A Build-out Analysis of the City of Marlborough, MA

Project Description

A build-out analysis is a useful tool for estimating and illustrating the amount and possible location of future development under the current zoning and development regulations. There are two phases in this project; the first is to map out the location of all potentially developable land using GIS. The second analytical phase provides an estimate of the total number of homes, commercial/industrial square footage, and demographic changes that could result if all buildable land within a community is developed.

By showing the community this information, urban planners can receive feedback from the public about how they want their city to look in future. Planners could then permanently protect desired open space parcels and change local zoning and subdivision regulation to reflect the community’s preferences. A build-out analysis is also instrumental for the municipality to estimate future demands on public infrastructure such as schools, water supply, sewage, utilities, waste disposal, as well as any future tax revenue that could be gained.

Site Description:
The City of Marlborough is located an hours drive west of Boston. It is a growing city with a dense commercial corridor running along Route 20 that gradually turning more suburban and rural as one move away from the main highways. New development within the town is constrained by several large bodies of water and protected open space. This analysis will serve to inform the City of where development can occur in the future by right (i.e. as allowed by zoning and not needing a special permit) and how that might influence the future landscape of this community.

Key Questions
1. How much land area can be developed under existing zoning regulations?
2. What type of development can occur on the available buildable land?
3. Where will this growth occur?

Methodology

When conducting a build-out analysis for both residential and commercially zoned parcels you must take into account various limiting factors such as:
- Bodies of water
- Protected and recreational open space
- Designated wetlands
- Slopes greater than 25%
- Current built features such as roads, parking lots, and driveways
- Easements

Using the erase tool in GIS, all man-made and natural development constraints were removed from the base map and the zoning and land use information intersected with the final attribute table. The maps below indicate the constraints that were removed from the base map, and the resulting buildable land map. Next, after copying the attribute table into excel, the remaining buildable land area was calculated and sorted by zoning type for further analysis.

Results

As shown in the tables below, Marlborough has roughly 9% of its total dry land area available for future development. Primarily this is the form of residential and industrial land. Square footage was predicted by removing 10-30% of the parcel to account for zoning restrictions and site amenities. With further breakdown of zoning classifications as described in the written report, limited industrial and single family residential land are the most common types available (37% and 25% of all buildable land respectively). Some of the effects of all this new development such as water usage and additional vehicles are particularly concerning and something the City of Marlborough should prepare for.

Buildable Land Summary

<table>
<thead>
<tr>
<th>Use Type</th>
<th>Acres</th>
<th># of Parcels</th>
<th>Low Sq Ft Estimate</th>
<th>High Sq Ft Estimate</th>
<th>% Total Buildable Area</th>
<th>% Total Dry Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>86</td>
<td>47</td>
<td>2,630,937</td>
<td>3,382,711</td>
<td>7%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Residential</td>
<td>527</td>
<td>539</td>
<td>16,074,684</td>
<td>20,667,451</td>
<td>43%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Industrial</td>
<td>623</td>
<td>127</td>
<td>19,011,064</td>
<td>24,642,797</td>
<td>50%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Total</td>
<td>1,237</td>
<td>713</td>
<td>37,716,746</td>
<td>48,492,959</td>
<td>100%</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

Notes:
- Low Square Foot Estimate is based on 75 gallons per person per day.
- High Square Foot Estimate is based on 30 gallons per 1,000 square feet of floor space.
- “Residential Water Use” is based on 75 gallons per 1,000 square feet of floor space.
- “Municipal Solid Waste” is based on 1026 lbs per person per year only.
- The number of “Students” is based on current average in Marlborough: 26.9% of households.
- “Additional Vehicles on Road” is based on the current average in Marlborough in that on average 36% of households own 1 vehicle, 36% of households own 2, and 17% of households own 3 or more.

Summary Build-Out Statistics

<table>
<thead>
<tr>
<th>Developable Land Area</th>
<th>1,237 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Floor Area</td>
<td>27,825,508 sq ft</td>
</tr>
<tr>
<td>Commercial Water Use</td>
<td>2,086,913 gallons/day</td>
</tr>
<tr>
<td>Total Residential Parcels</td>
<td>539</td>
</tr>
<tr>
<td>Dwelling Units</td>
<td>752</td>
</tr>
<tr>
<td>Future Residents</td>
<td>1676</td>
</tr>
<tr>
<td>Residential Water Use</td>
<td>125,720 gallons/day</td>
</tr>
<tr>
<td>Municipal Solid Waste</td>
<td>1,719,853 lbs/person/year</td>
</tr>
<tr>
<td>Students</td>
<td>385</td>
</tr>
<tr>
<td>Additional Vehicles on Road</td>
<td>940</td>
</tr>
</tbody>
</table>

Notes:
- Residential Water Use” is based on 75 gallons per person per day.
- “Commercial Use” is based on 30 gallons per 1,000 square feet of floor space.
- “Municipal Solid Waste” is based on 1026 lbs per person per year for residential uses only.
- The number of “Students” is based on current average in Marlborough: 26.9% of households.
- “Additional Vehicles on Road” is based on the current average in Marlborough in that on average 36% of households own 1 vehicle, 36% of households own 2, and 17% of households own 3 or more.

Jeanette Rebecchi
December 16, 2010
Data Sources:
- Mass GIS & City of Marlborough
- Projection:
  NAD 1983 State Plane Massachusetts Mainland
  FIPS 2001, Feet