State Surplus Land Assessment - Affordable Housing - Spring 2021	
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Organization	Office of Representative Nika Elugardo Suffolk 15th District
Organization Description	Nika Elugardo is a State Representative who represents the 15th Suffolk District in the Massachusetts House of Representatives. She represents the towns of Boston and Brookline.
Project Description	The goal of this project is to help address the critical shortage of affordable housing in Massachusetts. This is a project that will be used in a political advocacy context and storytelling is an important component of this project. In 2019, Representative Nika Elugardo filed legislation that would enable public housing authorities to borrow against real estate equity of municipal-owned properties to raise funds for maintenance and building of additional affordable housing units. *Note: this pertains to land owned by cities and towns (vs. the Commonwealth of Massachusetts)* In addition, the bill would enable the state to sell its unused lands to make this land more readily available to developers to either create affordable land or to generate capital for building or renovating affordable housing elsewhere. *Note: this pertains to lands owned by the Commonwealth, not cities and towns.* The goal of this phase of the project is to better understand the volume and attributes of lands owned by municipal housing authorities (cities and towns) and the market

	value of lands owned by the State Department of Housing and the State Department of Transportation. The output of this report should make recommendations of which land to sell and which to develop for affordable housing. These recommendations should be made based on the list of lands that are most transit friendly, i.e. have the highest proximity to multiple public transportation options and the assessed value of the land (based on the state assessment) as well as the market assessment of nearby lands. Please read the final report of the work completed last semester and over the summer for Representative Elugardo HERE. Please also read the project description for last semester HERE.
Other Strategic Questions to be Answered	1. Identify land owned by hospitals and universities a. Public vs. Private hospitals and universities - **Completed** b. Sort geographically and by legislative districts - **In Process** c. Find assessed value - **Completed** d. Lot vs. building (square footage) – undeveloped state owned land vs state surplus e. Proximity to housing authorities f. Proximity to affordable housing 2. Identify valuable State Land owned by Housing Authorities a. Sort geographically and by legislative districts b. Lot vs. building (square footage) – undeveloped state owned land vs state surplus c. Find assessed value d. Ownership
Data Sets	**IMP: Processed Data from the Summer and Two Semesters Ago (more on this in the tools and approaches section)** **Municipal Housing Authority Dataset** **State Housing Land** **State Owned Land Data District Summary** **State Dept. of Housing Owned Land District Summary**

	Real Estate APIs: ● Property Web API ● Estated API ● ATTOM API ● Zillow API request link to determine housing price trends **Available Affordable land Data (and Report) by Boston Federal Reserve** (row R: available affordable units per 100 low income residents) **Affordable housing thresholds in Mass** (town names top left, % of affordable housing bottom right) **Transportation APIs:** ● MBTA: https://docs.digital.mass.gov/dataset/massgis-data-mbta-rapid-transit ● Bus Routes: https://docs.digital.mass.gov/dataset/massgis-data-mbta-bus-routes-and-stops ● Look up access to transportation threshold to evaluate transportation access. Here is an API that might be useful for this exercise: https://www.walkscore.com/professional/walk-score-apis.php
Approach	**Completed:** **Review existing data (THIS IS CRITICAL).** Review work done two semesters ago / summer - Final report and scripts are here and here. Identify universities and hospitals near (define proximity – will vary for urban - adjacent vs. suburban/rural) affordable housing need (based on low income; utilization in community) and near housing authorities **To do:** Identify parcels that are contiguous with universities and hospitals Establish the % of affordable housing for each municipality/town by extracting data from this document Assign a relative "transit friendly" score for each parcel Look for proximity to public transport (.5 miles to public transportation). There are lots of approaches to this e.g. Transit Score or GoogleMaps API, etc. Some of this analysis has already been completed last semester, you can build on this. Do analysis of subsets of DOT and geographic concentrations, particularly around major towns and cities and regionally? (see map)

	Generate visualizations: TBD with client using software such as ArcGIS or tableau as a final deliverable along with the list data.
Tools and approaches	Using the processed data: ● Why? - The MAPC Land Parcel Database has three datasets that are virtually impossible to merge by themselves because of inconsistencies in data formatting. There is a statewide geodatabase available that expands to about 30GiB in memory, and therefore, any operations on this object takes a long time. Using geofeather, we optimized the storage mechanism, creating a much smaller initial database, stored as initial_data.feather (ensure to have initial_data.feather.crs to retain the geographic coordinates). ● Preprocessing Done - There are multiple functions defined at the top of the analysis file (Analysis.ipynb) which we used to preprocess data to remove erroneous entries, and only retain data that we need. This data is saved as x ffinal_data.csv and final_data.geojson. The geojson preserves geographic data. ● Most important to you are the filter_luc, filter_bldg and filter_out_bldg functions. The filter_luc function takes in the original df and a filter name, and filters out parcels with the given affiliation. Filter_bldg takes in the original df and filters out parcels with buildings. Filter_out_bldg does the opposite. ● A sample use case would be if you wanted to get all the parcels owned by the housing department, you would load up final_data.csv, and run filter_luc(df, 'housing'). Scitkit Learn and spaCy for basic machine learning and regression tools. Tableau and ArcGIS for mapping.
Other Readings	Background Testimony from Nika Elugardo: https://drive.google.com/open?id=1JgOE7YqXsC6MrKkULXJ2tdjt05XBQJ2C
Data processed	In addition to the main parcel data, we have gathered data all of the same data for all hospitals and universities that will potentially use the land
Analysis completed	We have sorted parcels based on proximity to hospitals and universities, and we have that data saved both for the whole state as well as the individually for parcels in each congressional district

Key Questions Answered	We have answered the question of the number of hospitals and universities in the specified radius of identified parcels.