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Does Brampton Have Enough Parks?

October 11th, 2021

1. Introduction

1.1 Background

Brampton is experiencing rapid population growth. As of the 2016 Census, "Brampton had the 2nd highest growth rate among Canada's 25 largest cities." (City of Brampton, 2019). This population growth presents the need for more community parks and open recreational spaces as tools for mental health and physical activity opportunities.

1.2 The Demand

Obesity and living in the suburbs are linked (Oregon State University, 2005). Further, rates of being overweight and obese in the Peel Region are higher than in the rest of the Greater Toronto Area (Glazier et al., 2014).

Parks seem to also be important for mental health. "Mental health is significantly related to residential distance from parks". (Sturm & Cohen, 2014)

1.3 Interest

This project can be used to inform City of Brampton planners. The goal is to inform these planners about the need for more parks for the people of the city and where specifically the need is the greatest.

2. Data acquisition and cleaning

There were two main datasets used in the analysis of this project.

2.1 Parks

The Parks dataset was retrieved from Brampton's Open Data on Geohub. It contained data on presumably all of Brampton's parks. The data was available in the GEOJSON file format. This meant that for each park a set of (latitude, longitude) points representing each park as a polygon were available.

Each park had a PARK_TYPE field. Seven of the parks were classified as OPERATIONS/ADMINISTRATION FACILITIES. These were excluded from the analysis as they did not seem like actual parks.

Excluded Parks:

CIVIC CENTRE
CITY HALL
ARTS, CULTURE AND THEATRE DIVISION
SANDALWOOD WORKS YARD
BRAMPTON FIRE TRAINING
WILLIAMS PARKWAY OPERATIONS CENTRE
BRAMPTON TRANSIT CLARK FACILITY

820 parks remained for the analysis.

2.2 Address Points

The Address Points dataset was also retrieved from Brampton's Open Data on Geohub. It contained data on 220,000 or so of Brampton's address points. From this data, I was able to remove the address points that were labeled as non-residential. Unfortunately, many of the addresses, about 137,000, lacked a label and so were not removed. This introduced a source of error because many of the address points used were not houses, even though the goal was to only consider houses. After removing these address points, 201645 address points remained.

Each address point had a (latitude, longitude) coordinate. This was used in the analysis.

2.3 Key Calculation

The metric of interest is the distance to the closest park for each house. Using the haversine formula, I proceeded to calculate in kilometers the shortest distance to any one of the 820 parks for the 201645 address points. Since parks are represented as a polygon (a set of points), to calculate the distance between an address point and a park, the minimum distance was taken from the address point to any one of the park's polygon's points.

3. Analysis

There are 3 major sources of error.

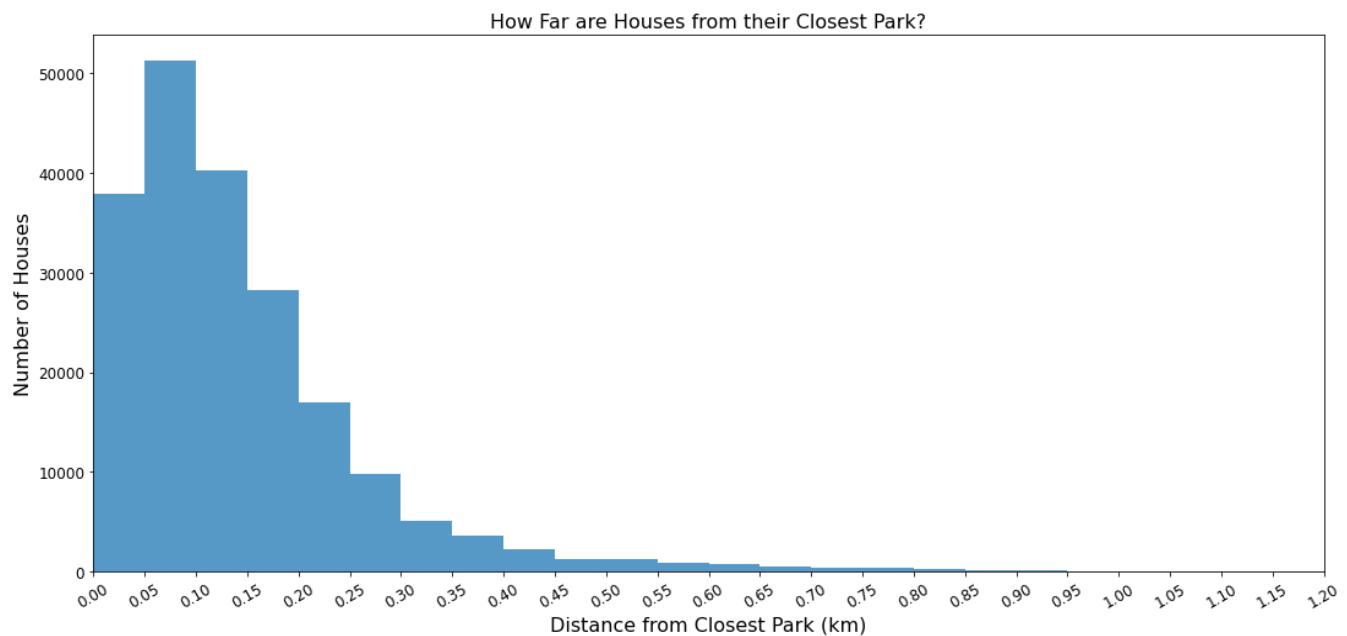
1. Distance numbers are misleading because although a park might be some distance away, this is a point-to-point distance and does not represent the distance that a citizen would have to walk to get to a park from their house (sidewalks do not exist as straight paths from any house to any park).
2. Using coordinates to calculate distances means that both parks and houses are treated as points, rather than larger areas. This was ameliorated somewhat by treating parks as a

set of points (polygons) and calculating the distance from a house to the nearest park as the distance from that house to the nearest point of a park polygon.

3. As mentioned earlier, many of the address points used are not necessarily residential address points, but they nonetheless are assumed to represent houses.

Moving on,

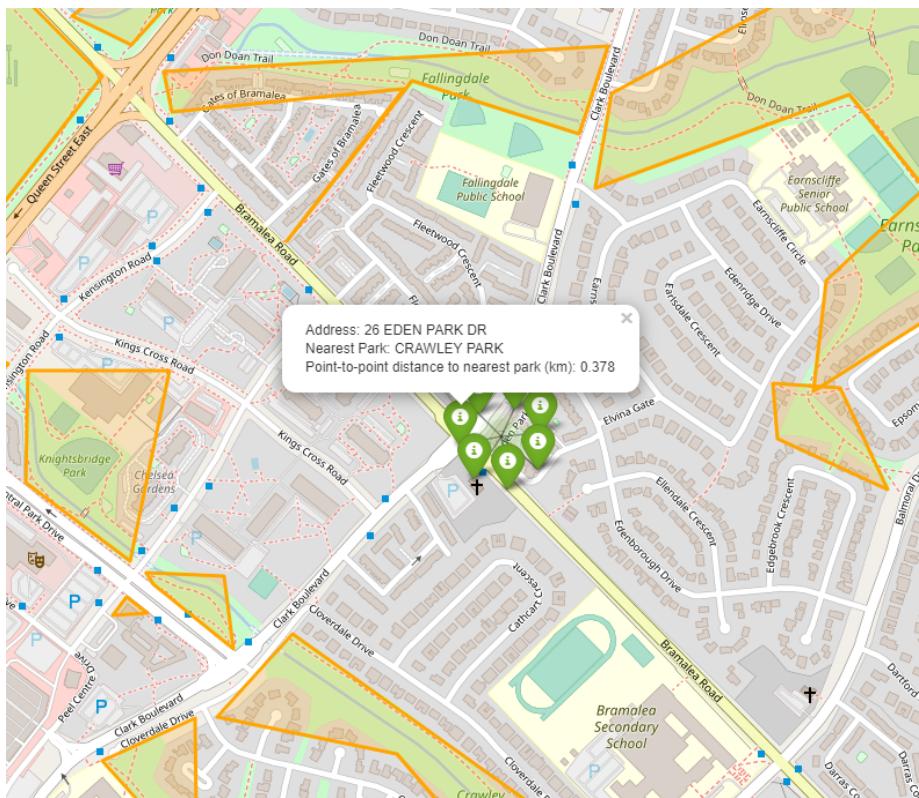
On average, I found the address points considered are about 145 meters away from the nearest park. And 75% of address points considered are less than 186 meters away from the nearest park. Of course, the smaller the numbers the better, but these numbers seem reasonable. Again the first mentioned source of error needs to be considered. Taking a look at a histogram of how far the address points considered are from their closest park:



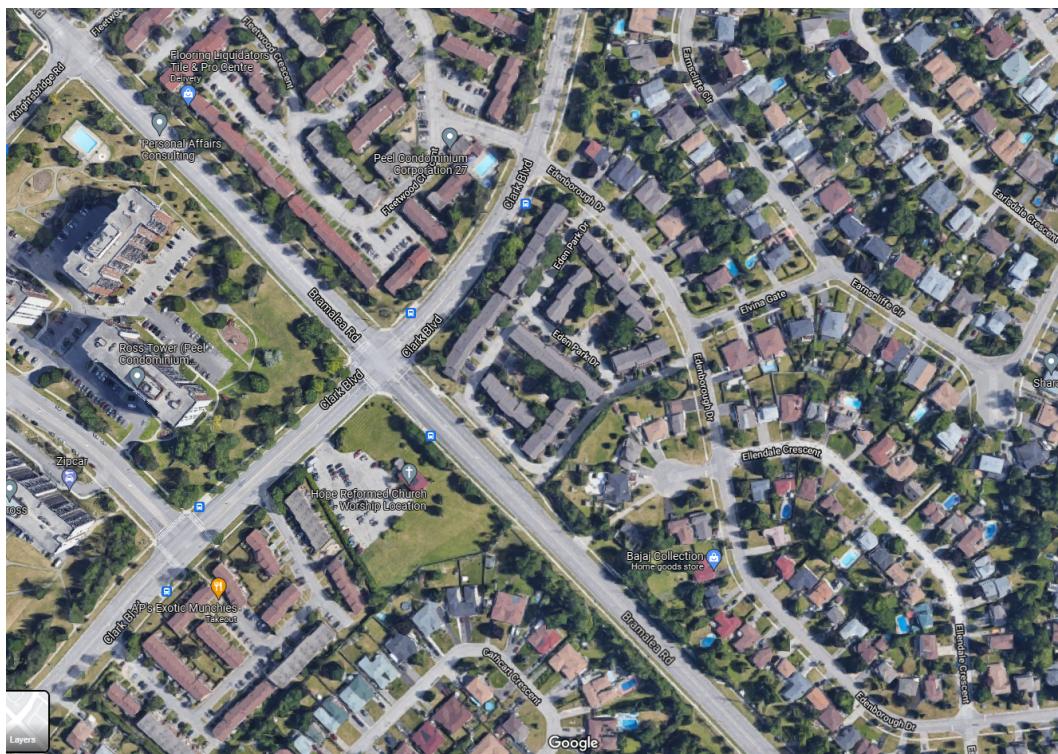
There seem to be many address points that are a sufficiently small distance away from a park (again though, the smaller the better). However, one thing to note in the histogram is that it is right-skewed with a steady decline in frequency after the peak. Many address points in the analysis are disproportionately far from a park and this needs to be further looked into in the map.

Mapping the address points and the parks (view https://manveertamber.github.io/brampton_parks.html), we can begin to look at the houses that are in the worst 5% of the “distance to nearest park” metric. This helps us identify the houses that are disproportionately far from parks.

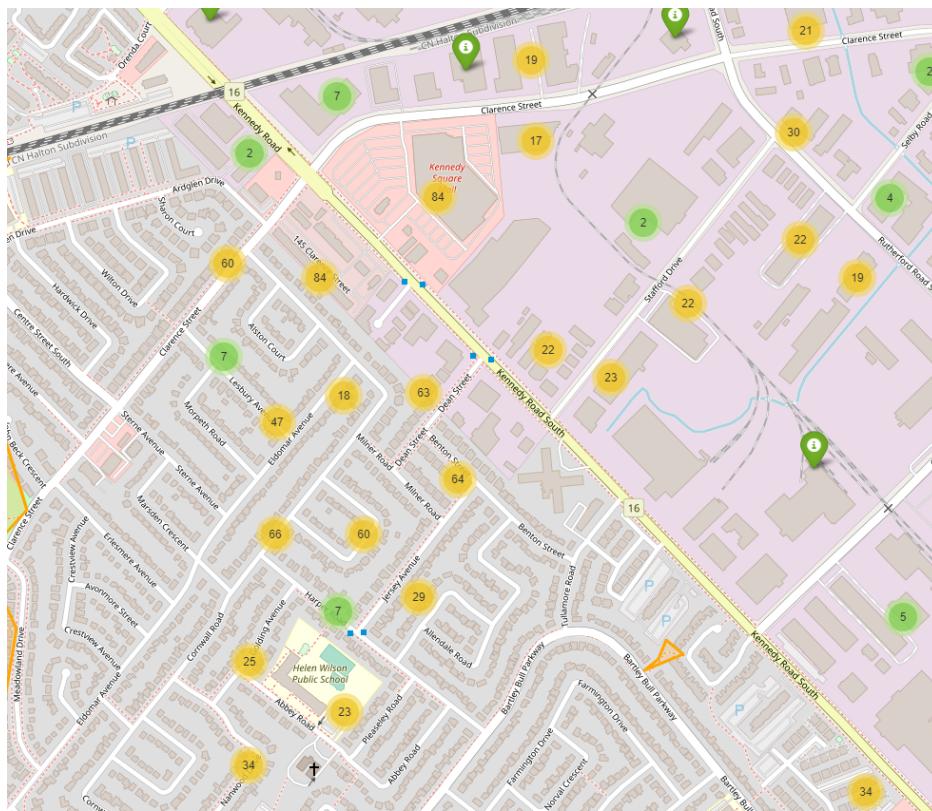
From Data Visualization:



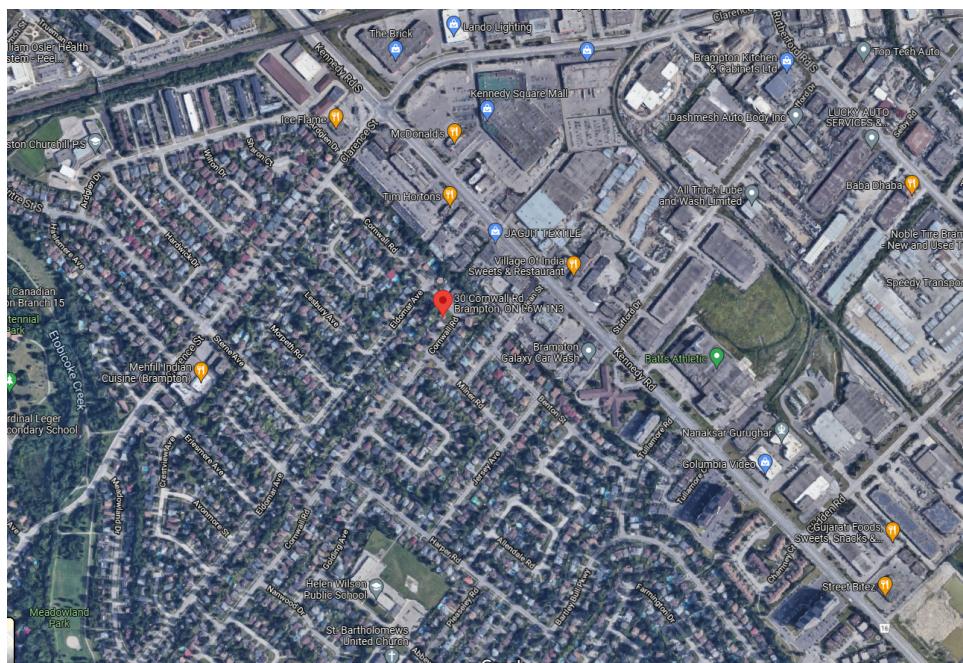
From Google Maps:



From Data Visualization:



From Google Maps:



4. Results and Discussion

The data visualization tool can identify areas that lack parks. The areas presented lack parks. It is important to recognize these areas and provide solutions for their residents. In the second example, the nearby houses live in an ugly area looking through the lens of proximity to parks. I recognize that there is the Etobicoke Creek trail, but many of the residents here face an almost 2km walk through endless houses to get to any sort of real greenery. It seems to be difficult to add any parks because of the densely built houses and buildings. City planners should look to add greenery to what looks like a grey mess from the satellite view. Repurposing some of the space for recreation, a targeted gardening program, or having initiatives for better lawns for the people who live there could be fruitful endeavors.

5. Conclusion

I hope that through this sort of analysis, citizens of Brampton can be better provided with essential outdoor recreation space. Parks are great faucets for mental health and physical well-being. The analysis in this project helps identify problem areas and citizens who need more greenery. I hope that the growing Flower City can work to better provide its citizens with essential parks.

Citations

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