Mapping with Tableau

Taught by: Ana Abraham and Chris McNulty

SOCL 2358: Current Issues in Cities and Suburbs

Prof. Gordana Rabrenovic

Spring 2023

Northeastern University

NULab for Texts, Maps, and Networks

Workshop agenda

- Learn about the Boston Area Research Initiative (BARI) Data Portal.
- Learn about Tableau.
- Understand how to import and modify data in Tableau.
- Filter data in a variety of ways to produce custom visualizations.
- Brainstorm sociological research questions BARI and Tableau could help answer.

All materials are available here:

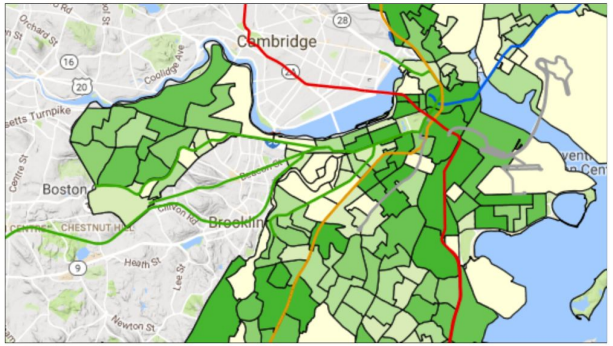
http://bit.ly/diti-spring2023-rabrenovic-tableau

Datasets and Maps

Northeastern University
NULab for Texts, Maps, and Networks

BARI Boston Data Portal

Boston Data Portal



The Boston Data Portal makes publicly available the data products from BARI projects. The Data Portal is a key part of BARI's efforts to collect and disseminate information that foster policy/research collaborations.

The Data Portal has two components: the Data Library and the Research Map.

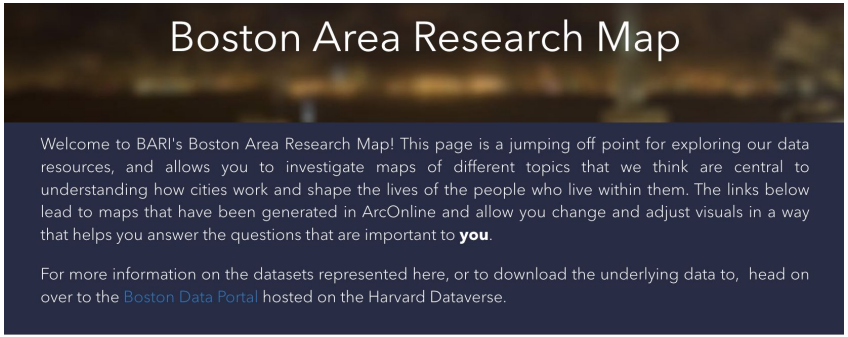
BARI offers Data Portal trainings for community organizations. If you or your organization would like to attend or host a training, please email us at bari@northeastern.edu.

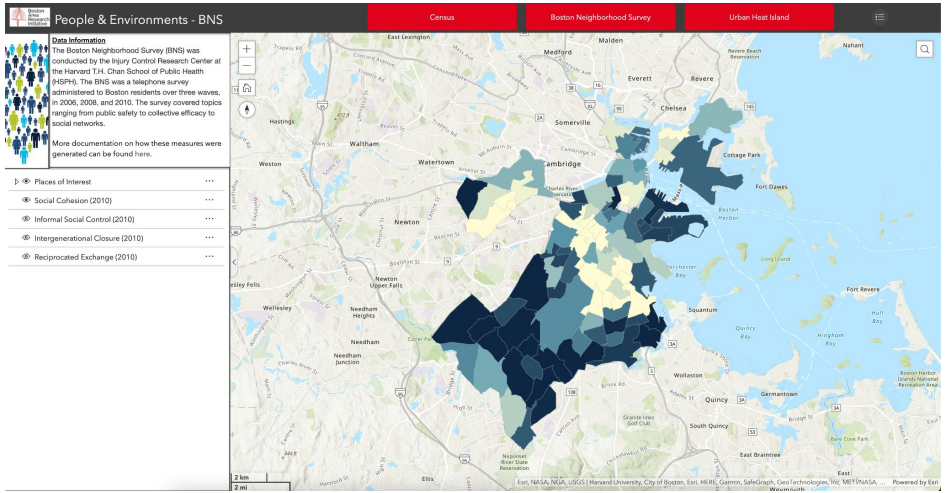
Boston Data Library →

Boston Area Research Map →

https://cssh.northeastern.edu/bari/boston-data-portal/

Boston Area Research Map





Data Categories

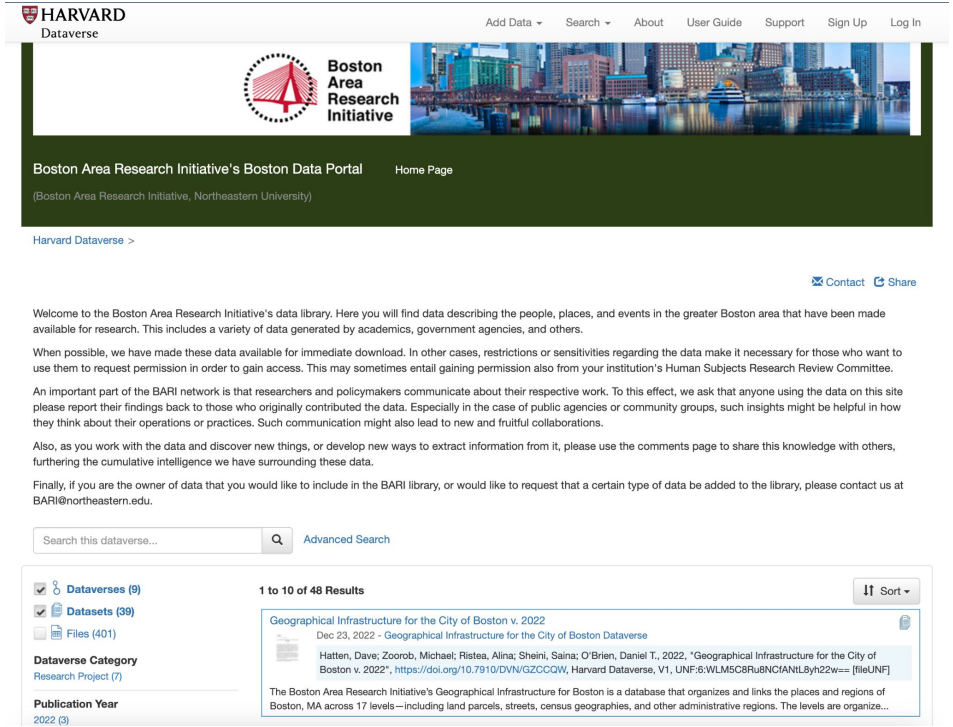
Housing & Land Value

Commerce & Institutions

https://boston-area-research-map-nu.hub.arcgis.com/

Northeastern University
NULab for Texts, Maps, and Networks

BARI's Boston Data Portal



https://dataverse.harvard.edu/dataverse/BARI

Tableau

Northeastern University
NULab for Texts, Maps, and Networks

Tableau basics

Tableau is a powerful tool for different types of data visualizations. Tableau can also be used for mapping.

A Tableau license is available for free to students with a .edu email address. You can use the key on two different devices.

Link to Tableau for students:
https://www.tableau.com/academic/students

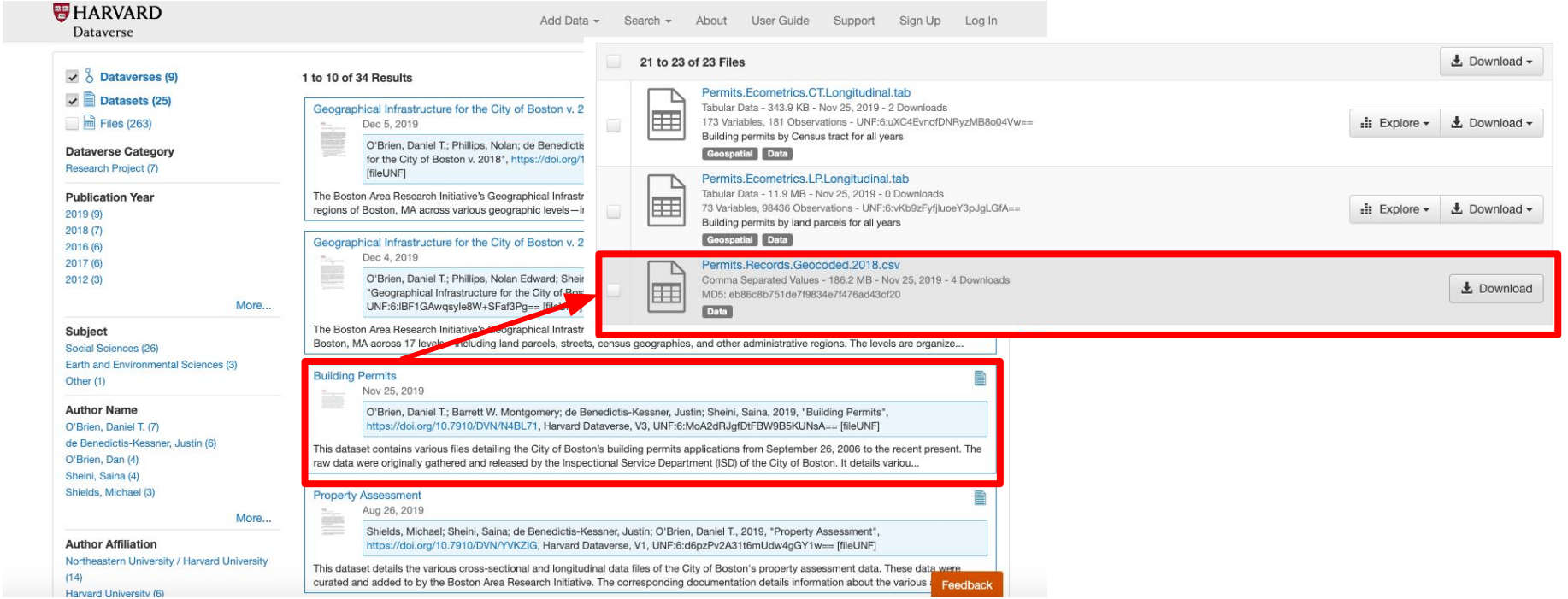
Key terminology

- **X/Y Coordinates**: Numerical values that allow every location on earth to be pinpointed.
- **Latitude:** The north/south coordinate of a location based upon its distance from the equator.
- **Longitude:** The west/east coordinate of a location based upon its distance from the standard meridian.

Key terminology continued

- **Dimension:** Qualitative values (such as names, dates, or geographical data). You can use dimensions to categorize or segment your data.
- **Measure:** Numeric, quantitative values that you can measure. Measures can be aggregated. When you drag a measure into the view, Tableau applies an aggregation to that measure (by default).
- **Basemap:** The type of map that your coordinates are plotted on. Options include streets and satellite images, just like Google Maps.

Our dataset


HARVARD Dataverse
Add Data
Search
About
User Guide
Support
Sign Up
Log In
Dataverses (9)
Datasets (25)
Files (263)
Dataverse Category
Research Project (7)
Publication Year
2019 (9)
2018 (7)
2016 (6)
2017 (6)
2012 (3)
More...
Subject
Social Sciences (26)
Earth and Environmental Sciences (3)
Other (1)
Author Name
O'Brien, Daniel T. (7)
de Benedictis-Kessner, Justin (6)
O'Brien, Dan (4)
Sheini, Saina (4)
Shields, Michael (3)
More...
Author Affiliation
Northeastern University / Harvard University (14)
Harvard University (6)
1 to 10 of 34 Results
Geographical Infrastructure for the City of Boston v. 2
Dec 5, 2019
Geographical Infrastructure for the City of Boston v. 2
Dec 4, 2019
Building Permits
Nov 25, 2019
O'Brien, Daniel T.; Barrett W. Montgomery; de Benedictis-Kessner, Justin; Sheini, Saina, 2019, "Building Permits", https://doi.org/10.7910/DVN/N4BL71, Harvard Dataverse, V3, UNF:6:MoA2dRJgfDtFBW9B5KUNsA== [fileUNF]
This dataset contains various files detailing the City of Boston's building permits applications from September 26, 2006 to the recent present. The raw data were originally gathered and released by the Inspectional Service Department (ISD) of the City of Boston. It details variou...
Property Assessment
Aug 26, 2019
Shields, Michael; Sheini, Saina; de Benedictis-Kessner, Justin; O'Brien, Daniel T., 2019, "Property Assessment", https://doi.org/10.7910/DVN/YVKZIG, Harvard Dataverse, V1, UNF:6:d6pzPv2A31t6mUdw4gGY1w== [fileUNF]
This dataset details the various cross-sectional and longitudinal data files of the City of Boston's property assessment data. These data were curated and added to by the Boston Area Research Initiative. The corresponding documentation details information about the various
Feedback
21 to 23 of 23 Files
Download
Permits.Ecometrics.CT.Longitudinal.tab
Tabular Data - 343.9 KB - Nov 25, 2019 - 2 Downloads
173 Variables, 181 Observations - UNF:6:uXC4EvnofDNRyzMB8o04Vw==
Building permits by Census tract for all years
Geospatial
Data
Explore
Download
Permits.Ecometrics.LP.Longitudinal.tab
Tabular Data - 11.9 MB - Nov 25, 2019 - 0 Downloads
73 Variables, 98436 Observations - UNF:6:vKb9zFyfjluoeY3pJgLGfA==
Building permits by land parcels for all years
Geospatial
Data
Explore
Download
Permits.Records.Geocoded.2018.csv
Comma Separated Values - 186.2 MB - Nov 25, 2019 - 4 Downloads
MD5: eb86c8b751de7f9834e7f476ad43cf20
Data
Download

Our dataset

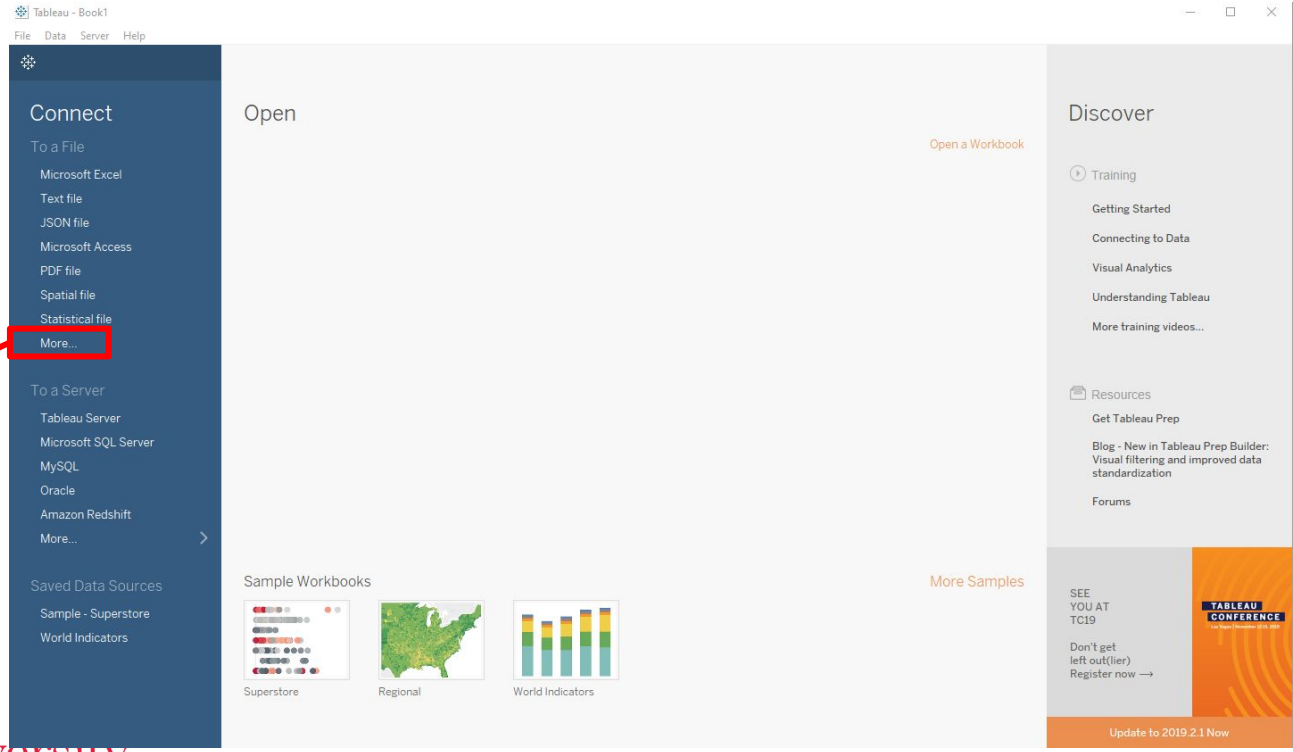
- Boston's 2018 Permit and Record Spreadsheet, which tracks construction permits.
- Includes information such as
  - Type of permit (addition, renovation, etc.).
  - Address of permit (including geographic coordinates) and neighborhood name.
  - Permit holder and fee information.

Tableau Walkthrough

Northeastern University
NULab for Texts, Maps, and Networks

Step One: Connecting to data

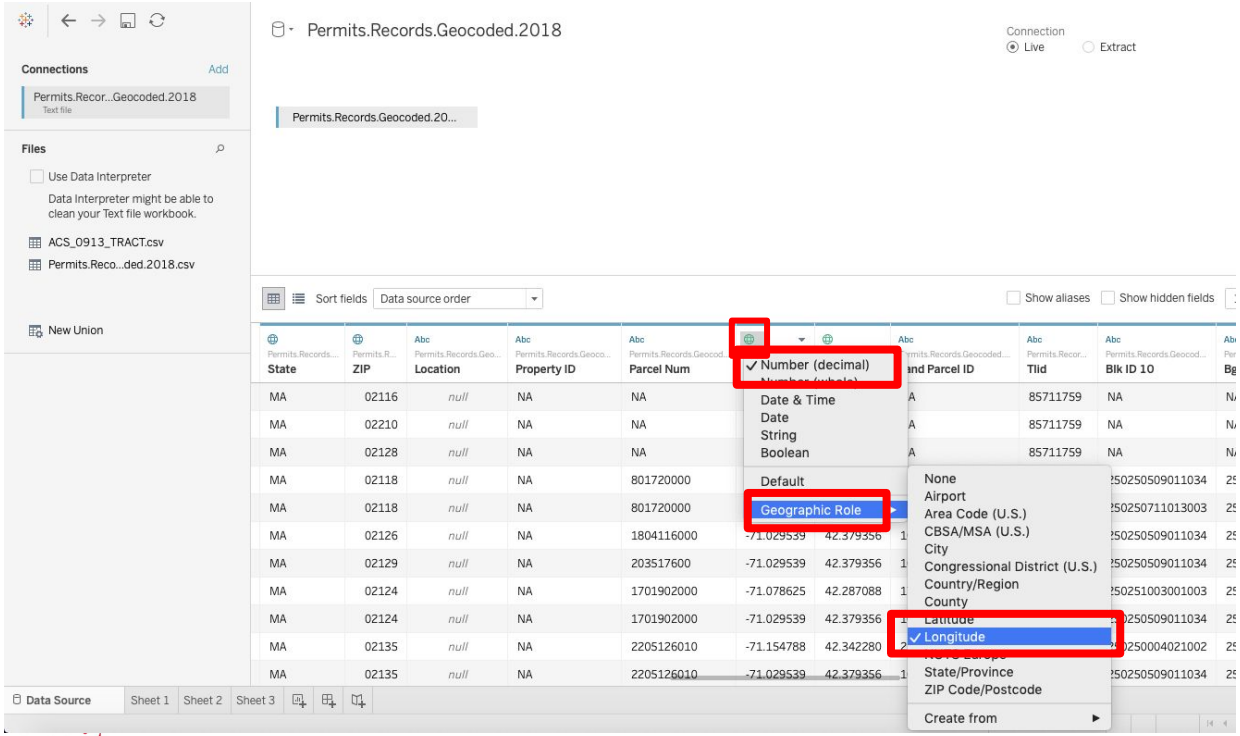
- First, we need to connect to our data.
- We will be using building permit data for the City of Boston in .csv format.
- Select **More…** and navigate to the data file that was sent via email.



Step Two: Convert coordinate column to geo data

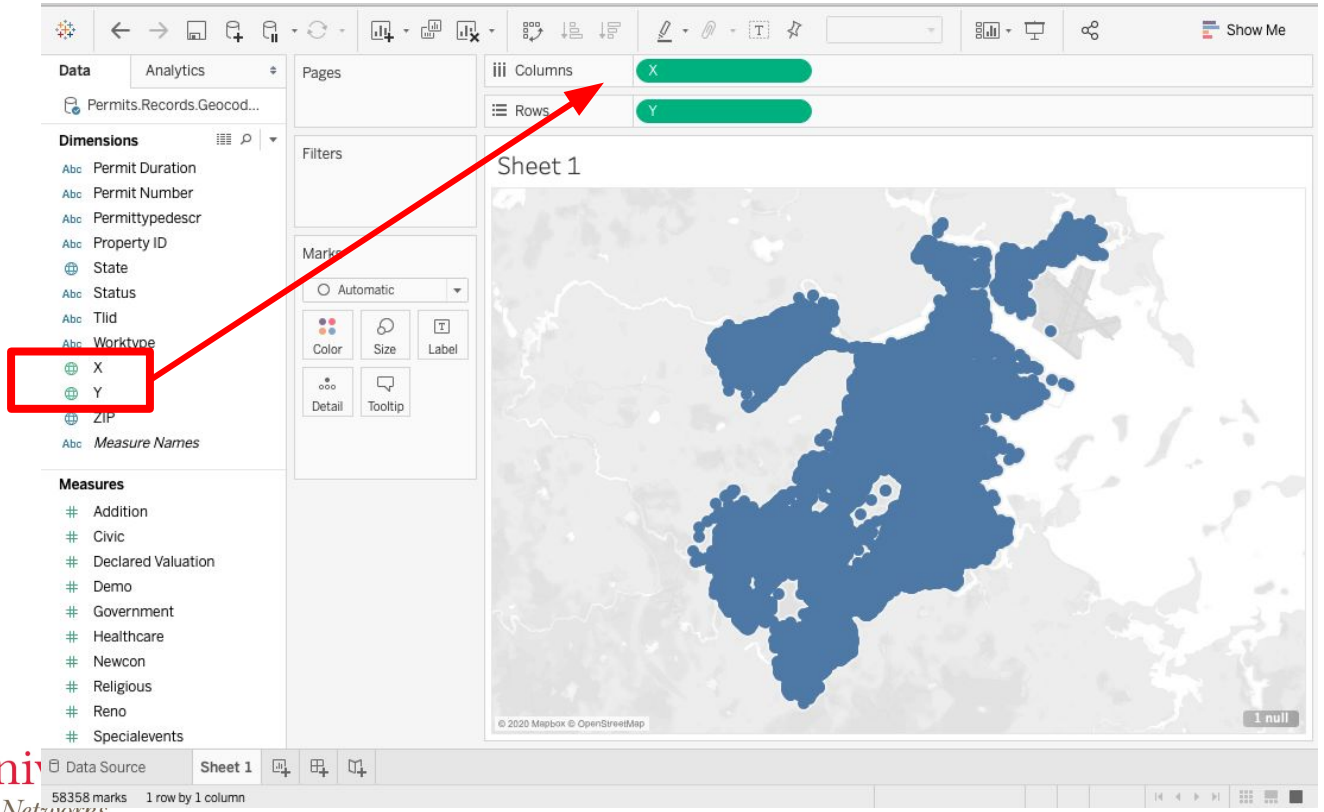
- To map our data, we have to first convert the X/Y data into coordinates.
- Click on the **Abc**, and change the data type from **String** to **Number (decimal)**.
- Click on the # and select over **Geographic role**, and then select **Latitude** or **Longitude**. Convert:

  X -> Longitude
  Y -> Latitude



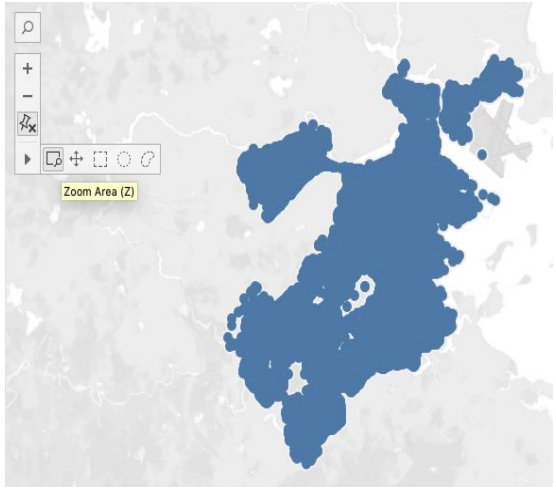
Step Three: Plotting points

- To map the data points, drag the Y data into the **Columns** area, and the X data into the **Rows** area.
- Tableau will automatically plot points based upon those X/Y coordinates.



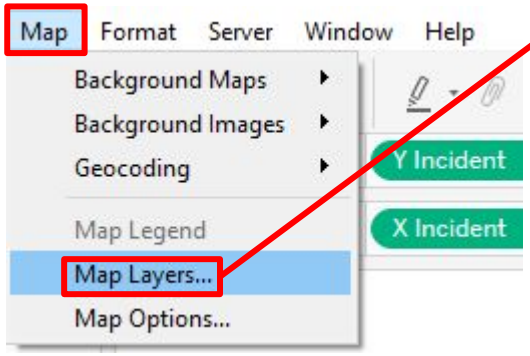
Step Four: Zoom controls

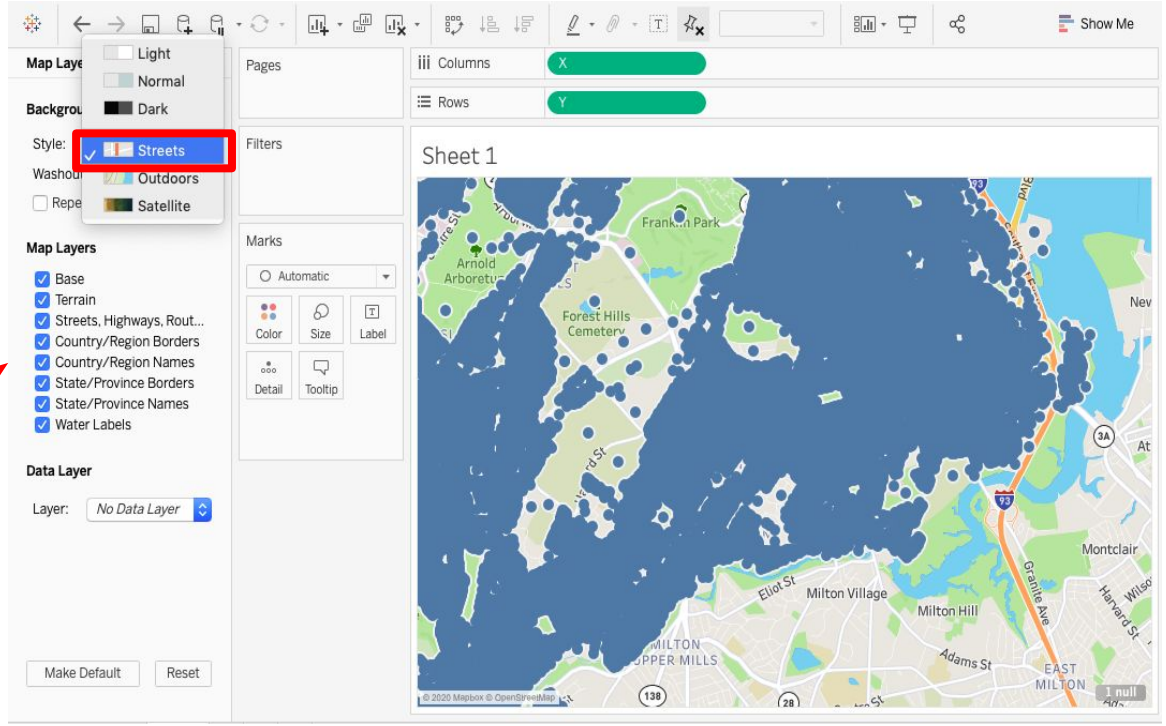
- The navigation and zoom controls are in the top left of the plot area.
- We have zoomed into the Downtown Boston, Fenway/Kenmore, Jamaica Plain, Roxbury areas.



Step Five: Modifying the basemap

- Select **Map** on the toolbar and go to **Map Layers…** to modify the basemap.
- Select a new style, e.g. **Streets**.
- When you are happy, click the **X** at the top of the map layers sidebar.



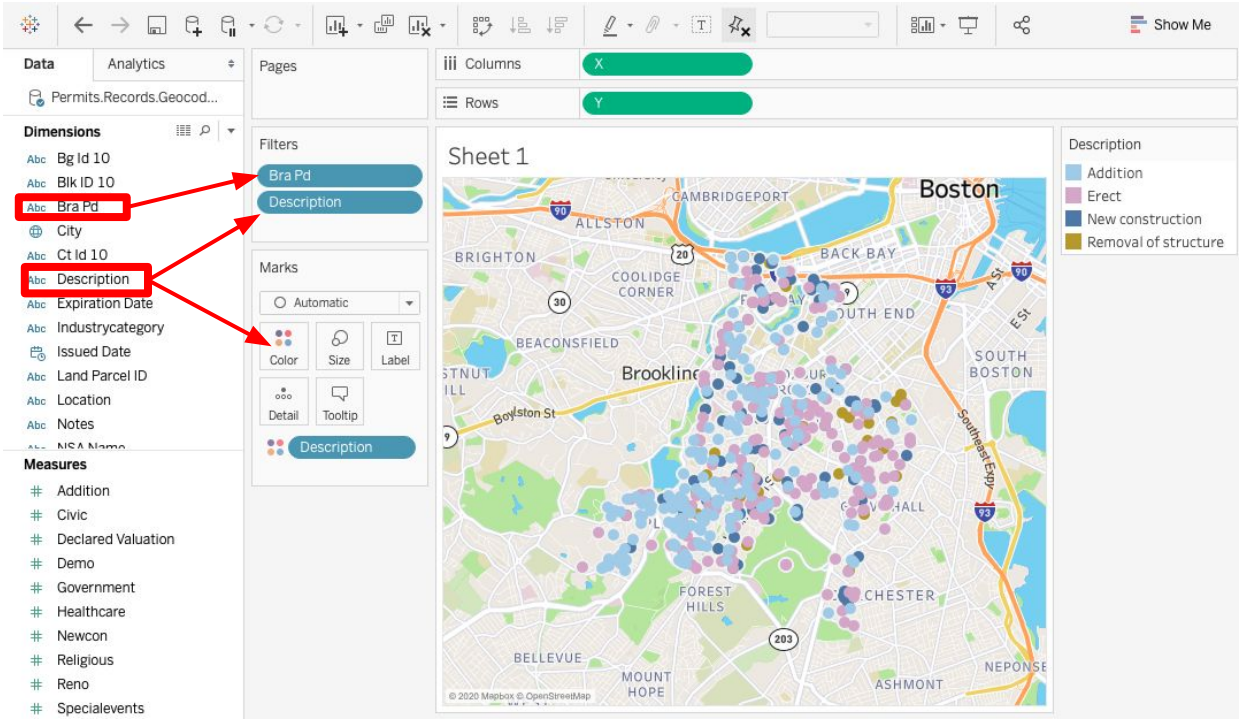


Hypothesis: Gentrification will look different in each neighborhood of study.

Operationalization: Gentrification can be tracked by filtering out **Addition**, **Erection**, **New Construction**, and **Removal of Structure** building permits.

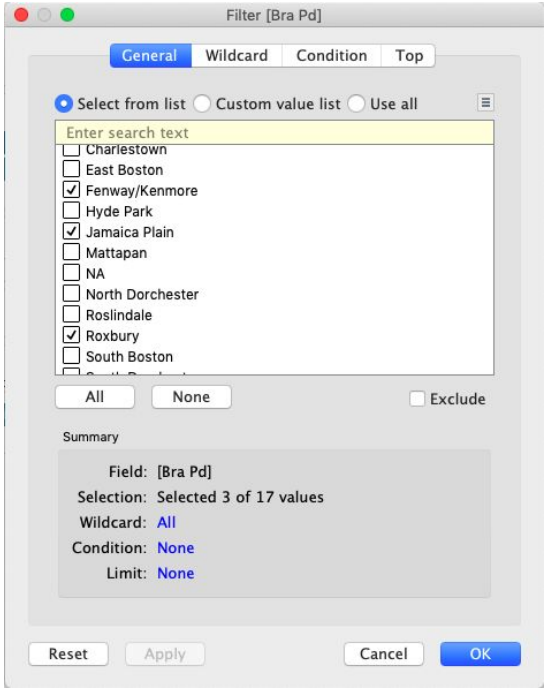
Step Six: Creating filters

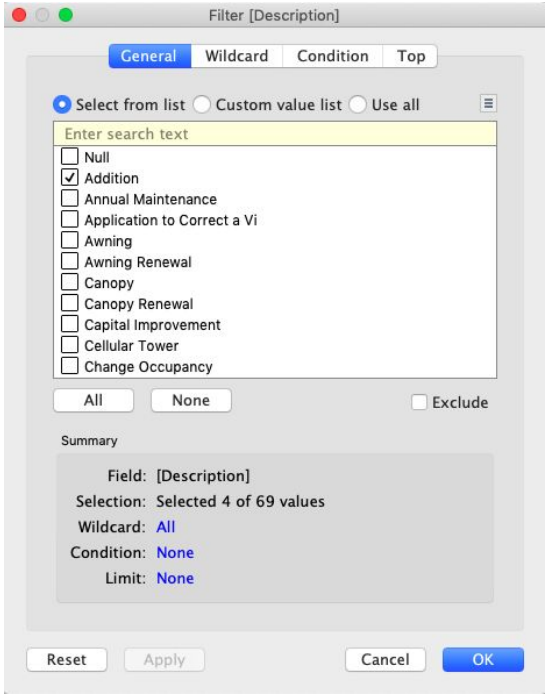
- To create different filters and visualization parameters, drag a dimension or measure into the **Marks** box. Change marks to **Map**.
- To specify a type of visualization, drag the parameter of choice onto **Color**, **Size**, etc.
- We have mapped **Description of Permit Type** as a color, and filtered by neighborhood and description of permit type (which will appear as a tooltip).



Step Seven: Creating filters continued

- We want to filter our neighborhood data parameter to only display Fenway/Kenmore, Jamaica Plain and Roxbury.
- Click on **Filter…** to bring up the filter box.
- Deselect all and then check the boxes for Fenway/Kenmore, Jamaica Plain and Roxbury.
- Do the same thing for permit description type, selecting the boxes for **Addition**, **Erect**, **New Construction**, and **Removal of Structure**.





Step Seven: Creating filters results

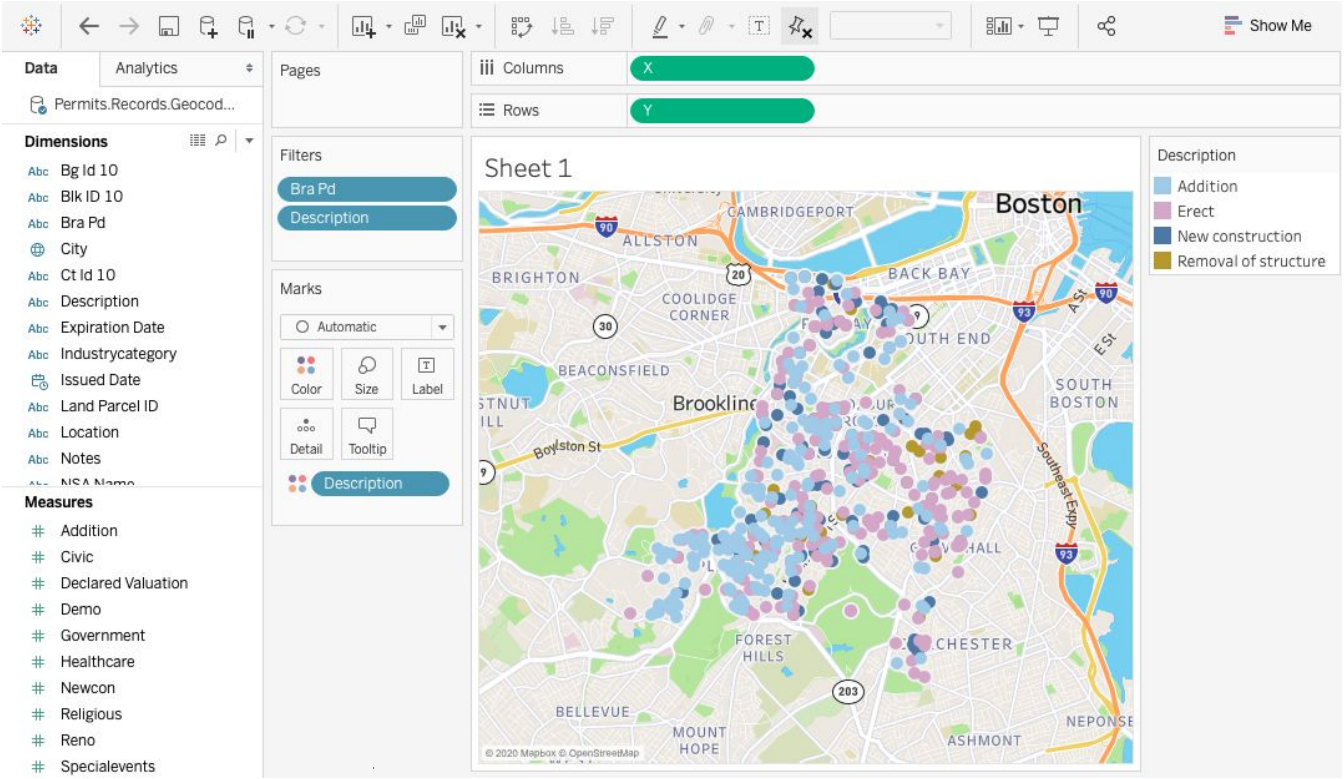
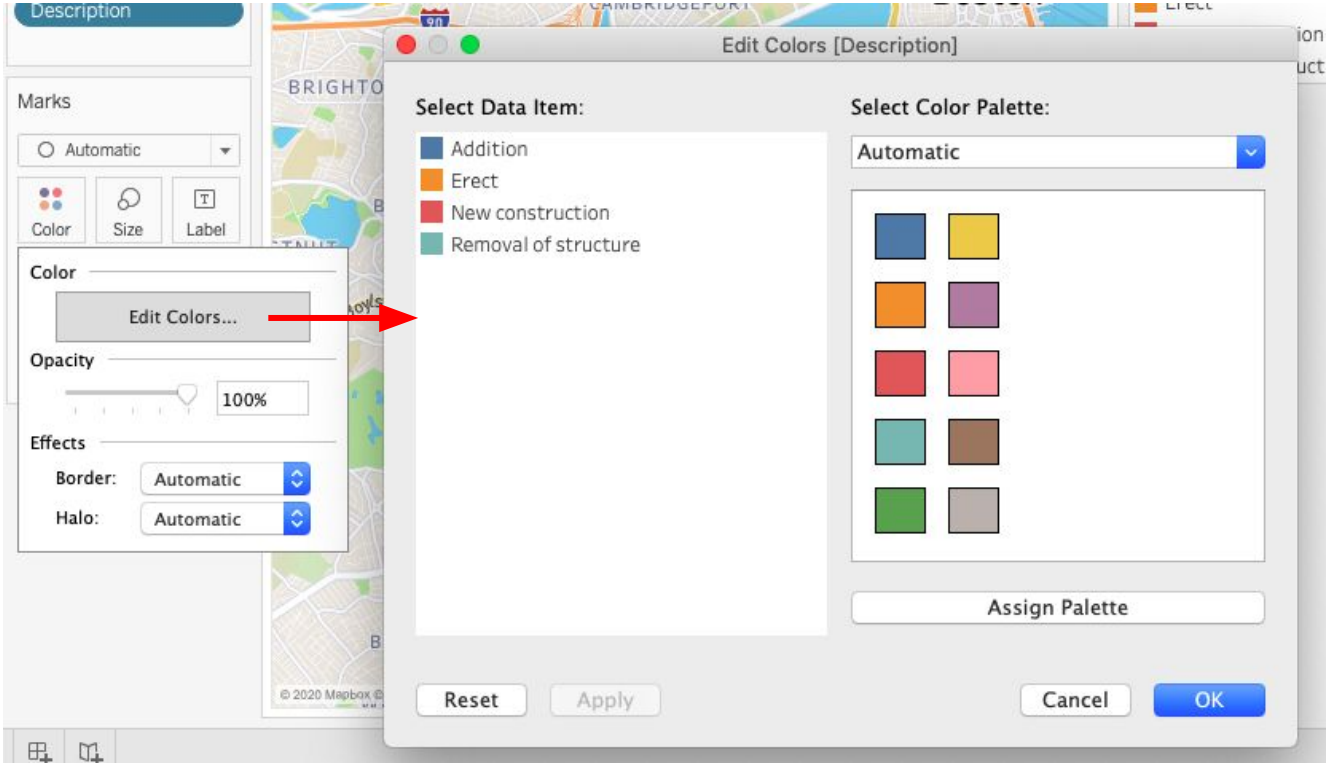


Tableau and Accessibility

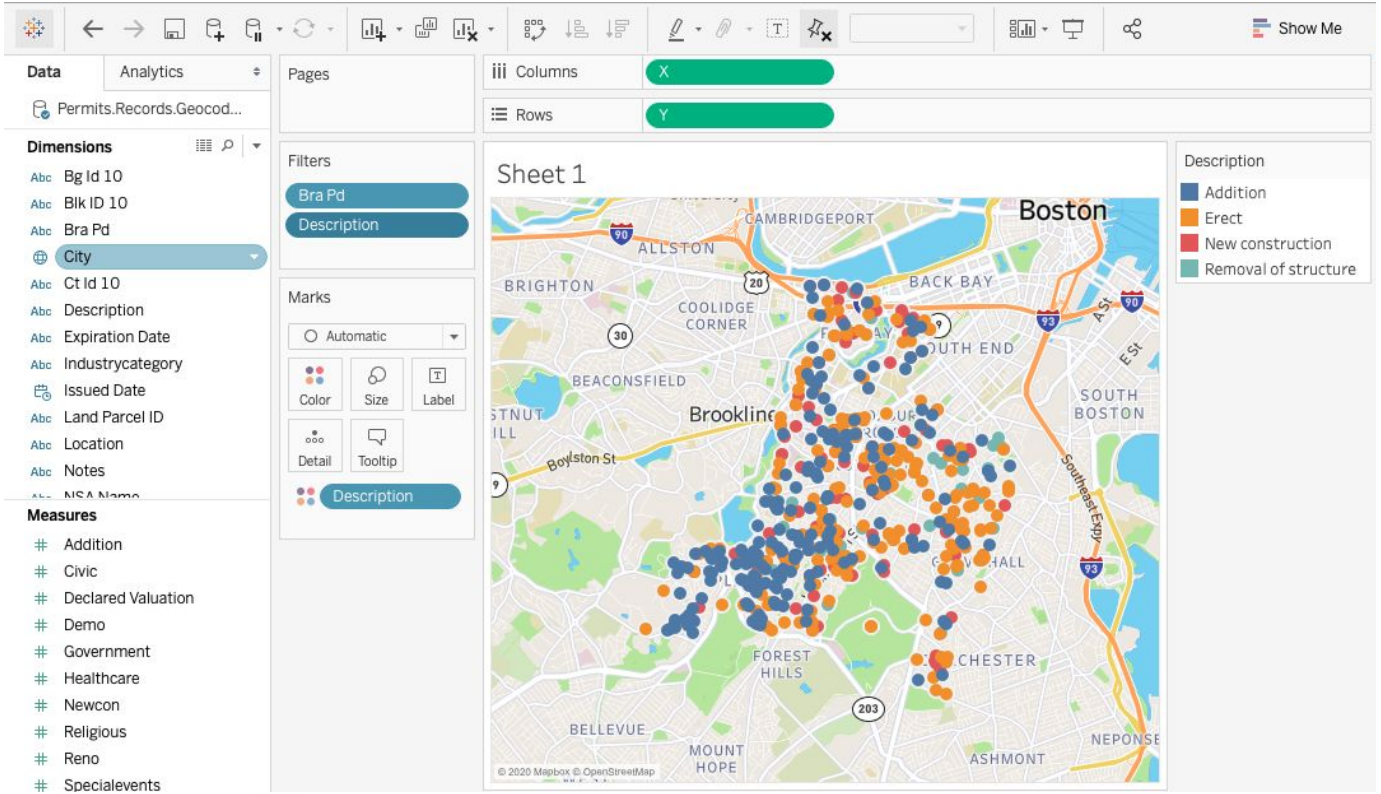
- Tableau lets you *modify* and *customize* how your maps and graphs look.
- Keep accessibility concerns in mind when choosing fonts and colors.
    - Colors with higher contrast from the background are easier to distinguish.
    - Larger, bolder fonts stand out and designate importance.
    - Overcrowding text makes the information harder to read.

Step Eight: Modifying colors

- The standard map colors don't contrast very well.
- On the **Bra Pd (neighborhoods)** sidebar, click the dropdown arrow, then click on **Edit Colors…**.
- We can now change our colors and improve the contrast.

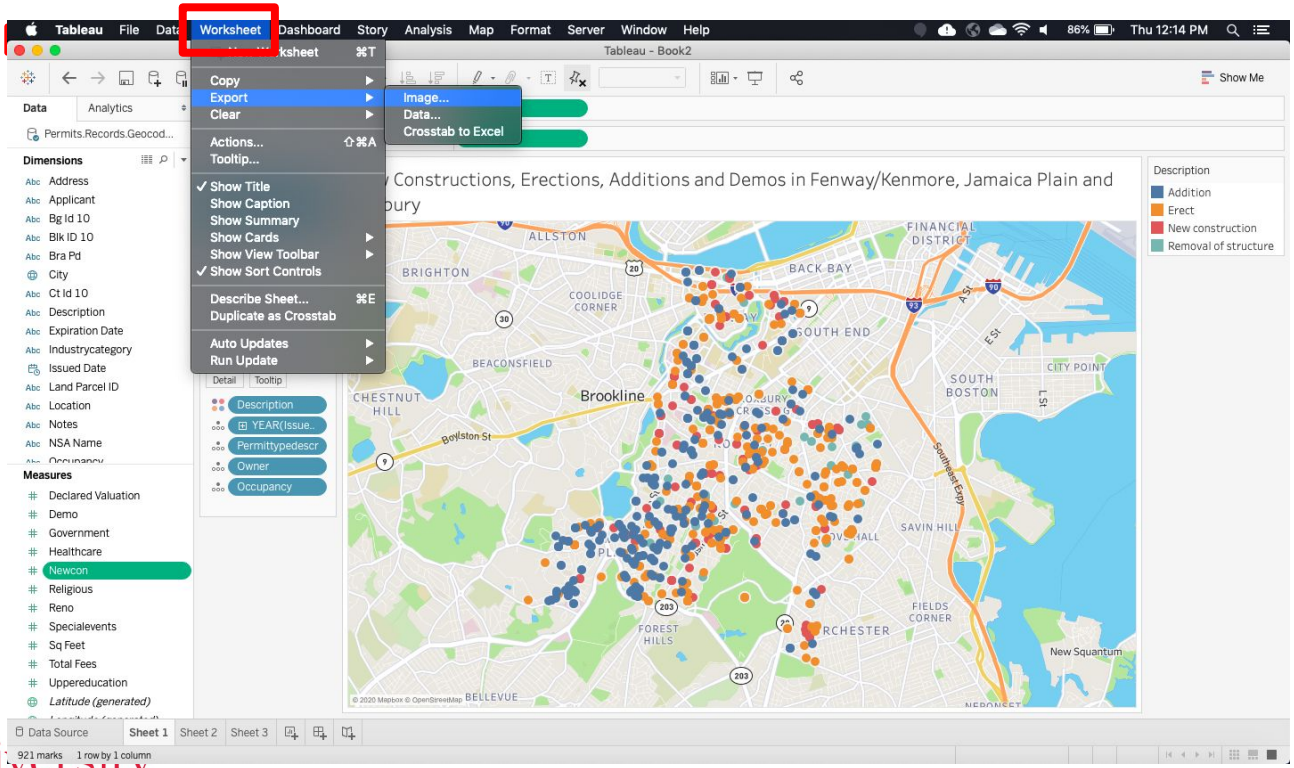


Step Eight: Modifying colors results



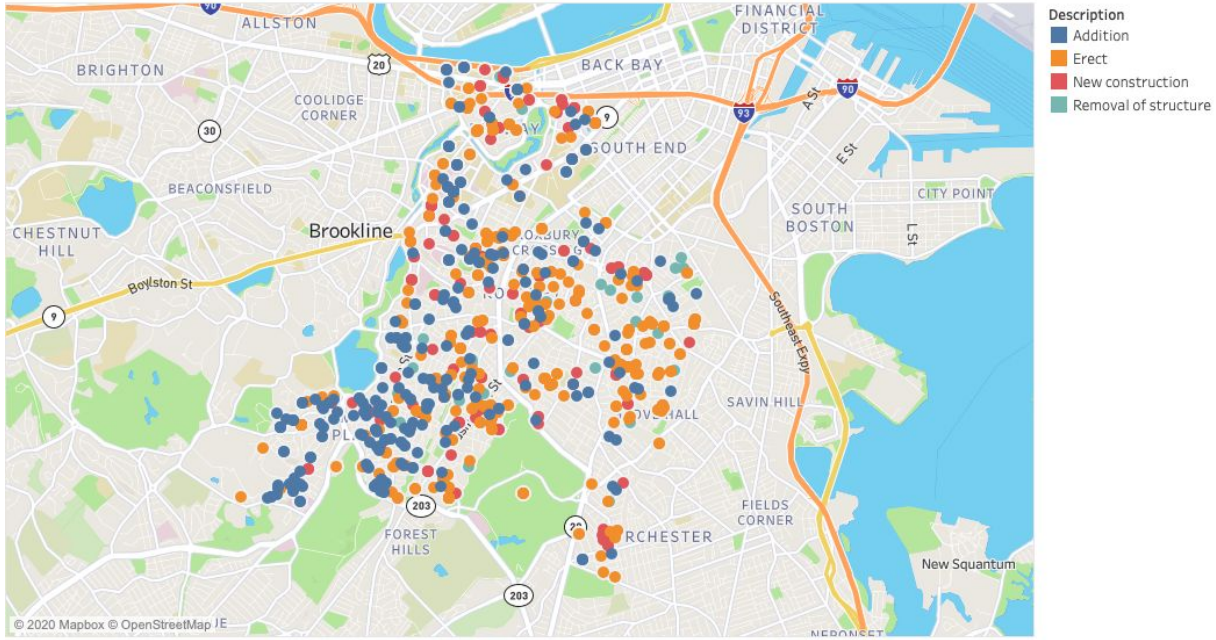
Step Nine: Exporting images

- From the **Worksheet** drop-drop down menu, select **Export**, then click on **Image…**.
- You can select the type of export then click **Save**.



Step Nine: Exported image

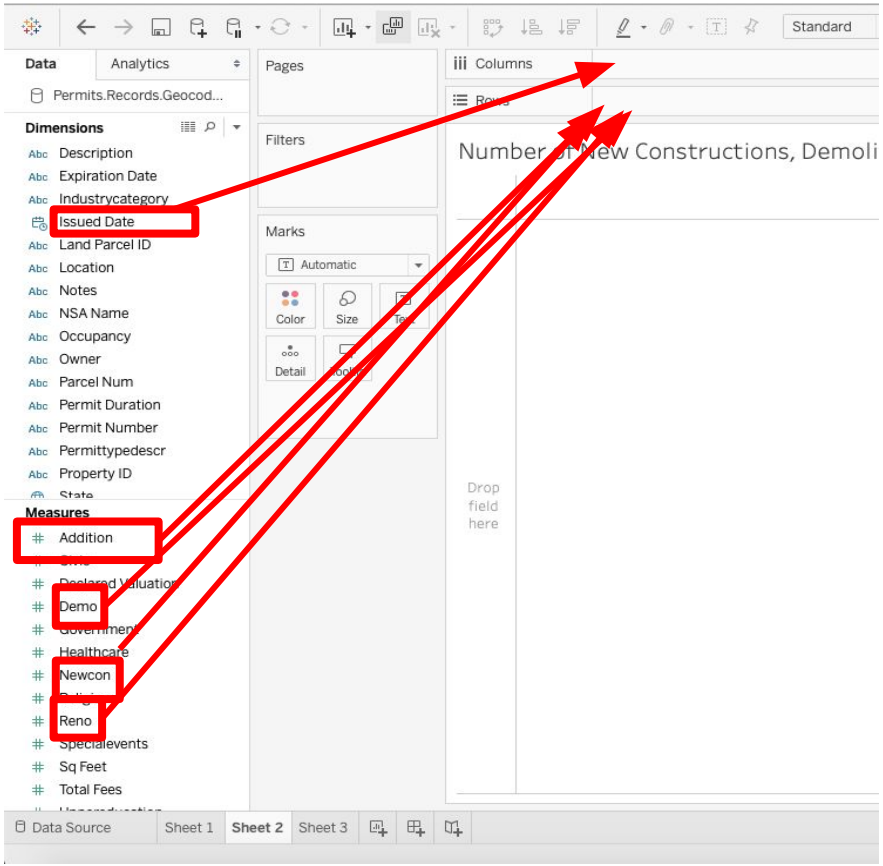
New Constructions, Erections, Additions and Demos in Fenway/Kenmore, Jamaica Plain and Roxbury



Map based on X and Y. Color shows details about Description. Details are shown for various dimensions. The data is filtered on Bra Pd and Worktype. The Bra Pd filter keeps Fenway/Kenmore, Jamaica Plain and Roxbury. The Worktype filter keeps ADDITION, ERECT, NEWCON and RAZE.

Graphs with Tableau: Drag & drop

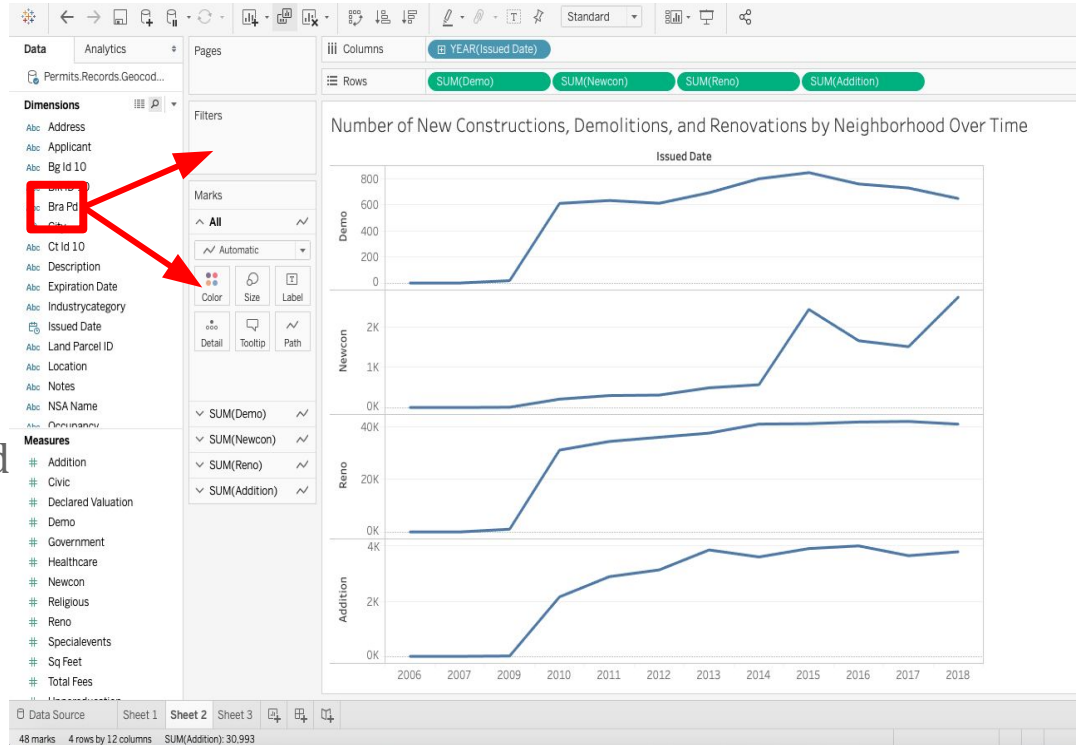
- As with mapping, creating a graph can be accomplished by dragging and dropping our dimensions and measures.
- To map the number of records over time according to permit type, first create a new sheet (click the **+** sign next to **Sheet 1** at the bottom).
- Next, drag and drop the **Issued Date** dimension to the columns, and the **Addition**, **Demo**, **Newcon** and **Reno** measures to the rows.



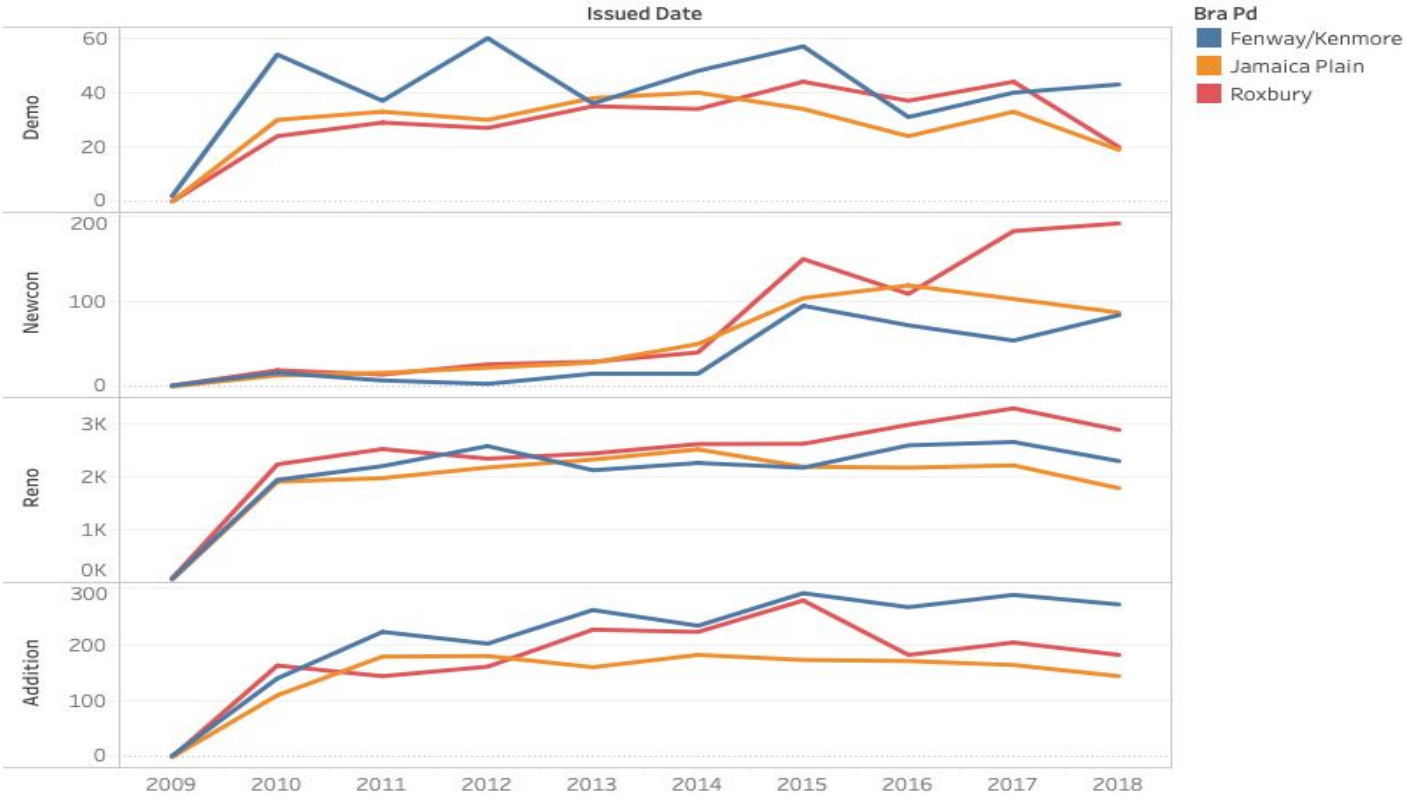
Graphs with Tableau: Drag & drop

We now have a graph of different building permit records over time. To see specific neighborhoods:

- Drag and drop the **Bra Pd** measure onto both the filter box and the colors in the marks box to the left of our new graph. Filter your neighborhoods to include only Fenway/Kenmore, Jamaica Plain and Roxbury.
- Tableau will automatically set each neighborhood to a different color and redraw our graph.



Number of New Constructions, Demolitions, and Renovations by Neighborhood Over Time



The trends of sum of Demo, sum of Newcon, sum of Reno and sum of Addition for Issued Date Year. Color shows details about Bra Pd. The view is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury.

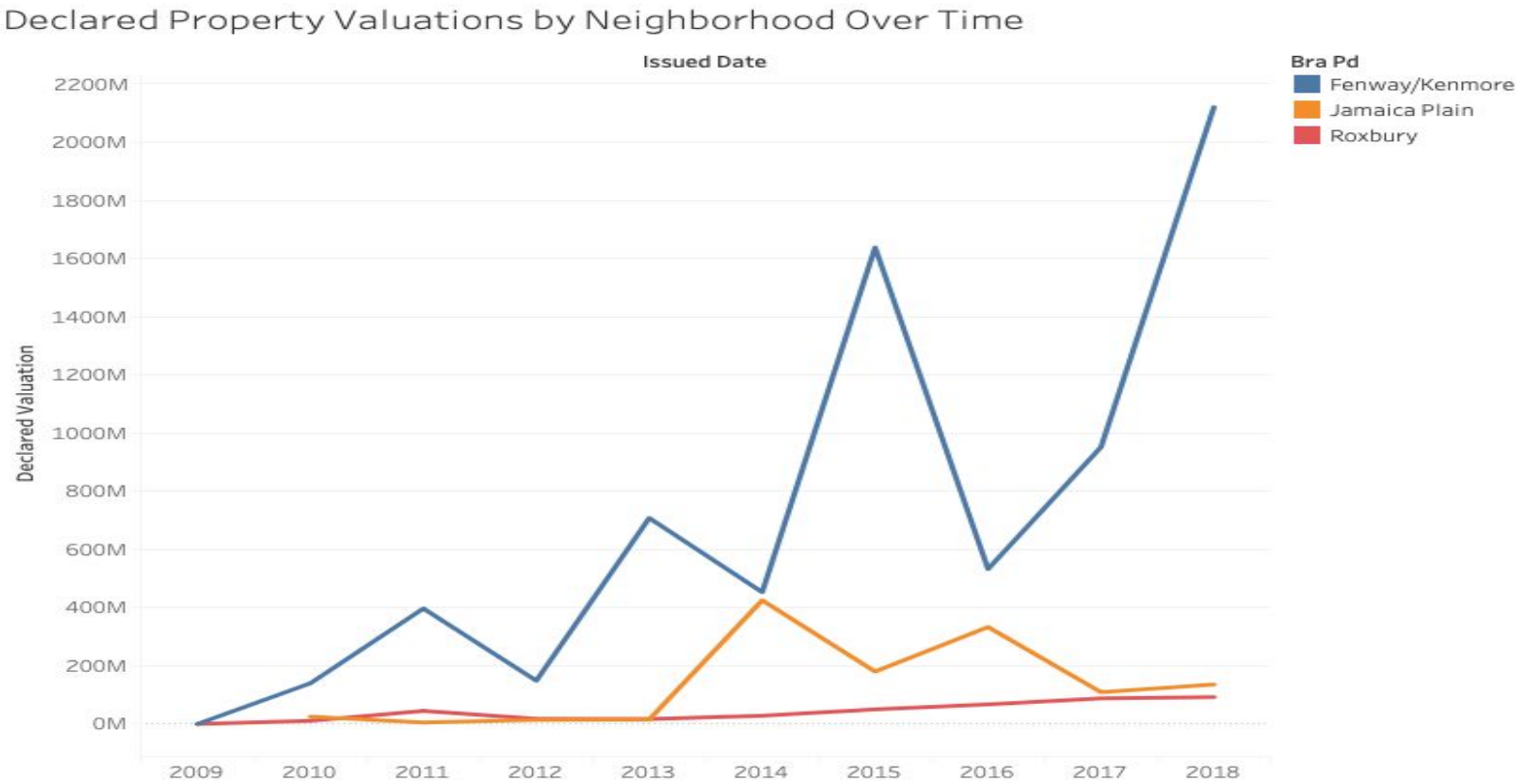
How can Tableau help us to answer sociological questions?

Northeastern University
NULab for Texts, Maps, and Networks

Example research questions

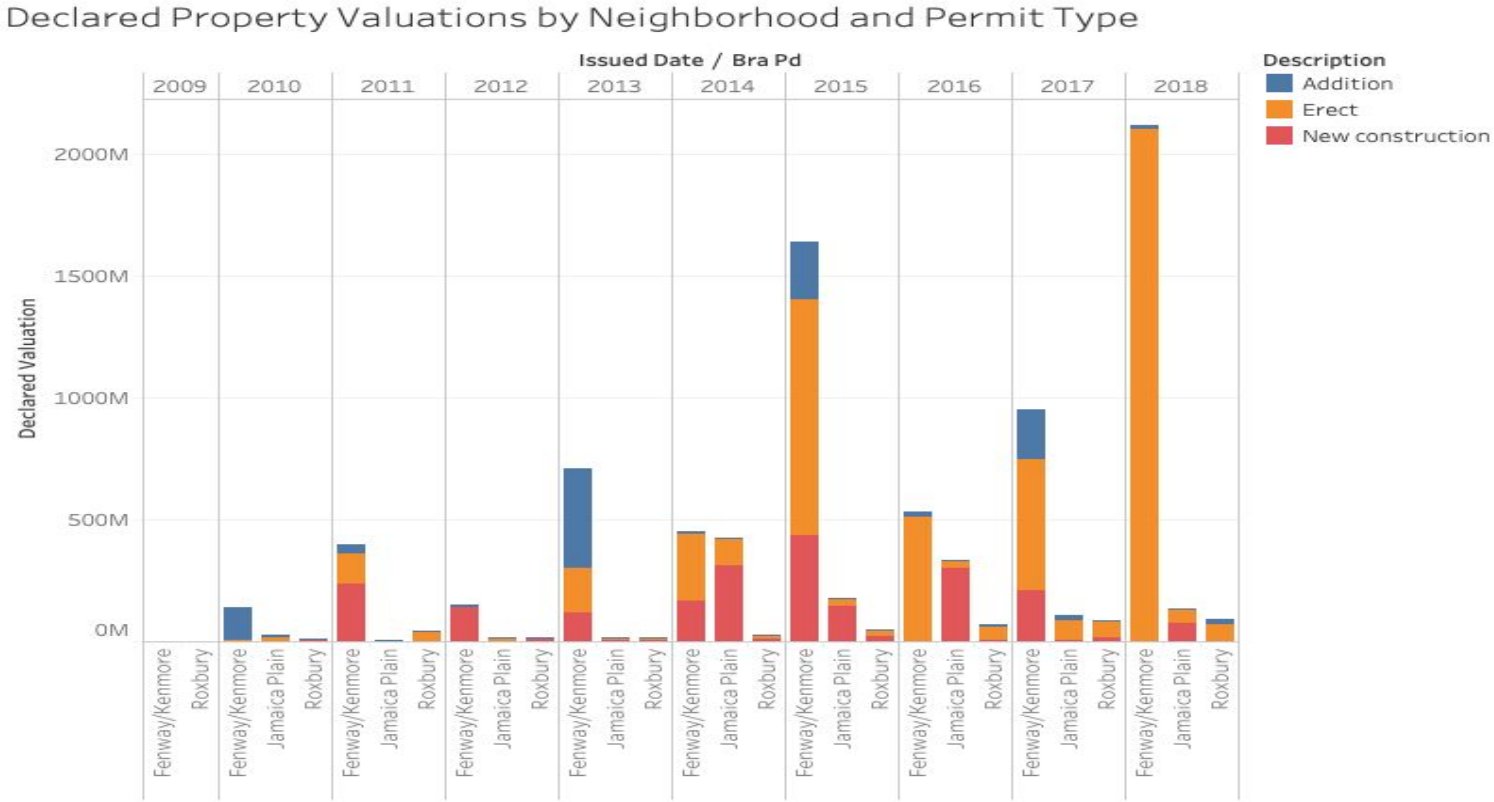
- How much value are new constructions and renovations adding to their neighborhood over time?
- How much value does each type of construction add to each neighborhood's overall valuation?
- What different types of industry are building in these neighborhoods?

How much value are new constructions and renovations adding to their neighborhoods over time?



The trend of sum of Declared Valuation for Issued Date Year. Color shows details about Bra Pd. The data is filtered on Worktype, which keeps ADDITION, ERECT and NEWCON. The view is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury.

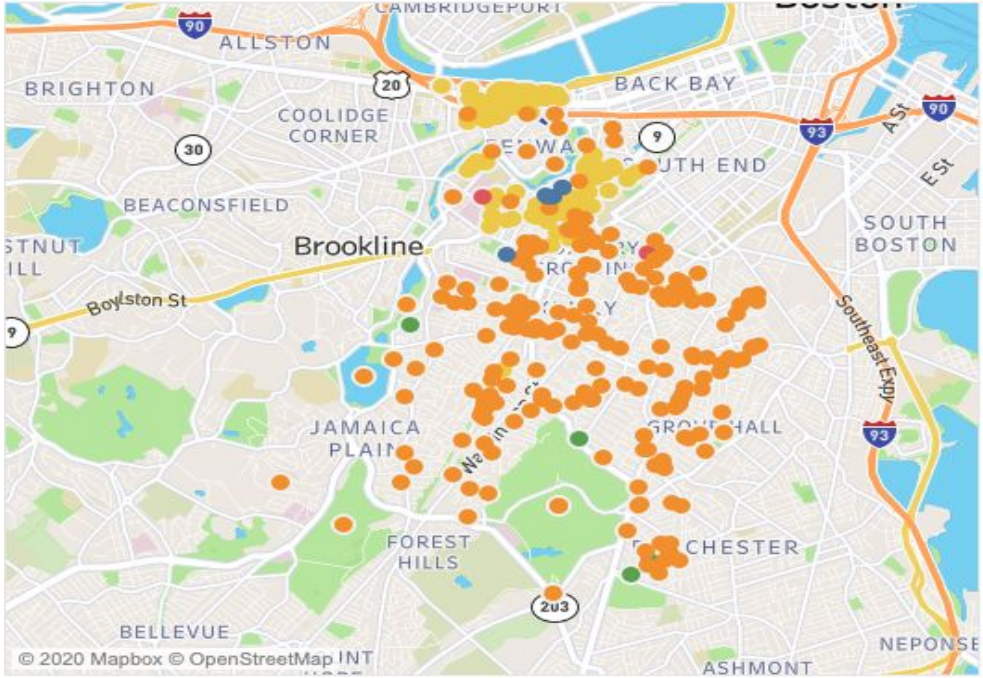
How much value does each type of construction add to each neighborhood's overall valuation?



Sum of Declared Valuation for each Bra Pd broken down by Issued Date Year. Color shows details about Description. The data is filtered on Worktype, which keeps ADDITION, ERECT and NEWCON. The view is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury.

What different types of industry are building in these neighborhoods?

Permits by Industry Type for Fenway/Kenmore, Jamaica Plain and Roxbury



Industrycategory
- Civic
- Government
- HealthCare
- Religious
- UpperEd

Map based on X and Y. Color shows details about Industrycategory. The data is filtered on Bra Pd, which keeps Fenway/Kenmore, Jamaica Plain and Roxbury. The view is filtered on Industrycategory, which keeps Civic, Government, HealthCare, Religious and UpperEd.

Conclusion

- Tableau is a powerful tool for mapping coordinate points onto maps.
- Tableau is also very powerful at creating a variety of charts and graphs by dragging non-coordinates to the ‘column’ and ‘row’ areas.
- Research questions can include a number of different dimensions and measures—do not be afraid of experimenting with different visualizations!

Thank you!

Ana Abraham
Digital Integration Teaching Initiative
Assistant Director

Chris McNulty
Digital Integration Teaching Initiative
Assistant Director

- If you have any questions, contact us at **nulab.info@gmail.com**
- Have questions? Schedule an appointment with us!
  https://calendly.com/diti-nu
- Link to Online Materials:
  http://bit.ly/diti-spring2023-rabrenovic-tableau
- We'd love your feedback! Please fill out a short survey here:
  https://bit.ly/diti-feedback

Northeastern University
NULab for Texts, Maps, and Networks