

Massachusetts Land Parcel Database, v. 1.15

Dataset Description and Field List

May 2019

The Massachusetts Land Parcel Database is a statewide atlas of more than 2.1 million land parcel boundaries and associated tax assessor data. Working from digital parcel and assessor records created and/or standardized by MassGIS (the Commonwealth's Office of Geographic Information), MAPC compiled data previously available only on a town-by-town basis in each of the state's 351 municipalities. In addition, we calculated additional statistics about each parcel, including floor area ratio, assessed value per area, impervious surface, and other indicators. This dataset is a unique resource for planners, researchers, advocates, and taxpayers interested in land use, urban form, development opportunities, and tax assessment across the state. We also hope that its availability and use will encourage municipalities to maintain and update their parcel boundary and assessment information and to submit those updates to MassGIS so that the dataset will remain current over time. Below we describe the key features of the dataset, the methods used by MAPC to summarize assessors' data, and the land use statistics we calculated. Additional details can be found in a technical appendix with a description of the process and the ESRI tools and python code used for processing the data can be found at www.github.com/MAPC/landparcels.

Data Sources

MassGIS' Level 3 Assessors' Parcel Mapping data set¹ is the primary source of information used for compiling the Massachusetts Land Parcel Database. MassGIS produced the following products for each city and town: 1) spatial data with parcel boundaries meeting the Level 3 specifications of the MassGIS Digital Parcel Standard², and 2) a table containing a standard extract of 25 elements from the tax assessor database. Data for each municipality must be downloaded as a separate database or shapefile. Since the City of Boston is not included in the MassGIS Level 3 parcel initiative, we requested and received parcel boundaries and assessors data directly from City of Boston staff. The Tax Assessor fields compiled here—including valuation, use, floor area, and more— date from Fiscal Year 2010 to FY 2019, depending on when MassGIS received and processed the data, or subsequent updates by MassGIS or MAPC. We used the most current Level 3 parcels datasets available in June 2018.

¹ <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/L3parcels.html>

² <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/standards/standard-parcels.html>

Summarizing Assessors Records

While most land parcels are owned by a single entity and assessed accordingly, there are other parcels with multiple ownership interests and separate tax assessment records. Condominiums are the most typical example—the land is held in common and each unit is assessed and taxed based on its value and share of the commonly held assets. In these cases, one parcel will have multiple associated assessor records. The “many-to-one” relation between assessor records and lot boundaries makes it difficult to map or analyze parcel characteristics directly from the assessor data. To overcome this difficulty, MAPC summarized selected assessor’s fields for each parcel by summing the totals, finding the range, or choosing the value of one selected record. Specific methods used for each field are outlined in the table below. Some key fields are discussed here, including MAPC-calculated fields.

Assessed Values and Last Sale Date/Price

Four value fields are included in the standard assessors extract: building value, land value, other value (improvements such as swimming pools), and total value. We summed the values from the assessor records associated with each parcel. It should be noted that condominiums generally have no land value associated with individual unit records—all the value is contained within the building value for each unit. As a result, statistics utilizing land value should exclude condominium parcels. The assessor data also provides the last sale date and last sale price where it is known (the presence of this data varies widely across municipalities.) Where there were multiple assessor records for a parcel, we selected the record with the most recent sale date and use that record to populate the last sale date and last sale price for that parcel. Data are current as of the Fiscal Year indicated, and have not been adjusted for inflation. Municipalities reassess all property every three years, so the year of assessment may precede the fiscal year.

Use Codes and Building Attributes

Each assessor record includes a numeric land use code (LUC) indicating the principle use of the property. The Massachusetts Department of Revenue publishes the official list of standard 3-digit classification codes³ for use by municipal assessors. There are two challenges when attempting to summarize land use codes from the assessors extract: first, where there are multiple assessors records associated with a parcel, each could have a different LUC, and LUC values cannot simply be totaled or averaged to yield a useful summary. Second, many assessors use nonstandard codes, either a 4 digit code or a 3 digit combination not included in the DOR standard; further, the description provided in assessors data means that the same nonstandard code may indicate different land uses in two different municipalities.

³ <http://www.mass.gov/dor/docs/dls/bia/classificationcodebook.pdf>

To account for more than one use code is associated with a single parcel, MAPC selected both the minimum and maximum values for the LUC in each parcel. (For parcels with a single assessor record, these will be identical.) For non-standard codes MAPC applied a two-step standardization process: First, trimmed four digit codes to three. Then, we matched nonstandard codes to a standard code using a manually created look-up table. The minimum and maximum values for both the “native” and standardized codes are provided in the parcel database. The “native” codes may be more useful for analysis within a given municipality, but the standard codes are essential for analyzing land uses across municipal boundaries.

Both building area and residential area values from the assessor records are summed for each parcel. Our review of records from various municipalities suggests that these fields are not consistently defined or measured by each assessor. In some cases, only one or the other field is filled in; in other cases there are values for both fields, which could be equivalent to gross and finished building area. Given this uncertainty, MAPC recommends that the most useful comparative statistic would be to take the larger of the two values (usually Building Area) and treat it as gross floor area. For the year built field, MAPC chose the most recent date.

Real Estate Types

Assessors’ data is gathered for the purposes of property value assessment and tax evaluation, therefore the land-use categories assigned to properties might not be fully suitable for urban and regional planning purposes, in particular land use planning. As an example, tax assessors assign properties that are tax exempt into a specific group of land use codes, regardless of use, which could be commercial, residential, or institutional, transportation, or open space. In order to standardize the Massachusetts land use categories, and facilitate the use of the tax assessment data in land-use planning practices, MAPC defined a Real Estate Type Categorization method.

Real Estate Type	Explanation
1	Single Family properties
2	Duplex/Triplex
3	Small Apartments (8 units or less)
4	Large Apartments (more than 8 units)
5	Multi-Use Residential: More than half residential use
6	Mixed use: More than half commercial use
7	Agriculture and Outdoor recreational activities
8	Commercial, retail, entertainment and medium sized offices with floor area ratio (FAR) of less than 0.75
9	Commercial, retail, entertainment and offices with floor area ratio (FAR) of 0.75 or more
10	Educational uses such as universities
11	Industrial properties, warehouses and utilities
12	Tax exempt properties such as public properties, charities, and local properties

A table relating standardized land use codes to real estate types can be found with the materials at www.github.com/mapc/landparcels.

Units

Unit counts from assessor records are often absent, and/or may be unreliable. We sum the values in the “Reported Units” field but also developed our “best estimate” of unit count by analyzing two other data points: the number of assessor records reported for each parcels, and the land use code. For example, where the use code is 102 (condominiums), we estimate units based on a count of assessor records. If the unit count is absent or inconsistent with the land use code, we use the low end of the range for land use code unit count as the estimated units.

Floor Area Ratio

Floor Area Ratio (FAR) is a measure of building density. FAR is estimated using three of assessors’ data set attributes: building area, residential area, and total lot area. To resolve inconsistent definitions of floor area, we use the larger of either building area or residential area and divide by total lot area in square feet. Values over 40 (the FAR of the densest parcel observed in Downtown Boston) were assumed to be erroneous and were removed from the final dataset.

Land Cover

MAPC calculated two aspects of land cover for parcels: percent of the lot covered by a building (rooftops), and percent of the lot that is impervious but not covered by a building structure (paved area.) MAPC used MassGIS's impervious surface⁴ layer (2005) and Building Structures⁵ layer (based on 2016 orthos) for the land cover estimates. These two estimates were combined to yield a total lot coverage estimate. Some parcels will have rooftops but no paved area if the development post-dated 2005 when the impervious surface data was collected.

Value metrics

In order to have a meaningful basis for comparing the assessed values of properties across Massachusetts towns, the values are normalized by calculating the total value per acre, building value per square foot of floor area, and land value per acre. We also estimate the ratio of building value to land value, to identify parcels with relatively high value improvements and those that may be underbuilt relative to their land value. Land value per acre, building value per square feet of floor area, and improvement/land value ratio are not calculated for condos where all value is treated as building value and land values are null.

⁴ <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/impervioussurface.html>

⁵ <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/datalayers/structures.html>

Maintenance

MAPC plans to maintain this database with updates published by MassGIS, with data collected through our planning activities, and with spot corrections of erroneous or misleading data as necessary. MassGIS will be vigorously encouraging communities to maintain their standardized digital assessor parcel mapping in compliance with Level 3 of the digital parcel standard. Maintaining Level 3 compliant data may be no more expensive than maintaining other forms of parcel mapping. The Department of Revenue's Bureau of Local Assessment may soon recommend that assessors maintain their mapping in compliance with Level 3 of the standard. MassGIS has assembled information and resources⁶ for municipalities interested in maintaining standardized parcel mapping.

Distribution

MAPC has currently made this data available as a single file geodatabase and as 3 shapefiles. Due to the large size of the data (> 3GB) it is not possible to store the data in a single shapefile without corrupting the attributes. As a result the data was split into 3 shapefiles covering the MetroFuture region, the Southeast region (including the Cape and Islands) and the western portions of the state.

Massachusetts Land Parcel Database -- Field List

Field Name	Field Alias	Description
mapc_id	MAPC Assigned ID	MAPC Assigned Parcel ID
muni_id	Municipal ID	Standard Numeric Municipal ID (assigned by MA DOR)
muni	Municipality	Name of Municipality
parloc_id	MassGIS Parcel ID	LOC ID from Level 3 Parcel assessor's tables. Unique parcel ID based on latitude-longitude of parcel centroid; assigned by MassGIS
poly_typ	Type of Parcel	Indicates type of ownership: FEE, TAX, ROW, WATER, PRIV_ROW, RAIL_ROW (Boston_poly for City of Boston)
map_num	Assessors Map Number	Local assessors map sheet number that contains the parcel

⁶ <http://www.mass.gov/anf/research-and-tech/it-serv-and-support/application-serv/office-of-geographic-information-massgis/municipal-gis/assessors-and-gis/maintaining-standardized-assessor-parcel-mapping.html>

mappar_id	Assessors Block-Lot Number	Parcel ID appearing on the original assessors map
loc_id_cnt	Count of Assessors Records	Count of Assessors records for each parcel (more than one if condominium)
land_value	Assessed Land Value	Sum of assessed land value for all associated assessors records. Generally zero for condominiums where land value is allocated among individual condo deeds. Value in \$
bldg_value	Assessed Building Value	Sum of assessed building value for all associated assessors records. For condominiums, generally includes land value. Value in \$
othr_value	Assessed Other Value	Sum of assessed value for accessory buildings or other improvements on all associated assessors records. Value in \$
total_value	Total Assessed Value	Sum of total assessed value for all associated assessors records Value in \$
ls_price	Last Sale Price	Last sale price, aggregated (sum of) assessor's records for each parcel. Value in \$
ls_date	Last Sale Date	Date of most recent last sale from all associated assessors records, maximum value among assessor's records for each parcel Value in YYYYMMDD
bldg_area	Gross Building Area	Aggregated (sum) of assessor's records of BLD_AREA (finished building area) for each parcel. Assessors' methods vary widely but gross building area may include garages, stairwells, basements, and other uninhabitable areas. (MassGIS field BLD_AREA). Units: square feet
res_area	Finished Building Area	Total residential living area aggregated (sum of) assessor's records for each parcel. Assessor's methods vary widely but net building area may exclude garages, stairwells, basements, and other uninhabitable areas (MassGIS field RES_AREA). Units: square feet
luc_1	Assessors Use Code (Min)	The minimum property type classification code found on all of the associated assessors records; may include non-standard codes assigned by local staff
luc_2	Assessors Use Code (Max)	The maximum property type classification code found on all of the associated assessors records; may include non-standard codes assigned by local staff
luc_adj_1	Standard Use Code (Min)	The minimum property type classification code, after non-standard codes were assigned by MAPC to the best match of standard codes
luc_adj_2	Standard Use Code (Max)	The maximum property type classification code, after non-standard codes were assigned by MAPC to the best match of standard codes
num_units	Reported Units	Number of units reported on assessors records, aggregated (sum of) assessor's records for each parcel.

units_est	Estimated Units	MAPC's best estimate of number of units, based on comparing the reported units, count of assessors records, and reported classification code
units_src	Estimated Units Source	Source of estimated units. units_nu = reported units; luc_adju = MAPC estimate based on use code; loc_idcn = count of associated assessors records for the parcel
num_rooms	Reported Rooms	Total room count as determined by assessor, aggregated (sum of) assessor's records for each parcel; may be absent for some property types or non-comparable across municipalities
yr_built	Most Recent Year Built	Most recent year built on associated assessors records, format YYYY
site_addr	Address	Address
addr_str	Street	Street
addr_num	Street Number	Street Number
addr_zip	Zip Code	Zip Code
owner_name	Owner Name	Owner Name
owner_addr	Owner Address	Owner Address
owner_city	Owner City	Owner City
owner_stat	Owner State	Owner State
owner_zip	Owner Zip Code	Owner Zip Code
fy	Fiscal Year	Fiscal Year of the assessor's data from which the information was extracted. Range: 2011-2019 (format: YYYY)
lot_areaft	Lot Area (square feet)	Calculated by MAPC based on digital parcel boundary. May include water area. Units: square feet.
far	Floor Area Ratio	A measure of density calculated by MAPC using either Gross or Finished building area (whichever is greater) divided by the Lot Area
pct_imperv	Percent Impervious (Total)	MAPC estimate of impervious cover (buildings and pavement) on the parcel based on a combination of MassGIS's impervious surface layer (2005) and building rooftop layer (2017)
pct_bldg	Percent Building Coverage	Percent of parcel estimated to be covered by a building
pct_pave	Percent Pavement Coverage	Percent of parcel that is non-rooftop impervious surface; may include parking areas, internal roadways, sidewalks, patios, or sandy/rocky ground.
landv_pac	Land Value per Acre	Assessed land value divided by lot area in acres. Units: \$/acre
Bldgv_psf	Building Value per Sq Ft	Assessed building value divided by the building/finished area in sq ft (recorded by assessors). Units: \$/square foot.
totv_pac	Total Value per Acre	Total assessed value divided by lot area in acres

bldInd_rat	Improvement to Land Value Ratio	Improvement value (building + other values) divided by total land value, where available
sqm_imperv	Total Impervious Area (sqm)	MAPC estimate of impervious cover (buildings and pavement) on the parcel based on a combination of MassGIS's impervious surface layer (2005) and building rooftop layer (2017) Units: square meters
sqm_bldg	Building Coverage Area (sqm)	Parcel area estimated to be covered by a building. Units: square meters
sqm_pave	Paved Coverage Area (sqm)	Parcel area that is non-rooftop impervious surface; may include parking areas, internal roadways, sidewalks, patios, or sandy/rocky ground. Units: square meters
realesttyp	Real Estate Type	One digit MAPC-assigned use category for all properties based on land use codes and FAR (density values)
Shape_Length	Shape_Length	Shape_Length
Shape_Area	Shape_Area	Shape_Area