

Motivation

The evolution of railroad and highway networks has been widely researched in the past. Similar research for bus networks is rare, because unlike roads and railways, bus networks are flexible and undergo relatively frequent changes. This flexibility means that tracking their evolution is data intensive. But it also means that we can modify them to suit future demands, for which, we need to understand the dynamics of their evolution.

Data

We use a unique data source to build the networks of the past — a repository of historical bus routes and timetables archived at <https://sydneybusroutes.com/wp/> and Sydney Bus Museum.

Route 470

SUMMER HILL – CANTERBURY – BELMORE (Sharp St)■

- Extended from Belmore (Sharp St) to Kingsgrove (1948-50)

(Sharp St south of Canterbury Rd was renamed Kingsgrove Rd by 1950.)

Timeline

8 June 1941: Full time service, Summer Hill – Canterbury – Belmore (Sharp St) renumbered from 70 [1925 number].

Ran as two separate services other than in peak hours:

Summer Hill – Hurlstone Park

Canterbury – Belmore (Sharp St).

20 October 1946: Restored as a full time route, Summer Hill – Hurlstone Park – Canterbury – Belmore (Sharp St).

22 February 1948 (opening date of Kingsgrove Depot): Extended from Belmore (Sharp St) to Kingsgrove station.

23 July 1950: Extension from Belmore (Sharp St) to Kingsgrove station ceased.

29 November 1953: 415 & 470 amalgamated as 415 Summer Hill – Belmore – Strathfield – Burwood.

Streets

Summer Hill – Belmore (Sharp St)

Circa 1946 (Gregory's Street Directory)

From Summer Hill (Carlton Cr at station) via Lackey St, Smith St, Prospect Rd, Old Canterbury Rd, Griffiths St, Queen St, Hanks St, Third St (Ashbury), King St, Jeffrey St (Canterbury), Canterbury Rd to Sharp St (Belmore).

From Belmore (Sharp St) (at Canterbury Rd) via reverse route to Prospect Rd, then Carlton Cr to Summer Hill station.

Summer Hill – Belmore (Sharp St) – Kingsgrove

Alteration

Circa 1948 (Gregory's Street Directory): Extended from Belmore (Canterbury Rd/Sharp St) via Kingsgrove Rd to Kingsgrove station.

Summer Hill – Belmore (Sharp St)

23 July 1950

Reverted to route circa 1946.

Timetable Summary

6 February 1949

Destinations	Off-peak trip time	Day	First trip		Last trip		Av day freq/No of trips	Notes
			From	Time	From	Time		
Summer Hill-Kingsgrove	29	M-F	Kingsgrove	6.02am	Summer Hill	11.50pm	30*	A
		Sat		6.08am		11.50pm	30	B
		Sun		8.10am		11.52pm	30	C

Figure 1: Sample data

Method

We track and analyse the evolution of Sydney's bus network since 1925 by building General Transit Feed Specification (GTFS) for each year. The method used to generate GTFS is depicted below:

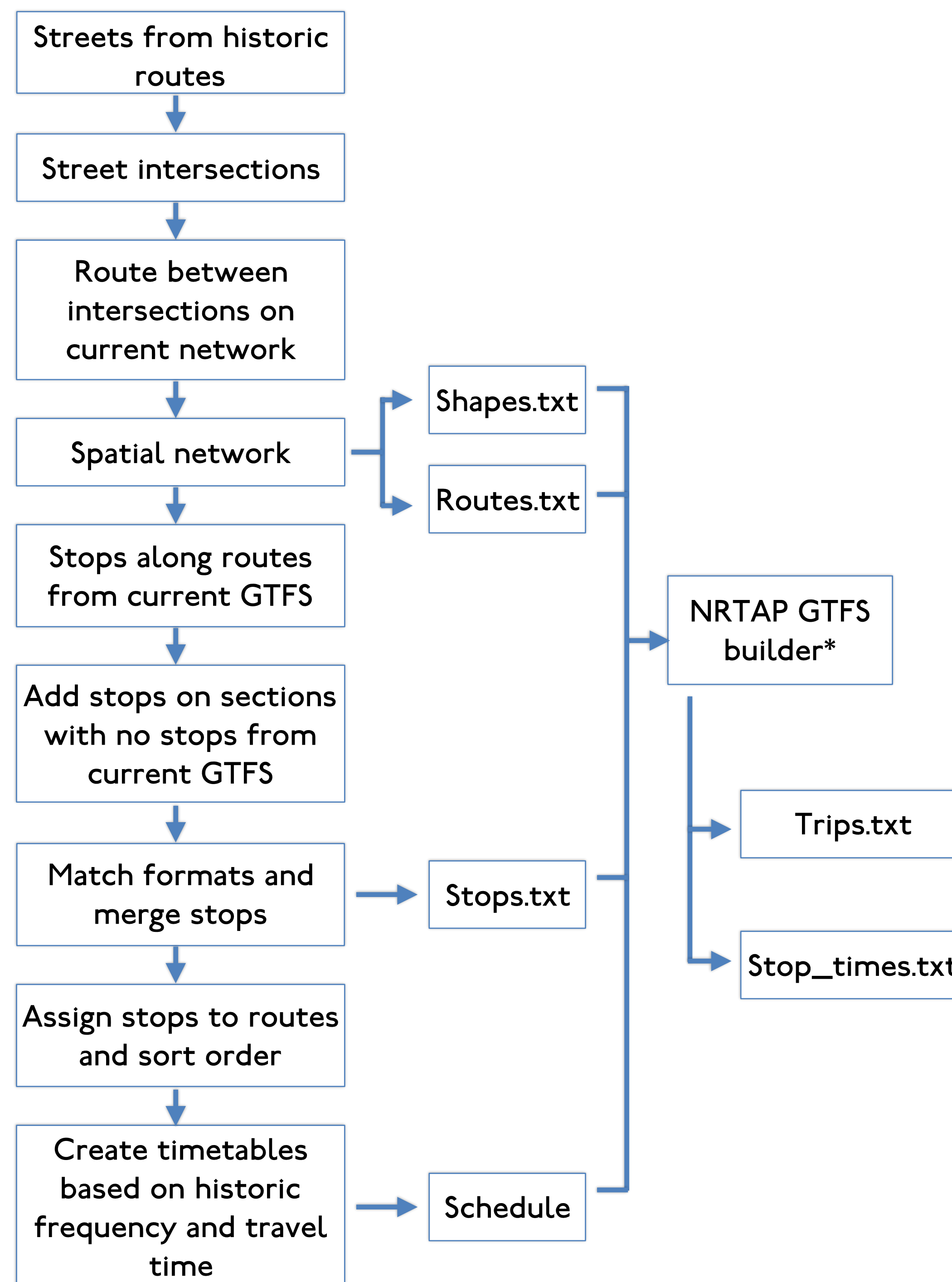


Figure 2: Method to generate GTFS

* GTFS builder developed by the US National Rural Transit Assistance Program, available at <http://www.nationalrtap.org/Web-Apps/GTFS-Builder>.

Research scope

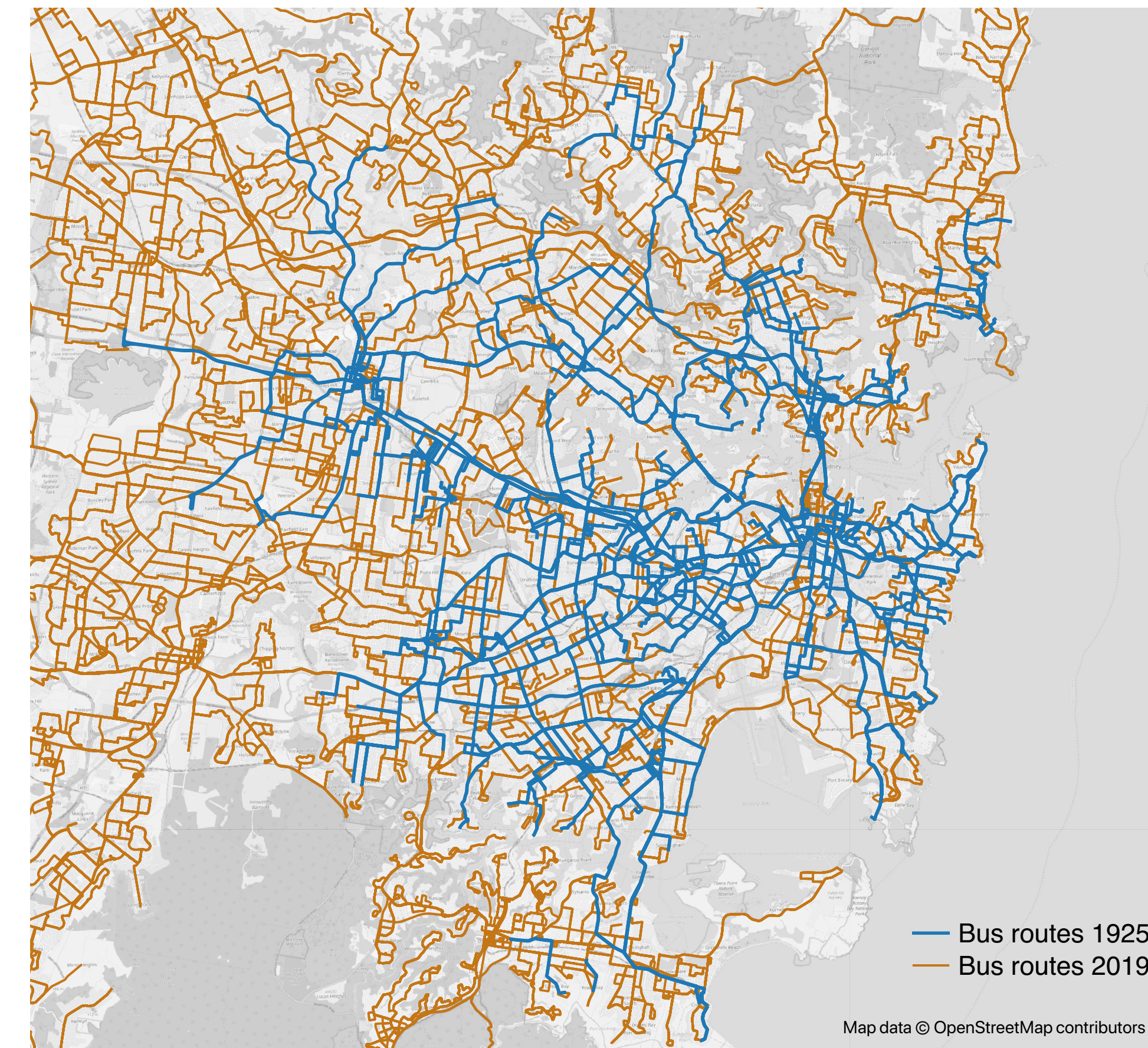


Figure 3: Bus network in 1925 and 2019

Sydney's bus network has evolved a lot since 1925, as seen above. The changes between then and now are currently being digitised to GTFS records. On completion, future research will explore:

- the changes in bus network structure over time and across suburbs;
- the evolution of Sydney's transit network by augmenting rail networks;
- the co-evolution of network growth and travel demand by coupling with historic transit ridership information; and
- the co-evolution of network growth and land-value by coupling with historic real-estate data.

In conclusion, this research is a step towards an evolutionary model for the region.