URBAN GREENING EXPLORER

An Interactive Dashboard for Exploring Vancouver's Public Trees

Progress Report 4

Student Name: Lakshantha Dissanayake

Student ID: 300392299

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Work Logs

Date	Hours	Description of Work Done
Oct 26, 2025	2.0	Planned the Neighbourhood Overview tab, including a density map, legend, hover tooltips, and a ranking table. Confirmed that density will be calculated as trees per square kilometre for each Local Area.
Oct 28, 2025	2.5	Implemented the neighbourhood summary calculations to get total trees, unique species, average diameter, and tree density using area in km² derived from the Local Area polygons.
Oct 30, 2025	2.0	Built the first version of the density map using Folium, configured the base map tiles, and added a helper to automatically create sensible colour ranges for different density levels.
Nov 01, 2025	1.5	Added hover tooltips to the map showing Local Area name, density, total trees, and unique species; enabled layer controls and checked that neighbourhood boundaries and data align correctly.
Nov 03, 2025	2.0	Created the "Neighbourhood Ranking (by Density)" table so users can compare neighbourhoods by trees per km² and see other attributes with clear, labelled columns.
Nov 05, 2025	1.5	Polished the user interface by improving captions, reusing the legend label consistently in tooltips, and applying a consistent colour scheme and spacing.
Nov 08, 2025	3.0	Tested performance with the full dataset, checked that the density map remains responsive, confirmed that caching behaves correctly, ran final quality checks on density values, ensured the Explore Trees tab and Neighbourhood Overview tab work correctly together, and prepared the Progress Report 4 submission with screenshots and final code commit.

Description of Work Done

From October 26 to November 8, the Urban Greening Explorer project advanced from focusing only on individual tree points to also providing neighbourhood-level insights. The new Neighbourhood Overview tab was designed and implemented to complement the Explore Trees tab by summarizing how greenery is distributed across Vancouver's Local Areas.

The updated code now calculates key indicators for each neighbourhood, including total trees, unique species, average diameter, and tree density. Tree density is defined as the number of trees divided by the area of the neighbourhood in square kilometres. This allows meaningful comparisons between neighbourhoods of different sizes.

A new density map (choropleth) was created using Folium. Each neighbourhood polygon is shaded according to its tree density, making greener areas stand out visually. To keep the map

readable even when densities vary a lot, the colour scale is based on ranges that are automatically derived from the data. When users hover over a neighbourhood, a tooltip displays the neighbourhood's name, density value, total number of trees, and number of unique species. This provides an immediate summary without leaving the map.

To support more detailed comparison, a Neighbourhood Ranking table was added beneath the map. The table lists all neighbourhoods ordered by trees per km² and shows additional metrics such as total trees, unique species, average diameter, and planting-year range. Column labels clearly indicate the units (for example, "Trees/km²" and "Area (km²)") to make the results easier to interpret.

User interface refinements were made throughout this period, including clearer captions describing what the map and table show, consistent colours aligned with the rest of the app, and better spacing. Caching and performance were tested to ensure that the map remains responsive when working with the full city dataset, and spot checks were used to verify that calculated densities are correct.

Current state of the web application is as follows:

The current application consists of two main tabs:

1. Explore Trees – Provides an interactive Folium map with local area boundaries, optional neighbourhood highlighting, sampled tree points with tooltips, and a responsive sidebar filter. Below the map, the Key Stats panel and live charts summarize filtered results in real time.
2. Neighbourhood Overview – Presents a city-wide choropleth highlighting tree density by local area, along with a sortable ranking table that compares all neighbourhoods based on trees per km² and other attributes. The tab serves as a high-level analytical view of Vancouver's green distribution.

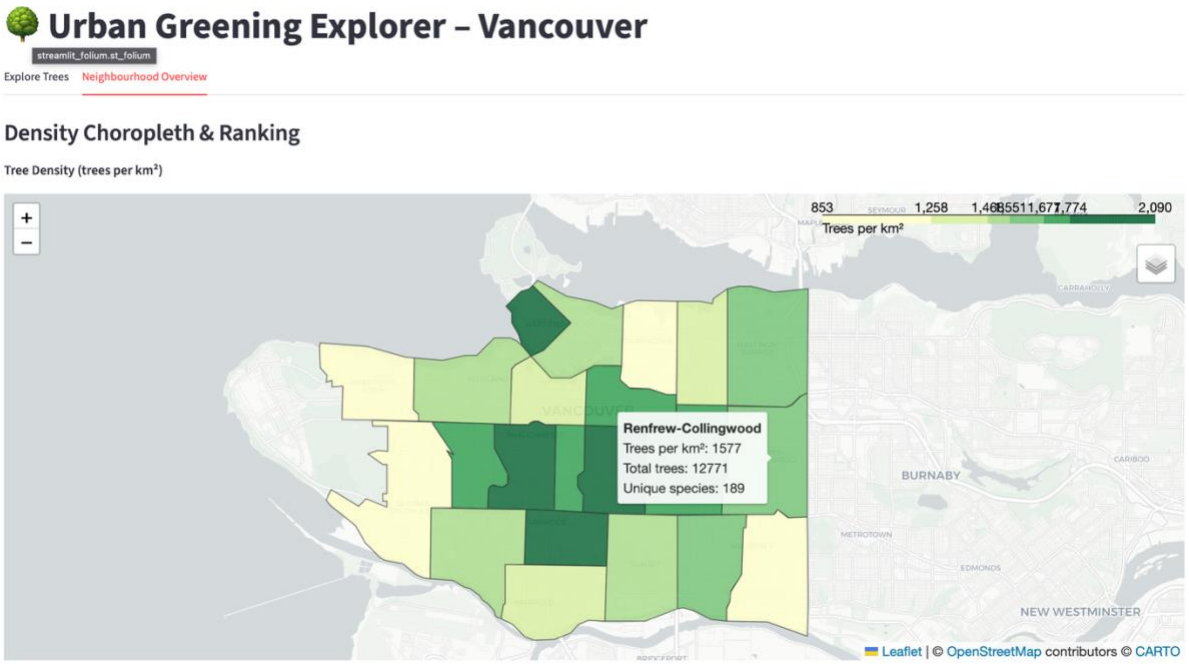

Figure 1: Density choropleth map

Neighbourhood Ranking (by Density)

Local Area	Trees	Unique Species	Avg Diameter (in)	Oldest Planting Year	Newest Planting Year	Area (km²)	Trees/km²
Shaughnessy	9365	407	15.0212	1989	2024	4.4803	2090.2684
Riley Park	9997	272	13.1477	1990	2024	4.9317	2027.0997
West End	4031	155	13.4101	1990	2024	2.2562	1786.6103
Oakridge	7165	160	11.8698	1990	2024	4.0236	1780.7422
South Cambie	3848	149	11.6248	1990	2024	2.1764	1768.0951
Kensington-Cedar Cottage	12689	191	12.3862	1989	2024	7.2525	1749.6038
Mount Pleasant	6461	148	12.677	1989	2024	3.7205	1736.5718
Arbutus Ridge	6206	149	12.4208	1989	2024	3.7006	1677.0161
Hastings-Sunrise	13343	206	11.9512	1990	2024	8.3323	1601.3642
Victoria-Fraserview	8723	140	9.9775	1989	2024	5.5005	1585.847

Data: City of Vancouver Open Data (Public Trees & Local Area Boundaries).

Figure 2: Neighbourhood rankings table

Repo Check-in of Implementation Completed

The GitHub repository has been updated to include the following files under **Implementation** folder:

1. **app.py** – Updated to include the Neighbourhood Overview tab, choropleth generation with data-driven colour ranges, legend-aware tooltips, and ranking table. The Explore Trees tab remains fully functional with map sampling, filters, tooltips, and statistical summaries.