

# BICYCLE TRANSPORT ANALYSIS



The Bike Transport Analysis (BTA) is a data analysis tool that measures how well bike networks connect people with the places they want to go. Because most people are interested in riding to local destinations only when it's a comfortable experience, this analysis has been specifically developed to recognise the low-stress bicycle connections.

The BTA simplifies the ability to track the positive impact of bicycle infrastructure upgrades that enhance accessibility by bicycle in local town and city areas wherever they are.

The BTA creates both a numerical score and network map to display the location of low stress connections.

The BTA score is developed in four stages: data collection, traffic stress analysis, destination access analysis, and score aggregation. Each of these steps is described below.

## **Data Collection**

The BTA relies on data from two main sources: The Australian Census and [OpenStreetMap](#) (OSM).

For score development, the geographic units of analysis, population data, and jobs data is derived from census data where available.

OSM data is open source data and publicly available worldwide, providing a fully-routable network of on- and off-street transport facilities including details about the types of bicycle facilities on any given street segment.

Although OSM data quality varies between cities and countries, anyone can edit OSM to improve the BTA's accuracy.

The ability to rapidly incorporate recent upgrades in the local bicycle connections into the analysis has been particularly valuable to understanding the benefits in recent pop-up bicycle infrastructure installed as a response to the COVID pandemic.

## **Traffic Stress Analysis**

The BTA relies on the concept of a low-stress bike network. Since the measures are concerned with low-stress bicycling, the methodology focuses on roadway characteristics that generally translate to a Level of Traffic Stress 1 or 2 rating based on the scale originally developed by the [Mineta Transportation Institute](#) in the US.

**In practical terms, this corresponds with the comfort level of any rider 8 to 80 with an interest in riding a bicycle.**

Once the transportation network has been identified, every street segment is rated along with intersections for high or low traffic stress. Evaluation includes (but not limited to) speed limits, road design, intersection treatments, bike infrastructure, car parking infrastructure and infrastructure connections. You can follow the logic using [this analysis logic spreadsheet](#).

The BTA evaluates traffic stress for each link in the transportation network by applying the logic outlined in the spreadsheet to the street characteristics documented in OSM.

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## **Destination Access Analysis**

Once street segment stress ratings have been established, every geographic unit or block is evaluated to identify whether those blocks are within biking distance and can be reached on the low-stress network. The BTA assumes a comfortable biking distance of 2.68km along comfortable streets or paths, in ten minutes riding at 16km/h.

Detours are a strong disincentive to trips by bicycle, so it is also assumed that a low-stress route is only available if it doesn't force a person to go out of their way by more than **25%** compared to the equivalent car trip.

Finally, the assumption is made that two data blocks are connected if and only if there is an unbroken low-stress connection between them. In other words, even a short stretch of stressful biking negates a potential connection.

This is consistent with the Traffic Stress concept and also highlights the importance of a continuous network, rather than the patchwork of facilities that is common in many Australian cities.

Points are assigned on a scale of 0 to 100 for each destination type based on the number of destinations available on the low-stress network as well as the ratio of low-stress destinations to all destinations within biking distance.

The BTA's six scoring categories are:

1. People: Access to other people in the city based on the resident population distribution
2. Opportunity: Access to jobs and educational institutions
3. Core Services: Access to critical services such as health care
4. Recreation: Access to public recreation outlets
5. Retail: Access to shopping areas
6. Transit: Access to major public transport hubs

If a specific type of destination is not located within an evaluated area, that destination type is excluded from the calculations. For example, the score within a city with no University or higher education is produced by excluding the Higher Education destination type so the score is unaffected by its absence.

We use the category scores to calculate one overall score for each data evaluation block, weighting each category according to its relative importance. The step thresholds, destination scoring, and weighting assumptions are all described in [this spreadsheet](#).

## **Score Aggregation**

Each category score is combined to calculate scores for the whole city and then with weighted according to population distribution and then averaging destination type (subcategory) scores across the city.

The current BTA's for Australia can be found at <https://www.weride.org.au/bta/>