



PLANNING BOARD

Report to Town Meeting

**ARTICLE 16. OFFICIAL ZONING MAP CONVERSION  
(Planning Board)**

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To see if the Town will amend Section 2.1, Zoning Map, of the Zoning Bylaw, by deleting the ~~lined-out~~ language and adding the language in ***bold italics***, as follows:

**SECTION 2.1 ZONING MAP**

The location and boundaries of zoning districts shall be ~~shown on a map of the Town~~ comprised of sheets numbered 1-B through 30-D at a scale of 1" = 200' and 1" = 400' and ***as delineated on the Town of Amherst Geographic Information Systems (GIS) map*** entitled 'Official Zoning Map, Amherst, Massachusetts, May, 1984 ***2011***,' as amended. This map, including overlays ***districts***, shall be on file in the Town Clerk's Office ***in electronic and hard-copy (paper) format with copies available upon request. The "Official Zoning Map" shall also be available for viewing on the Town of Amherst website.***

Said Zoning Map and amendments thereto as shall be duly adopted shall be considered an integral part of this Bylaw. ***Amendments to zoning district boundaries adopted by action of Town Meeting shall be shown as amendments to this Map or shown on such other maps as may be incorporated as part of this Zoning Bylaw.***

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**Recommendation**

The Planning Board voted 9-0 to recommend that Town Meeting adopt Article 16.

**Background**

Article 16 proposes to modernize Amherst's Official Zoning Map, changing it from an outdated paper version to a secure digital GIS map layer. The Official Zoning map accompanies and is part of the Zoning Bylaw, and is the legal mechanism by which zoning district boundaries are identified and their

distinct regulations are enforced.

Since the 1960s, Amherst’s Official Zoning Map—the official legal mapping of Amherst’s zoning districts—has consisted of a large-format (22” x 18”) paper document of over 90 sheets including 105 different numbered maps. Every time the Official Zoning Map information has been amended to show new district boundary changes, that information had to be placed, by hand, on an original base map (the Town Assessor’s cadastre), and then multiple copies made and distributed to the Town offices which use the map.

In the 1990s, the Town of Amherst entered the digital age in terms of its mapping. Beginning in the Planning Department and later in the Information Technology (IT) Department, a digital Geographic Information Systems (GIS) mapping system was developed which resulted in the remarkable array of online maps Amherst uses today.

But Amherst’s legally-recognized Official Zoning Map still exists only in the severely outdated paper form. **How outdated is it?**

- **Fifty-Five (55) Years Old** - The base mapping for the Official Zoning Map was developed using aerial photography and a statewide coordinate system dating from 1956 and deed information from 1957. State and federal coordinate systems for mapping were changed in the 1980s. As a result, Amherst’s Official Zoning Map no longer uses the same coordinate system as the rest of Massachusetts and the country.
- **Inaccurate Features** - The locations of ground features and topographic elevations (sometimes used to determine zoning district boundaries) of the Map are based on field conditions in existence in 1956. At that time, topography was being measured in 5 or 10 foot increments of elevation. Amherst’s current GIS system can indicate topographic differences of less than one (1) foot. In some cases, physical features like streams and roads have moved in the 55 years since the base maps were created. In reviewing the base map data compared to modern digital mapping, some streams were found to be 100 feet or more away from their locations on the Official Zoning Map.
- **Difficult to Update** - Property boundaries shown on the Official Zoning Map are taken from the Town Assessor’s maps. The Assessor’s map itself changes frequently in response to changing property boundaries. Over the years it has become increasingly difficult to keep both the base map information and the zoning district boundaries based on that information up to date on a paper map. The GIS system can make these changes easily and can be updated daily, if need be.

For over two years, at the request of the Planning Board, Planning and IT Department staff have been examining the Official Zoning Map to explore the feasibility of converting that Map to a data layer in the Town’s GIS system.

Most of Amherst’s zoning district boundaries are relatively simple and easy to identify. They are usually tied to readily identifiable features—property boundaries, the middle of the public way, specific

setbacks from front property bounds, etc. that pose no difficulty in being accurately converted to digital mapping. In fact, all of Amherst's zoning districts except for one have been accurately mapped and unofficially kept updated on Amherst's GIS system for more than a decade. Only one zoning district has consistently been a problem, until now.

### **The FPC District**

The Flood Prone Conservancy (FPC) district is unique among Amherst's zoning districts in that most of its boundaries are legally defined not by property boundaries, setbacks from roads, or other typical means, but instead by: 1) topographic elevations above mean sea level ("contour lines") indicating the approximate 100 year flood levels in the areas shown, or 2) by setbacks of varying widths from the banks of small streams. Going upstream or downstream, transitions from one topographic elevation to another are sometimes made by having the district boundary proceed along property bounds or roadways until the next elevation is reached. On all properties where the FPC District boundary is defined by specific elevations or stream setbacks, the Zoning Bylaw requires anyone applying for a permit to develop that property to undertake an accurate modern field survey to determine the actual FPC boundary on the ground—the illustrated locations of the lines on the Map are not sufficient.

Converting the outdated Flood Prone Conservancy (FPC) District to a digital version of the Official Zoning Map has been a challenge. The combination of inaccurate and outdated original base mapping (a vestigial mapping coordinate system, erroneous stream locations, approximated elevation lines, changing property boundaries, land features, etc.) has made it difficult to accurately convert the existing FPC District to a digital form without inadvertently changing its boundaries from those originally voted into being by Town Meeting. But two years of work by staff has allowed the Town to accurately represent what the original FPC District created by Town Meeting means on the ground in 2011.

It's important to remember that even after it is accurately mapped on the GIS system, the current FPC District will still be badly outdated. But before the outdated FPC District can be amended based on new flood studies (for which the 2011 Annual Town Meeting appropriated funding), the current FPC District needs to be accurately represented on the GIS system. Town Meeting can't be asked to vote to create new FPC boundaries based on new flood study information until it knows for sure where the current outdated FPC boundaries are in the real world. Otherwise there will be no way to know what impacts the new FPC District boundaries might have on properties in Amherst.

Fortunately, after considerable effort, the current boundaries of the outdated FPC District have been accurately identified and can be transferred to the GIS system as part of a new Official Zoning Map. In several places around Amherst—mostly in APR farming areas, Town conservation lands and similar locations—those boundaries of the FPC District tied to topographic elevations will in some places appear to shift in the GIS version. But this is a change in appearance only. The FPC zoning regulations have always required that any development of property must first accurately identify the FPC District based on new survey information. If the Official Zoning Map indicates that the FPC boundary corresponds to a specific numerical elevation at mean sea level on a given property, then an accurate modern determination of where that elevation is located must be used as the FPC boundary during the

development permitting process, regardless of where the graphic line for the FPC District boundary was drawn on the old paper Map.

In practice, there is a 96.71% match between the traced FPC boundary lines on the old paper Map and the revised lines in the Town's GIS mapping. The total apparent (visual) difference in acreage amounts to 65.5 acres. Much of this acreage is in low, flat farmland area where even a slight difference in the height of floodwater could create a large change in the amount of inundated land. Most of the land where the more accurate placement of the FPC boundary lines will make it appear to change is under APR (Agricultural Protection Restriction) or is town-owned. When only non-protected lands are considered, the visual difference between the FPC boundary on the old paper Official Zoning Map and the version shown on the GIS is only 25.5 acres.

### Security & Future Changes

Amherst's current GIS database is secured with permissions required for access to each layer. The Town's IT Department provides all internal users and web-based viewers with read-only access to all data layers. Editing capabilities are limited to specific departments or users. There is also an automated backup every hour that allows the Town to "roll back" the data to any particular point in time, ensuring that if edits are accidentally made, the data can be restored to a known prior state.

In the future, following every Town Meeting at which the Official Zoning Map was amended, a revised version of the Map would be printed out on paper, stamped, and archived by the Town Clerk, who is required under state law to keep on file "a true copy" of Amherst's zoning. As the proposed amendment itself provides, both digital and paper "hard" copies of the Official Zoning Map would be available to the public, and everyone could see and use the Map on the Town's website.

### Public Hearing

The Planning Board held a public hearing on the changes proposed under Article 16 on Wednesday, September 21. The Board heard a presentation by the Zoning Subcommittee and GIS Administrator Michael Olkin. There was no public comment. After further discussion, the Planning Board voted unanimously, 9-0, to recommend that Town Meeting adopt Article 16.