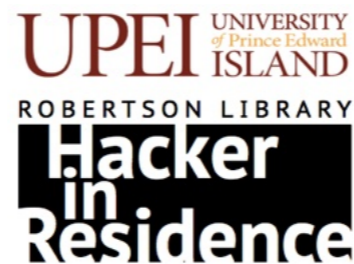



The Government That Swallowed a Pond (Using Open Data and GIS to Inform Policy and Influence Behaviour)

Engineers PEI Annual General Meeting
November 29, 2019
Rodd Charlottetown Hotel



Peter Rukavina

Hacker in Residence, Robertson Library, University of Prince Edward Island
prukavina@upei.ca

 orcid.org/0000-0002-7690-4909

Provincial Admin Buildings

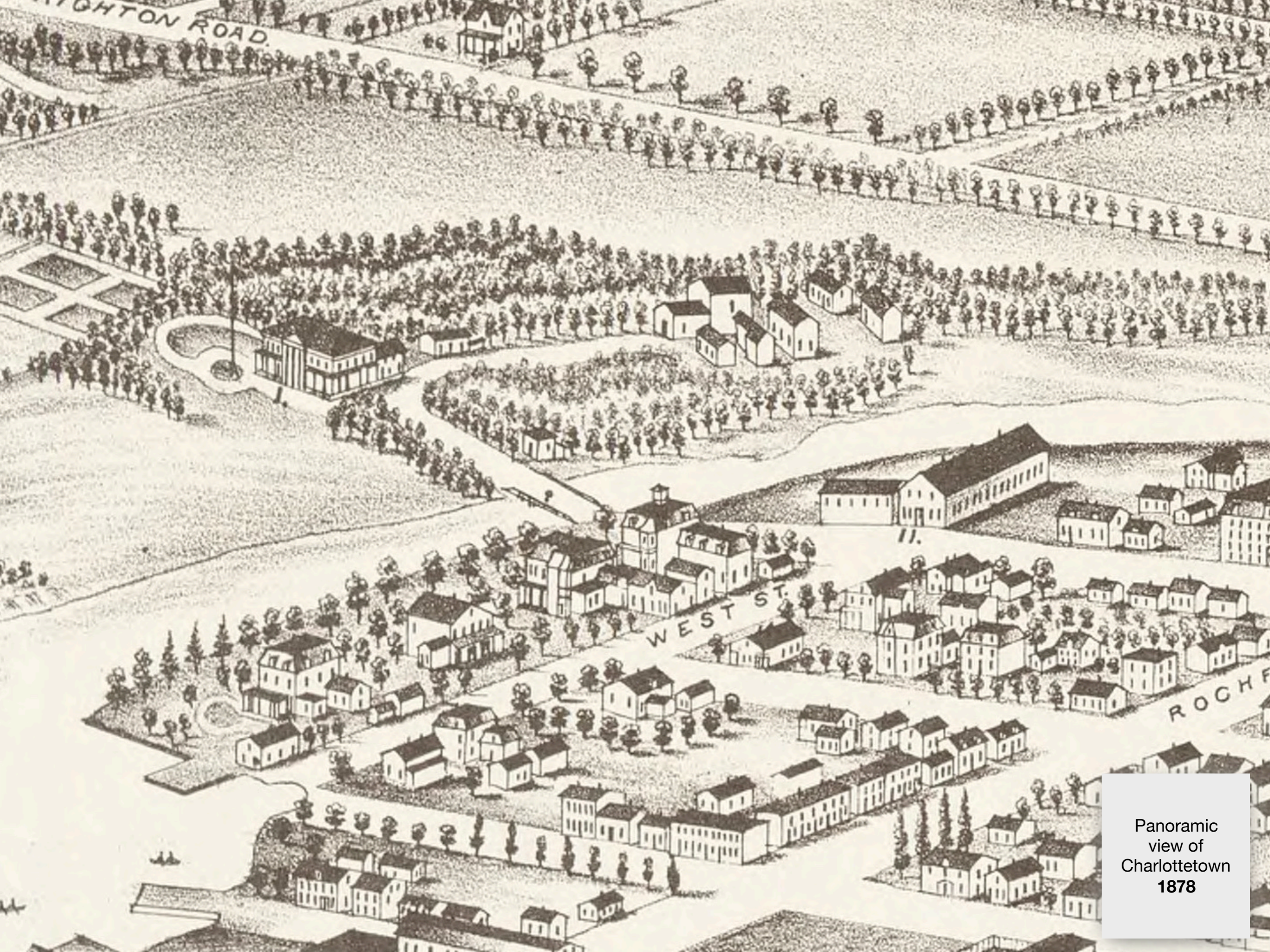
Image from Google Street View, Captured October 2015



Provincial Admin Buildings

Image from Google Street View, Captured October 2015





Panoramic
view of
Charlottetown
1878

George Davies

DAVIES

Dond Mc Kinnon
"BRIGHTON"
Tannery

McKinlay & McLe...

SPR...

48 49 50
57 52
Old church
6
st James
Pres
Ch

ST.

W M E N T

Barns

GOVERNMENT POND

Drill Shed

Public School

ROCHFORD

ROCHFORD SQUARE

4TH

GOVERNMENT HOUSE

Res. of
Lieut Gov.

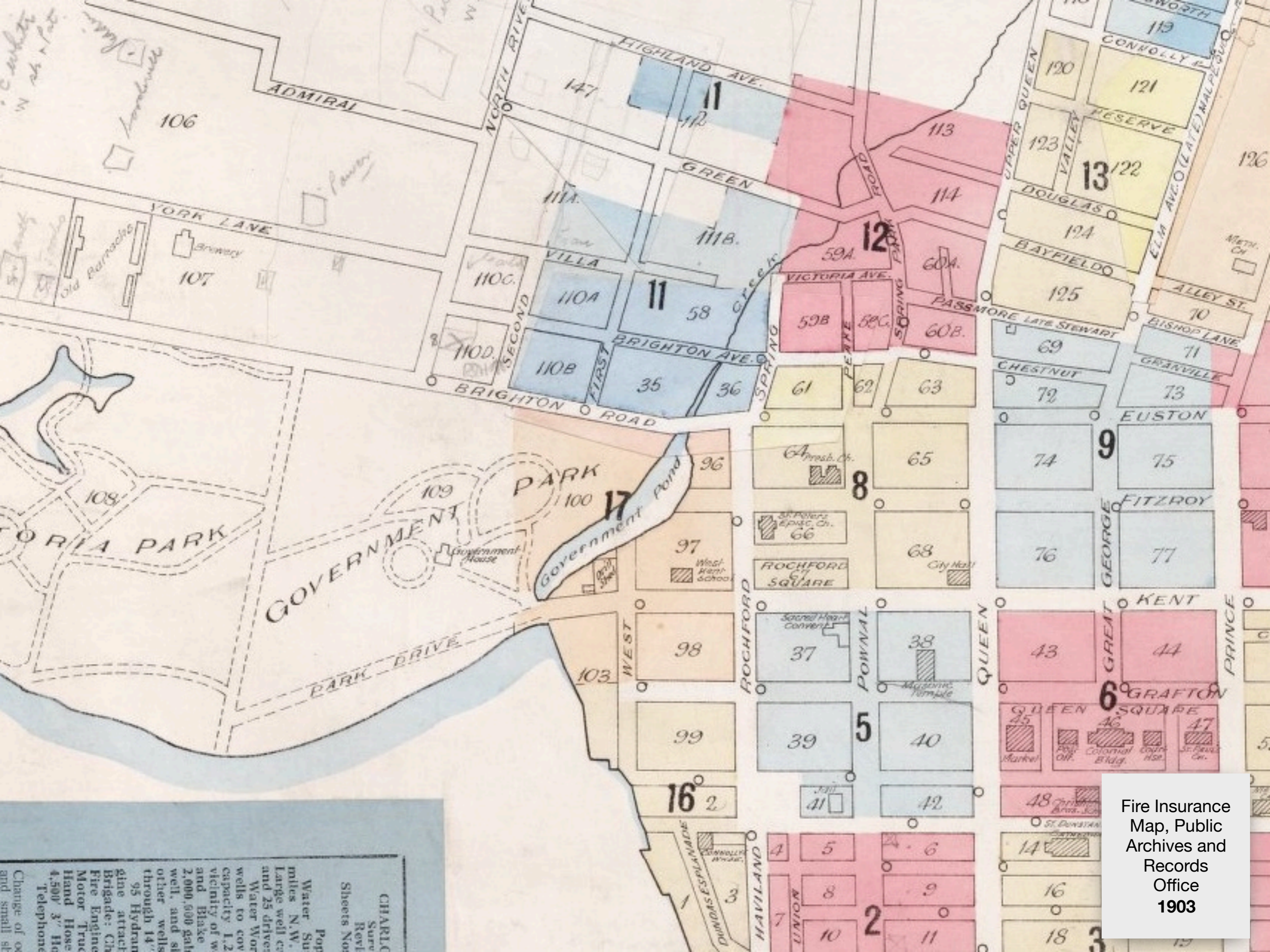
WEST-END HOUSE
Jas. Peake

(78) WEST BOURNE
J. Sparvell

65 66 67 68 69
15 16 17 18 19

70 71 72 73

Map of the City of Charlottetown 1880



Fire Insurance Map, Public Archives and Records Office 1903

CHARLES
 SURVEYOR
 REVISED
 SHEETS
 POPULATION
 WATER SUPPLY
 MILES N.W.
 LARGE WELL
 AND 25 DRIVE
 WATER WORKS
 WELLS TO COVER
 CAPACITY 1.2
 AND BLAKE
 VICINITY OF
 2,000,000 GALS
 WELL, AND SH
 OTHER WELLS
 THROUGH 14
 95 HYDRANT
 BRIGADE: CHIEF
 FIRE ENGINE
 MOTOR TRUCK
 HAND HOSE
 4,500 3" HOSE
 TELEPHONE
 CHANGE OF
 AND SMALL ST



Fire Insurance Map, Public Archives and Records Office 1903



CHARLOTTETOWN

Government House

Victoria Park

Plan of Township No. 48, Public Archives and Records Office 1915



Brighton Street, Prince Edward Island Post Card Collection
(Postcards collected by Boyde Beck, Prince Edward Island Museum and Heritage Foundation)



Brighton Pond, Prince Edward Island Post Card Collection
(Postcards collected by Boyde Beck, Prince Edward Island Museum and Heritage Foundation)



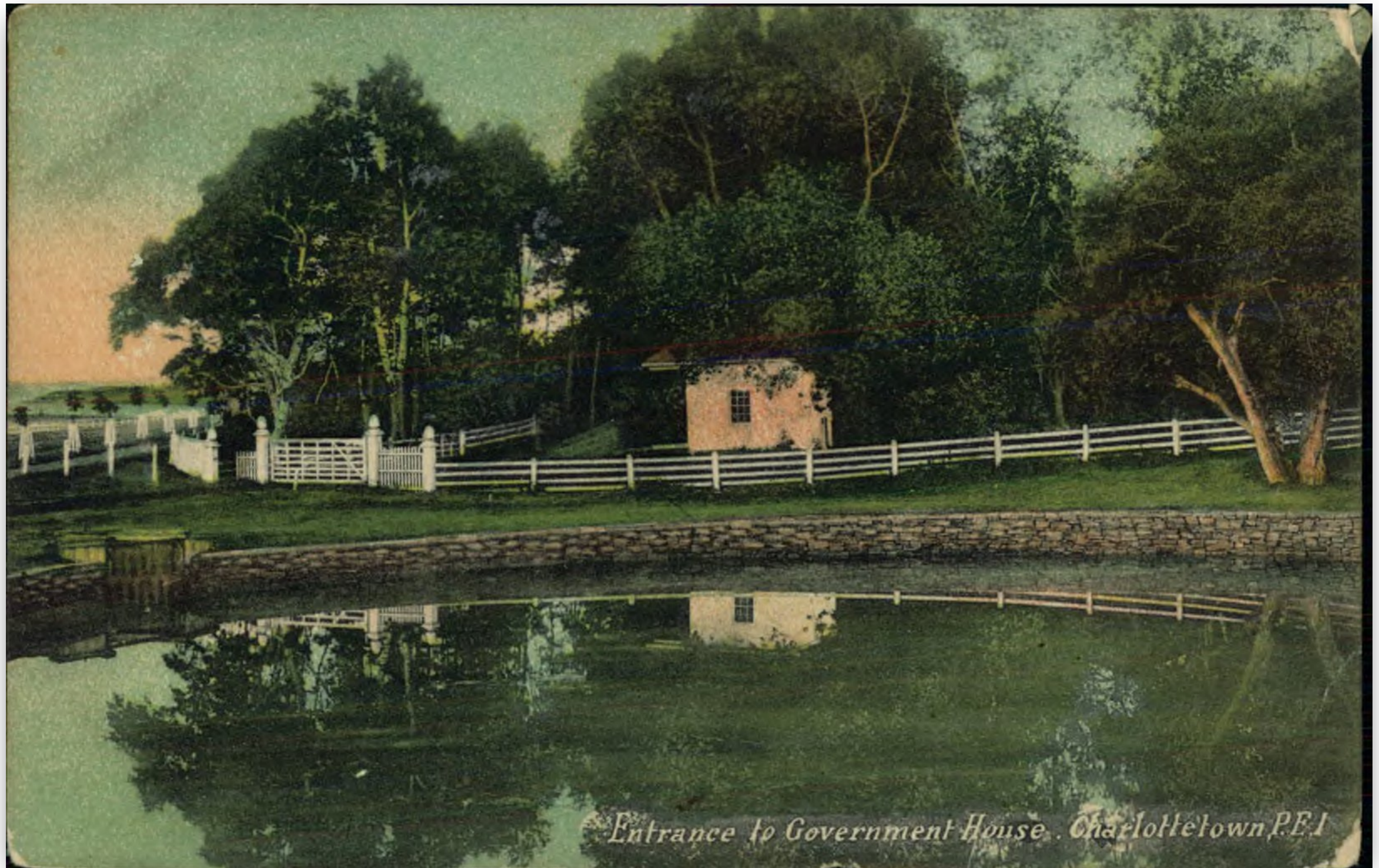
GOVERNMENT POND. CHARLOTTETOWN. P.E.I.

Government Pond, Prince Edward Island Post Card Collection
(Postcards collected by Boyde Beck, Prince Edward Island Museum and Heritage Foundation)

View at Government Pond, Charlottetown, P. E. Island.



View at Government Pond, Prince Edward Island Post Card Collection
(Postcards collected by Boyde Beck, Prince Edward Island Museum and Heritage Foundation)



Entrance to Government House, Prince Edward Island Post Card Collection
(Postcards collected by Boyde Beck, Prince Edward Island Museum and Heritage Foundation)



Charlottetown Aerial, Prince Edward Island Post Card Collection
(Postcards collected by Boyde Beck, Prince Edward Island Museum and Heritage Foundation)



1935
0 Spaces

1935 Aerial
Survey,
National Air
Photo Library,
Natural
Resources
Canada



1968
150 Spaces

1968 Aerial
Survey,
National Air
Photo Library,
Natural
Resources
Canada



2010
330 Spaces

2010 Aerial
Survey,
Province of
Prince
Edward
Island

Clear Form



Request to Access Information

Personal information on this form is collected under Prince Edward Island's *Freedom of Information and Protection of Privacy Act* and will be used to respond to your request. See instructions for completing this form.

About You

<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms. <input type="checkbox"/> Dr.		Last Name	First Name
<input type="checkbox"/> Mrs. <input type="checkbox"/> Miss		Rukavina	Peter
Name of company or organization (if applicable)			
Mailing Address 100 Prince Street			
City or Town Charlottetown	Province PE	Postal Code C1A 4R4	
Telephone (day)	Email peter@rukavina.net		

About Your Request

1. What kind of information do you want to access?
 General Information (An initial fee of \$5.00 is required – see instructions for explanation of fees.)
 Personal Information (No initial fee is required for personal information.)
2. To which public body are you making your request? (Please fill in the name of the organization.)

PEI Public Service Commission
3. Do you want to: (a) receive a copy of the record? OR (b) examine the record?
4. **What records do you want to access?** Please give as much detail as possible. *(If you want access to your own personal information, be sure to give all your previous names. For another person's information, you must attach proof that you can legally act for that person.)*

“A spreadsheet providing the postal code of the home address of each employee of the PEI public service, across all departments and agencies, and the civic address (or, if not available, building name) of their primary work location.”



PO Box 2000, Charlottetown
Prince Edward Island
Canada C1A 7N8

PEI Public Service
Commission

Commission de la Fonction
Publique de l'Î.-P.-É.



C.P. 2000, Charlottetown
Île-du-Prince-Édouard
Canada C1A 7N8

September 27, 2019

2019-207 PSC

Peter Rukavina
100 Prince Street
Charlottetown, PE C1A 4R4

Dear Mr. Rukavina:

Re: *Freedom of Information and Protection of Privacy Act* (the "Act")

You have requested access to records under the Act from the Public Service Commission, as follows:

"A spreadsheet providing the postal code of the home address of each employee of the PEI public service, across all departments and agencies, and the civic address (or, if not available, building name) of their primary work location."

I am writing to inform you that we are providing access to the information you have requested by creating a table of relevant information. A copy of the record is attached.

Pursuant to section 60 of the Act, you may make a written request to the Information and Privacy Commissioner to review this matter. You have 60 days from the date of this notice to request a review by writing to the Information and Privacy Commissioner at the J. Angus MacLean Building, P. O. Box 2000, Charlottetown, PE C1A 7N8.

When requesting a review, please provide the Commissioner with the following information:

- the file number noted at the top of this letter;
- a copy of this letter; and
- a copy of your original request form.

.... /2

Row Labels	Count of Indicator
B2G 0E2	1
Brudenell Admin Office	1
B2X 2T5	1
Provincial Admin Building	1
B3L 3B4	1
Sherwood Business Centre	1
B4P 0C5	1
Holman Building (Ch'town)	1
B4V 2S1	1
Red Road Homes	1
C0A 0H9	1
Ch'Town Government Garage	1
C0A 1A0	35
185 Beach Grove Road	1
40 Enman Crescent	1
40A Burns Ave.	1
Borden Scale House	1
Brudenell Admin Office	1
Brudenell Golf	1

But...

Apparently “**each employee of the PEI public service,**” doesn’t mean “everyone who works for government. So...

2 A spreadsheet, or CSV file, providing the postal code of the home address of each employee of **Health PEI**, and the building name and civic address (or, if not available, building name) of their primary work location.

3 A spreadsheet, or CSV file, providing the postal code of the home address of each employee of **Public Schools Branch**, and the building name and civic address (or, if not available, building name) of their primary work location.

4 A spreadsheet, or CSV file, providing the postal code of the home address of each employee of **Innovation PEI, Financial PEI, Bio-Foods and IIDI** and the building name and civic address (or, if not available, building name) of their primary work location.

Transform the Data

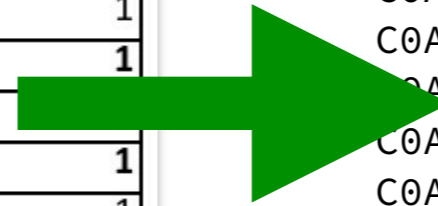
- Convert from Excel to CSV.
- Combine the data from four access requests.
- Normalize postal codes (COA 1H0 to C0A 1H0, etc.).
- Convert to a format that I can import into GIS.
- Geocode the postal codes.
 - Accurate, up-to-date sources of postal code data are hard to find, and not free.

Normalize and Combine

Row Labels	Count of Indicator
B2G 0E2	1
Brudenell Admin Office	1
B2X 2T5	1
Provincial Admin Building	1
B3L 3B4	1
Sherwood Business Centre	1
B4P 0C5	1
Holman Building (Ch'town)	1
B4V 2S1	1
Red Road Homes	1
C0A 0H9	1
Ch'Town Government Garage	1
C0A 1A0	35
185 Beach Grove Road	1
40 Enman Crescent	1
40A Burns Ave.	1
Borden Scale House	1
Brudenell Admin Office	1
Brudenell Golf	1

postalcode,work_location,employee_count

B2G 0E2,"Brudenell Admin Office",1
 B2X 2T5,"Provincial Admin Building",1
 B3L 3B4,"Sherwood Business Centre",1
 B4P 0C5,"Holman Building (Ch'town)",1
 B4V 2S1,"Red Road Homes",1
 C0A 0H9,"Ch'Town Government Garage",1
 C0A 1A0,"185 Beach Grove Road",1
 C0A 1A0,"40 Enman Crescent",1
 C0A 1A0,"40A Burns Ave.",1
 C0A 1A0,"Borden Scale House",1
 C0A 1A0,"Brudenell Admin Office",1
 C0A 1A0,"Brudenell Golf",1
 C0A 1A0,"Ch'Town Government Garage",3
 C0A 1A0,"Coles Building",1
 C0A 1A0,"Frank Gaudet Nursery",1
 C0A 1A0,"Georgetown Government Garage",1
 C0A 1A0,"J. Angus MacLean Bldg",1
 C0A 1A0,"Montague Cannabis Store",2
 C0A 1A0,"Northumberland Park",1
 C0A 1A0,"Orwell Corner Museum",1
 C0A 1A0,"PEI Medicare Office",2
 C0A 1A0,"Provincial Admin Building",11



Canadian Postal Code Data

postalcode,latitude,longitude,city,confidence

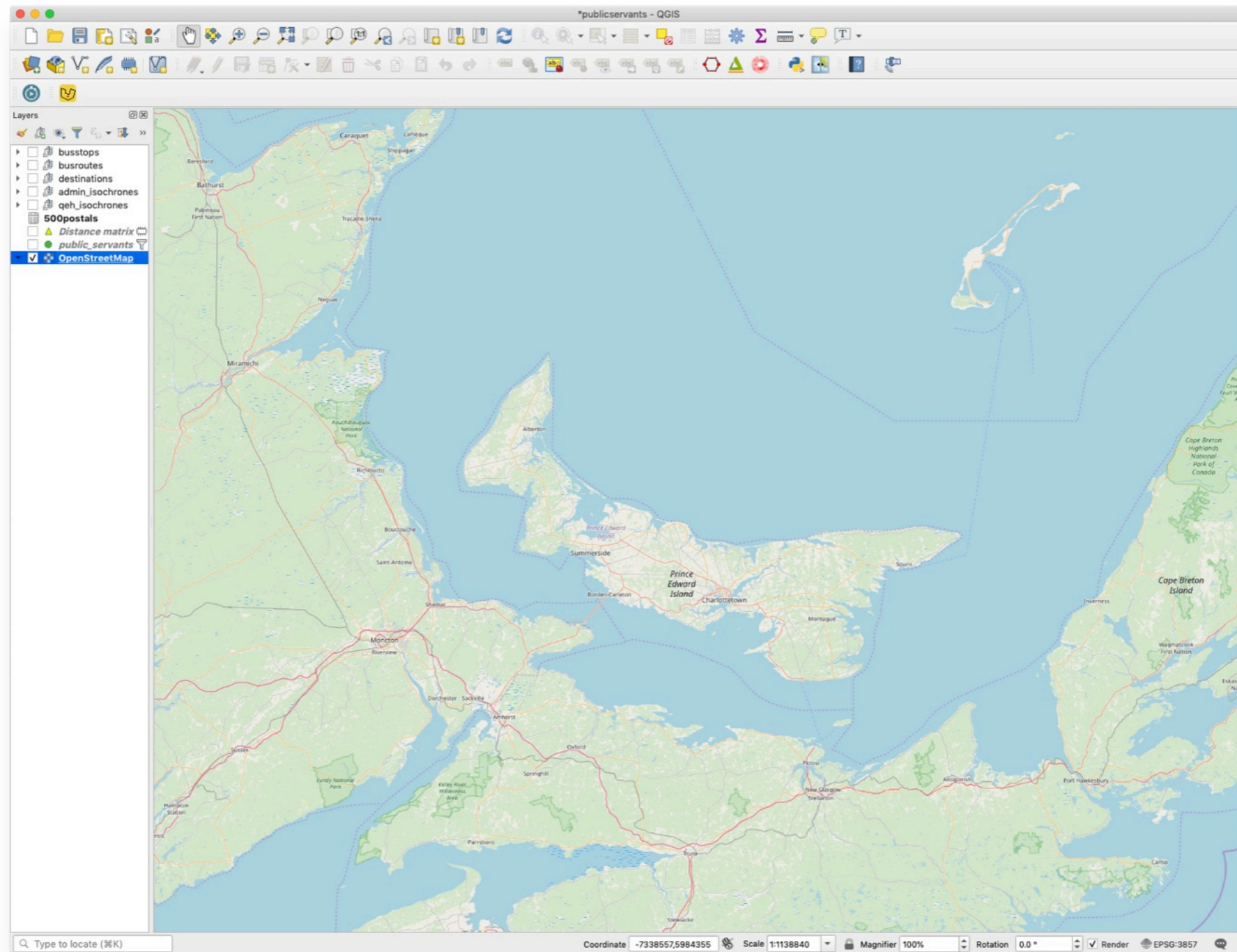
C0A 0H9,46.3756,-62.7209,Suffolk,0.9
C0A 1C0,46.2284,-63.3454,Bonshaw,0.9
C0A 1E0,46.3592,-63.4965,Lot 21,0.9
C0A 1G0,46.2612,-62.5501,ROAD,0.9
C0A 1H2,46.1814,-63.1856,Lot 65,0.9
C0A 1H6,46.1611,-63.2387,Lot 65,0.9
C0A 1H7,46.1595,-63.3,Lot 65,0.9
C0A 1H9,46.2609,-63.2471,Lot 31,0.9
C0A 1J0,46.2273,-63.4468,Crapaud,0.9
C0A 1K0,46.4417,-62.0669,Souris,0.9
C0A 1R0,46.1125,-62.588,Lot,0.9
C0A 1S0,46.4191,-62.706,Morell,0.9
C0A 2B0,46.4053,-62.2983,Souris,0.9
C0B 1A0,46.2836,-63.6373,Albany,0.9
C0B 1C0,46.3266,-63.7506,Lot 26,0.9
C0B 1H0,46.6822,-64.0728,Coleman,0.9
C0B 1N0,46.326,-63.6255,Kinkora,0.9
C0B 1V0,46.7179,-64.2062,O'Leary,0.9
C0B 2B0,46.9578,-64.0352,Tignish,0.9

geocoder.ca

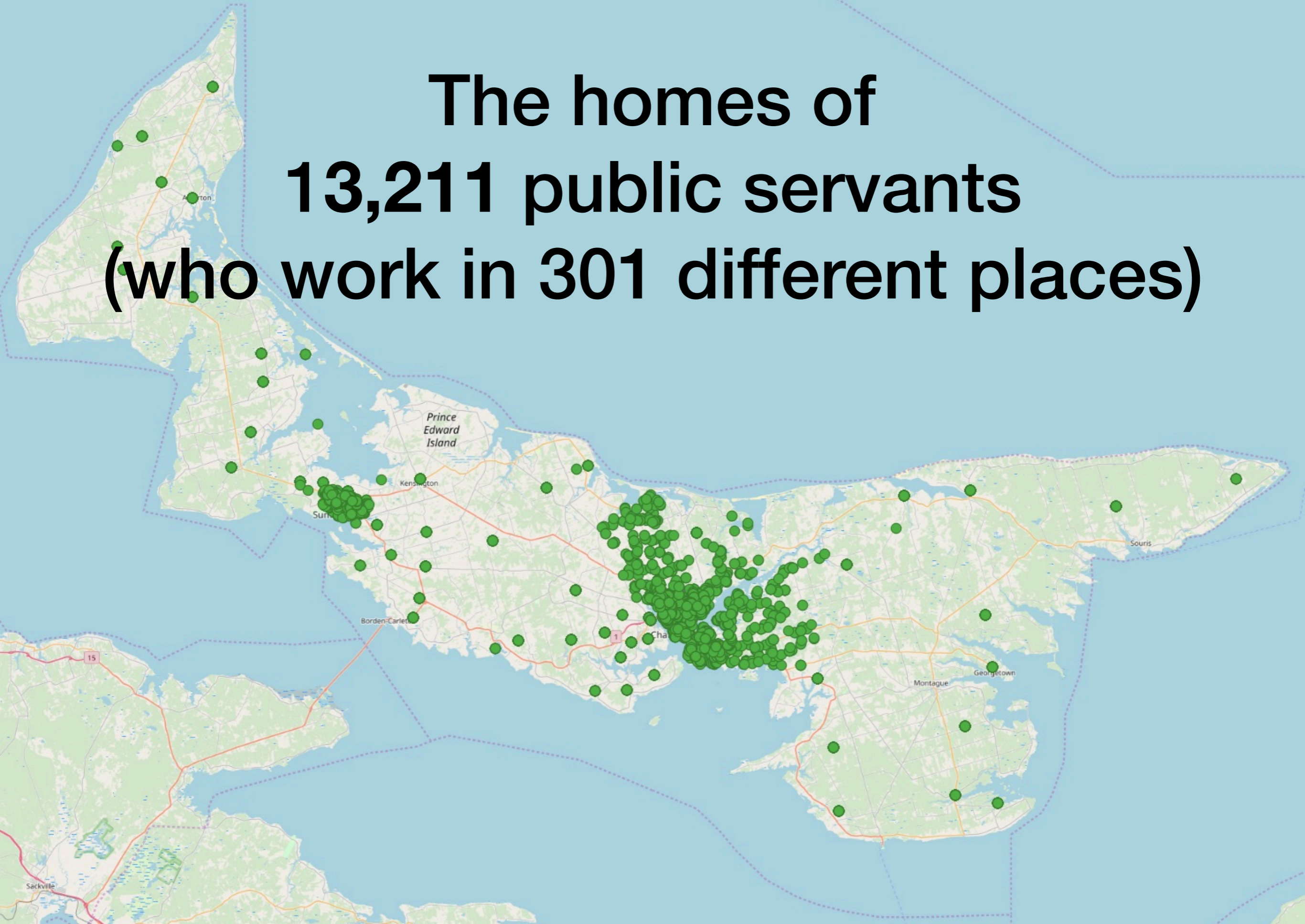
Geocoded Result

postalcode	work_location	employee_count	latitude	longitude
C0A 1A0	101 Belvedere Ave, Charlottetown	1	46.0851	-62.8832
C0A 1A0	16 Garfield St.	1	46.0851	-62.8832
C0A 1A0	185 Beach Grove Road	1	46.0851	-62.8832
C0A 1A0	40 Enman Crescent	1	46.0851	-62.8832
C0A 1A0	40A Burns Ave.	1	46.0851	-62.8832
C0A 1A0	Beach Grove Home	1	46.0851	-62.8832
C0A 1A0	Belfast Consolidated	5	46.0851	-62.8832
C0A 1A0	Borden Scale House	1	46.0851	-62.8832
C0A 1A0	Brudenell Admin Office	1	46.0851	-62.8832
C0A 1A0	Brudenell Golf	1	46.0851	-62.8832
C0A 1A0	Ch'Town Government Garage	3	46.0851	-62.8832
C0A 1A0	Coles Building	1	46.0851	-62.8832
C0A 1A0	Douses Road	1	46.0851	-62.8832
C0A 1A0	Elm Street School	1	46.0851	-62.8832
C0A 1A0	English Language School Board	5	46.0851	-62.8832
C0A 1A0	Frank Gaudet Nursery	1	46.0851	-62.8832
C0A 1A0	Georgetown Government Garage	1	46.0851	-62.8832
C0A 1A0	Glen Stewart Elementary	1	46.0851	-62.8832
C0A 1A0	Hillsborough Hospital	4	46.0851	-62.8832
C0A 1A0	J. Angus MacLean Bldg	1	46.0851	-62.8832

QGIS: Open Source Mapping



**The homes of
13,211 public servants
(who work in 301 different places)**



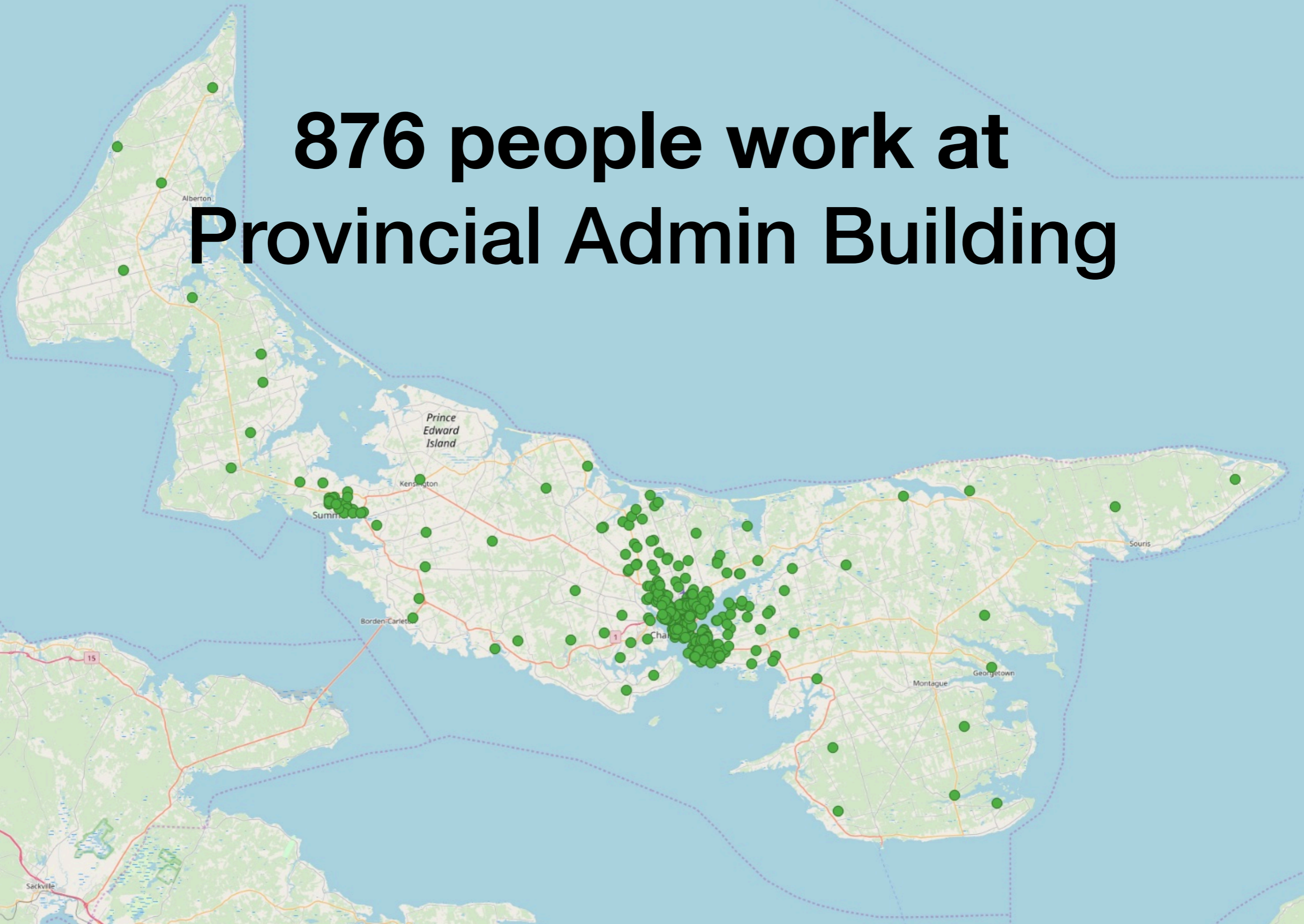
Top 10 Work Locations for PEI Public Servants

Work Location	People
Queen Elizabeth Hospital	1,740
Provincial Admin Building	876
English Language School Board	822
Prince County Hospital	688
Ch'Town Government Garage	289
Prince Edward Home	252
Beach Grove Home	246
Hillsborough Hospital	233
Sherwood Business Centre	215
Wedgewood Manor	207

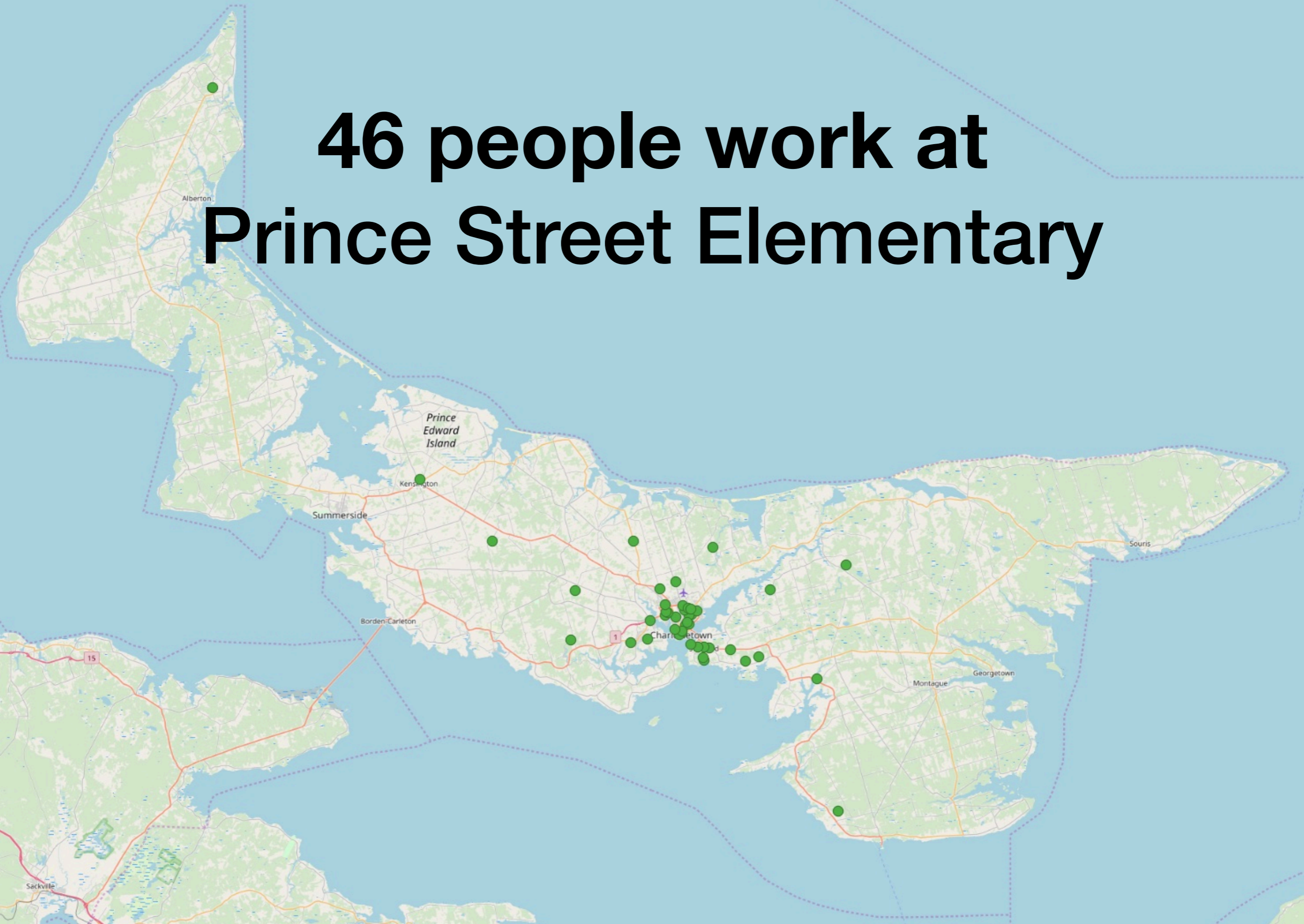
1,740 people work at Queen Elizabeth Hospital



876 people work at Provincial Admin Building



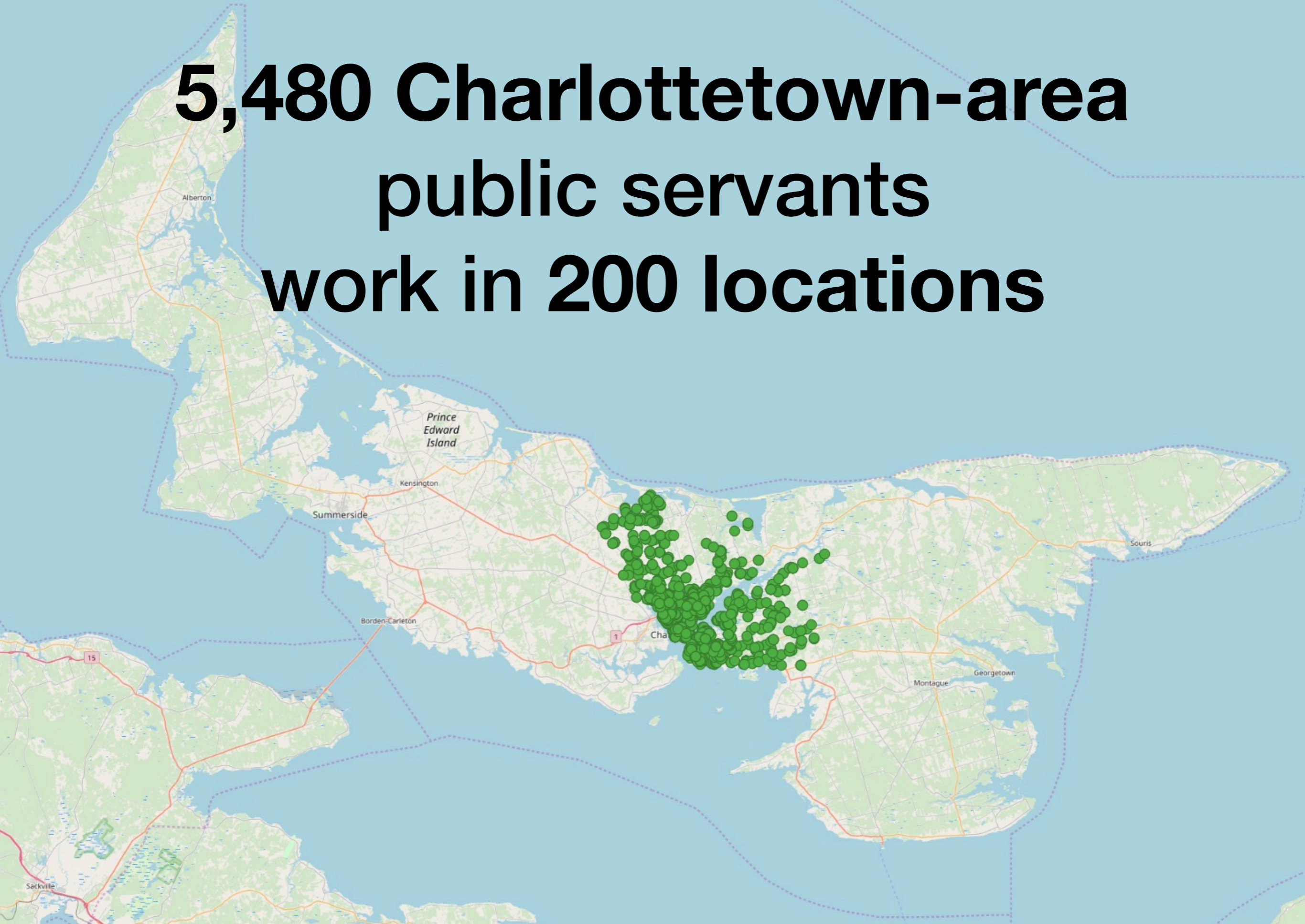
46 people work at Prince Street Elementary



9 people work at the Borden Scale House



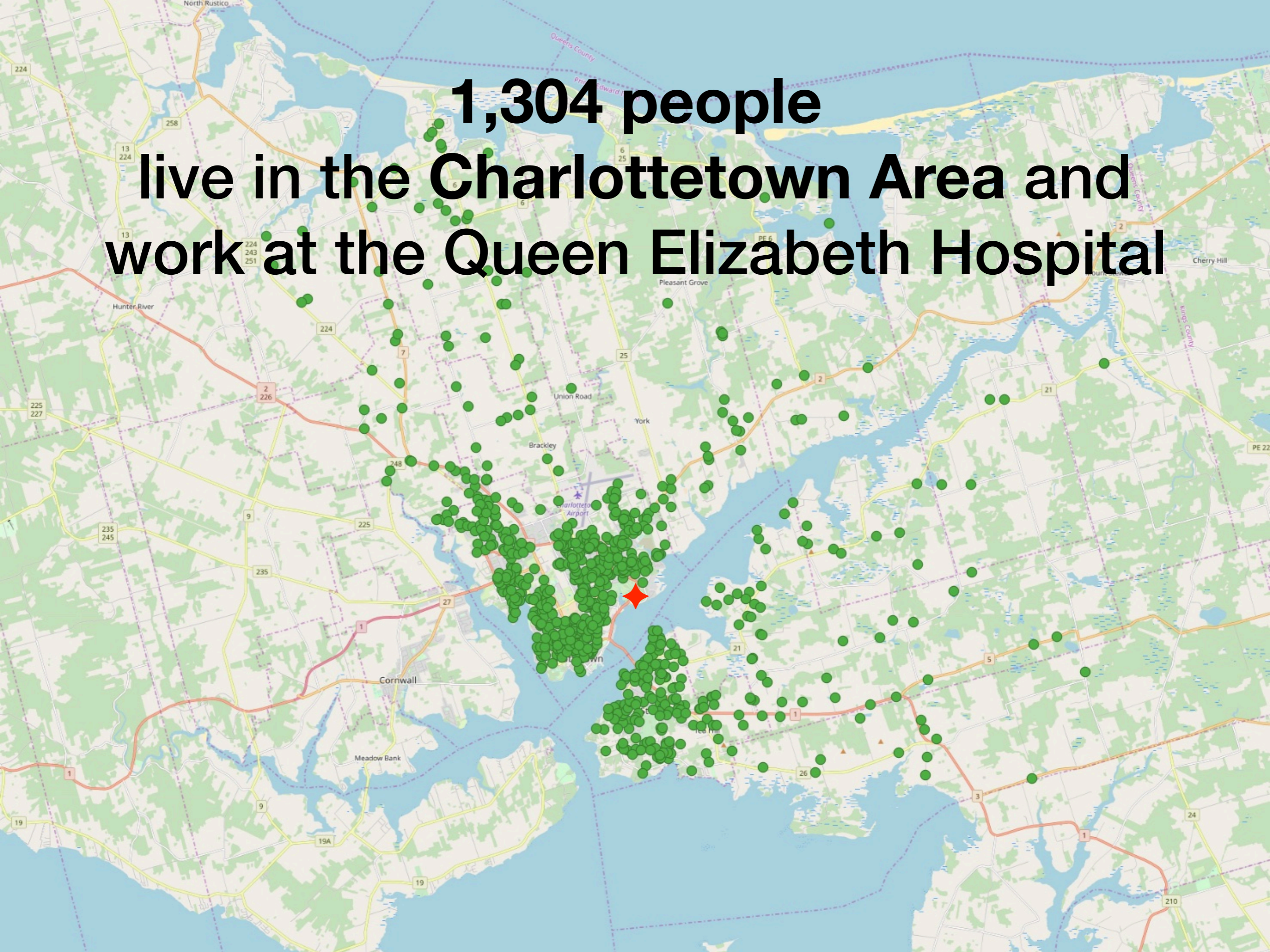
**5,480 Charlottetown-area
public servants
work in 200 locations**



Top 10 Work Locations Public Servants Living in Charlottetown

Work Location	People
Queen Elizabeth Hospital	1,304
Provincial Admin Building	577
English Language School Board	424
Prince Edward Home	162
Sherwood Business Centre	158
Hillsborough Hospital	154
Ch'Town Government Garage	142
Beach Grove Home	140
16 Garfield St.	102
Charlottetown Rural. High	70

**1,304 people
live in the Charlottetown Area and
work at the Queen Elizabeth Hospital**

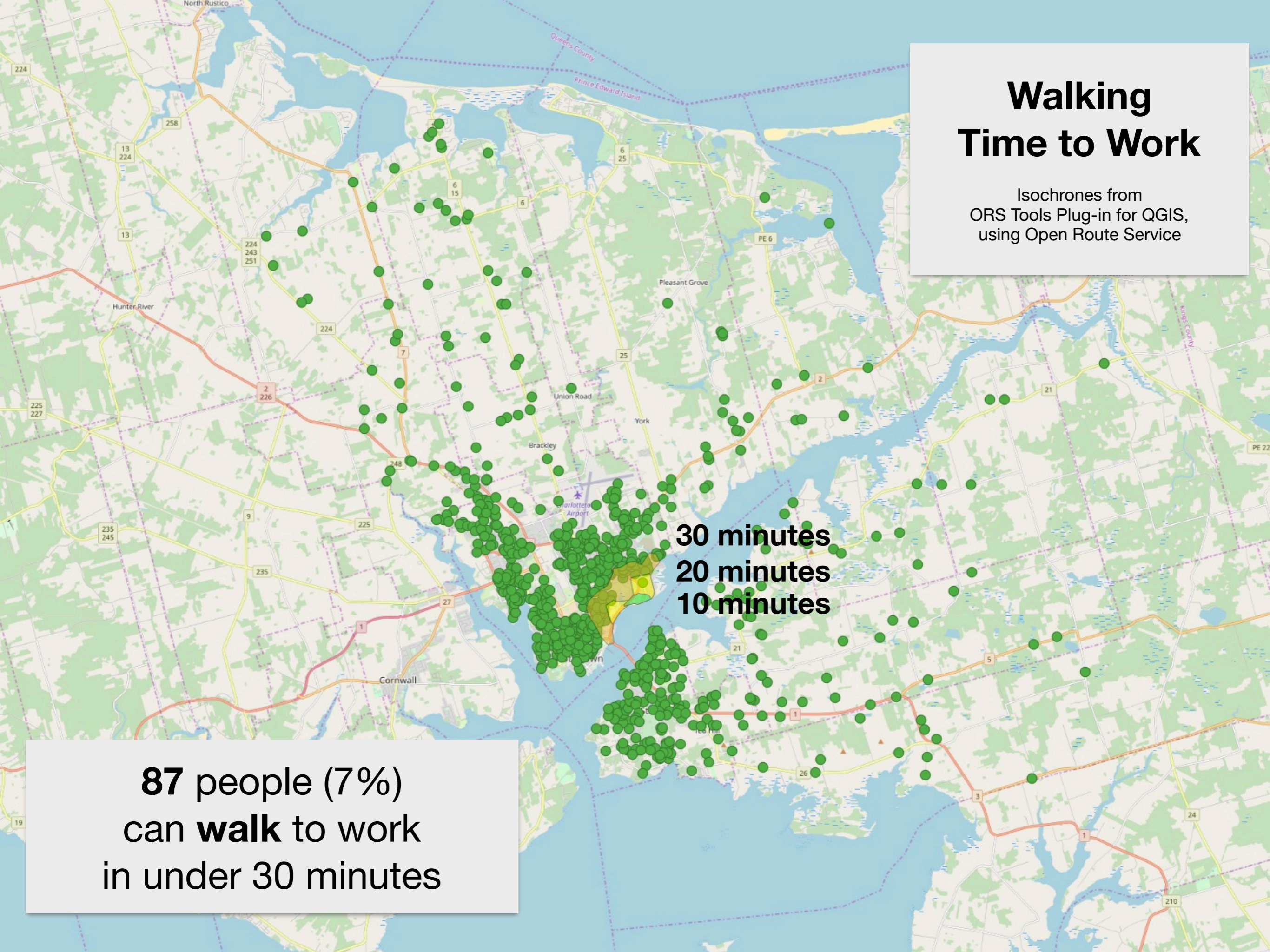


Walking Time to Work

Isochrones from
ORS Tools Plug-in for QGIS,
using Open Route Service

30 minutes
20 minutes
10 minutes

87 people (7%)
can **walk** to work
in under 30 minutes

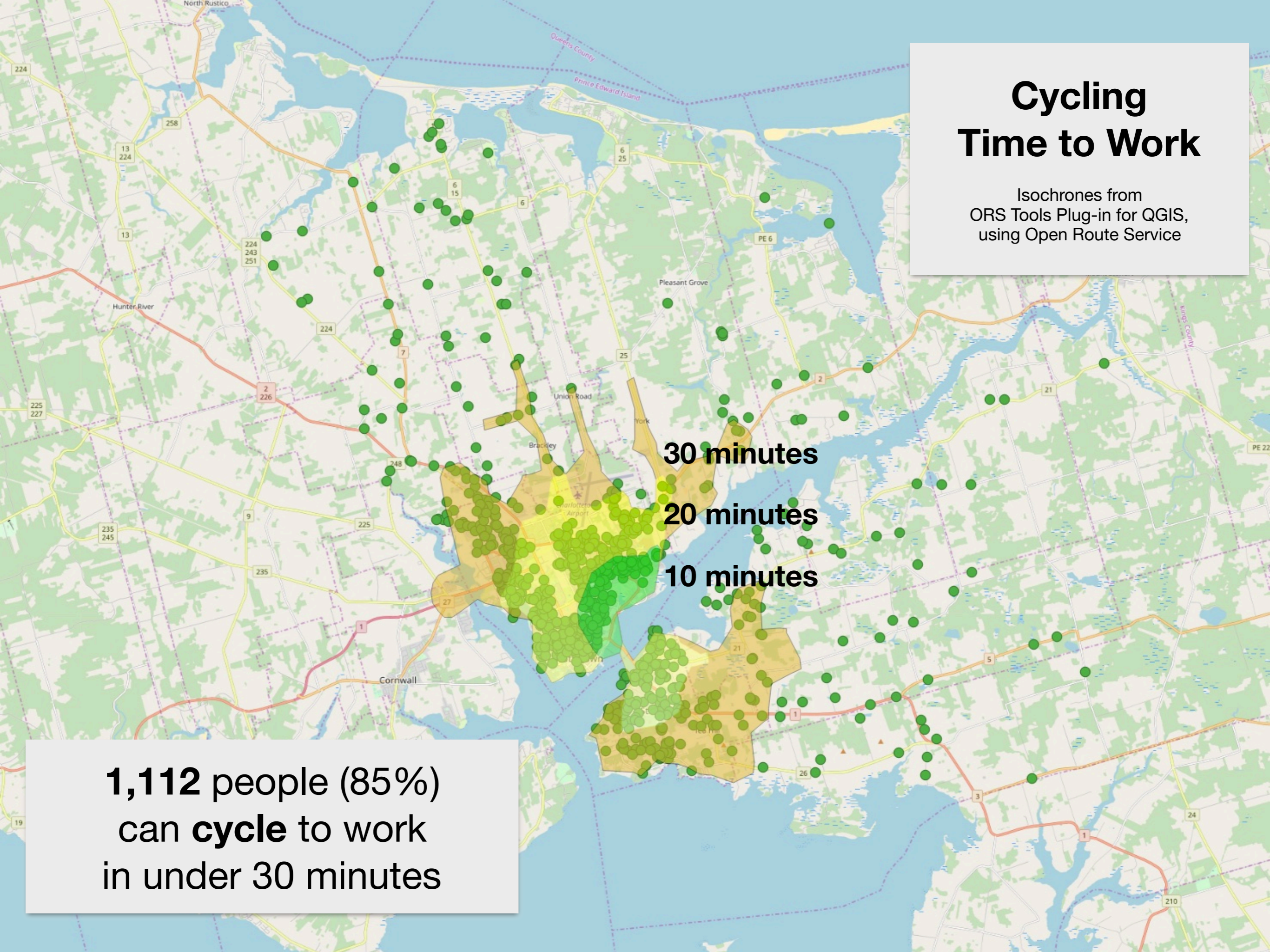


Cycling Time to Work

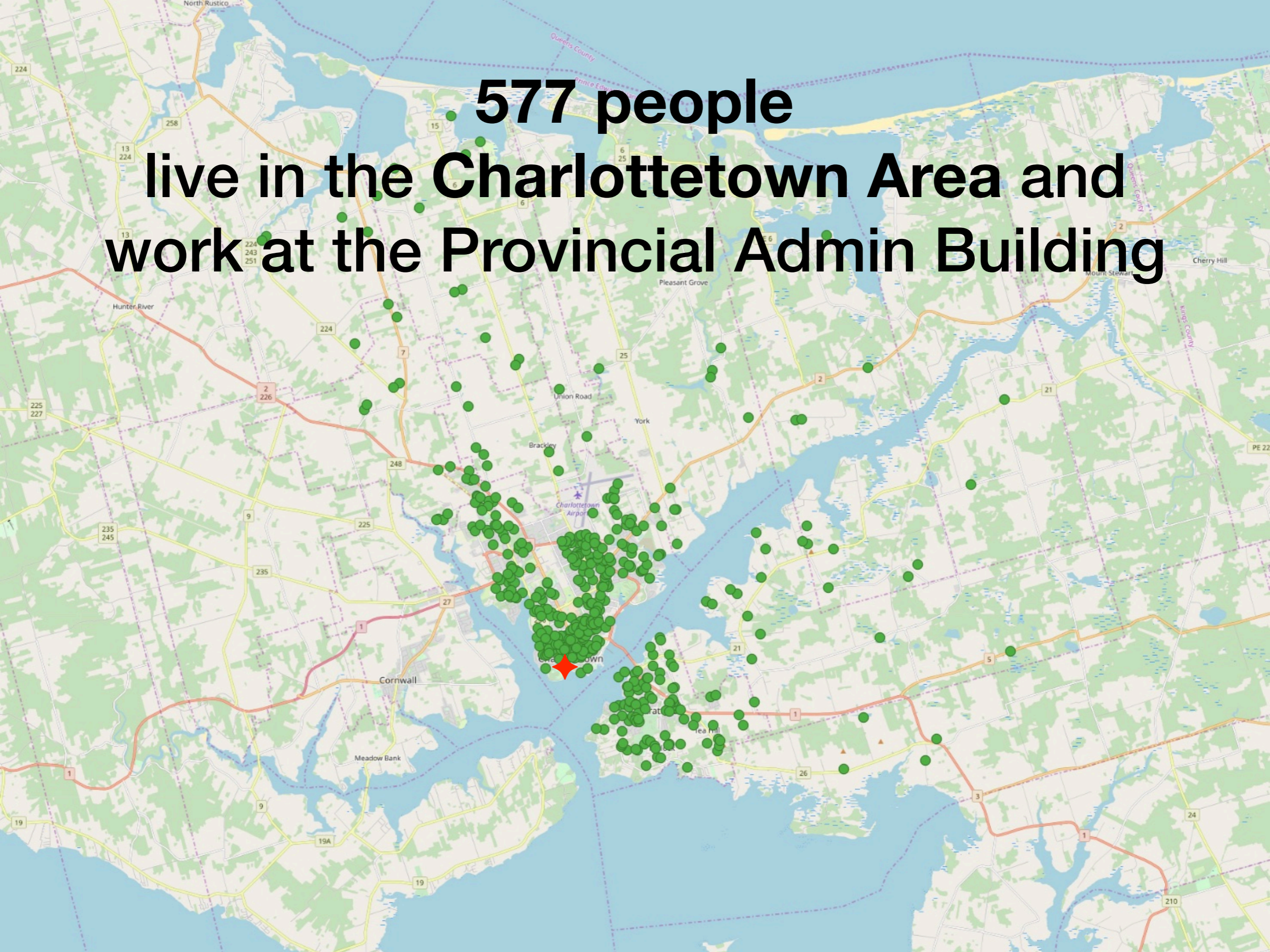
Isochrones from
ORS Tools Plug-in for QGIS,
using Open Route Service

30 minutes
20 minutes
10 minutes

1,112 people (85%)
can **cycle** to work
in under 30 minutes



**577 people
live in the Charlottetown Area and
work at the Provincial Admin Building**

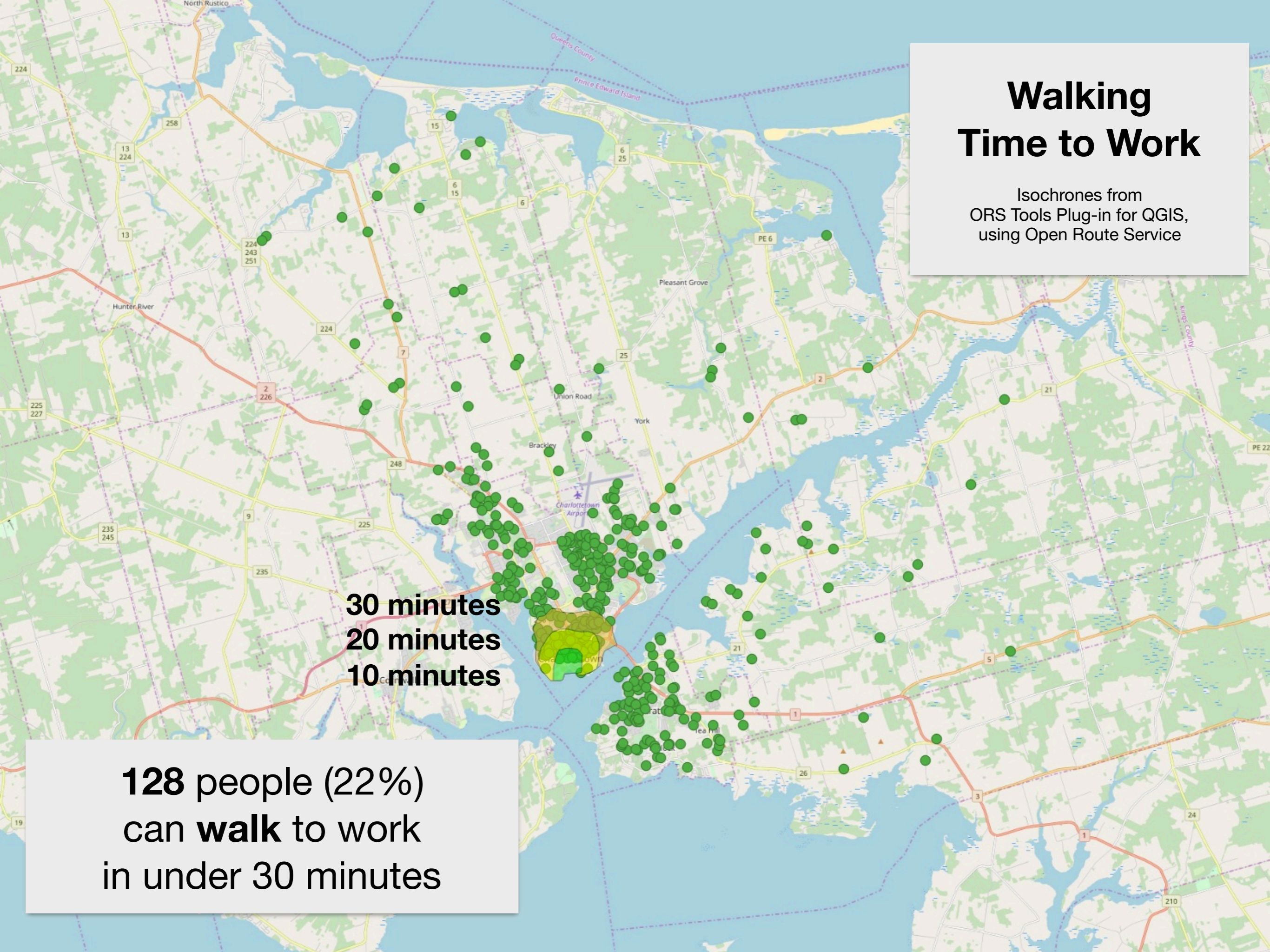


Walking Time to Work

Isochrones from
ORS Tools Plug-in for QGIS,
using Open Route Service

30 minutes
20 minutes
10 minutes

128 people (22%)
can **walk** to work
in under 30 minutes



Cycling Time to Work

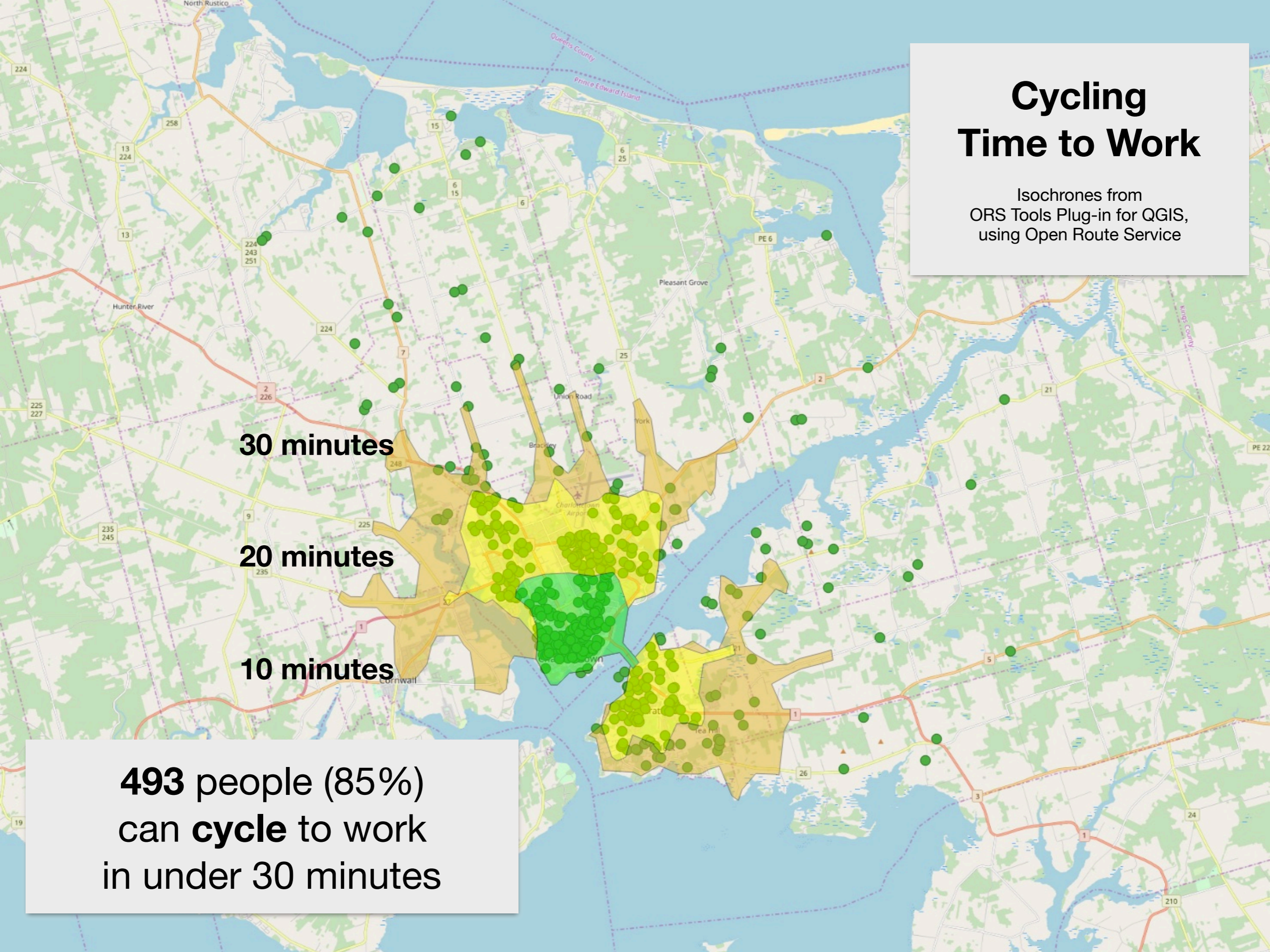
Isochrones from
ORS Tools Plug-in for QGIS,
using Open Route Service

30 minutes

20 minutes

10 minutes

493 people (85%)
can **cycle** to work
in under 30 minutes



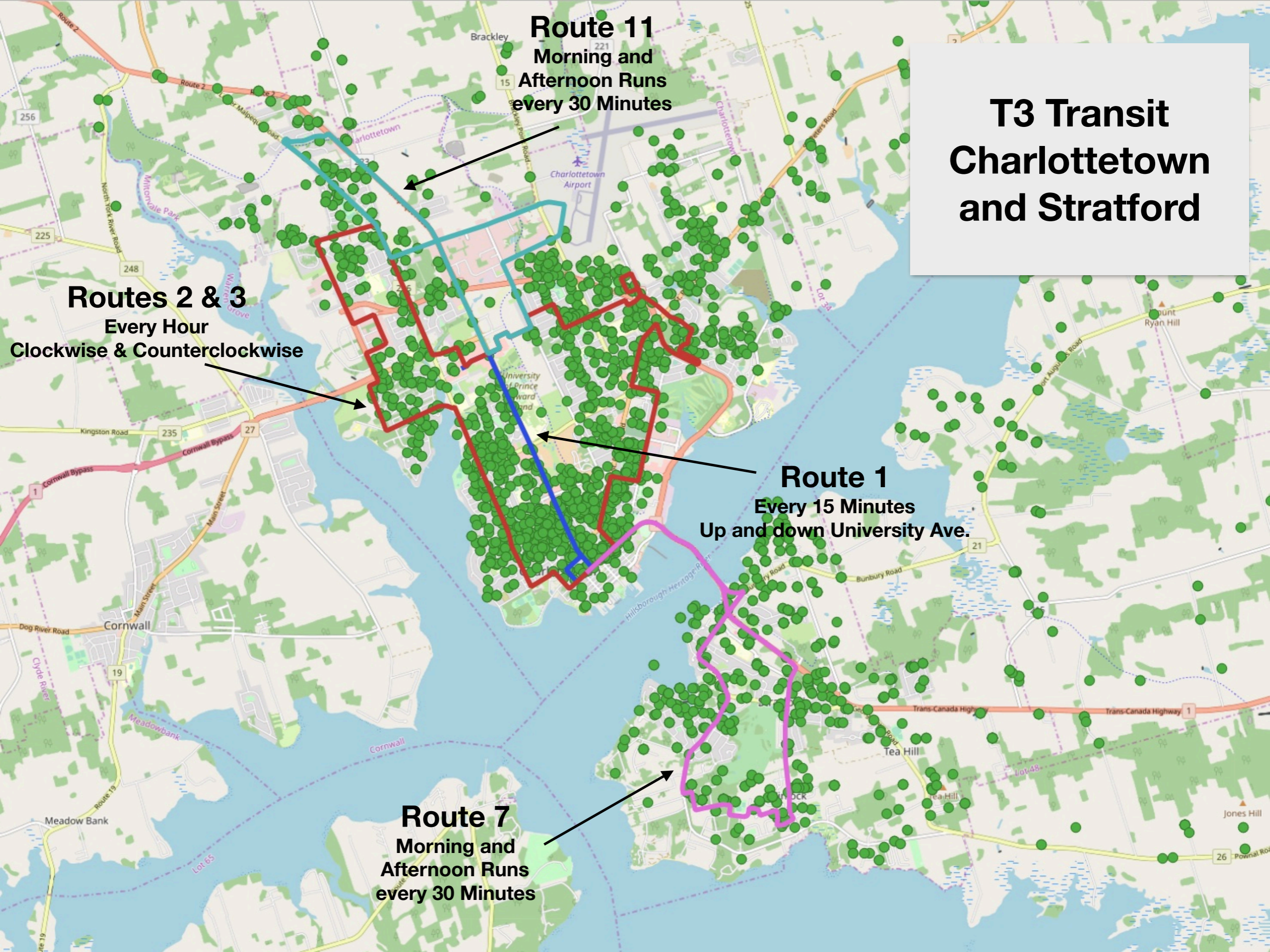
T3 Transit Charlottetown and Stratford

Route 11
Morning and
Afternoon Runs
every 30 Minutes

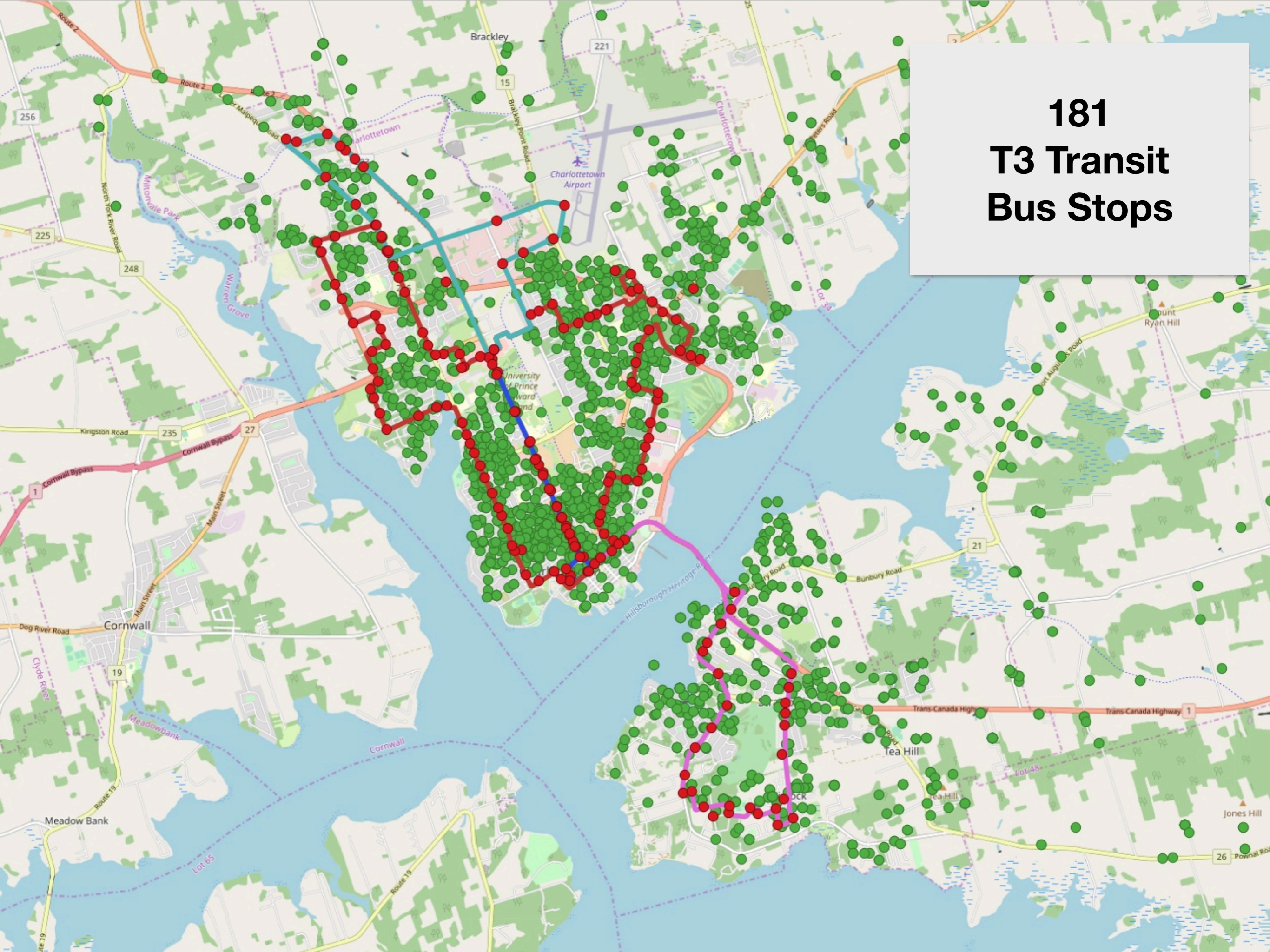
Routes 2 & 3
Every Hour
Clockwise & Counterclockwise

Route 1
Every 15 Minutes
Up and down University Ave.

Route 7
Morning and
Afternoon Runs
every 30 Minutes

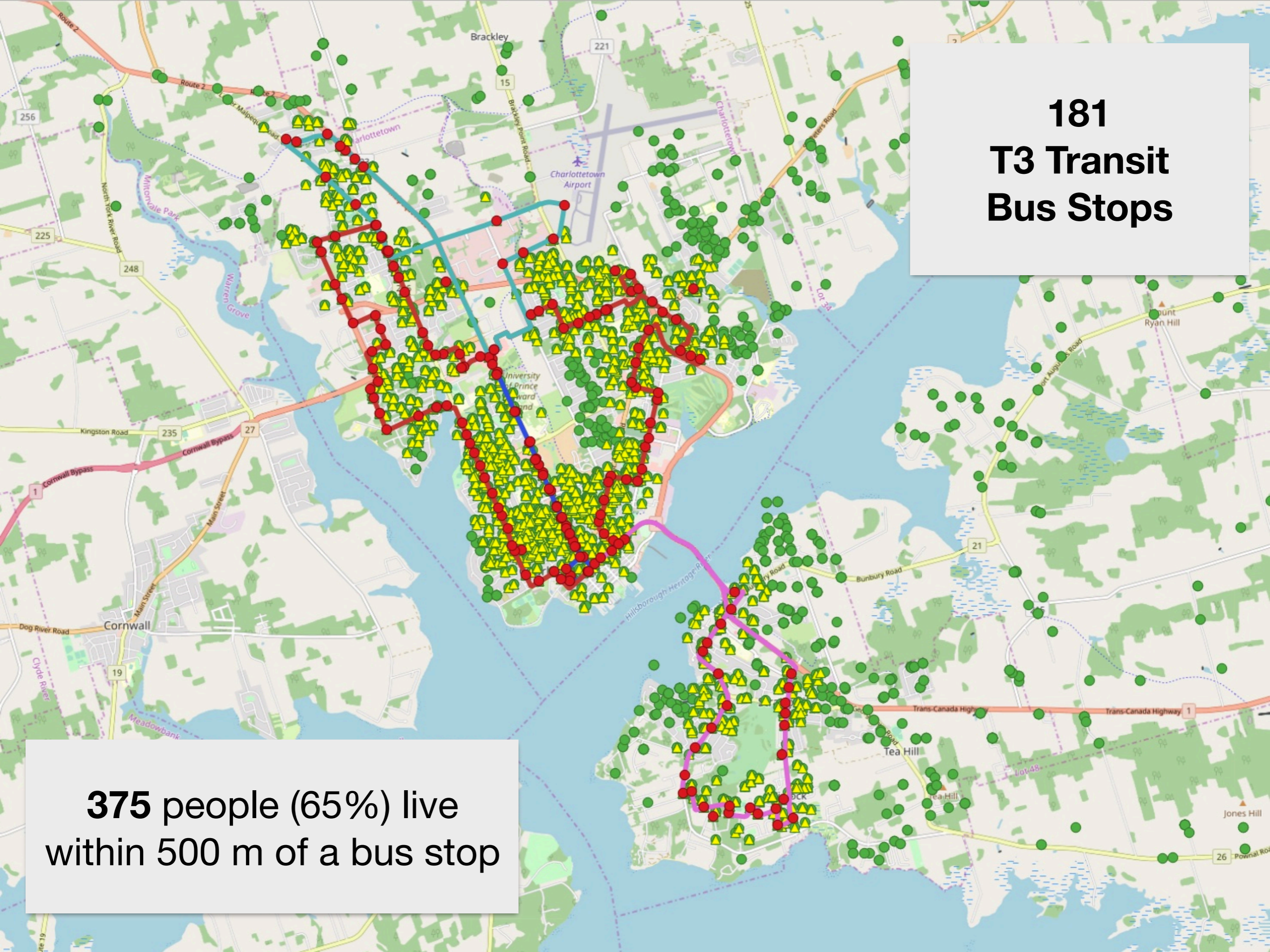


181 T3 Transit Bus Stops



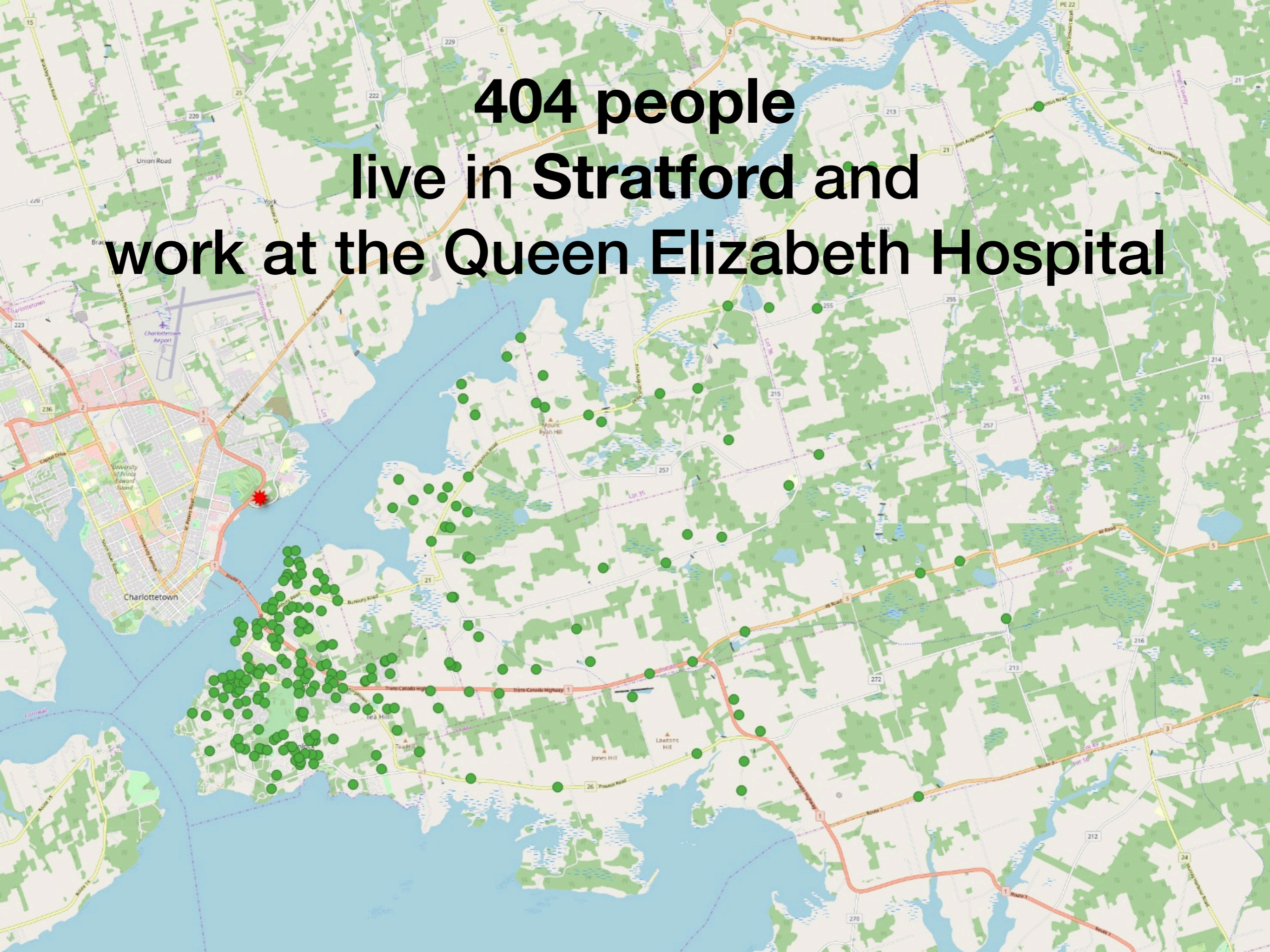
**181
T3 Transit
Bus Stops**

**375 people (65%) live
within 500 m of a bus stop**

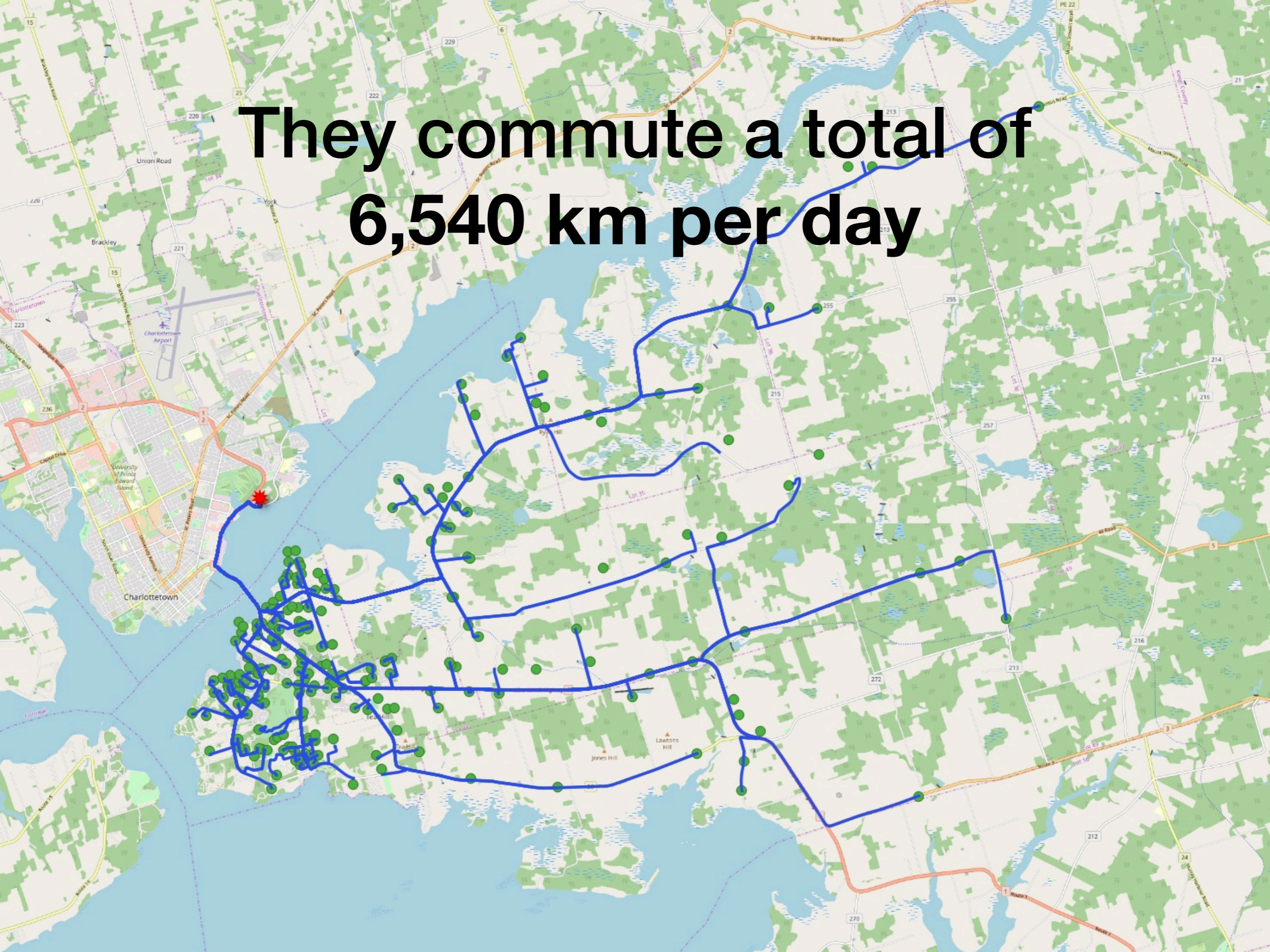


**(Using Open Data and GIS
to Inform Policy and
Influence Behaviour)**

**404 people
live in Stratford and
work at the Queen Elizabeth Hospital**



**They commute a total of
6,540 km per day**

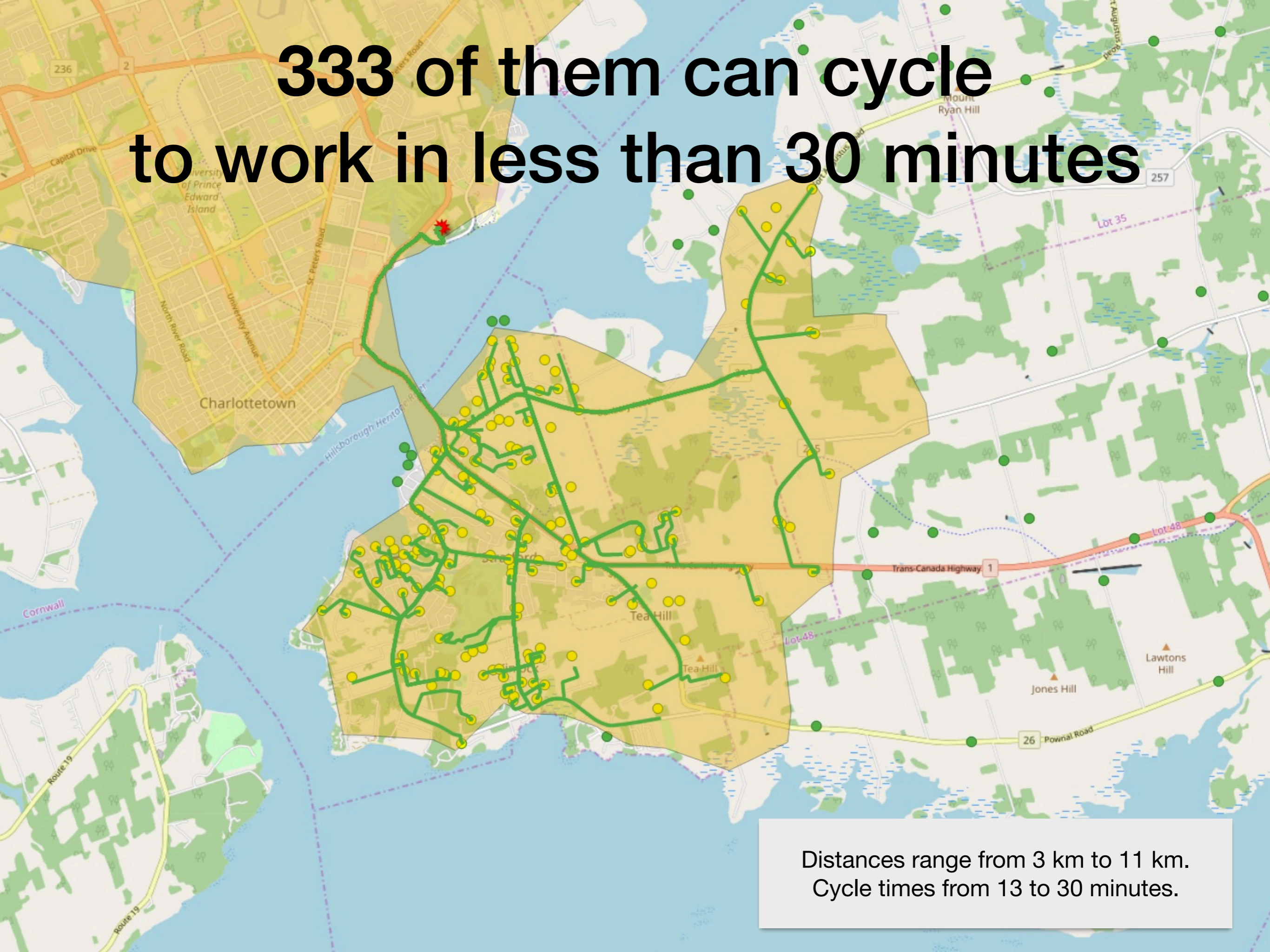




**Their commutes emit
412 tonnes of CO₂E per year**

Based on US EPA figure of
251 grams of CO₂E per km for
average passenger vehicle, 251 workdays

**333 of them can cycle
to work in less than 30 minutes**



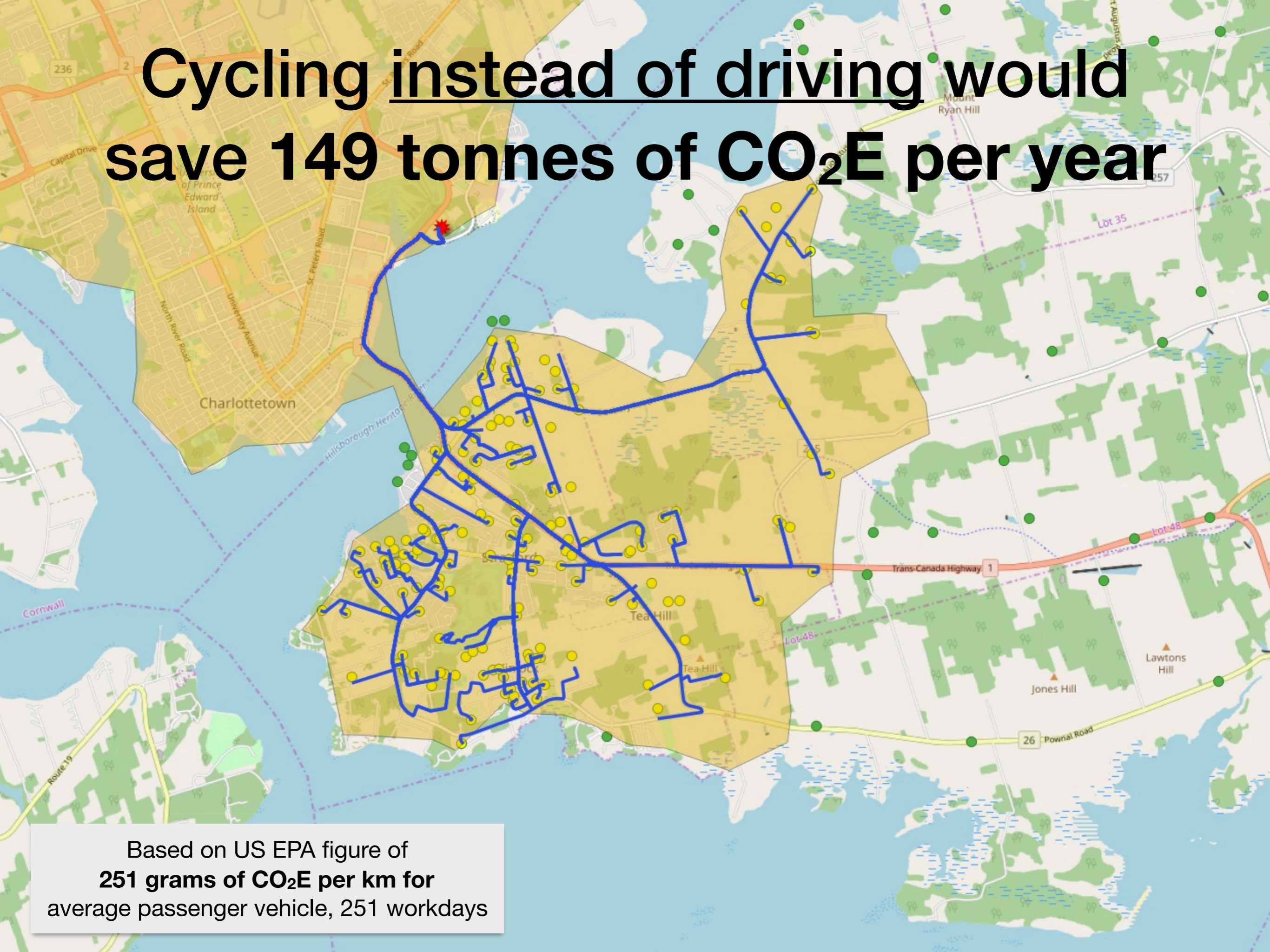
Distances range from 3 km to 11 km.
Cycle times from 13 to 30 minutes.

Right now those 333 who could
cycle drive 2,378 km every day

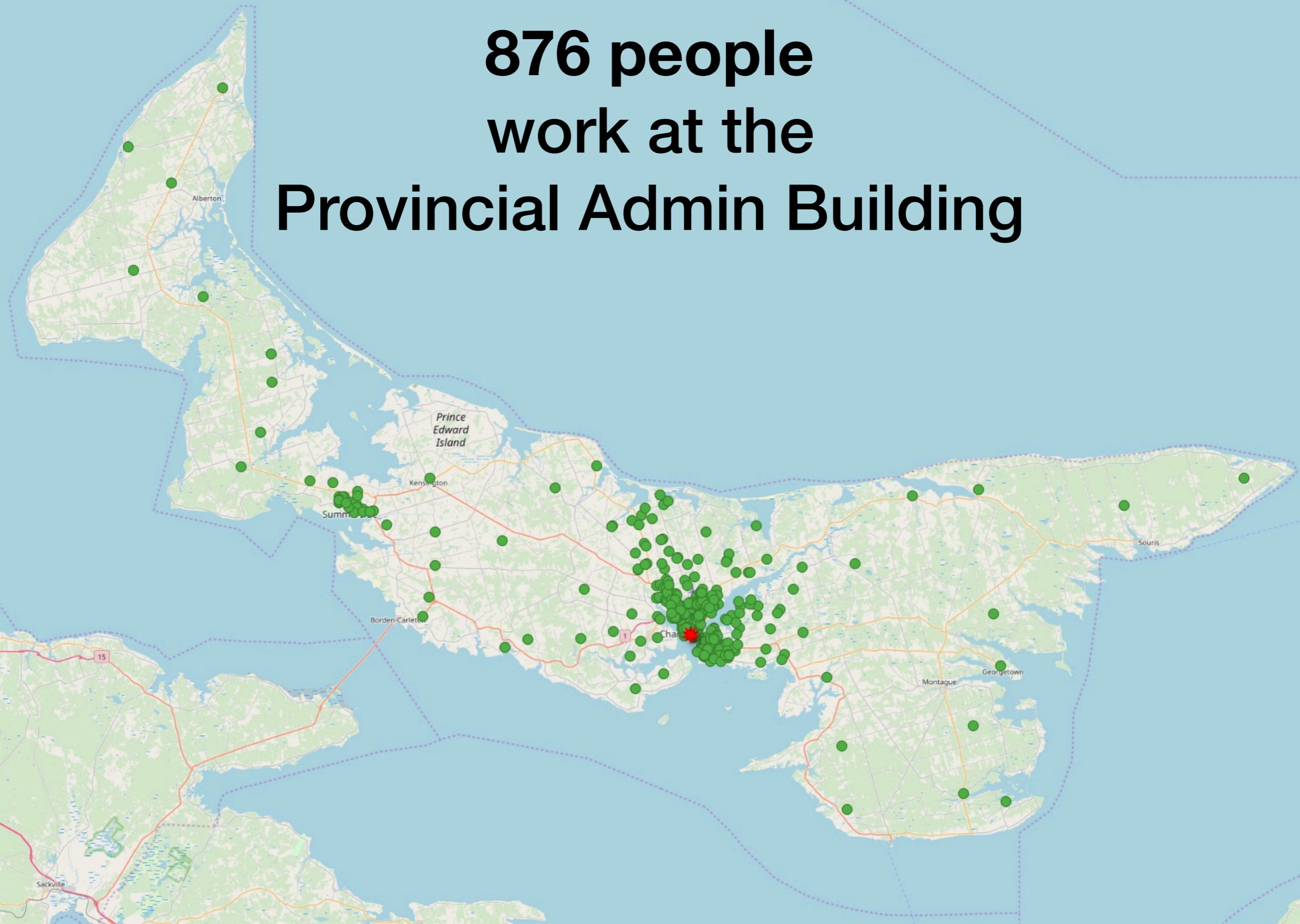


**Cycling instead of driving would
save 149 tonnes of CO₂E per year**

Based on US EPA figure of
251 grams of CO₂E per km for
average passenger vehicle, 251 workdays



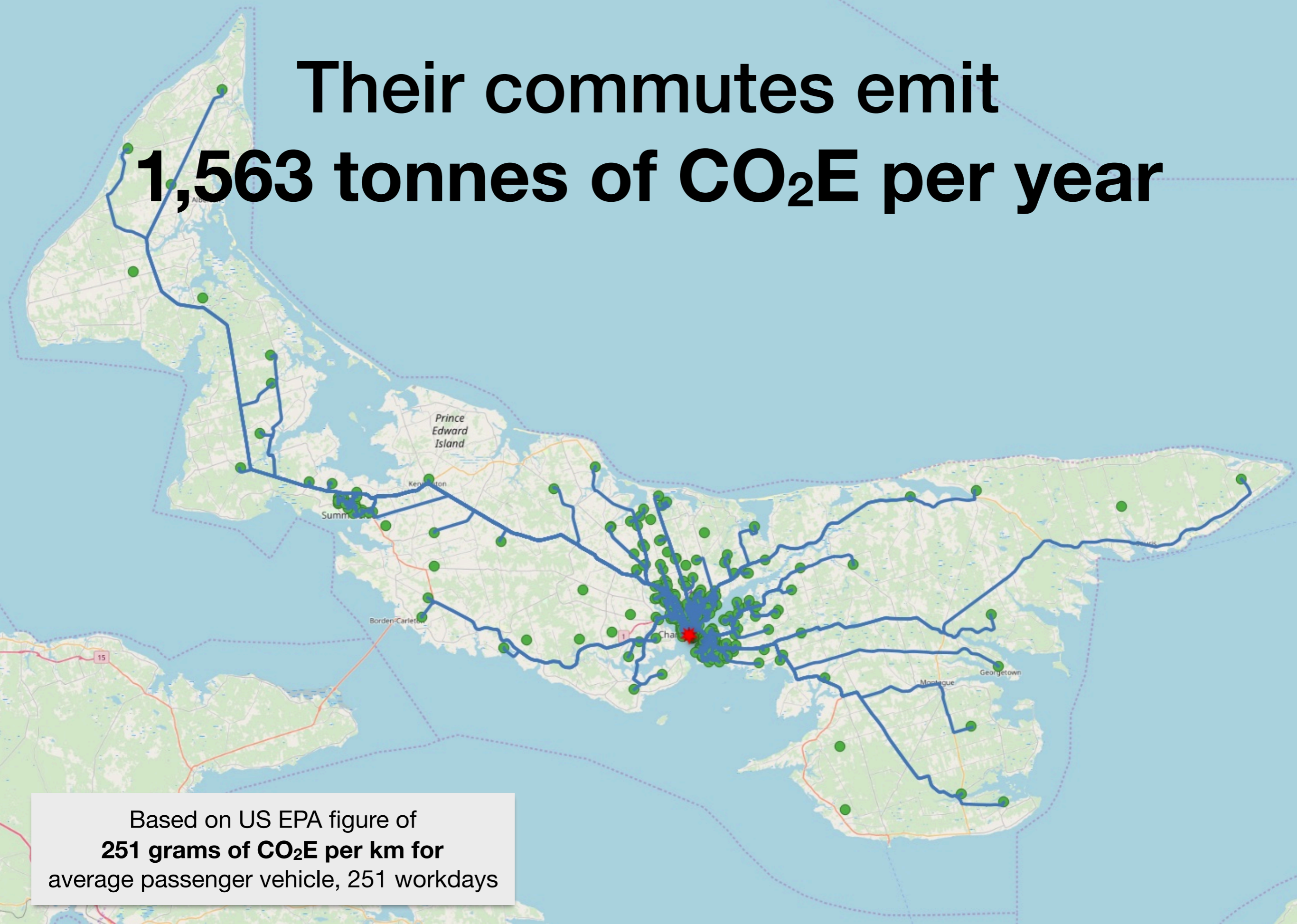
876 people work at the Provincial Admin Building



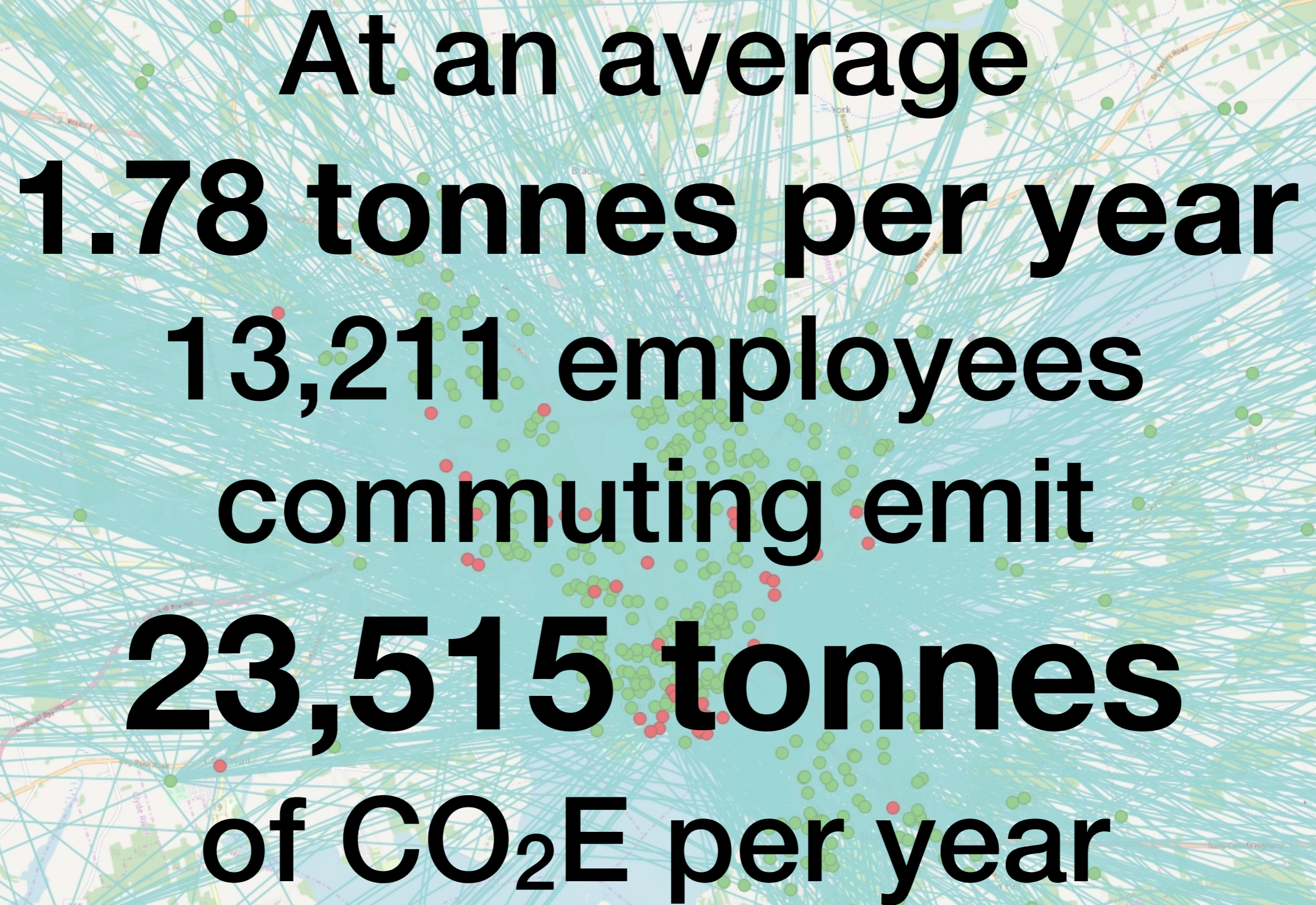
**They commute a total of
24,825 km per day**



Their commutes emit **1,563 tonnes of CO₂E per year**



Based on US EPA figure of
251 grams of CO₂E per km for
average passenger vehicle, 251 workdays



**At an average
1.78 tonnes per year
13,211 employees
commuting emit
23,515 tonnes
of CO₂E per year**

At an average

1.78 tonnes per year

13,211 employees

CO₂e per unit

23,400 tonnes

of CO₂e per year

45% of the 4 tonne per year reduction we each need to achieve to meet our 2030 climate targets.

At an average

1.78 tonnes per year

13,200 tonnes

4% of the
600,000 tonne per year
reduction the province
needs to meet our 2030
climate targets.

commuting emit

23,515 tonnes

of CO₂E per year



View at Government Pond, Charlottetown, P. E. Island.

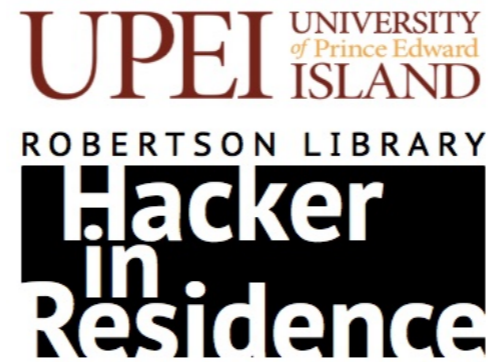




Detail from 2010 high resolution orthophoto of Charlottetown downtown area, Dept. of Environment, Water and Climate Change, Forests, Fish & Wildlife Division



Detail from 1968 high resolution orthophoto of Charlottetown downtown area, Dept. of Environment, Water and Climate Change, Forests, Fish & Wildlife Division



Slides are online at
<https://ruk.ca/engineers>



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wide as possible under the terms of the license.