Buildable Lands Inventory

Monroe, Oregon

June 10, 2019

Prepared for the City of Monroe by Constellation Planning

Table of Contents

List of Figures and Tables

Overview of the Methodology

The purpose of this BLI is to measure and determine the supply of land available to meet the long-term growth needs of the community. The inventory addresses **residential and employment land needs** within the City's urban growth boundary (UGB). For the purposes of this report, "UGB" will refer to lands within the growth boundary, including lands that fall outside the city limits.

The City of Monroe BLI includes all residential, commercial, industrial, and public land designated in the zoning map within Monroe's UGB. The BLI builds off of an inventory of all tax lots inside the UGB, as well as a tax lot-level database from Benton County. The tax lot database is current as of February 15, 2019. Maps and tables produced for the BLI come from a combination of GIS data sources from Benton County, Oregon Department of Geology and Mineral Industries (DOGAMI), Federal Emergency Management Administration, United States Geological Survey, Oregon Spatial Data Library, City-adopted maps, as well as visual verification, to verify accuracy.

The BLI was created through a series of sequential steps based on definitions and best practices identified by Oregon's Department of Land Conservation and Development (DLCD).

- **Step 1: Develop an existing land use inventory.** This analysis identifies existing uses of each tax lot inside the UGB, using a simplified classification system:

    - Residential
    - Commercial
    - Industrial
    - Utilities
    - Institutional
    - Parking
    - Unused

    The inventory was completed through a combination of aerial imagery, assessor information, and "windshield" surveys.

- **Step 2: Identify and calculate constraints.** Based on state guidance for buildable lands inventories, constraints to development included in this BLI are:

    - Floodways
    - Slopes

    These above constraints are compliant with DLCD standards for determining "suitable and available" land in OAR 660-008-005 (2). Additionally, tax lots or portions of tax lots that are constrained are considered unbuildable, as consistent with DLCD guidance on BLIs. All constraints were merged into a single constraint file, which was then used to identify

the area of each tax lot that is constrained. The final buildable areas does not include areas identified as constrained. See the 'Definitions' section for more information on these constraints.

- **Step 3: Classify lands by development status.** Each eligible parcel is classified into one of the following categories, based on development status:

    - Vacant
    - Partially Vacant
    - Undevelopable
    - Fully Utilized

    Some lots were omitted as part of the analysis; this, along with the above, terms are defined in the 'Definitions' section. See Appendix A for a complete documentation of the methodology used to classify land by development status.

- **Step 4: Verification.** City and DLCD staff reviewed the BLI for accuracy. Suggested amendments and comments were incorporated after staff review.

The BLI was completed using Geographic Information Systems (GIS) mapping software. The output is a database, presented in both tabular and map format, at both the parcel and acreage level. Some of the data has been aggregated by zoning designations, as appropriate, to identify patterns in development availability and suitability.

Definitions

OAR 660-024 gives general guidance on how to calculate buildable lands, but leaves certain definitions up to the analysis. Via synthesis with assumptions provided in OAR 660-038, the following definitions were used to identify buildable land for inclusion in inventory analysis:

- **Vacant land:** Residentially-zoned tax lots over 3,000 square feet with no permanent structure and less than $10,000 in improvement value were considered vacant, based on OAR 660-038-0060 (2). Commercially-zoned tax lots are considered vacant if their improvement value is less than $5,000 or less than 5% of the land value of the parcel.
- **Partially Vacant land:** Partially vacant tax lots are those partially occupied by a use of structure, but which have enough land space to be further developed. OAR 660-038-0060 (3) stipulates that tax lots that are a one-half acre or larger are considered partially vacant if occupied by a single residential building. If the lot is occupied by multifamily housing, a visual inspection based on recent map imagery must evaluate the available remaining land. If the remainder of vacant land is greater than one quarter-acre, the lot may be considered partially vacant. It is assumed that public facilities either are or can be made available to serve the site. Residential buildings on partially vacant land are assumed to be one quarter-acre in size when evaluating infill potential per OAR 660-038-0060 (3)(a).

Commercial lots are considered partially vacant if their improvement value is between 5% and 40% of the land value of the parcel.

- **Undevelopable land:** Vacant parcels less than 3,000 square feet are considered undevelopable, even if contiguous, based on OAR 660-038-0060 (2). Partially vacant parcels which, once the quarter-acre building assumption is subtracted, have zero remaining acres of buildable land are also considered undevelopable.
- **Omitted land**: As a matter of course, institutional and utility lands, as well as public parks and churches, are not considered for the purposes of either residential or commercial land inventory, per OAR 660-024-0267(5)(g)(A) and OAR 660-038-0060(3)(c)(A). These lands are categorized as omitted.
- **Mismatched land**: A number of parcels are mismatched between zoning designation and actual use (e.g., a single-family home in a commercially-zoned parcel). These parcels were considered "mismatched" and did not count toward the buildable land. However, these parcels may have high redevelopment potential, and were categorized as utilized for the purposes of classifying every lot.
- **Fully Utilized land:** Fully utilized land contains no potential for additional development. Lands not classified as vacant or partially vacant are considered developed. Commercial lots are considered fully utilized when their improvement value is greater than 40% of the land value of the parcel. Parking uses are considered fully utilized.

The following definitions were used to identify constrained, unbuildable lands, based on OAR 660-038-0070 definitions of residential buildable land constraints:

- **Floodways:** Federal Emergency Management Agency (FEMA) maps from the National Flood Hazard Layer product were used to identify lands within floodplains. Portions of parcels within floodplains are considered fully constrained.
- **Slopes:** Digital Elevation Model (DEM) data provided by the State of Oregon were used to identify lands with slopes of 25% or greater. Portions of parcels with slopes greater than 25% are considered fully constrained for that portion, and buildable elsewhere.

Zoning

Figure 1 and Table 1 identify the amount and percentage of land within each zone in the Monroe UGB. For the purposes of this analysis, Benton County zoning designations were applied to parcels within the UGB but outside City limits and aggregated to the corresponding City zoning designation. Part of the zones incorporated from Benton County includes residential zones on the northeast corner and west end of the UGB. See Appendix A for more details.

Figure 1: Zoning, Monroe UGB, 2019

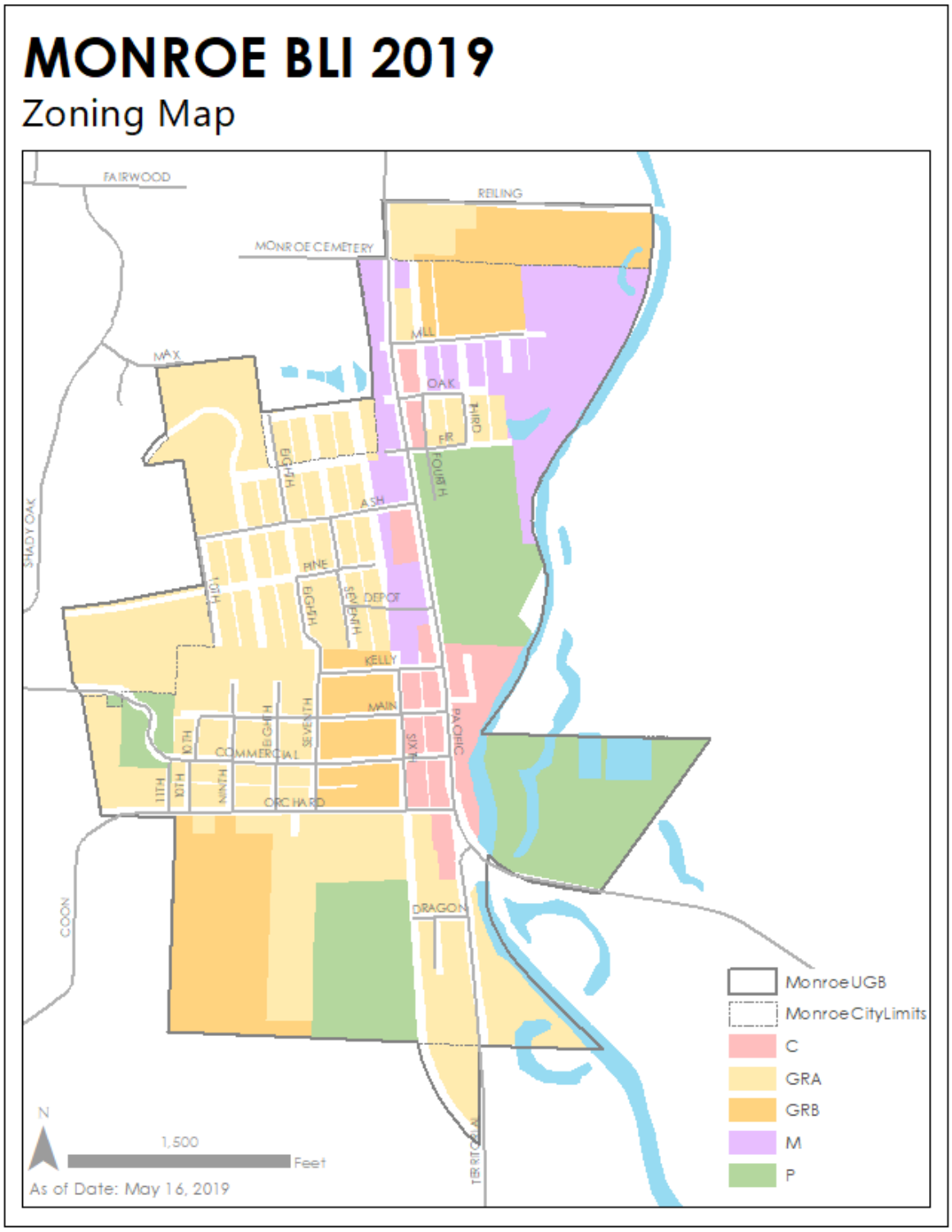


Table 1: Land by zoning designation, Monroe UGB, 2019

Zoning Designation	Total Acres	As Percentage
Residential	181.1	63.1%
GRA	131.5	45.8%
GRB	49.7	17.3%
Employment	43.2	15.0%
C	19.9	6.9%
M	23.3	8.1%
P	62.7	21.9%
Total	**287.1**	100%

The largest portion of the land base with the UGB (63.1%) is zoned for residential uses. Almost three-quarters of residentially-zoned land is designated for single-family residential use (GRA), with the remainder zoned for medium-density single family use (GRB).

Over one-fifth of all land (21.9%) is zoned for public use, which includes governmentally-owned lands. This zone consists primarily of treatment facilities located in the southeast corner of the City, as well as the two public schools located within the UGB.

The remaining land (15.0%) is zoned for employment uses, which is split fairly evenly between commercial and industrial uses. Most of the commercially-zoned land is located along Highway 99-West, the City's current downtown corridor. Some manufacturing land also runs along the Highway 99-West corridor, but the largest parcels are dedicated to a former brickyard on the City's north end.

Land Use Inventory

This land use inventory reflects the existing land uses of each tax lot within Monroe's UGB. This step builds a foundation for understanding the current uses, which may reflect conditional uses or any inconsistencies between land use and zoning designations.

Land use inventory designation types used for this report are:

- **Residential** includes all types of housing.
- **Commercial** includes all land used for goods- or service-oriented uses, including offices.
- **Industrial** includes all land used for storage, warehouse, distribution, manufacturing, assembly, and/or processing.
- **Utilities** includes all land uses for public utility provision, including the telephone service and public wastewater treatment pond.
- **Institutional** includes all land use for the administration of government and community services, including public schools.
- **Parking** includes all land dedicated entirely to surface parking, both paved and unpaved.
- **Unused** includes both undeveloped lots and empty buildings, essentially capturing all tax lots that do not fall into any of the use categories listed above.

Figure 2 and Table 2 show the results of the land use inventory.

Figure 2: Land use inventory, Monroe UGB, 2019

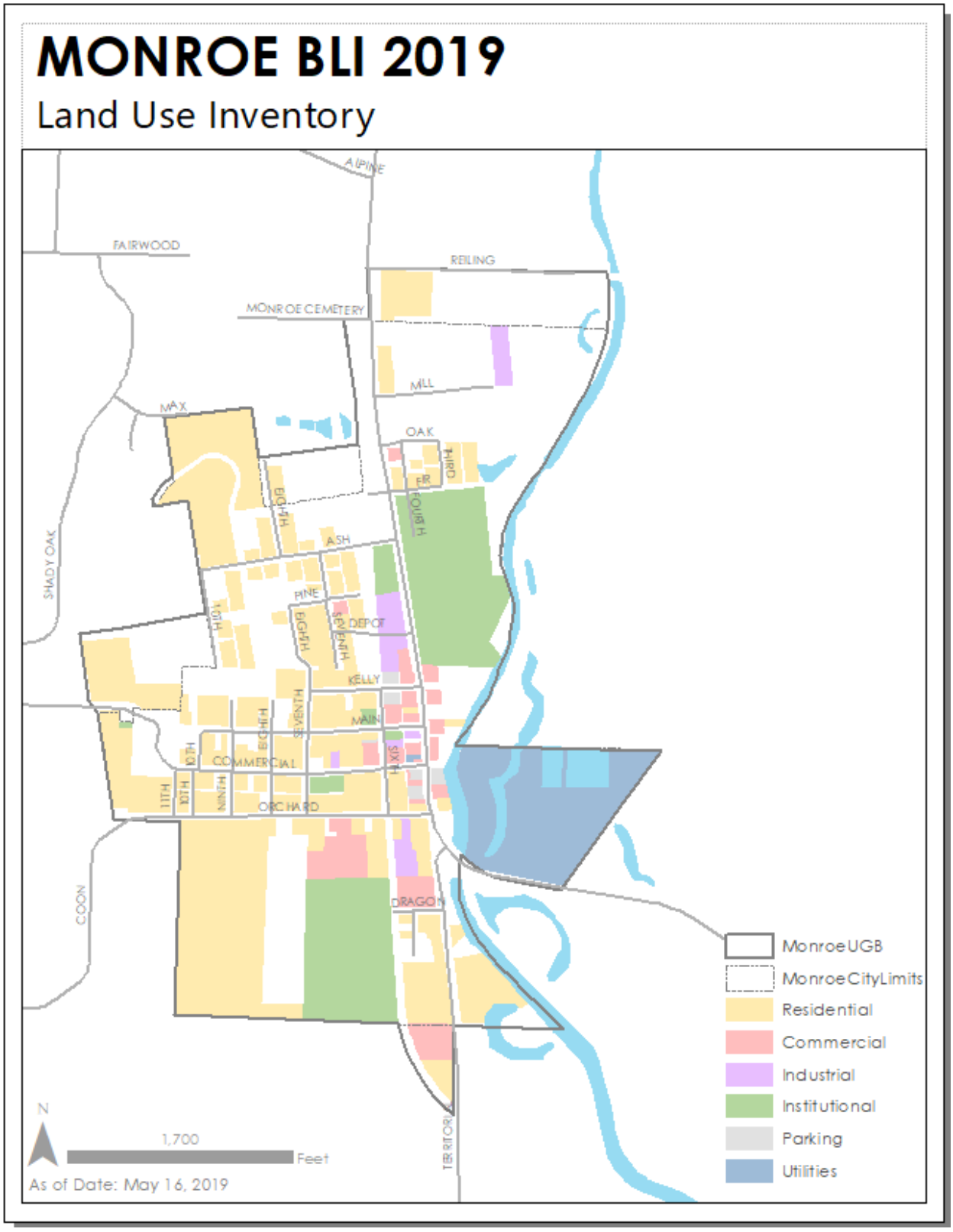


Table 2: Land use by acreage, Monroe UGB, 2019

Land Use Designation	Total Acres	Percent of Total
Residential	104.6	36%
Commercial	11.7	4%
Industrial	5.7	2%
Utilities	26.1	9%
Institutional	40.5	14%
Unused	97.0	34%
Parking	1.5	1%
Total	**287.1**	**100%**

The results of the land use inventory show some differences when compared to land by zoning designation. Land use designation is significant for evaluating development status, but also offers insight into how lands are being utilized compared to what would be expected via zoning. This provides context for whether buildable land comes mostly in the form of vacant lots, redevelopment potential of mismatched uses, or further development of existing buildings. Each of these may call for different land use policies. What follows is an overview of each use within the Monroe UGB.

Residential Lands

While almost two-thirds of the lands within the Monroe's UGB are zoned Residential (181.1 acres), less than sixty percent of residentially-zoned lands are utilized for residential purposes (104.6 acres). This difference is due in part to the sizeable acreage of unused residentially-zoned land in the west and northeast portions of the city. There are several tax lots that are zoned for residential use, but are currently occupied by commercial and institutional land uses. In addition, there are several sizable residential parcels located within commercial zones, contributing to the discrepancy in acreage between land that is zoned residential and land that is being used for residential purposes. These parcels are primarily located along the mid-lower section of the city and represent future redevelopment potential.

Commercial Lands

The land use inventory also shows that less land is being used for commercial purposes than is allocated through Commercial zoning designation (11.7 acres versus 19.9 acres). This is in part because the land use inventory accounts for parking uses separately from commercial uses. Currently 1.5 acres of land within the UGB is used for parking, and these lands are primarily located in Commercial zones along Highway 99-West and North 6th Street. There are also multiple commercial parcels that are currently unused, which are primarily located along Highway 99-West.

Industrial Lands

Only 5.7 acres of the 23.3 acres in Industrial zones are actually being used for this purpose. This difference results in large part from the decrease in industrial activity that Monroe has experienced since the closure of the brickyard in the north end of the city. Much of this formerly-industrial land is currently unused, suggesting that there is much more industrially-zoned Industrial than is actually needed.

Utilities and Institutional Lands

Utilities and institutional uses take up a large portion of the overall land in Monroe (26.1 acres and 40.5 acres, respectively). Parcels being used for institutional purposes include the City Hall, Fire Department, water tank for water supply, the US Postal Office, public schools, and the Monroe Community Library. Parcels being used for utility purposes include the telephone company and several lots near Highway 99-West. As mentioned in the 'Definitions' section, utilities and institutional lands are omitted as part of the buildable lands inventory. Most of the acreage is dedicated to educational uses, which is generally consistent with other cities.

Unused Lands

The land use inventory reveals that roughly thirty-four percent of land within the UGB is unused. Unused parcels are concentrated in the northeast corner and mid-west section of the UGB, as well as along the Long Tom River. A majority of unused lots fall within Manufacturing, Residential, and Commercial zones throughout the city.

Land Availability

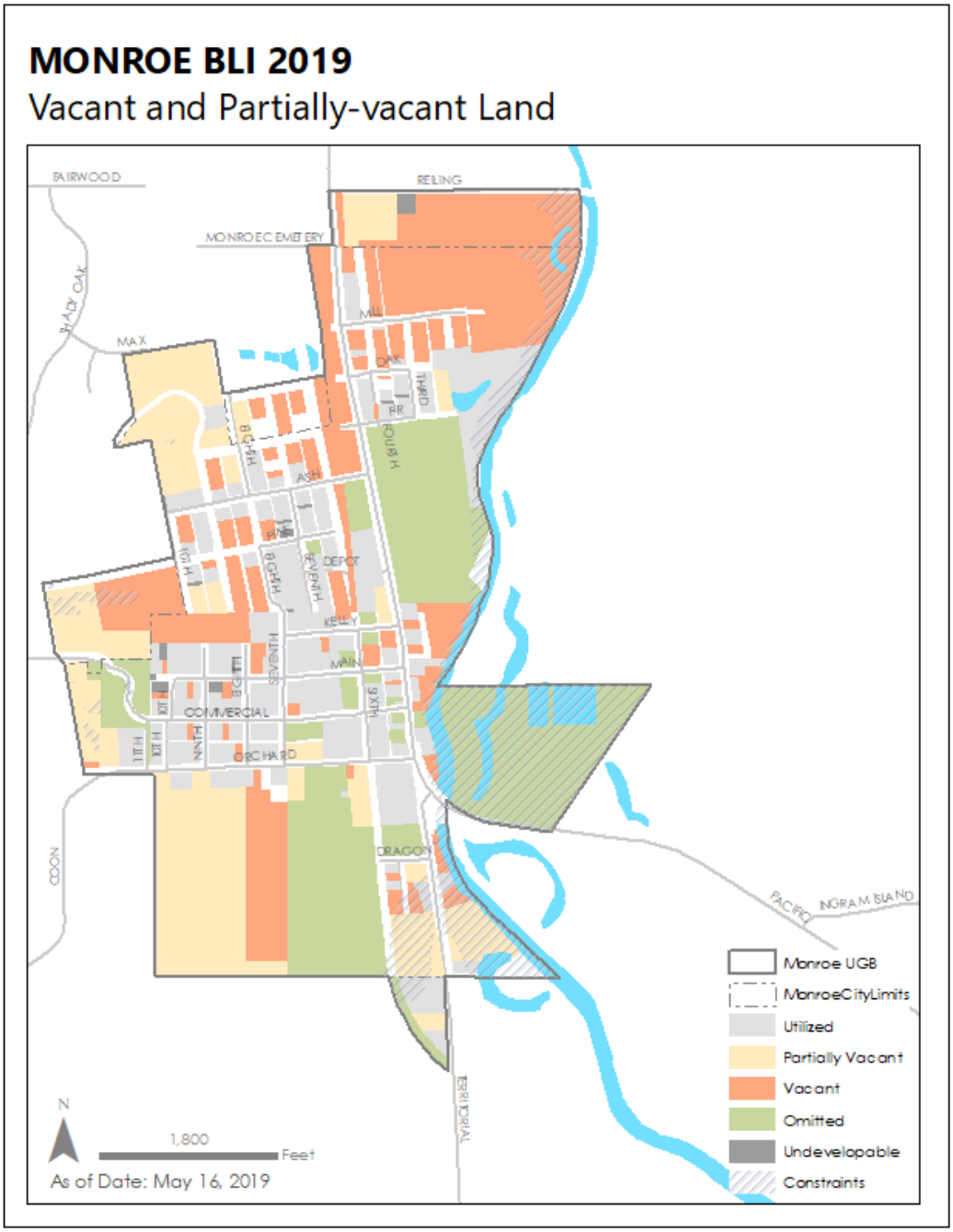
Under ORS 197.295(1), buildable lands are land parcels that have the potential and are suitable for residential uses. Buildable lands include both vacant parcels and developed parcels that have the potential to be redeveloped or developed further. A number of parcels were omitted based on OAR guidance. The remaining parcels are divided into the following four categories:

1. Vacant
2. Undevelopable
3. Partially Vacant
4. Utilized

Only lands that fall under the vacant and the partially vacant categories are counted towards the final buildable lands. Buildable lands are parcels that have the potential for further development. Residential buildable lands may be further utilized by partitioning or subdividing lots, constructing multifamily housing units with minimum parcel sizes, or modifying dwelling densities and other requirements within the zone.

Parcels committed to parking may be low barrier opportunities for development in the future, but they do not qualify as vacant lands for the purposes of the BLI. Converting current off-street parking uses to commercial uses should not require zoning changes. Conversion to residential uses may require modification of the current Monroe development code.

Figure 3: Lands by development status, Monroe UGB, 2019



Developed parcels within the Monroe UGB are concentrated mostly in the center of the city, while large acreages of vacant and partially vacant lands are generally located on the outer-boundaries of the city. Large acres of partially vacant parcels are especially present along the western edges of the city, while the largest vacant parcels are predominantly concentrated in the northeast.

Table 3: Lands by development status, Monroe UGB, 2019

Development Status	# of Parcels	Gross Acreage	Net Buildable Acres
Vacant	84	96.8	74.8
Partially Vacant	27	62.6	48.4
Undevelopable	17	16.6	0.0
Utilized	237	53.1	0.0
Total	**365**	**224.3**	**123.2**

Table 3 shows that there are 123.2 acres of buildable land in Monroe's UGB. Roughly forty percent of this land is partially vacant and has development potential, while the remainder is vacant and presents greenfield development potential.

Constraints per zone account for a significant portion of the difference between gross and net buildable acres (Table 4).

Table 4: Constrained acres by zoning designation, Monroe UGB, 2019

Constraints	Vacant	Partially Vacant	Total
GRA	2.4	8.4	10.9
GRB	2.4	0	2.4
C	2.4	0.0	2.4
M	4.1	0	4.1
Total	**7.3**	**8.4**	**15.7**

Table 5 shows the development status of unconstrained, buildable lands by zoning designation.

Table 5: Unconstrained, buildable land by zoning designation, Monroe UGB, 2019

Zoning Designation	Partially Vacant	Vacant	Total Buildable	Total Buildable as Percentage
GRA	27.4	35.5	62.9	51.1%
GRB	20.0	17.7	37.7	30.6%
C	1.0	4.6	5.6	4.5%
M	0.0	17.0	17.0	13.8%
Total	**48.4**	**74.8**	**123.2**	**100%**

Table 5 shows that a large majority of the total unconstrained, buildable acres in the UGB is located in Residential zones (approximately 100 acres). The acreage of buildable lands in residentially-zoned land is split fairly evenly between partially vacant lots, which present further development potential, and vacant lots, which present greenfield development opportunities. The majority of vacant and partially vacant acreage falls in GRA zones.

There is notably less unconstrained, buildable acreage in employment lands–Commercial (C) and Manufacturing (M) zones–totaling under twenty-three acres. Within employment lands, the

majority of buildable acreage is located in M zones and is vacant, at seventeen acres. This distribution is in large part due to the decrease in industrial activity that Monroe has experienced since the closure of the brickyard in the north end of the city. Most buildable acreage in C zones, on the other hand, is partially vacant (4.6 acres).

Figure 4 and Table 6 show residentially-zoned land by development status.

Figure 4: Residentially-zoned land by development status, Monroe UGB, 2019

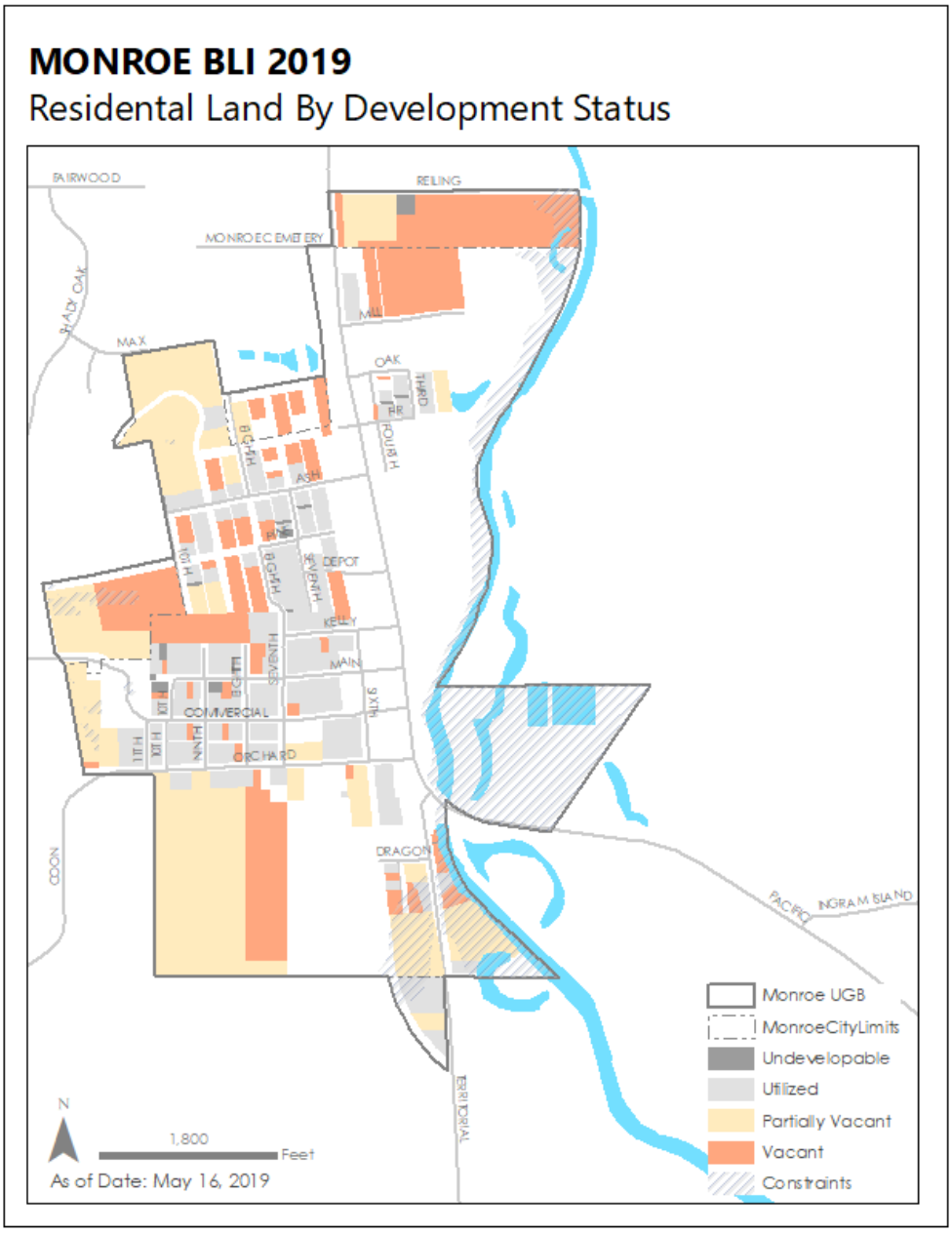


Table 6: Residentially-zoned land by development status, Monroe UGB, 2019

Development Status	No. of Parcels	Gross Acreage	Net Buildable Acres

Vacant	60	68.7	53.3
Partially Vacant	25	61.6	47.4
Undevelopable*	17	16.6	0.0
Utilized	198	42.1	0.0
Omitted	18	8.8	0.0
Total	**318**	**181.1**	**100.7**

* Undevelopable lands are omitted from gross acreage, as they are counted in vacant and partially vacant lands

The results show that there are over 100 buildable acres within the existing UGB for residential development. This acreage is evenly split between vacant and partially vacant lands. These findings indicate that with regards to residential lands, the City is underdeveloped in relation to the Monroe UGB and has ample land base for further residential development. Some of these parcels may constrain the type of residential development that is possible, due to the difference between lot sizes in the Monroe development code—which for single family residential range from 8,000 to 14,000 square feet—and the minimum vacancy size dictated in state administrative rules of 3,000 square feet. It is possible that more housing types may be required to support development on smaller lots.

Figure 5 and Table 7 show land zoned for commercial and manufacturing use by development status.

Figure 5: Employment-zoned land by development status, Monroe UGB, 2019

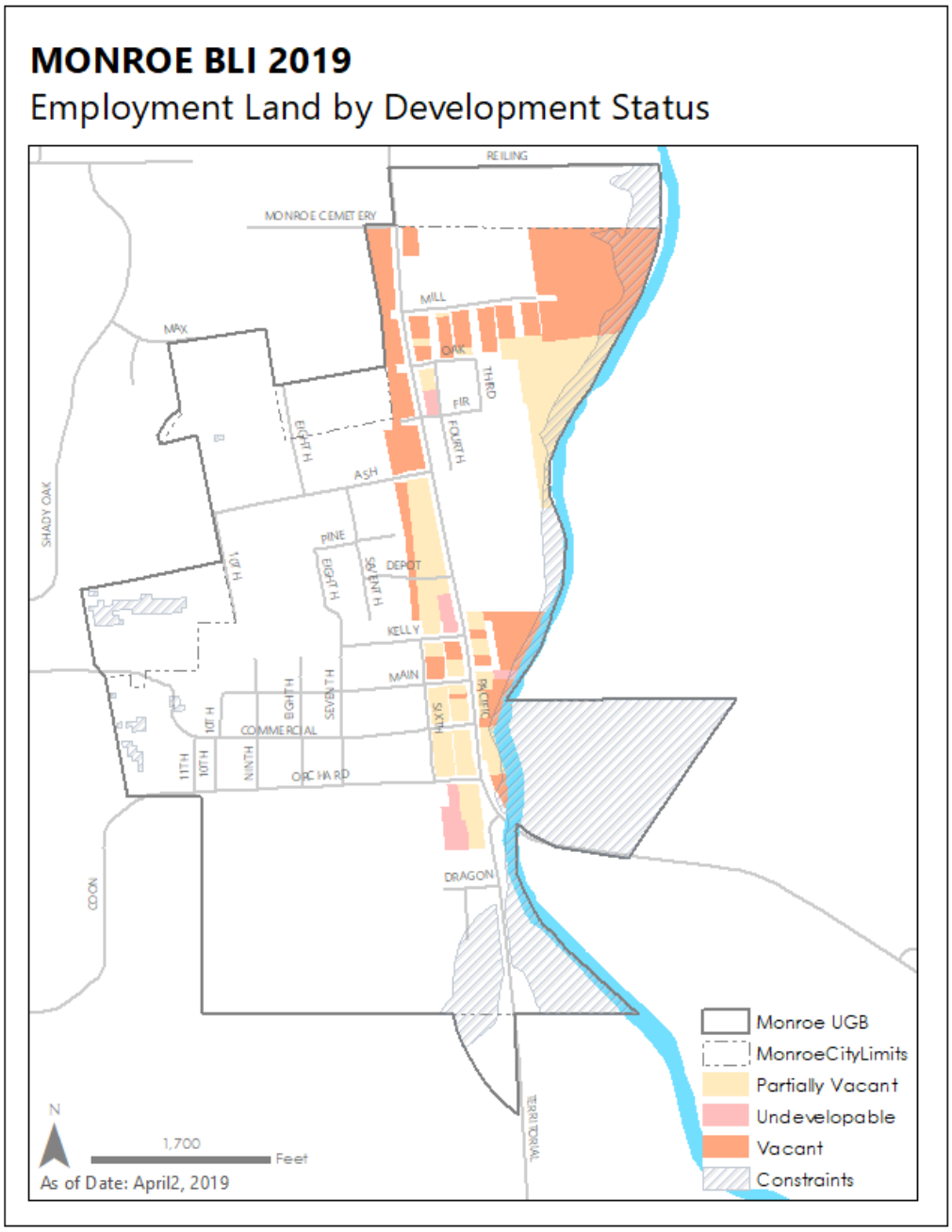


Table 7: Employment-zoned land by development status, Monroe UGB, 2019

Development Status	# of Parcels	Gross Acreage	Net Buildable Acres
Vacant	24	28.1	21.5
Partially Vacant	2	1.0	1.0
Utilized	39	11.0	0.0
Omitted	11	3.0	0.0
Total	**76**	**43.2**	**22.5**

The results show that there are approximately 23 acres of net buildable employment lands, predominantly vacant, that are available within the Monroe UGB. Available parcels are located mostly along Highway 99-West, the Northeast corner along Mill Street, as well as several parcels along the Long Tom River. These clusters of vacant employment lands serve as opportunities for future commercial and industrial development in and around the City's downtown area. As efforts to reorient the city along the Long Tom River progress, many of the affected parcels will be ripe for development.

A portion of lands zoned for Manufacturing include county-owned railroad right-of-way on the west side of Highway 99-West. This land has been historically allocated for railbeds, and thus may be a market deterrent for development.

Summary

Monroe has 287.1 acres of land within its UGB, of which 224.3 fall within residential or employment zones. All acres can be accounted for by subtracting the acreages per zoning type for each category from the gross acreage, which reveals the overall buildable acres in Monroe (Table 8).

Table 8: Summary of all lands by category, by zoning designation; Monroe UGB; 2019

Zoning Designation	Parcels	Designations (acres)						
		Gross	Utilized	Undevelopable	Constrained	Omitted	Mismatch	Buildable
GRA	261	131.5	32.1	16.6	10.9	7.0	2.2	62.8
GRB	57	49.7	7.0	0.5	2.4	1.8	0.2	37.7
C	61	19.9	5.5	0	2.4	3.0	3.5	5.6
M	18	23.3	2.1	0	4.1	0.1	0.0	17.0
Total	**397**	**224.3**	**46.7**	**17.1**	**19.9**	**11.8**	**5.8**	**123.1**

Note: Public zone ("P") omitted for the purposes of this table

Monroe has significant available land, over 120 acres, that can absorb future population and job growth. There may be opportunity to rezone large portions of land, as only 2.1 acres of the 23.3 available for industrial uses is currently utilized. This could be rezoned to support a relatively low amount (2.6 acres) of commercial land. Both low- and medium-density residential zones have large amounts of land throughout the city, leaving Monroe with numerous options for focusing and future growth.

Appendix A: Methodology for Land Classification

Development potential was generally determined using acreage sizes outlined in DLCD statutes. As of 2016, DLCD has provided a simplified buildable lands inventory methodology to support smaller jurisdictions, provided via OAR chapter 660, division 38. The standard BLI methodology is outlined in OAR chapter 660, division 24. This BLI synthesizes those two methodologies.

For the purposes of this inventory, wetlands and lands protected by Goals 5, 6, and 7 were not included in the aggregation of constrained, unbuildable lands. This decision is based on the following factors:

- Regulated wetlands are not identified in DLCD statute as precluding factor in identifying buildable lands. Development on wetlands is available, though it is more expensive. Additionally, most of the wetlands within Monroe's UGB are included in floodways, which were included in the calculation of constrained, unbuildable lands.
- Lands protected under Goals 5, 6, and 7 include, respectively: natural resources, scenic and open areas, and open spaces; air, water, and land resources; and areas subject to natural disasters and hazards. These lands are identified as significant assets for the state, and are thus protected from potentially harmful development, under both DLCD state planning goals and OAR 660-038-0070 (2) (e). The City of Monroe contains no Goal 5 resources within its UGB, so these lands are therefore omitted from constraints identified for the purpose of this BLI. The inclusion of floodways and slopes in the calculation of constrained lands captures Goal 6 and 7 resources that fall within Monroe's UGB.

Assumptions

There were minor discrepancies between the tax lot acreages provided in the Benton County tax lots data layer and GIS-calculated tax lot acreages. Additionally, the County tax lot acreage data field was incomplete. To ensure consistency, all tax lot acreage amounts were calculated in GIS. Acreages in this analysis will therefore not exactly match County acreage data.

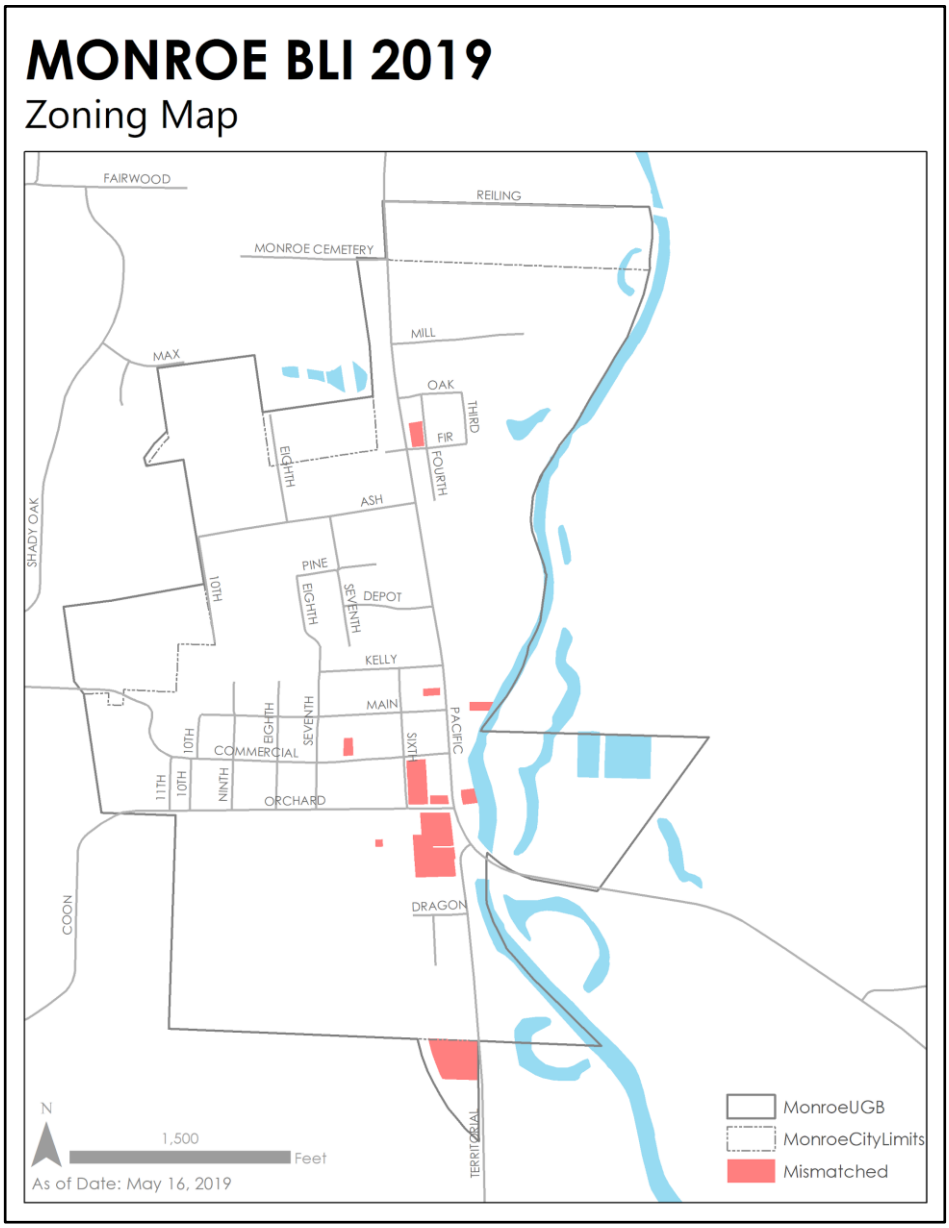
There are a number of adjacent, subdivided residential tax lots with the same owner. For the purposes of development calculations, all adjacent parcels with the same owner are merged into a single parcel. This decision reflects the findings of the land use inventory, which showed that these tax lots (usually yard spaces) were occupied and used by the owner of the adjacent residence. Adjacent "empty" lots with different owners were not aggregated.

Several lots zoned by Benton County exist outside of the Monroe City Limits but within the Monroe UGB. All of these lots are zoned Rural Residential, which allows for one single family home, manufactured or not, among several other small uses. For the purposes of the BLI, this was considered equivalent to the GRA zone. A significant portion of this land to the southeast of the

city is within the floodplain and thus fully constrained. The northeastern portions are either unused or contain a single family home. Single family homes were factored out via the partial vacancy assumption of one quarter-acre (see “Vacancy Calculation” below), meaning that for the purposes of this BLI, most of the land was considered vacant. Any mismatch between lot sizes between the Rural Residential Benton County zone and the Monroe GRA zone is thus insignificant.

Parcels with land use that is inconsistent with zoning designations are assumed to be utilized parcels, and are therefore not included in developable lands (Figure 6). Broadly, these are “mismatched” uses. Omitted uses, such as churches, public land, utilities, and parking were not considered mismatched.

Figure 6: Zoning and land use mismatches, Monroe UGB, 2019



The inventory utilized the following GIS layers as part of the analysis:

Table 9: GIS layers with sources utilized for Monroe BLI

Information needed	Layer/Product Name	Source
UGB, Monroe	Oregon Growth Boundaries - 2018	Oregon Spatial Data Library
Zoning, Monroe	Monroe zoning	Benton County
Tax lots, Monroe	Taxlots	Benton County
Floodplains	Floodplains	FEMA NFHL
Wetlands	Wetlands	Oregon Spatial Data Library
Slope	Oregon 10m Digital Elevation Model	Oregon Spatial Data Library
Water Features	National Hydrography Dataset	U.S. Geological Survey
Roads	Benton County roads	Oregon Spatial Data Library

In addition, a GIS layer of current uses was required. This was created through visual analysis via Google Maps, followed by on-site inspection of each lot. A new layer derived from the Benton County tax lots layer was extended to include attributes for use, which were updated after the inspection. Also included in this survey was determination of the housing type on each residential lot, with categories for single-family detached (SFD), multifamily (MF), manufactured homes (MaH), and mobile homes (MoH). For the purposes of the BLI, manufactured homes were combined with single-family detached homes since there are different safe harbor rules for multifamily versus single-family homes when looking at partially vacant lots.

Vacancy Calculation

OAR 660-024-0050 describes buildable lands inventory calculations for both residential and commercial land. OAR 660-038-0060 includes a simplified method to give jurisdictions a lower barrier path to UGB expansion, which was used to supplement some definitions in OAR 660-024-0050.

Residential

Vacant lands are not explicitly defined by administrative rules. For this inventory, based on several other adopted buildable lands inventories, and supplemented using OAR 660-038-0060, vacant residential lands are those which are greater than 3,000 square feet with improvement values of

less than $10,000. This only applies to unused or empty residential lands (by use). Unused or empty residential lots smaller than 3,000 square feet or with improvement value over $10,000 would therefore be undevelopable vacant lots.

Partially vacant lands must be at least one half-acre in size. The buildable area is the remainder of subtracting one quarter-acre from the overall area, based on OAR 660-024-0050 (2)(a). This applied to residential and multiple use lots.

Any lot over one half-acre is fully developed, per OAR 660-024-0050 (2)(b). Mismatched uses that fall into the vacant or partially vacant category were also considered fully developed. Further study on the redevelopment potential of these lots is warranted. However, this was a relatively uncommon case and did not meaningfully affect the results.

Employment

OAR 660-024-0050 and OAR 660-038-0120 offer diverging opinions on vacant employment lands: the former declares a safe harbor of lots greater than one half-acre being vacant as long as they do not include a permanent structure, while the latter bases its definition on the improvement value of the land, namely that the improvement value is less than either $5,000 or 5% of the land value of the parcel.

By coincidence, both definitions yield approximately the same amount of vacant commercial land. However, the OAR 660-024-0050 definition produces unpredictable results, with some lots that have significant improvement value and even in some cases new buildings being declared vacant. Because of this, we utilized the OAR 660-038-0120 definition, focusing on the improvement value of the land. This produced much more consistent results that generally fell along unused parcels. In addition, we placed a 3,000 square foot minimum on commercially-zoned lots, consistent with the residential requirement, since commercial forms are less disruptive than industrial forms and generally compatible with residential buildings.

Industrial (manufacturing) parcels were considered vacant if they were greater than one half-acre, per OAR 660-024-0050 (3)(a), as well as having an improvement value of less than $5,000 or five percent of the land value of the parcel, based on OAR 660-038-0120. This balanced both pure land availability as well as redevelopment potential where improvements were of low value.

Several parcels owned by Monroe Telephone Company and the Monroe School District are zoned commercial or manufacturing and have a land value of zero per county records. These were considered fully utilized by default.

Hazard Calculation

Slope was calculated using the Slope feature of QGIS, an open-source GIS software. The Slope feature takes a digital elevation model (DEM) and calculates the slope based on differences

between raster cells representing height above sea level. The DEM was furnished by DOGAMI via the Oregon Spatial Data Library.

Floodplain data is published by FEMA via their National Flood Hazard Layer product. For the purposes of this analysis, all A-level floodplains were considered fully constrained. This, combined with water features intersecting tax lots, created the flood hazard layer.

The slope layer and floodplain layer were unioned to create the overall hazard layer. Using the calculated area from the features in the GIS layer, the area was subtracted from each affected parcel to get the overall buildable area for the lot.