Build-Out Analysis: Northampton, MA

Project Description

Build-out analyses are often used by municipal planning departments to forecast what their city would look like if the built environment were to continue to develop to the maximum extent allowed according to existing zoning regulations. Based on this, planners and the community at large can then see where the physical areas of greatest growth are located within the city.

A thorough build-out analysis would begin by first locating all the remaining areas of potential development in the city. In order to do this, GIS would be used to remove existing constraints from consideration for development. The second part of a build-out analysis would then determine the potential for various types of growth, such as population changes and commercial and industry growth, that would be incurred due to the remaining developable land.

The build-out analysis is a powerful tool for communities that wish to see how future development could impact their city's character. Once planners, community officials, and residents are informed with the facts, they can then determine whether or not any existing zoning regulations should be changed for the future.

Site Description:

This project seeks to visualize the potential build-out scenario for Northampton, MA. Northampton is a city of about 28,592 people, located in western Massachusetts. Known for its vibrant arts scene and being the home of Smith College, Northampton also has a long history as a politically liberal hub. It is located about 15 miles north of Springfield, MA and has an area of 35.8mi^2. The city has a considerable amount of permanently protected open space, devoting 21% of its area to this purpose.

Questions:

1. What is the make-up of developable land under existing zoning regulations?
2. How would development be affected by the maximum build-out scenario?

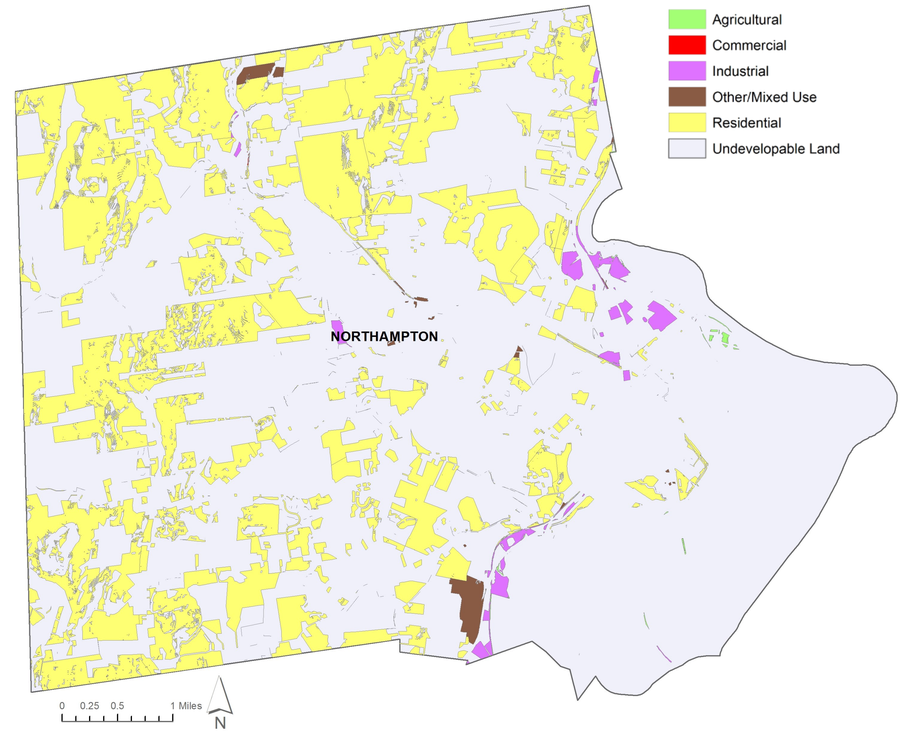
Methodology

Phase 1: Map the area of all potentially developable land

Analysis began by creating a base map of Northampton to provide a context for future work. From there, a map showing existing zoning conditions was created in order to see where the different zoning areas were located throughout the city and to have a layer through which to erase the development constraints.

The bulk of the GIS processes occurred while constructing the map which shows the remaining developable land. The following development constraints were used to erase areas deemed "undevelopable" from the existing zoning base map:

Developable Land By Zoning Type



Methodology Cont.

Development Constraints:

- Roads
- Hydrography
- Protected and recreational open space
- Flood zones
- Slopes greater than 25%
- Parcels within 1,500 feet of a hazardous waste site
- Parcels smaller than 5 acres and which have buildings on them
- Parcels that have a Use Description of "Undevelopable" in their Assessor's Data

Developable Land Summary		
Use Type	**Acres**	**% Total Buildable Area**
Agricultural	12	.19%
Commercial	1	.02%
Industrial	188	2.98%
Other/Mixed Use	111	1.75%
Residential	6,018	95.07%
Total	**6,330**	**100%**

Summary Development Statistics	
Total Developable Land Area	6,330 acres
Additional Households/Dwelling Units	3,488
Potential Population Growth	8,825 additional residents
Additional Vehicles	5,094

Phase 2: What does growth look like if all buildable land was developed?

Now that all undevelopable lands have been erased from the zoning base map, what remains is a zoning map of developable land. The analysis of this growth is discussed below.

Results

As seen in the two tables above, there is a total of 6,330 developable acres of land remaining in Northampton based on this preliminary build-out analysis. The vast majority of that land is residentially zoned (95%). If this land were to be fully built-out with housing, the current Census data determines that this would incur approximately 3,488 additional households. Given the average household size for Northampton of 2.53, this would result in 8,825 additional residents living in the city. From this, it is possible to calculate the potential additional number of vehicles: given that 44% of households own one vehicle, 36% of households own two vehicles, and 10% of households own three or more vehicles, an additional 5,094 cars would be on the road. This growth is certainly something that Northampton would want to consider while planning for its future.

Elizabeth Gohringer, Spring 2016
UEP 232: Introduction to GIS for Urban and Environmental Analysis

Projection and Coordinate System: Lambert_Conformal_Conic, Linear Units: Meter, NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001
Data Sources: MassGIS

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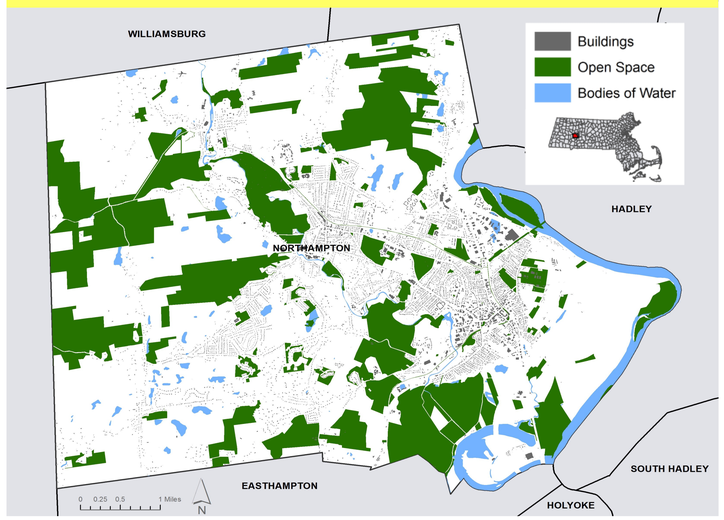
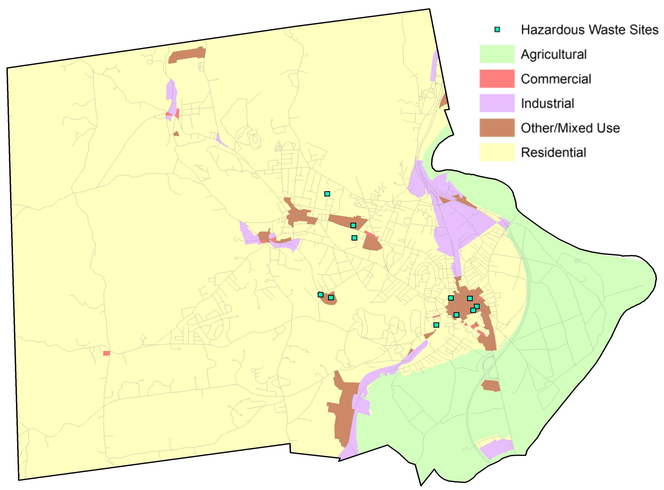
uep Urban + Environmental Policy + Planning

Build-Out Site Location: Northampton, MA



Current Zoning & Hazardous Waste Sites



Remaining Developable Land