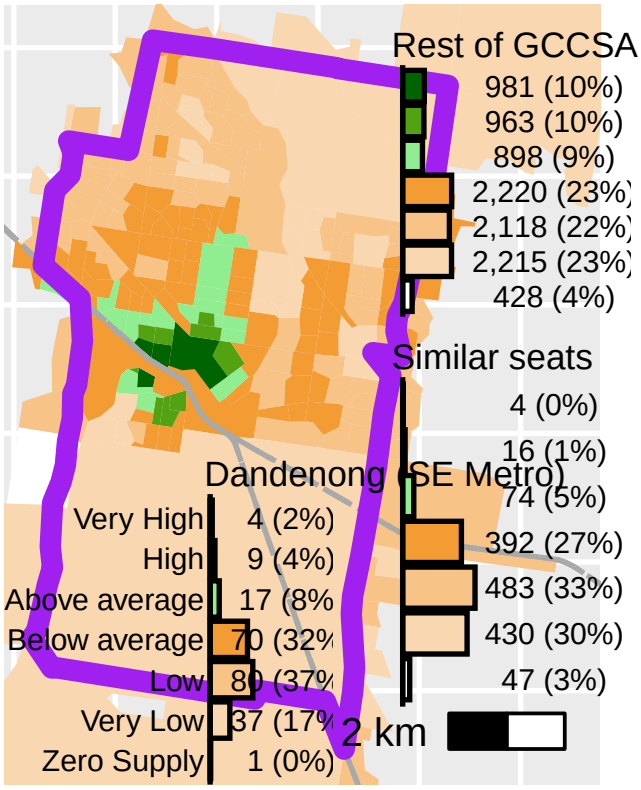


Figure 2: Transport Supply 2021 (left, by population) and 2023 (right, by SA1)

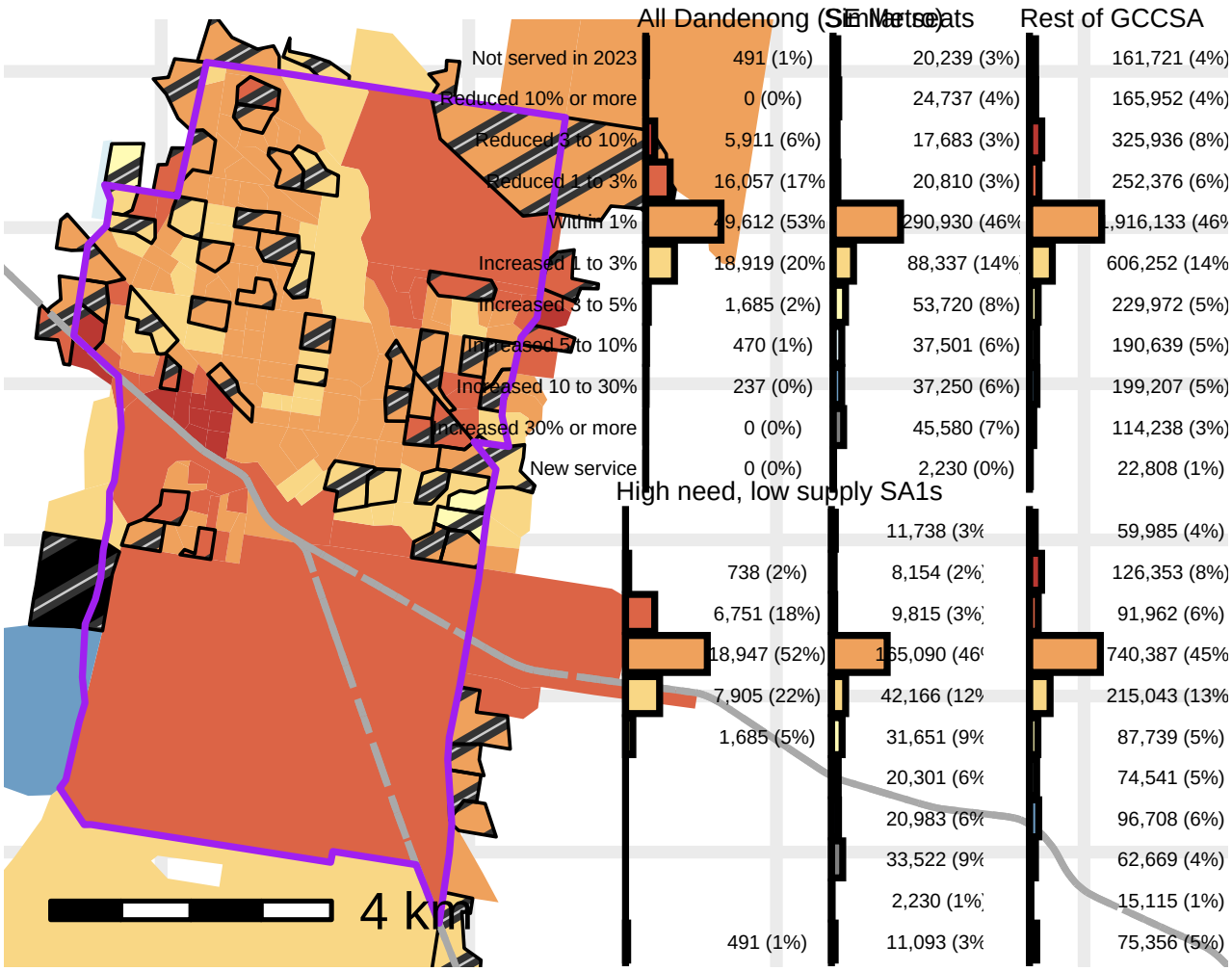


Figure 3: Transit service change 2021 to 2023. SA1s with needs above, but supply below, average highlighted in black.

Overall, Dandenong (SE Metro) residents appear to have been less likely to have less transit supply than Melbourne's average than those in surrounding seats or the rest of Melbourne, and more likely to have seen service increases between 2021 and 2023.

```
##             ratio_binned population        perc
## 1            New service          0 0.000000000
## 2  Increased 30% or more          0 0.000000000
## 3    Increased 10 to 30%        237 0.002537962
## 4     Increased 5 to 10%        470 0.005033090
## 5      Increased 3 to 5%       1685 0.018044163
## 6      Increased 1 to 3%      18919 0.202597931
## 7              Within 1%      49612 0.531280118
## 8        Reduced 1 to 3%      16057 0.171949626
## 9       Reduced 3 to 10%       5911 0.063299137
## 10   Reduced 10% or more          0 0.000000000
## 11    Not served in 2023        491 0.005257973
```

```
##             ratio_binned population        perc
## 1            New service       2230 0.003489735
## 2  Increased 30% or more      45580 0.071328306
## 3    Increased 10 to 30%      37250 0.058292659
## 4     Increased 5 to 10%      37501 0.058685450
## 5      Increased 3 to 5%      53720 0.084066621
## 6      Increased 1 to 3%      88337 0.138238889
## 7              Within 1%     290930 0.455277403
## 8        Reduced 1 to 3%      20810 0.032565644
## 9       Reduced 3 to 10%      17683 0.027672190
## 10   Reduced 10% or more      24737 0.038711020
## 11    Not served in 2023      20239 0.031672084
```

```
##             ratio_binned population        perc
## 1            New service      22808 0.005449636
## 2  Increased 30% or more     114238 0.027295487
## 3    Increased 10 to 30%     199207 0.047597578
## 4     Increased 5 to 10%     190639 0.045550380
## 5      Increased 3 to 5%     229972 0.054948421
## 6      Increased 1 to 3%     606252 0.144854983
## 7              Within 1%    1916133 0.457831748
## 8        Reduced 1 to 3%     252376 0.060301527
## 9       Reduced 3 to 10%     325936 0.077877605
## 10   Reduced 10% or more     165952 0.039651785
## 11    Not served in 2023     161721 0.038640850
```

```
##    ratio_binned_less population       ratio_binned       perc
## 1 Not served in 2023        491 Not served in 2023 0.01344579
```

```
## 2  Increased 3 to 5%       1685  Increased 3 to 5% 0.04614289
## 3  Increased 1 to 3%       7905  Increased 1 to 3% 0.21647452
## 4          Within 1%      18947          Within 1% 0.51885423
## 5    Reduced 1 to 3%       6751    Reduced 1 to 3% 0.18487280
## 6   Reduced 3 to 10%        738   Reduced 3 to 10% 0.02020977
```

```
##        ratio_binned_less population          ratio_binned        perc
## 1     Not served in 2023      11093    Not served in 2023 0.031095214
## 2            New service       2230           New service 0.006250999
## 3  Increased 30% or more      33522 Increased 30% or more 0.093966805
## 4    Increased 10 to 30%      20983   Increased 10 to 30% 0.058818253
## 5     Increased 5 to 10%      20301    Increased 5 to 10% 0.056906513
## 6      Increased 3 to 5%      31651     Increased 3 to 5% 0.088722133
## 7      Increased 1 to 3%      42166     Increased 1 to 3% 0.118197134
## 8              Within 1%     165090             Within 1% 0.462770117
## 9        Reduced 1 to 3%       9815       Reduced 1 to 3% 0.027512803
## 10      Reduced 3 to 10%       8154      Reduced 3 to 10% 0.022856790
## 11   Reduced 10% or more      11738   Reduced 10% or more 0.032903238
```

```
##        ratio_binned_less population          ratio_binned       perc
## 1     Not served in 2023      75356    Not served in 2023 0.04578524
## 2            New service      15115           New service 0.00918366
## 3  Increased 30% or more      62669 Increased 30% or more 0.03807680
## 4    Increased 10 to 30%      96708   Increased 10 to 30% 0.05875841
## 5     Increased 5 to 10%      74541    Increased 5 to 10% 0.04529006
## 6      Increased 3 to 5%      87739     Increased 3 to 5% 0.05330897
## 7      Increased 1 to 3%     215043     Increased 1 to 3% 0.13065708
## 8              Within 1%     740387             Within 1% 0.44984865
## 9        Reduced 1 to 3%      91962       Reduced 1 to 3% 0.05587481
## 10      Reduced 3 to 10%     126353      Reduced 3 to 10% 0.07677029
## 11   Reduced 10% or more      59985   Reduced 10% or more 0.03644604
```

```
## [1] 1
```

```
##  transit_supply Dandenong (SE Metro) Similar seats
##     Zero Supply                    1            50
##        Very Low                   33           445
##             Low                   82           476
##   Below average                   72           378
##   Above average                   17            77
##            High                    8            16
##       Very High                    5             4
```

```
## [1] 2
```

```
##  transit_supply Dandenong (SE Metro) Similar seats
```

```
##     Zero Supply             6.681490     44.318510
##        Very Low            62.622596    415.377404
##             Low            73.103365    484.896635
##   Below average            58.954327    391.045673
##   Above average            12.314904     81.685096
##            High             3.144231     20.855769
##       Very High             1.179087      7.820913
```

```
## [1] 3
```

```
##  transit_supply Dandenong (SE Metro) Rest of Greater Melbourne
##     Zero Supply                    1                        438
##        Very Low                   33                       2214
##             Low                   82                       2133
##   Below average                   72                       2241
##   Above average                   17                        881
##            High                    8                        950
##       Very High                    5                        966
```

```
## [1] 4
```

```
##  transit_supply Dandenong (SE Metro) Rest of Greater Melbourne
##     Zero Supply             9.531122                  429.4689
##        Very Low            48.784583                 2198.2154
##             Low            48.089832                 2166.9102
##   Below average            50.217508                 2262.7825
##   Above average            19.496464                  878.5035
##            High            20.799124                  937.2009
##       Very High            21.081366                  949.9186
```

```
## [1] 5
```

```
##  transit_supply Dandenong (SE Metro) Similar seats
##     Zero Supply                    1            47
##        Very Low                   37           430
##             Low                   80           483
##   Below average                   70           392
##   Above average                   17            74
##            High                    9            16
##       Very High                    4             4
```

```
## [1] 6
```

```
##  transit_supply Dandenong (SE Metro) Similar seats
##     Zero Supply             6.288462     41.711538
##        Very Low            61.181490    405.818510
##             Low            73.758413    489.241587
```

```
##   Below average            60.526442    401.473558
##   Above average            11.921875     79.078125
##            High             3.275240     21.724760
##       Very High             1.048077      6.951923
```

```
## [1] 7
```

```
##  transit_supply Dandenong (SE Metro) Rest of Greater Melbourne
##     Zero Supply                    1                        428
##        Very Low                   37                       2215
##             Low                   80                       2118
##   Below average                   70                       2220
##   Above average                   17                        898
##            High                    9                        963
##       Very High                    4                        981
```

```
## [1] 8
```

```
##  transit_supply Dandenong (SE Metro) Rest of Greater Melbourne
##     Zero Supply             9.314013                  419.6860
##        Very Low            48.893138                 2203.1069
##             Low            47.720745                 2150.2793
##   Below average            49.718156                 2240.2818
##   Above average            19.865551                  895.1344
##            High            21.103077                  950.8969
##       Very High            21.385320                  963.6147
```

```
## [1] 9
```

```
##           ratio_binned Dandenong (SE Metro) Similar seats
##            New service                   0             3
##  Increased 30% or more                   0            89
##    Increased 10 to 30%                   1            83
##     Increased 5 to 10%                   1            89
##      Increased 3 to 5%                   3           114
##      Increased 1 to 3%                  46           211
##              Within 1%                 113           670
##        Reduced 1 to 3%                  41            48
##       Reduced 3 to 10%                  12            37
##    Reduced 10% or more                   0            55
##     Not served in 2023                   1            47
```

```
## [1] 10
```

```
##           ratio_binned Dandenong (SE Metro) Similar seats
##            New service            0.3930288      2.606971
##  Increased 30% or more           11.6598558     77.340144
```

```
##    Increased 10 to 30%           11.0048077     72.995192
##     Increased 5 to 10%           11.7908654     78.209135
##      Increased 3 to 5%           15.3281250    101.671875
##      Increased 1 to 3%           33.6694712    223.330529
##              Within 1%          102.5805288    680.419471
##        Reduced 1 to 3%           11.6598558     77.340144
##       Reduced 3 to 10%            6.4194712     42.580529
##    Reduced 10% or more            7.2055288     47.794471
##     Not served in 2023            6.2884615     41.711538
```

```
## [1] 11
```

```
##           ratio_binned Dandenong (SE Metro) Rest of Greater Melbourne
##            New service                    0                        56
##  Increased 30% or more                    0                       262
##    Increased 10 to 30%                    1                       453
##     Increased 5 to 10%                    1                       448
##      Increased 3 to 5%                    3                       524
##      Increased 1 to 3%                   46                      1402
##              Within 1%                  113                      4509
##        Reduced 1 to 3%                   41                       585
##       Reduced 3 to 10%                   12                       761
##    Reduced 10% or more                    0                       395
##     Not served in 2023                    1                       428
```

```
## [1] 12
```

```
##           ratio_binned Dandenong (SE Metro) Rest of Greater Melbourne
##            New service             1.215815                 54.78418
##  Increased 30% or more             5.688278                256.31172
##    Increased 10 to 30%             9.856787                444.14321
##     Increased 5 to 10%             9.748232                439.25177
##      Increased 3 to 5%            11.441689                515.55831
##      Increased 1 to 3%            31.437506               1416.56249
##              Within 1%           100.348172               4521.65183
##        Reduced 1 to 3%            13.591077                612.40892
##       Reduced 3 to 10%            16.782591                756.21741
##    Reduced 10% or more             8.575839                386.42416
##     Not served in 2023             9.314013                419.68599
```

```
## [1] 13
```

```
##  composite_needs Dandenong (SE Metro) Similar seats
##         Very Low                   46           238
##              Low                   40           235
##    Below average                   41           262
```

```
##    Above average                   33           234
##             High                   26           203
##        Very High                   20           219
##               NA                   12            55
```

```
## [1] 14
```

```
##   Dandenong (SE Metro) Similar seats
## 1             36.63369      247.3663
## 2             35.47276      239.5272
## 3             39.08453      263.9155
## 4             34.44083      232.5592
## 5             29.53914      199.4609
## 6             30.82905      208.1709
```

```
## [1] 15
```

```
##  composite_needs Dandenong (SE Metro) Rest of Greater Melbourne
##         Very Low                   46                      1752
##              Low                   40                      1760
##    Below average                   41                      1732
##    Above average                   33                      1411
##             High                   26                      1448
##        Very High                   20                      1438
##               NA                   12                       282
```

```
## [1] 16
```

```
##   Dandenong (SE Metro) Rest of Greater Melbourne
## 1             38.00021                  1760.000
## 2             38.04247                  1761.958
## 3             37.47184                  1735.528
## 4             30.51852                  1413.481
## 5             31.15256                  1442.847
## 6             30.81440                  1427.186
```

```
##      ratio_binned_less Dandenong (SE Metro) Similar seats
##     Not served in 2023                    1            19
##            New service                    0             3
##  Increased 30% or more                    0            52
##    Increased 10 to 30%                    0            36
##     Increased 5 to 10%                    0            36
##      Increased 3 to 5%                    3            55
##      Increased 1 to 3%                   14            74
##              Within 1%                   32           291
##        Reduced 1 to 3%                   11            17
##       Reduced 3 to 10%                    1            14
##    Reduced 10% or more                    0            21
```

```
##      ratio_binned_less Dandenong (SE Metro) Similar seats
##     Not served in 2023            1.8235294     18.176471
##            New service            0.2735294      2.726471
##  Increased 30% or more            4.7411765     47.258824
##    Increased 10 to 30%            3.2823529     32.717647
##     Increased 5 to 10%            3.2823529     32.717647
##      Increased 3 to 5%            5.2882353     52.711765
##      Increased 1 to 3%            8.0235294     79.976471
##              Within 1%           29.4500000    293.550000
##        Reduced 1 to 3%            2.5529412     25.447059
##       Reduced 3 to 10%            1.3676471     13.632353
##    Reduced 10% or more            1.9147059     19.085294
```

```
##      ratio_binned_less Dandenong (SE Metro) Rest of Greater Melbourne
##     Not served in 2023                    1                       133
##            New service                    0                        27
##  Increased 30% or more                    0                       106
##    Increased 10 to 30%                    0                       169
##     Increased 5 to 10%                    0                       133
##      Increased 3 to 5%                    3                       158
##      Increased 1 to 3%                   14                       383
##              Within 1%                   32                      1320
##        Reduced 1 to 3%                   11                       163
##       Reduced 3 to 10%                    1                       227
##    Reduced 10% or more                    0                       107
```

```
##      ratio_binned_less Dandenong (SE Metro) Rest of Greater Melbourne
##     Not served in 2023             2.780455                131.21954
##            New service             0.560241                 26.43976
##  Increased 30% or more             2.199465                103.80054
##    Increased 10 to 30%             3.506693                165.49331
##     Increased 5 to 10%             2.759705                130.24029
##      Increased 3 to 5%             3.340696                157.65930
##      Increased 1 to 3%             8.237617                388.76238
##              Within 1%            28.053548               1323.94645
##        Reduced 1 to 3%             3.610442                170.38956
##       Reduced 3 to 10%             4.730924                223.26908
##    Reduced 10% or more             2.220214                104.77979
```