2025 Commonwealth Grants Commission Methodology Review

Northern Territory Department of Treasury and Finance response to the Draft Report – Transport Addendum

NORTHERN TERRITORY GOVERNMENT

Contents

1. Population-weighted density

1.1. Introduction

As set out in the Territory's submission to the Draft Report, the Territory broadly supports all changes proposed by the Draft Report as a whole. However, this submission makes additional comments on population-weighted density (PWD) measures due to the release of additional information in the addendum and further subsequent information provided by Commission staff in late August 2024.

While there are a range of issues in the transport consultation paper, the largest is the change to PWD measures. PWD is a function of area and population, so is heavily dependent on chosen geography measures, as set out in detail in the Draft Report. PWD is an explanatory variable in the transport regression model and impacts both state levels and regression coefficients.

The Draft Report expresses a preference to cease using Statistical Area (SA) 1 geographies for PWD. The Department agrees with this analysis. The alternative options are either SA2 or Square Kilometre Grid (KM2), with the Draft Report preferring the KM2 approach due to uniformity.

The Department prefers the SA2 approach because it is not impacted by boundary issues which impacts the KM2 approach and may be relevant for smaller cities. The Department otherwise supports the Draft Report changes as a whole. Given the significant inter-relatedness of issues, this support is to the package of changes as a whole only.

1.2. Preferred geography

The Commission's discussion on the relative merits of SA1, SA2 and the KM2 measure is comprehensive and unnecessary to repeat. However, this submission notes the possible distortions created by aligning KM2 to Significant Urban Areas (SUA), based on Urban Centre and Locality (UCL) boundaries.

To convert KM2 and SA2s to cities, the Draft Report advises (at 76), that:

> *"For both measures, the SA2s and square kilometres were first mapped to Urban Centre and Locality boundaries before being aggregated to significant urban areas. This ensures that the non-urbanised areas on the fringes of larger significant urban areas (typically reserves, mountainous areas, forests and waterways) could also be removed. As square kilometres can cross urban centre boundaries, residents were allocated to each area based on the proportion of land in each urban centre boundary."*

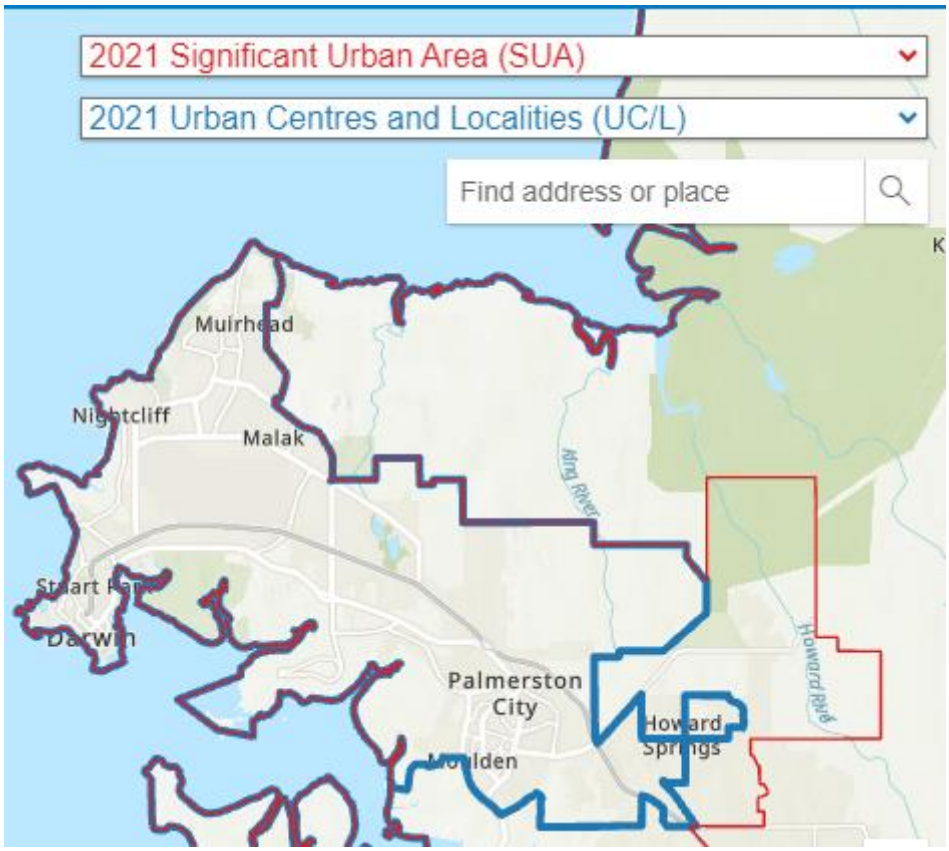
There also appears to be an assumption that if more than half of a KM2 grid's area is in one UCL, all of the grid's population is apportioned to that area.

This treatment of KM2 boundary areas creates some difficulties. The proposed apportionment approach requires an assumption that population density within a KM2 area that straddles a UCL boundary is uniform either side of the UCL boundary. If population density is not evenly distributed, and in particular, if the area within the UCL is higher-density than the area outside the UCL, the assumption will lower population density (and vice versa). This is particularly problematic because UCLs are specifically designed to reflect urban boundaries and indeed, UCLs are designed by direct reference to population density. This means that population density should be expected to differ sharply at some UCL boundaries.

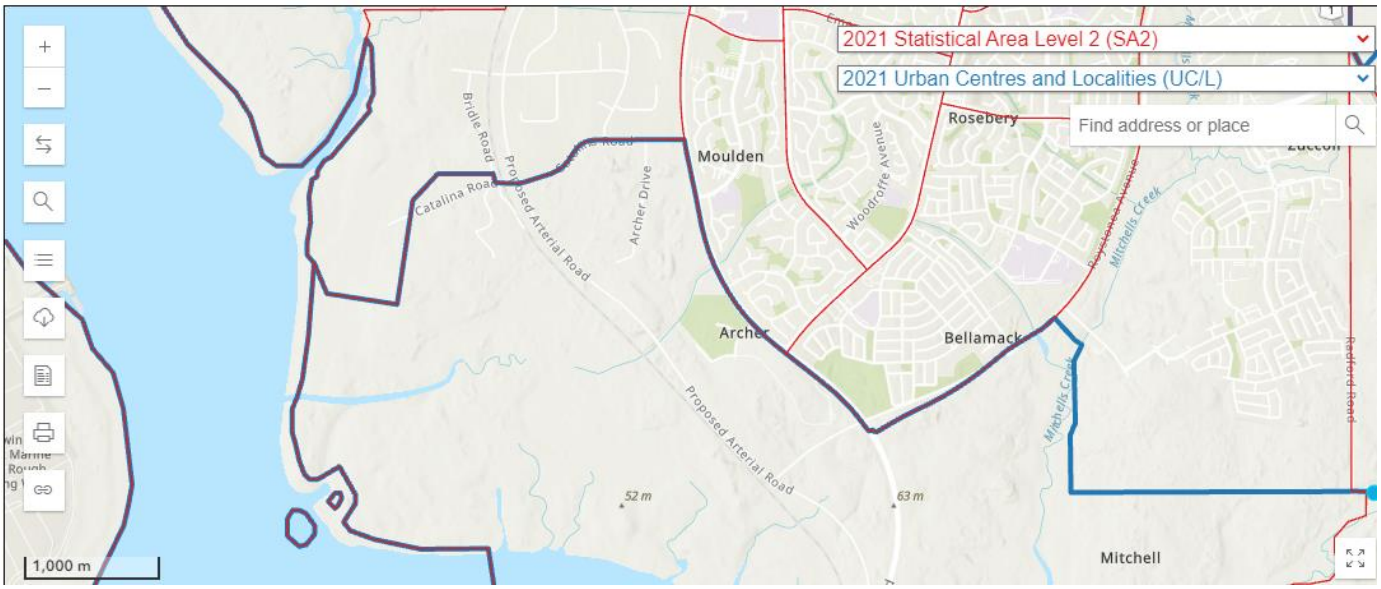
The impact of this assumption will be different between UCLs, with a greater impact in areas with sharp urban/rural boundaries and/or for UCLs with smaller total populations (i.e. a larger proportion of persons near the UCL boundary). There are also potential issues with the ratio of a UCL's area to its perimeter, which vary with UCL shape and size. This potentially biases the measure, particularly in smaller UCLs.

The below example illustrates how this may impact Darwin. As shown, the Darwin UCL is specifically designed to include urban suburbs in the city of Palmerston, such as Moulden and Bellamack, but exclude the immediately surrounding undeveloped rural area. The KM2 assumption appears likely to apportion Palmerston's urban population to the surrounding rural area and therefore under-estimate PWD.

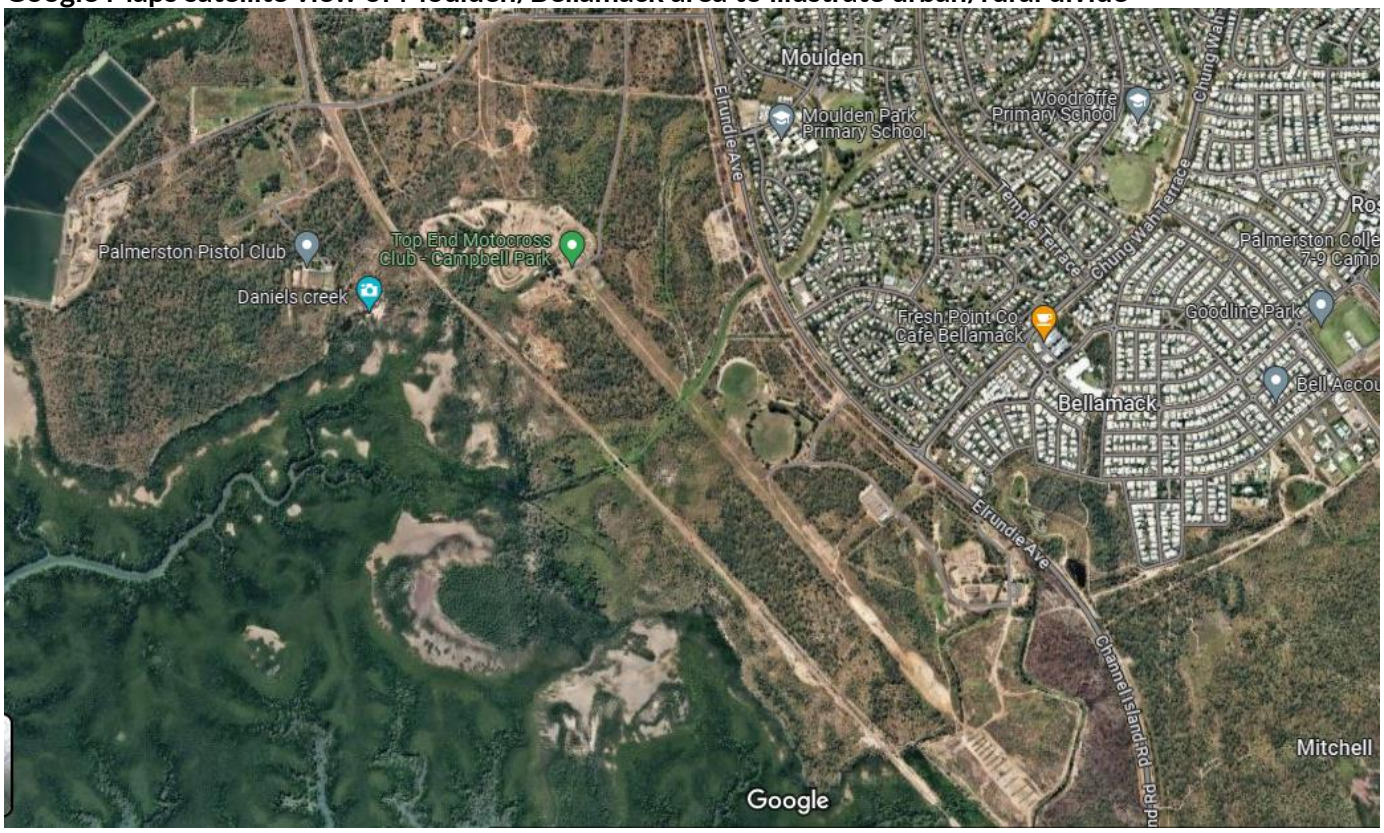
ABS Maps Darwin UCL (blue line)



Southern Darwin UCL boundary - Moulden/Bellamack Suburbs



Google Maps satellite view of Moulden/Bellamack area to illustrate urban/rural divide



There does not appear to be any way to consistently resolve this issue as it is not possible to align KM2 grids to UCLs and all UCL contexts differ. Similarly, it does not appear possible to test the materiality of the apportionment, as there is no baseline PWD for reference.

It is also not possible to compare densities between SA2 and KM2 approaches. All SA2 capital city densities in the Draft Report are lower than the KM2 measure, but the SA2 measure has less total difference between cities. The direction of inter-censal change is also different for several cities.

Rather than seeking to resolve these issues, it is simpler and more reliable to use SA2 geographies for alignment with UCL boundaries. This also reflects the intended design of these geographies, as SA2s and UCLs are specifically designed to map urban/economic areas. While there are a range of other competing and finely balanced issues with SA2 compared to KM2 measures, the Department does not consider there is enough on balance to cause KM2 to be preferred given the above boundary issue. For example either SA2 or KM2 has comparable and much lower inter-censal volatility than SA1s.

Accordingly, the Department prefers SA2s on balance.

For completeness, the Department understands that the ABS is currently consulting on the Australian Statistical Geography Standard 4, and that one of the issues under consideration is SUA/UCL definitions and boundaries. This may impact future consideration of the issues and views herein.