

Growth Area Recalibration

Round 3 Methodology

October 2023



Land Needed

1 Population Projections

For each municipality, we calculated the number of additional residents expected between now and 2040 by taking 2040 projections and subtracting the 2020 population as reported in the U.S. Census.

2 Urban/Rural Split

- In municipalities with UGAs, we assigned 85% of growth to UGAs.
- We assigned additional population and housing units to UGAs to make up for municipalities with no UGAs. This shift ensures that 85% of growth *countywide* is directed into UGAs.
 - 3% of population was shifted
 - 1% of housing units were shifted

To assign new housing units to each UGA, we used two ratios:

- For municipalities with one UGA, we used a minimum of 85% or the ratio of urban to rural that we observed in 2002-2015 data, if larger.
- For municipalities with multiple UGAs, we used the 2015 buildable land ratio to split the projection among the UGAs in that municipality.

3 Housing Units Needed

We took the population projection for each UGA and divided it by the average household size for that UGA.

4 Residential Land Needed

We took the number of housing units needed and divided by two different sets of densities (housing units/acre):

- Trend density
 - Average density observed in each UGA from 2002-2015
- Policy density as defined in *places2040*
 - Central Lancaster UGA (Metro) = 9.0 units/acre
 - 9 UGAs = 6.5 units/acre
 - 4 UGAs = 5.5 units/acre

5 Non-Residential Land Needed

We multiplied the acres of residential land needed by a ratio of 0.08 acre/housing unit.

6 Adjustments

After we added residential land needed and non-residential land needed, we made a few adjustments. We:

- Added 18% for roads and other infrastructure
- Added 10 acres per 1,000 population for parks & open space
- Subtracted 5% for potential redevelopment

7 Total Land Needed

When we completed steps 1-6, this number was the result.

Buildable Land

The goal was to create a GIS layer that depicts “buildable land” within growth areas (UGAs and VGAs) as they are shown on the Future Land Use and Transportation Map in [places2040](#). Buildable land was generated by capturing all “undeveloped” land, and then removing land coverage depending on certain environmental constraints. To capture buildable land, a manual scan of aerial imagery was completed by LCPD staff, followed by automated processing of the initial data capture based on queries and overlay operations.

Data Used

Imagery:

- 2018 PEMA Aerial Imagery
- 2021 PEMA Aerial Imagery
- 2022 Imagery from Google Maps
(all but one section in the northwest corner of the county)

GIS Layers:

- Parcels
- Parks
- Cemeteries
- Preserved Farms
- Water Bodies
- Streams
- Wetlands
- Floodplains
- Land Use Land Cover
- Tile Network

Initial Data Capture

Product

Undeveloped Land layer, with each feature classified as either an entire parcel, or part of a parcel.

Process

Using ArcGIS Pro for desktop, LCPD staff visually scanned the aerial imagery and classified land as undeveloped. At the beginning of the process, the most recent imagery available to the county was captured in 2018. Some research revealed that Google Maps, accessed with a standard web browser, had 2022 imagery for all but a portion of the northwest corner of the county. A dataset was created to track where there were construction or demolition discrepancies to help staff capture the appropriate undeveloped land. 2021 imagery was provided to the county in the middle of the visual scan process, so staff used the 2021 imagery as the new baseline, but continued to compare with the Google Imagery which was more current.

Land was considered undeveloped if it was:

- **Not** committed/consumed land, including parks, preserved farms, golf courses, cemeteries, quarries, stormwater basins, and certain planned open spaces
- Free of buildings, “formal” parking/paved surfaces, and other coverage that essentially commit the land to another use
- Agricultural – All parcels with an 800s land use code (not preserved), where the imagery confirmed the use, was considered undeveloped (including the curtilage)

Note: Land “in transition,” or areas where ground disturbance for a project was visible, were considered developed.

All undeveloped land was classified as either:

- **Entire Parcel** – The entire parcel was considered undeveloped
- **Part Parcel** – Only part(s) of the parcel were considered undeveloped
 - Non-contiguous undeveloped polygons on the same parcel were created as “multipart” features, which means that they are one record in the overall layer to allow for easy parcel counting

Considerations for Manual Scan

Since this process is subjective, there is rarely one correct answer regarding how polygons should be chosen and/or drawn. To make decisions, staff considered the following:

Context/Pattern

- Road access (lesser weight for parcels and portions of parcels without road access)
- Lot size, configuration, and shape
- Position/layout of buildings

Consumed Land – Always

- Stormwater facilities
- Planned/maintained open spaces (often landscaped)
- Formal parking surfaces (even when on a separate lot)
- Agritainment uses such as corn mazes

Consumed Land – On the same lot as primary building(s), usually residential

- Gardens
- Sheds and play equipment
- Pools
- Fenced areas set up as pasture for animals (when not an 800 land use code)

Other

- When the elements above were on their own lot, separate from the primary building(s), they were considered undeveloped
- Parcels with 130 LUC (estates) were not considered buildable
- Power lines
 - Areas with high tension power lines were excluded if they were on their own linear lots, or made up the only open portion of a lot
 - If they ran through an open lot, or significant amount of open space in a partially developed lot, they were not addressed

Processing for Constraints

Product

The Undeveloped Land layer from the initial data capture, with a “buildable acreage” field that reflects the area of each feature that is buildable once the land area with environmental constraints was removed.

Process

1. Use GIS “Erase” geoprocessing tool to remove land within the following constraints, from the “undeveloped” layer
 - a. Wetlands (Forested and Non-Forested from Land Use Land Cover GIS layer)
 - b. Steep Slopes GIS layer
 - c. 100 Year Floodplains from FEMA GIS layer (this is how significant water bodies are addressed)
2. Calculate acreage of the erased undeveloped land in a new field
3. Join the newly calculated acreage field (buildable acres) to the original data capture layer using a unique identifier field

Adjustments Based on Partner Input

Products

Adjusted version of the Buildable Lands layer (both versions – the initial scan and with environmental constraints removed) based on comments received from the June 2023 regional meetings. All features that had a comment questioning the actual feasibility of development on the parcel, or the likelihood of development in the near future, were flagged in a new field. This allowed for new acreage calculations and visualization, without losing the initial polygons that were drawn.

Process

1. Download the point and polygon comment features from the two online surveys (ESRI Survey123)
2. Project the downloaded features into the projected coordinate system we use

3. Read the comment for each survey feature and classify in a new field if the comment triggers removal from the Buildable Lands layer
 - a. A survey feature was flagged for removal if it questioned the feasibility of development, or the likelihood of development in the near future
 - b. Comments that mentioned recorded plans or recently started development were not flagged as it's not certain that the projects will come to fruition (and they will be accommodating future growth)
4. In a new field in the Buildable Lands layer (both versions), classify polygons for removal that intersect with the comment features classified as triggering removal

Note: Some manual interpretation was done with the polygons because the comments did not always refer to all buildable land polygons within.

Legacy Areas

Legacy areas are developed areas immediately adjacent to – but outside of – existing *places2040* growth areas. Since there are many different examples of these areas, it is not perfectly clear which should come in, and how the boundaries should be drawn. The goal of this work was to use GIS to manually scan the edges of the growth areas and draw boundaries around areas to be considered for inclusion within the adjacent growth area.

Data Used

Imagery:

- 2021 Aerial Imagery

Layers:

- Parcels
- *places2040* Growth Areas
- Water Lines
- Sewer Lines

Product

A GIS polygon layer of areas to be considered for growth area inclusion. The layer includes attribute fields that will help staff and/or our partners decide which areas should come in.

- **Adjacent Dev:** Area is adjacent to development within the growth area
- **Appendage:** Area does not form an irregular appendage off the existing growth area
- **Barrier:** No barrier in between the candidate area and growth area (barriers include highways, major watercourses, and railroads)
- **Clear Boundaries:** Area has clear boundaries to draw around
- **Pattern Extension:** Area is of a similar land use pattern to adjacent developed area within the growth area
- **Donut Hole:** Area would not result in the creation of a doughnut hole (no growth area completely surrounded by growth area)
- **Creeping Dev:** Area does not have a sprawling or tentacle-like dynamic of irregular/uncontained development
- **Connects Growth Area:** Area does not fill in a gap between separate growth areas (since some original growth areas were purposefully drawn to retain a gap)
- **Water Line:** Area touches or is within the immediate vicinity of a water line
- **Sewer Line:** Area touches or is within the immediate vicinity of a sewer line
- **Small:** Area is 5 acres or larger
- **Score:** Sum of all fields above

Process

1. Scan outside edges of *places2040* growth areas, focusing on aerial imagery and parcel lines to see where candidate areas exist
2. Draw polygons around candidate areas that meet the following criteria:
 - a. Outside and adjacent to *places2040* Growth Area
 - b. Significant enough in size (depending on immediate context – long stretches of nothing may result in highlighting a small area that would not be highlighted in an area of small, speckled development all around)
 - c. Has enough of a boundary distinction for staff to draw boundaries
3. Fill in the scores for each of the attribute fields (note that many of these are subjective)
4. Track progress with a freehand line layer that includes a field noting whether the segment was:
 - a. Complete – Assessed and decisions were rather clear, or
 - b. Revisit – Assessed and decisions were hard to make