NFRMPO 2010 Land Use Allocation Model

TECHNICAL DOCUMENTATION

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North Front Range Metropolitan Planning Organization

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1.0 INTRODUCTION

The population of the NFRMPO Modeling Area shown in purple in **Figure 1** is expected to nearly double from 535,000 residents in 2015 to over 987,000 by the year 2045. To better understand the impacts of this growth and to assist long-range transportation planning efforts, the North Front Range Metropolitan Planning Organization (NFRMPO) maintains a Land Use Allocation Model (LUAM) to generate land use and socioeconomic data forecasts. The LUAM forecasts the location and timing of employment and household development patterns. Socioeconomic forecasts from the LUAM serve as inputs to the NFRMPO Regional Travel Demand Model (RTDM), which forecasts travel patterns including roadway volumes and transit ridership.

The NFRMPO Model Steering Team (MST) was pivotal to the development of the 2010 LUAM. The MST included transportation and land use planners, engineers, and other planning partners from jurisdictions and organizations within the NFRMPO Modeling Area. Members of the MST provided model inputs and reviewed and approved model outputs.

The 2010 LUAM was developed between 2017 and 2019 in support of the 2045 Regional Transportation Plan (RTP). The 2010 LUAM replaces the 2012 base year LUAM which was developed between 2013 and 2015 in support of the 2040 RTP.

1.1 Demographic and Economic Forecasting Framework

The 2010 LUAM builds upon the statewide and county-level forecasts produced by the State Demography Office (SDO) of the Colorado Department of Local Affairs (DOLA). County-level forecasts were refined by SDO staff to produce population, household, and job growth forecasts for the NFRMPO Planning Area and Modeling Area, both of which cover portions of Larimer and Weld Counties as shown in **Figure 1**. These regional demographic and economic forecasts serve as annual household and employment control totals for the 2010 LUAM, ensuring total growth in households and jobs each year do not exceed the SDO-provided forecasts. Control totals are discussed in greater detail in **Chapter 3** and the methodology SDO used for creating NFRMPO-specific control totals is presented in **Appendix A**.

The allocation of forecasted households and jobs within the Modeling Area was developed using UrbanSim, a location-choice model that considers the relationship between households, businesses, and developers to guide the spatial allocation of new households and jobs. Additional inputs to the UrbanSim model include base year data from the U.S. Census, local government zoning codes and comprehensive plans, and recently constructed and committed development. These datasets provide information at the local level and facilitate allocation of forecast growth to individual Census Blocks. The relationship between the different datasets and processes is shown in **Figure 2.**

Figure 2Figure 1. Modeling Area, Planning Area, and Air Quality Boundaries

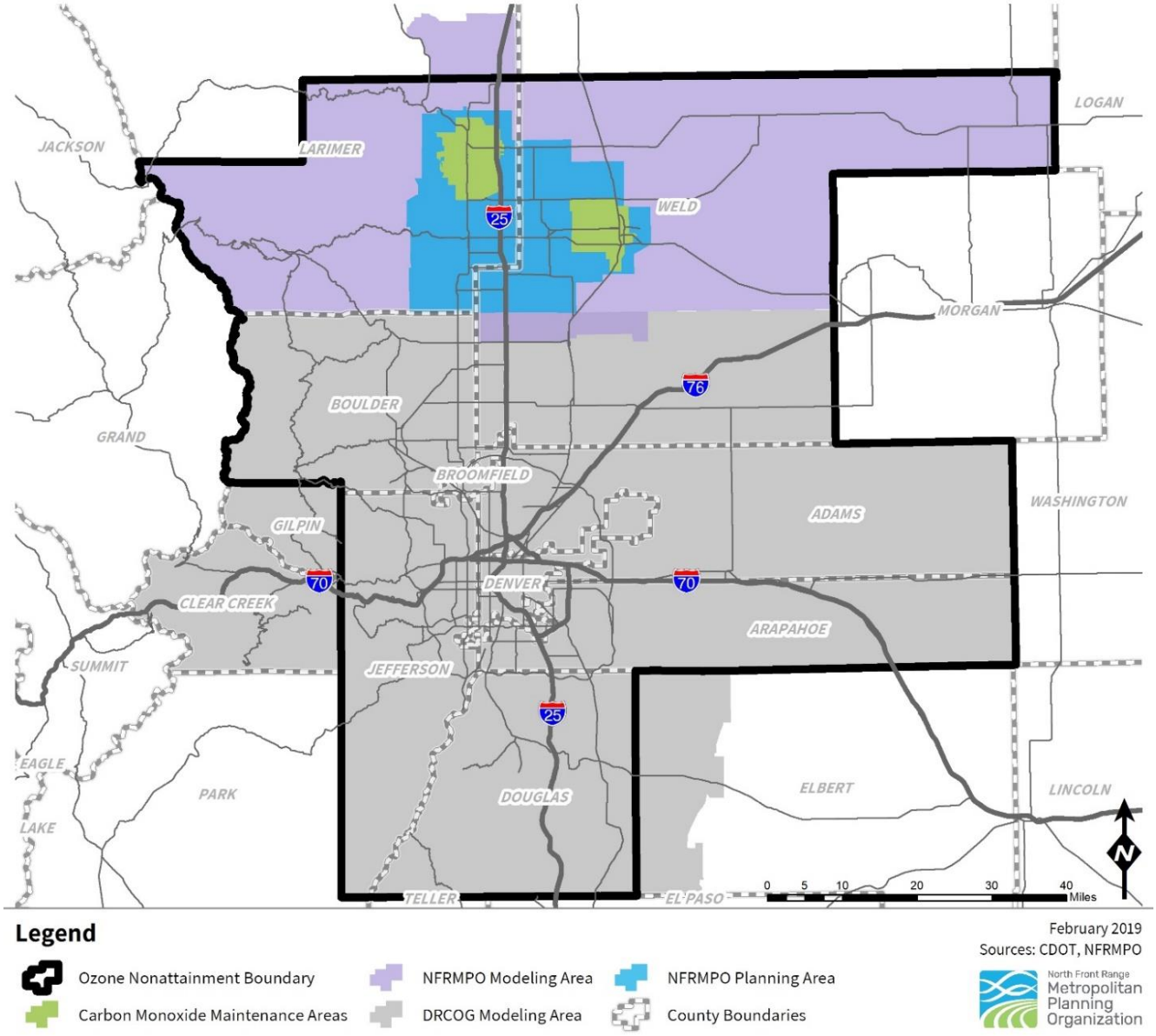
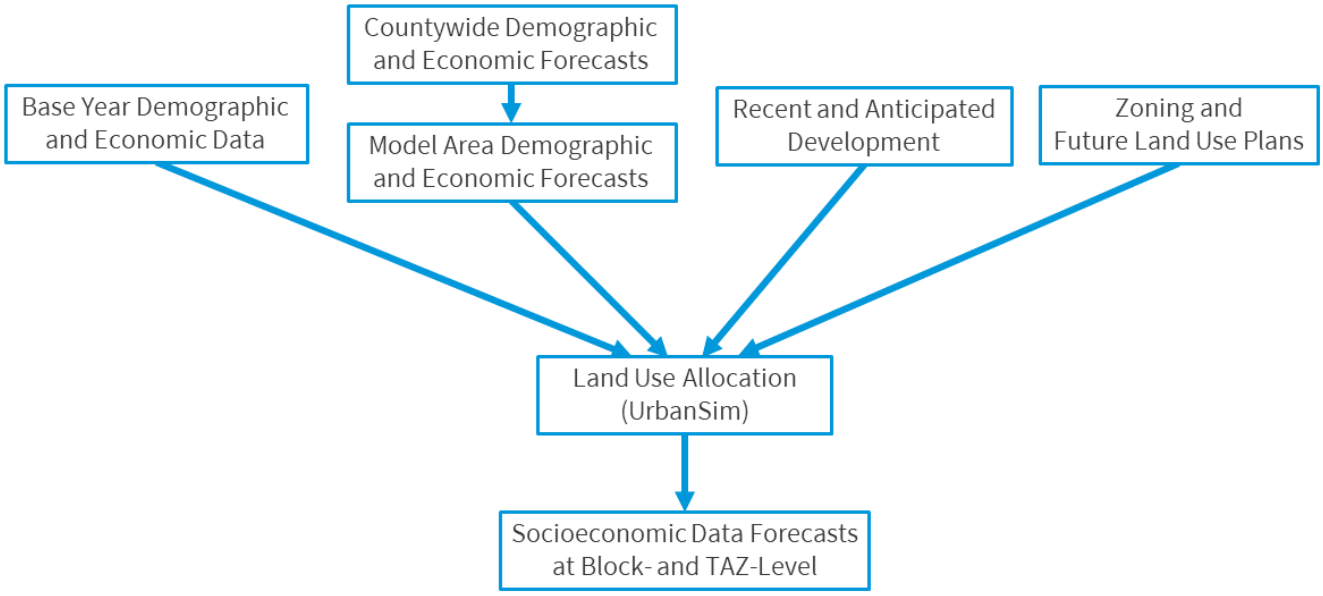


Figure 2. Demographic and Economic Forecasting Framework



1.2 Forecasting Geography

Land use and socioeconomic forecasting was performed at the Census Block level by the UrbanSim model and aggregated to the Traffic Analysis Zone (TAZ) level. TAZs are small areas defined for use in travel modeling. They are typically bordered by roadways or geographic features that limit direct travel between TAZs. They are often, but not always, made up of homogenous activity (i.e., all residential activity, all commercial activity, etc.). For the 2010 LUAM, TAZs were updated to align with Census Blocks for easier integration into the UrbanSim model. The updated TAZs also aligned with municipal boundaries and future growth boundaries where possible to make model outputs more useful to local agencies. There are 1,205 TAZs in the NFRMPO Modeling Area. LUAM results were reviewed and analyzed at the TAZ level.

Forecasting was conducted for the NFRMPO Modeling Area, which extends beyond the NFRMPO Planning Area to facilitate ozone conformity analysis for the Northern Subarea of the Denver Metro/ North Front Range Nonattainment area. The Modeling Area, NFRMPO boundary, and air quality boundaries are shown in **Figure 1**.

1.3 Allocation Process Overview

The 2010 LUAM uses the UrbanSim model, hosted on the UrbanCanvas Modeler web-based platform, to allocate households and jobs by Census Block. UrbanSim is a data-driven, location-choice model that provides a behavioral representation of the real estate market. The UrbanSim documentation describes the model as follows:

"UrbanSim works at the microsimulation level representing individual persons and households. UrbanSim simulates the interactions among households, businesses, and developers within real estate markets. By modeling how households trade off housing costs, accessibility, and housing and neighborhood amenities, UrbanSim microsimulates households' choices to move within a year, make a new location choice, and to rent or own. UrbanSim also microsimulates employment dynamics, including firms' location choices. Furthermore, the model microsimulates developers' choices of what kind of buildings to build, where, and when, and whether to redevelop existing properties." [1]

The UrbanSim model is available at the Block level and the parcel level. The 2010 LUAM uses the Block-level model, which provides several advantages to mid-sized MPOs including a significantly reduced demand for user-provided data while retaining a data-driven allocation mechanism. The UrbanSim methodology is powered by statistical models estimated using observed local data. Additionally, outputs are readily aggregated into larger Census geographies or disaggregated into synthetic household-level data.

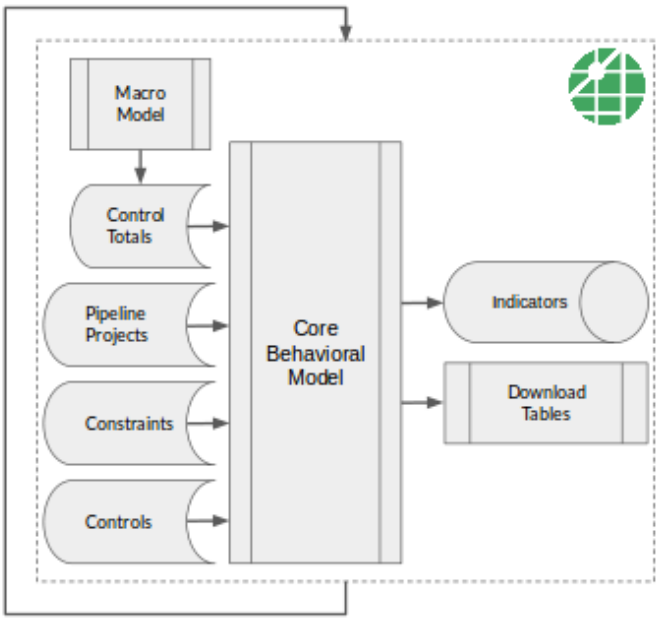
The UrbanSim model is capable of connecting dynamically to the travel demand model by receiving travel time information, known as travel model skims, to incorporate accessibility into the land use allocation process. This two-way exchange of information helps capture the interrelationships between transportation and land use over time. This feature of UrbanSim was not utilized for the 2010 LUAM. Instead, the land use and travel models were connected in one direction only by using the 2010 LUAM model outputs as inputs to the 2015 RTDM.

The 2010 LUAM begins with base year data from the 2010 U.S. Census as described in **Chapter 2.** During the model simulation, households and jobs are moved and added to Census Blocks within the NFRMPO Model Area until annual control totals are achieved. Control totals are described in more detail in **Chapter 3**. To better reflect socio-political forces on regional growth and development, the Block Model allows users to upload constraint layers reflecting the maximum allowable residential and employment densities according to zoning codes and/or land use plans and information about recently constructed and new development. These inputs are described in **Chapter 4** and **Chapter 5**. The UrbanSim allocation process is illustrated in **Figure 3**.

Two notable refinements were made to the NFRMPO UrbanSim model to more closely match anticipated growth. The refinements include recalibrating the model to better match observed population change within Growth Management Areas (GMAs) and re-specifing the model to include household size as an explanatory variable to improve the allocation between Larimer and Weld counties. Additional detail on these refinements is presented in **Section 6.3.**

[1] UrbanSim Cloud Platform Documentation, https://cloud.urbansim.com/docs/

Figure 3. UrbanSim Land Use Allocation Process



Source: *UrbanSim Cloud Platform Documentation Release 0.10.1*

2.0 BASE YEAR DATA

The UrbanSim Block Model uses three datasets from the US Census Bureau to establish base year household and employment characteristics: the 2010 decennial census, the 2009-2013 American Community Survey (ACS), and the 2011 Longitudinal Employer-Household Dynamics (LEHD).

Whenever possible, Census Block data is used to inform the base year. However, certain data are only available at the Census Block Group level. The decennial census provides total households, household size, tenure (rent or own), and total population at the Census Block level, while the ACS provides more detailed attributes such as income, auto ownership, and worker status at the Census Block Group level. The UrbanSim model uses a population synthesizer to apply detailed attributes from the Census Block Group level to the Census Block level. The LEHD dataset provides the number of jobs categorized into 20 industries at the Block level; however, the data includes noise infusion to protect confidentiality which reduces spatial accuracy. The industrial categories in LEHD are organized using the 2-digit North American Industry Classification System (NAICS). UrbanSim models are calibrated using ACS and LEHD data at the Public Use Microdata Area (PUMA)-level.

2.1 Revising the Base Year Data

The base year data inherent to the UrbanSim Block-level model required revisions to correct for instances of over or under-allocation of jobs. Mis-allocation of jobs is common and typically occurs when decentralized jobs are assigned to a central location, such as an administration building or headquarters building, or due to the noise infusion in the LEHD dataset.

NFRMPO staff used the 2012 Quarterly Census of Employment and Wages (QCEW) dataset, which was manually revised to account for these misallocations during the previous model update, to validate the base year LEHD data. Blocks with universities, schools, administration buildings, headquarters, and Blocks with unexplained anomalous trends were examined closely and compared against the 2012 QCEW dataset[2] to determine if a misallocation occurred. Some misallocations were addressed by removing jobs from specific Block(s) and adding them to another Block or set of Blocks. Other times, swapping the jobs with another Block or set of Blocks was not feasible. Due to those cases, the total number of jobs within the region was modified compared to the original dataset for 2011. Annual employment control totals corrected for this inconsistency. Additionally, the base year data was mapped as a transparent layer over an aerial base map and spot checked for unusual activity. This methodology was especially helpful in identifying headquarters, unusual concentrations of home offices, and misidentified job sectors.

Employment within the educational sector was checked against employment at schools and universities. Public and private K-12 school faculty data were obtained from the National Center for Education Statistics (NCES).[3] Support staff employment was estimated by doubling the faculty employment at each school based on the faculty to staff ratio at the Thompson School District. Faculty and staff data for Colorado State University (CSU) were obtained from the annual CSU FactBook[4] and data for the University of Northern Colorado (UNC) were obtained from the UNC Office of Institutional Reporting and Analysis Services. The faculty and staff data were then compared to the LEHD data for educational services sector (NAICS 61) employment by Census Block, with edits made to move educational service jobs away from Blocks without schools and toward Blocks with schools. Educational sector employment was not completely cleared from Blocks without schools, since some educational employment occurs at non-school sites such as testing centers and tutoring businesses.

3.0 HOUSEHOLD AND EMPLOYMENT CONTROL TOTALS

Control totals are used in land use modeling to ensure the model adheres to anticipated growth over the duration of the modeling horizon. Control totals determine the total number of households and jobs anticipated for each year; the LUAM then assigns households and jobs to Blocks until the annual control totals are met.

For the 2010 LUAM, population, household and job projections for the Modeling Area were developed by the SDO using the methodology detailed in **Appendix A**. Estimates were

[2] 2017 QCEW data was procured but due to timing constraints was not revised to address centralized location issues and was not used as part of this model update.

[3] https://nces.ed.gov/

[4] http://irpe-reports.colostate.edu/pdf/fbk/1617/FactBook_2016-17_Final.pdf

provided for 2010 and 2015 and projections were provided for 2020 to 2050 in five-year increments. Annual control totals were estimated by interpolating between the five-year intervals using the Compound Annual Growth Rate (CAGR) for each five-year interval. UrbanCanvas Modeler only accepts household and job control totals and does not use population control totals. Instead, UrbanCanvas Modeler estimates household size for each synthetic household in each forecast year. Initial LUAM runs forecasted higher average household size in 2045 than forecasted by the household and population control totals developed by SDO, resulting in an over-estimation of population by the model. To correct for this over-estimation, household control totals were redefined by household size as follows:

1. The annual population control totals were converted to household population by removing the population estimated to live in group quarters, which was 2.8 percent according to 2010 Census data for the region.

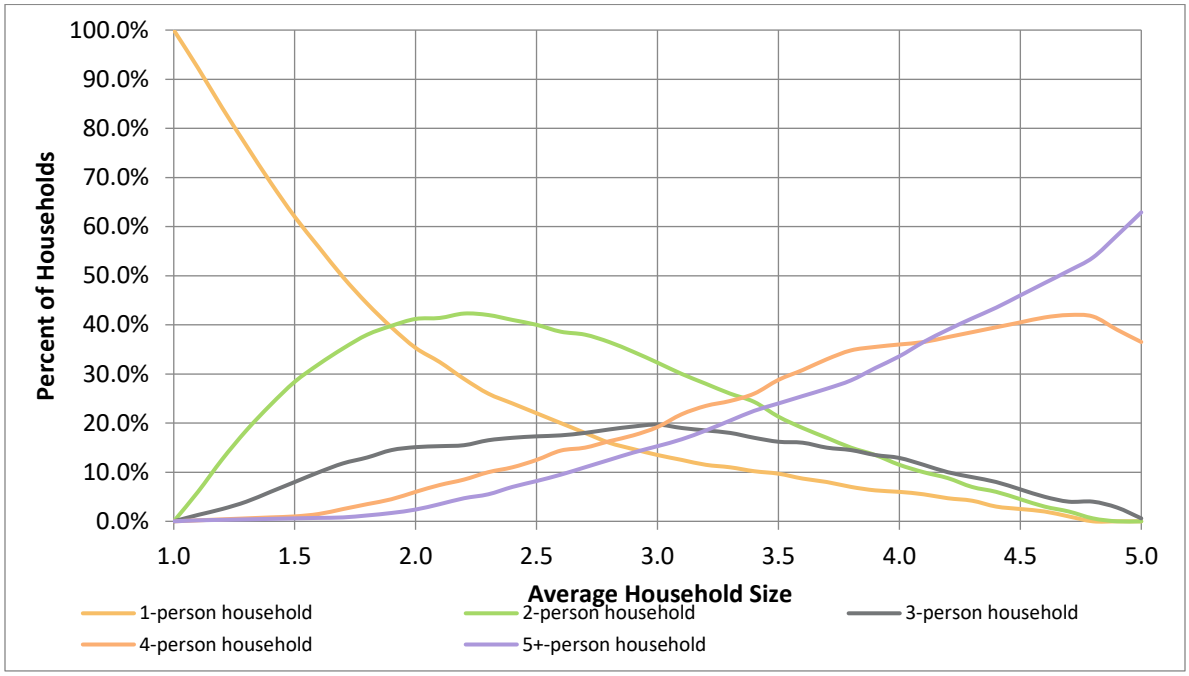
2. For each forecast year, the annual household control total was divided by the annual household population control total to produce an annual average household size for the region.

3. The household size disaggregation model shown in **Figure 4** was used to identify the distribution of 1, 2, 3, 4, and 5+ households associated with that average value.

4. The factors identified in Step 3 were applied to the annual household control total to produce annual household control totals by household size.

5. In some cases, the new household size distributions implied a decrease in households for certain household sizes from the 2010 base year, which would have significantly impacted the household allocation patterns within the region. To prevent this decrease, estimated number of households by household size were not allowed to fall below UrbanSim's original distributions, which affected years 2010 through 2016.

Figure 4. Household Size Disaggregation Model



Source: *North Front Range 2012 Base Year Regional Travel Model Technical Documentation*

In contrast with the 2012 LUAM, this model update did not identify sub-regional control totals. Future efforts may consider developing job control totals by NAICS code, if data is available, to better reflect anticipated shifts in industries over time.

Table 1 through **Table 3** show the population, household, and job estimates and forecasts provided by SDO for the NFRMPO and the NFRMPO Modeling Area through 2045. In addition, the population and job tables include the SDO forecasts for the State of Colorado and for the portions of Larimer and Weld counties within the NFRMPO. Household forecasts were not provided for those geographies. Only the household and employment estimates for the NFRMPO Modeling Area are used as control totals within UrbanSim. The remaining forecasts provide context for the control totals.

Between 2010 and 2045 population within the NFRMPO Modeling Area is forecast to increase 2.1 percent per year on average, higher than the statewide forecasted growth of 1.3 percent per year. The portion of Weld County within the NFRMPO is expected to grow more quickly than the portion of Larimer County within the NFRMPO. Similarly, the forecasted job growth for the NFRMPO Modeling Area of 2.0 percent is higher than the statewide forecast of 1.4 percent over the same timeframe and the number of jobs within Weld County is expected to grow more quickly than in Larimer County.

Table 1. Population Estimates and Forecast, 2010-2045

Geography	2010	2015	2020	2025	2030	2035	2040	2045	Average Annual Percent Change 2010-2045
Colorado	5,049,935	5,448,055	5,908,335	6,372,724	6,837,206	7,278,619	7,685,560	8,053,832	1.3%
NFRMPO	434,973	483,570	543,571	609,531	676,883	745,778	814,362	883,686	2.0%
Larimer in NFRMPO	277,414	307,214	335,229	364,548	392,665	419,396	445,399	472,373	1.5%
Weld in NFRMPO	157,559	176,356	208,341	244,982	284,218	326,382	368,963	411,313	2.8%
NFRMPO Modeling Area	481,779	535,716	603,126	677,369	753,348	831,256	908,869	987,255	2.1%

Source: *State Demography Office, Department of Local Affairs*

Table 2. Household Estimates and Forecast, 2010-2045

Geography	2010	2015	2020	2025	2030	2035	2040	2045	Average Annual Percent Change 2010-2045
NFRMPO	165,996	184,617	209,749	238,497	267,698	296,918	326,031	356,463	2.2%
NFRMPO Modeling Area	185,139	205,950	234,351	266,887	300,014	333,255	366,402	401,016	2.2%

Source: *State Demography Office, Department of Local Affairs*

Table 3. Job Estimates and Forecast, 2010-2045

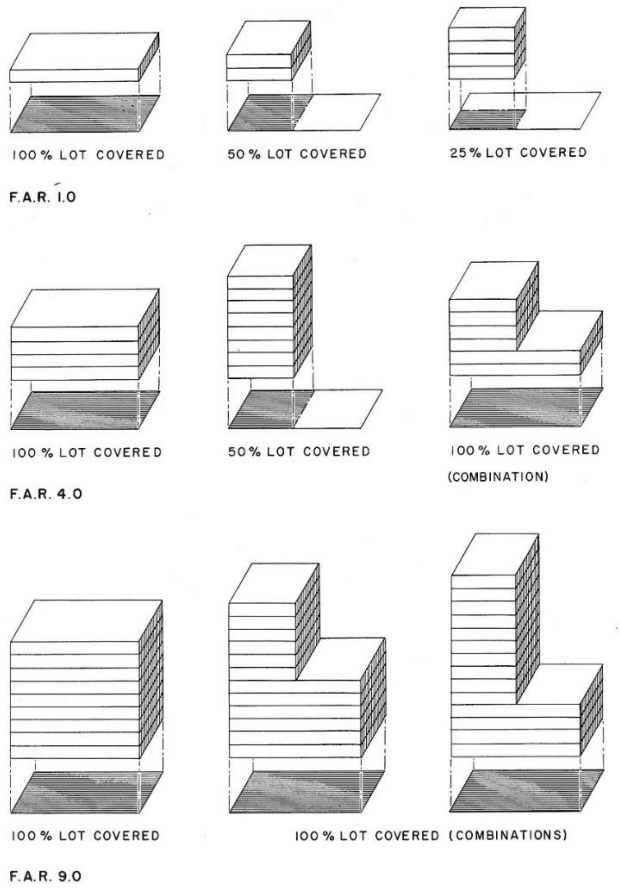
Geography	2010	2015	2020	2025	2030	2035	2040	2045	Average Annual Percent Change 2010-2045
Colorado	2,787,441	3,158,732	3,433,115	3,680,976	3,926,085	4,151,227	4,379,960	4,590,633	1.4%
NFRMPO	240,777	283,893	309,928	340,937	371,819	401,796	436,609	473,340	2.0%
Larimer in NFRMPO	163,629	188,097	206,411	225,264	243,638	259,941	276,961	294,843	1.7%
Weld in NFRMPO	240,777	95,796	103,517	115,673	128,181	141,855	159,648	178,497	2.4%
NFRMPO Modeling Area	245,721	290,447	317,023	348,843	380,558	411,429	447,390	485,337	2.0%

Source: *State Demography Office, Department of Local Affairs*

4.0 ZONING AND FUTURE LAND USE CONSTRAINTS

Regional zoning and future land use constraint layers account for land use constraints not otherwise reflected in the model. Specifically, these layers identify the maximum capacity for households and employment per Census Block and dictate where development cannot occur due to constraints like floodplains and conservation easements. Household capacity was derived from Dwelling Unit per Acre (DUA) data and employment capacity was derived from Floor Area Ratio (FAR) data.

Figure 5. Floor Area Ratio Illustrations



Source: *American Planning Association*

DUA, a common metric for maximum household density, represents the maximum number of households a Census Block could accommodate under current or future regulations. FAR, which represents the ratio of a building's total floor area to the gross developable area of the lot, roughly correlates with employment density for a zone. **Figure 5** illustrates FARs for different building configurations. Typically, higher FARs represent higher-allowable employment density, though factors like required open space, building height limitations, or required parking will impact final density. For use in UrbanCanvas Modeler, FAR must be converted to jobs per acre by applying an average square-footage per job factor. UrbanCanvas Modeler uses a default

value of 500 square-feet per job. NFRMPO staff replaced this value with 1,000 square-feet per job, which is the average square-footage per worker in the Mountain West identified by the U.S. Energy Information Administration (EIA).[5] During the development of the 2010 LUAM UrbanCanvas Modeler only permitted one conversion factor for all industries across the entire region; future iterations of UrbanCanvas Modeler may allow square-footage per job to vary by building type and geographic location.

Two constraint layers were developed for the 2010 LUAM: the short-term constraint layer, which covers model years 2011 through 2019, and the long-term constraint layer, which covers model years 2020 through 2045. The short-term constraint layer generally uses maximum DUA and FAR from municipal and County zoning codes, while the long-term constraint layer generally uses maximum DUA and FAR from comprehensive plans, also known as Future Land Use Plans (FLUPs). The methods for determining DUA and FAR are described in **Section 4.1** and **Section 4.2**, respectively.

Adopted zoning codes are legally enforceable and reflect the parameters of development that are currently allowable. Over the long term, properties may be rezoned and zoning codes may be amended to reflect long-range land use goals defined in a FLUP. For jurisdictions without a FLUP, zoning constraints were applied for all model years. At the request of the City of Greeley, FLUP constraints were applied for all model years for their jurisdiction. In addition, a modified zoning layer was used for years 2020-2045 for the City of Fort Collins, as the City was updating their land use plan during the development of the 2010 LUAM. The modified zoning layer reflected the anticipated updates to the FLUP. The district-level DUA and FAR is available in **Appendix B** for forecast years 2011-2019 and **Appendix C** for forecast years 2020-2045.

Zoning and future land use districts may overlap one another intentionally, as with overlay districts, or unintentionally in the case of imprecise map drawings. UrbanSim reconciles all cases of overlapping districts by averaging the constraint values for the locations within multiple districts. This approach is used due to its simplicity, but it does not accurately reflect constraints in overlay zones. In future iterations of the model, the constraints within overlay districts could be more carefully specified.

In the UrbanSim Block model, the zoning layer and, separately, the future land use layer, is intersected with Census Blocks and their density attributes are applied to those Blocks proportionally based on area. This results in a single employment and a single dwelling unit capacity for each Block for each constraint layer. **Table 4** displays the total number of dwelling units and employment spaces identified in the constraint layers. These totals are higher than the control totals, detailed in **Section 3**, which ensures there are plenty of possible locations for allocating households and jobs.

[5] https://www.eia.gov/consumption/commercial/data/2012/bc/pdf/b1-b2.pdf

Table 4. Number of Dwelling Units and Employment Spaces Identified in the Constraint Layers

Constraint Layer	Dwelling Units	Employment Spaces
Short-term: 2011-2019	1,787,018	8,609,607
Long-term: 2020-2045	2,208,507	12,196,918

Source: *NFRMPO 2010 LUAM*

4.1 Determining Dwelling Units per Acre (DUA)

Several methods were used to calculate maximum DUA for each district. Whenever possible, values explicitly stated in zoning codes or FLUPs for maximum DUA were used. When explicit values were not available, DUA was estimated by aerial imagery, comparing to similar districts, or other land use standards. Calculating DUA from aerial imagery was used whenever feasible[6], as this was the most reliable method for estimating DUA; inferring DUA from permitted land uses and similar districts was used most commonly, and was second most reliable; estimating DUA based on alternate land use standards was used sparingly, as this was the least reliable method. In any case, estimated DUA values were reviewed closely by land use planners and planner-recommended values where used whenever provided.

Estimating DUA from Aerial Imagery

For districts that consist primarily of single-family dwellings, maximum DUA can be approximated by calculating the area of development in GIS, counting the number of households in that development and dividing dwelling units by acres. Calculations were repeated in multiple locations with the same zoning type and an average was computed to arrive at a final estimated value. Accessory buildings and garages were not counted as dwelling units. A similar methodology was used to calculate DUA for zones that consist primarily of duplexes by counting structures with two visibly separate driveways and entrances as two dwellings. For zones that allowed multi-family units, the number of units per structure was estimated by counting parking spaces and converting to dwelling units based on zoning code parking requirements; however, some developments provide extra parking spaces and so this method may produce estimates that are too high.

Estimating DUA from Permitted Land Use and Similar Districts

District and land use descriptions should not be used to estimate density since “low density” may imply different densities even between similar communities. However, in some cases DUA was inferred based on permitted uses. The most common use of this methodology was to identify a DUA of zero for districts that did not permit any residential uses. This methodology

[6] The aerial imagery method was primarily used for low-density residential districts and some multifamily districts. The method was not feasible for high density residential or commercial districts or for districts without any development.

was also used to estimate DUA for zones that referenced other zones within the community with clearer density standards.

Estimating DUA Based on Various Land Use Standards

Finally, though minimum lot size is a commonly provided development standard, converting minimum lot size to DUA often overestimates density because it does not account for setbacks and other dimensional standards. This method was used on a limited basis.

4.2 Determining Floor Area Ratios (FAR)

As with DUA, explicitly stated maximum FAR values were used when available; when not available, FAR was estimated by NFRMPO staff and reviewed by land use planners. Estimating FAR from permitted land use and similar districts was used most frequently and was most reliable; in some cases, FAR was estimated based on land use standards, though this method was less reliable. In any case, estimated FAR values were reviewed closely by land use planners. Planner-recommended values where used whenever provided.

Estimating FAR from Permitted Land Use and Similar Districts

The most reliable method of estimating FAR was comparing to a similar district in a similar community. For example, districts primarily supportive of big-box developments tend to yield a similar FAR regardless of geographic location. For most communities, an FAR greater than 1 was only expected in the densest zones and land use categories, therefore most districts were assigned an FAR less than 1. Districts that typically require more parking per square foot, like auto-oriented shopping centers, were given lower FARs. Districts that require less parking per square foot, like mixed-use pedestrian-oriented activity centers, were assigned higher FARs. In all cases, downtown districts and future activity centers were assigned the highest FARs.

As with DUA, in some cases, one zone or land use description would reference another and so the FAR for these categories would be set equal to one another. Also similar to DUA, permitted uses were frequently used to determine districts for which FAR should equal zero, such as a residential neighborhood that does not allow mixed use. Residential zones that permitted very limited employment, such as home offices or group care facilities, were originally not considered mixed-use; this was later amended in smaller communities for which job forecasts were deemed too low.

Local staff were particularly valuable when validating FAR estimates since explicit values were rarely available and calculating values was less reliable. During conversations with local staff, it was important to ask for the maximum FAR allowable, since typical values may represent averages rather than maximums. Over-constraining the UrbanSim model prevents optimal model operation.

Estimating FAR Based on Various Land Use Standards

Estimating FAR from development standards is possible but may result in an overestimation for districts with strict parking and setback standards. For districts without strict parking and setback standards, FAR can be estimated as the maximum number of allowable floors multiplied by the maximum allowable lot coverage. For these calculations, a typical floor is assumed to be 10 feet high. For a district with a maximum building height of 40 feet and a maximum lot coverage of 70 percent, the calculation is as follows:

Max FAR = (max bldg. height/10 feet per floor) x (maximum lot coverage as a decimal)

Max FAR = 4 x 0.7 = 2.8

For a district with the same building height and maximum lot coverage standards, but strict parking requirements, the FAR would be significantly lower since the parking area would still count as lot coverage, but not as part of the building's floor area. Open space requirements were sometimes used in lieu of maximum lot coverage. A district with an open space requirement of 30 percent was treated identically as one with a maximum lot coverage of 70 percent.

5.0 DEVELOPMENT PIPELINE

The UrbanSim model allows users to specify real estate development projects to reflect known changes such as new subdivisions or employment centers. This feature inserts the dwelling units and employment spaces created by developments into the forecast, and then allows households and jobs to fill the spaces using the location choice model. Including major development projects in the model helps ensure the accuracy of base year data and development trends; however, including too many developments can result in over-specifying the model.

5.1 Identifying Developments

Staff collected information on major real estate developments from county assessor's data and land use planners for projects recently constructed, committed, or proposed. Committed projects were originally defined as projects officially approved by local officials; however, the definition was later expanded to include all projects with generally known parameters that were approved or likely to be approved as determined by land use planners. Proposed projects were developments for which parameters and approval were uncertain. The MST decided to include only constructed and committed developments in the model; data on proposed developments was retained for future scenario planning.

With a model base year of 2010, it was important to incorporate major developments between 2010 and 2017. Developments constructed between 2010 and 2017, identified from Larimer and

Weld County Assessors' data, were incorporated if they added 50 or more dwelling units or jobs. The number of jobs was estimated by applying industry-specific conversion factors from the EIA[7] to the square footage of developments. Once major developments constructed between 2010 and 2017 were identified from the assessors' data, the list of projects was sent to the communities' land use planners for confirmation.

In addition, data was gathered from land use planners for 2017 and beyond to identify recently constructed and future development projects that would add a significant number of dwelling units or jobs to the region. The definition of "significant" was subjective and depended on the size and character of the community, since smaller developments may have more significant impacts in smaller communities. Examples of development projects included subdivisions with 10 or more new houses, mixed use activity centers, and multi-tenant employment centers. Single lot subdivisions, home-to-office conversions, and small businesses were typically not included as new developments.

The threshold for including development projects was likely too low, creating more work for limited improvements to the model. For future revisions to the 2010 LUAM a higher cut-off (e.g. 100 households or jobs) is recommended to capture only the largest new developments, especially those in greenfields and in redeveloping areas, which the model otherwise may not predict.

5.2 Development Pipeline Summary

A total of 337 residential and commercial development projects, including 198 completed and 139 committed developments, were incorporated into the 2010 LUAM. The projects span from 2010 to 2028 and include information about number of dwelling units, average dwelling unit size in square feet, employment capacity, start year, and project duration. **Table 5** identifies the number of dwelling units and employment spaces specified in developments compared to the total number of dwelling units and jobs added in the model over 5-year increments. The most specified years of the model are from 2015 through 2020, where 54% of dwelling units and 26% of jobs are specified by developments.

[7] https://www.eia.gov/consumption/commercial/data/2012/bc/pdf/b1-b2.pdf

Table 5. Dwelling Units and Employment Spaces Specified by Developments

Model Years	Dwelling Units Specified via Developments	Total Dwelling Units Added	Percent of Dwelling Units Specified	Employment Spaces Specified via Developments	Total Jobs Added	Percent of Jobs Specified
2010-2015	8,045	22,729	35%	4,600	44,726	10%
2015-2020	16,852	31,022	54%	6,820	26,576	26%
2020-2025	5,483	35,538	15%	528	31,820	2%
2025-2030	486	36,186	1%	73	31,715	0%
2030-2035	0	36,310	0%	0	30,871	0%
2035-2040	0	36,206	0%	0	35,961	0%
2040-2045	0	37,809	0%	0	37,947	0%
Total	**30,866**	**235,800**	**13%**	**12,021**	**239,616**	**5%**

6.0 MODEL REVIEW AND FINALIZATION

The MST, comprised of members of the Technical Advisory Committee (TAC) and land use planners from communities within the Modeling Area, conducted three rounds of 2010 LUAM output review.[8] The review focused on model outputs for 2015, which is the base year of the 2015 RTDM, and 2045, the out year for both the 2010 LUAM and the 2015 RTDM. Feedback from the first two rounds of review was used to alter inputs, primarily development and zoning or future land use constraints, described in **Section 6.1**. Feedback from the third round of review was used to post-process model outputs through the adjustment process described in **Section 6.2**.[9] The model was recalibrated and re-specified to address remaining concerns, as described in **Section 6.3**.

For all three rounds of review, MST members were provided with maps for their communities displaying TAZs labeled with TAZ IDs, 2015 forecasts for households and jobs, 2045 forecasts for households and jobs, and annual growth rates for households and jobs. TAZ maps were supplemented with growth tables, which displayed the following information for each GMA and for the non-GMA portions of Larimer County and Weld County:

- 2015 and 2045 population and jobs from the 2010 LUAM
- 2012 and 2040 population and jobs from the previous 2012 LUAM

[8] The reviewed model runs included Run 52, Run 76, and Run 83.

[9] During all runs used for analysis and comparison, a random seed of “5” was used to ensure the differences presented between each run were the result of changes to model inputs, not to model variation. Model variation may be tested by specifying different random seeds, and while the number is not associated with a magnitude, it is recommended to select a random seed between 1-10.

- Growth Rate (CAGR) for population and jobs for 2015-2045 from the 2010 LUAM
- CAGR for population and jobs for 2012-2040 from the 2012 LUAM
- Municipal population growth rate for 1987-2017 (SDO)
- 2015 and 2045 Jobs:Population ratios from the 2010 LUAM
- 2012 and 2040 Jobs:Population ratios from the 2012 LUAM
- 2015 Municipal Population (SDO)
- Percent Group Quarters (Census)
- 2015 Population in Households (SDO/Census)
- 2015 Difference (Model-SDO/Census)

Some data was also provided for all of Larimer and Weld County inside the NFRMPO Planning Area and all of Larimer County and Weld County inside the NFRMPO Model Area. Data for these geographies included:

- Population, households, and jobs for 2015 and 2045 from the 2010 LUAM
- Population and jobs for 2012 and 2040 from the 2012 LUAM (NFRMPO Planning Area only)
- CAGR for population and jobs from the 2010 LUAM
- CAGR for population and jobs from the 2012 LUAM (NFRMPO Planning Area only)
- 2015 and 2045 Jobs:Population ratio from the 2010 LUAM
- 2012 and 2040 Jobs:Population ratio from the 2012 LUAM (NFRMPO Planning Area only)
- 2015 county-wide Population (SDO)
- Percent Group Quarters (Census)
- 2015 Population in Households (SDO/Census)
- 2015 Difference (Model-SDO/Census)
- 2045 Population in Households (SDO/Census)
- 2045 Difference (Model-SDO/Census)

6.1 Revising Model Inputs

During the first two rounds of review, MST members reviewed both the GMA-level growth patterns and the TAZ-level outputs to identify high-level and TAZ-level inaccuracies. Comments from the first round included requested changes to base year data and 2045 forecast year data. Comments from the second and third round of review focused primarily on changes to 2045 forecast year data. For the first two rounds of review, NFRMPO staff focused on addressing recommended revisions resulting in a change of greater than 200 households or jobs to acknowledge that small inconsistencies may reflect inherent variability in the model and to avoid

over-specifying the model. Exceptions were made for comments requesting changes to TAZs to or from zero households or jobs.

TAZs identified for a requested change were analyzed to ensure the capacity matched the request (i.e. capacity was sufficient to support an increase or was low enough to limit growth) and to identify whether a development had already been placed in the TAZ. In the event growth was to be added and zoning/FLUP capacity was sufficient, households or jobs were added, also known as “seeded”, as new developments. In the event growth was to be added and zoning/FLUP capacity was insufficient, the density for the zone or zones covering that TAZ was increased with expressed permission from the appropriate land use planners. Development may have been additionally seeded if the zoning change did not immediately address the issue.

In the event a request to remove growth was made and zoning capacity was high, zoning was amended downward with the expressed permission from the appropriate land use planners. In some cases, entire zoning categories were deemed too low or too high and were amended to better reflect anticipated development patterns. During this process, development data was returned to land use planners for their review to identify any projects for which a status change was required (i.e. a project originally submitted as proposed may have changed to committed; alternatively, some projects submitted as committed did not occur and were removed from the development list or changed to proposed).

Revising Constraint Layers

Zoning and Future Land Use layers were only revised with the expressed permission of land use planners. The first two review processes revealed some inconsistencies in original reporting of maximum allowable densities. For example, many commercial zones that allow limited residential use were input as prohibiting residential use, which restricted population and household growth for these communities. Furthermore, the maximum densities provided by Fort Collins represented the greatest density of project, rather than the greatest density the district could support. This resulted in densities that were largely too high, leading to an overallocation of households and jobs in Fort Collins.

Evaluating Progress

The model was rerun with the incorporated changes and outputs were analyzed to see if comments were addressed. In general, comments were considered addressed if the new output was within 200 households or jobs of the requested value. In some cases, more subjective standards accounting for scale of change were used to assess the result (e.g. a request for 200 jobs in a TAZ with an original forecast of 1,500 jobs that was brought down to 500 was considered addressed). Changes were reported back to the MST and the review process was repeated.

New runs were also compared against the originally reviewed run to monitor unanticipated changes resulting from amending the inputs. TAZs with significantly different outputs from the original run were flagged and closely reviewed by planners.

6.2 Post-Processing Model Outputs

Following the first two rounds of review and revisions to inputs, a run was developed that best met requested changes using all reasonable alterations of inputs. The outputs of this run, Run 83, were provided to the MST for final review. Comments from the final review were used to post process the outputs through the UrbanSim Adjustment tool. Adjustments are simulation overrides that allow specification of the number of households and/or jobs for a Block or set of Blocks. Each adjustment has a specified start year and a specified out year. Adjustments are best used sparingly for situations where known policy changes will impact the number of households and/or jobs. Approximately 100 adjustments were completed for the 2010 LUAM.

Most adjustments were made in response to requested changes to households or jobs in 2045. These adjustments were started in year 2020 and ended in year 2045. Adjustments requested to 2015 data were started in 2011 and ended in 2015.

Adjustments requested to both 2015 and 2045 data were input as two separate adjustments to one geography, each with separate start and end years.

Though NFRMPO staff requested only changes greater than 100 households or jobs be submitted, all adjustments greater than 50 households or jobs were made. As before, there were some exceptions made for changes requested to or from zero households or jobs. One exception was made in Fort Collins to accommodate an adjustment of several contiguous Blocks along College Avenue. The requested adjustments for some of the Blocks were below the threshold, however the cumulative request was deemed significant.

A typical adjustment upward adds households or jobs to a Block(s), pulling them at random from other Blocks in the region. A typical adjustment downward removes households or jobs from a Block(s) and disperses them at random elsewhere in the region. The UrbanSim model also allows adjustments between specified sets of Blocks, known as a “from-to” adjustment. In one instance, it was requested that households and jobs be removed from one TAZ and be dispersed to other TAZs within unincorporated Weld County. Due to limitations with the model code, not all TAZs within unincorporated Weld County could be designated as recipients. Instead, a random number generator was used to select a smaller number of TAZs to which households and jobs would be dispersed.

6.3 Model Recalibration and Re-Specification

During the review process the MST identified potential issues in land use allocations by GMA and county. These concerns were addressed through a model recalibration at the GMA-level and model re-specification at the county level.

GMA-level Model Recalibration

Following the second review of model inputs UrbanSim staff added a GMA-level calibration to improve the allocation among communities. The GMA-level calibration accounted for the

observed population and employment growth captured within each GMA from 2010 to 2015 and used those percentages to inform change by GMA beyond 2015. The calibration did not force the model to exactly match the identified percentages, as that would have over-calibrated to near-term conditions and reduced the sensitivity of the model and. Instead, the calibration considered the observed growth as one factor in the overall allocation methodology, bringing the forecast results closer to the observed growth.

A County calibration was also tested to match SDO's forecasted growth of Weld and Larimer County; however, this calibration negatively impacted the community balance and was removed. The GMA-level calibration was retained.

County-Level Model Re-specification

Following the implementation of output adjustments the model was still experiencing an imbalance in forecasted population between Larimer and Weld County compared to the SDO forecasts, with the modeled portion of Larimer County forecasted at higher population than SDO's county-wide forecast in 2045 and the modeled portion of Weld County substantially lower than SDO's county-wide forecast in 2045. UrbanSim staff re-specified the model by adding household size as an explanatory variable, such that large households tended to locate in Weld County and smaller households tended to locate in Larimer County. This successfully moved the population totals toward anticipated values without negatively impacting the balance of households among communities.

7.0 SCENARIO OUTPUTS

2010 LUAM Baseline Scenario

The 2010 LUAM Baseline Scenario reflects the future anticipated to occur by land use planners and the MST. The Baseline Scenario, also known as Run 124, uses a default vacancy rate of 8.45 across the region, the household and employment control totals described in **Chapter 3**, all developments identified as constructed or committed, and the zoning and future land use as finalized through the review process. The outputs for this scenario reflect the three rounds of review and model recalibration and re-specification described in **Chapter 6.**

Table 6 summarizes the population, household, and job forecasts of the Baseline Scenario for the geographies displayed in **Figure 6**, including GMAs, the North Front Range metropolitan planning area, the modeled portions of each county, and the entire Modeling Area. **Table 6** includes data for 2015, the base year of the 2015 RTDM, as well as data for the 2045 forecast year and the growth rate from 2015 to 2045.

Figure 6. North Front Range Modeling Area, Metropolitan Planning Area, and GMAs

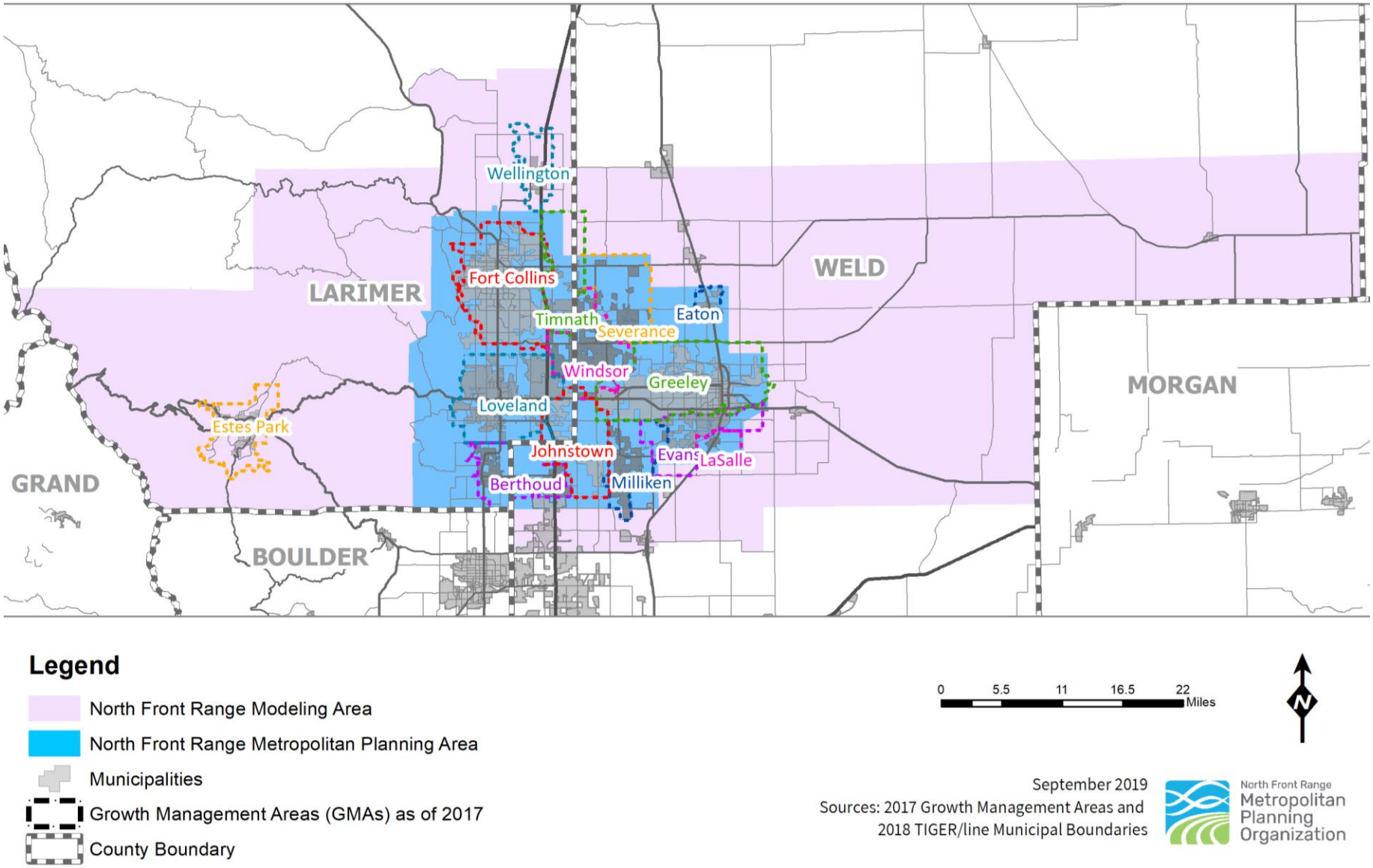


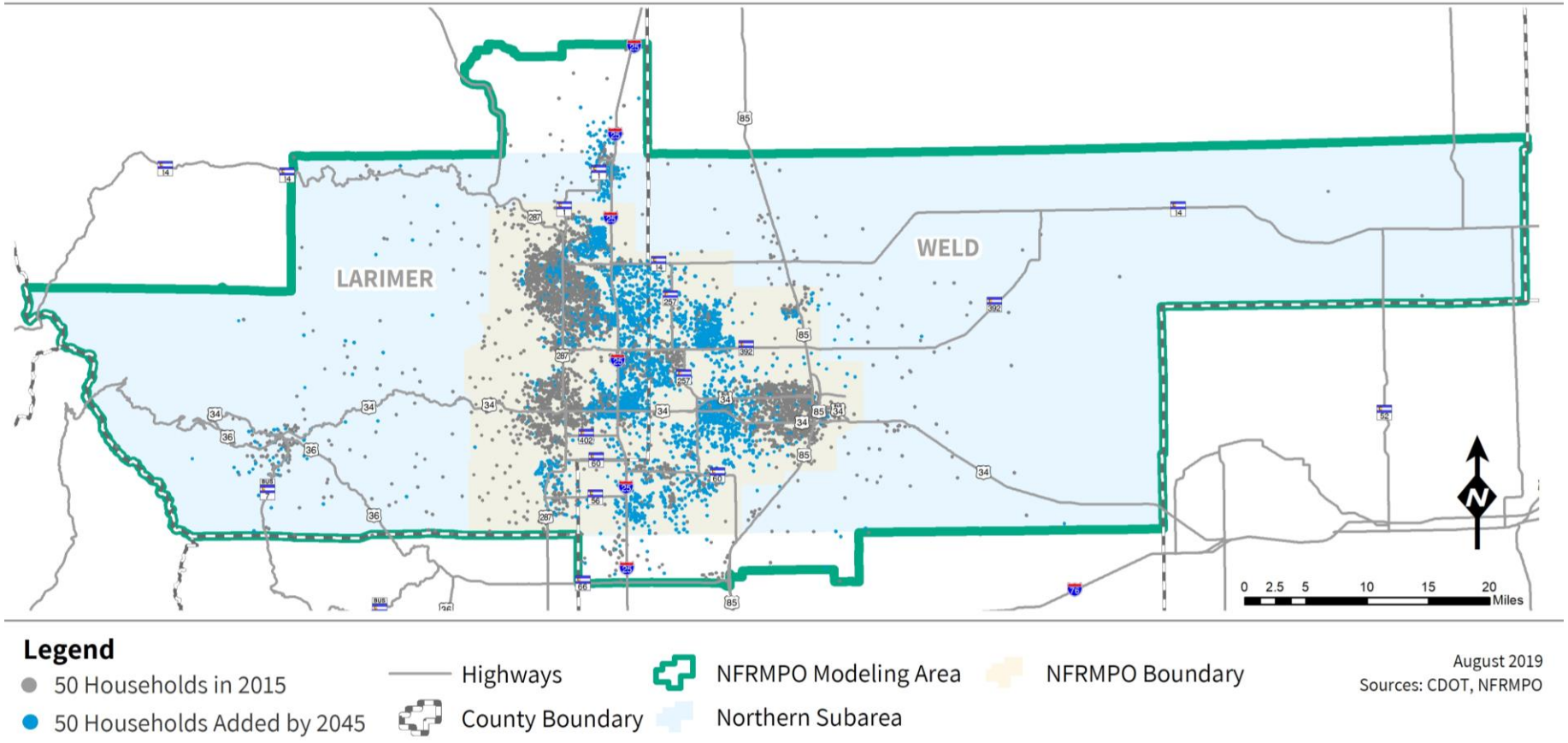
Table 6. 2010 LUAM Baseline Scenario Population, Households, and Jobs Forecasts by Community in 2015 and 2045

Geography	2015 Population	2045 Population	2015 Households	2045 Households	2015 Jobs	2045 Jobs	2015-2045 Growth Rate		
							Population	Households	Jobs
Berthoud GMA	8,132	28,610	3,209	11,589	4,465	14,843	4.3%	4.4%	4.1%
Eaton GMA	5,239	9,630	1,907	3,564	2,282	2,388	2.0%	2.1%	0.2%
Estes Park GMA	10,010	14,571	4,698	6,583	4,855	5,222	1.3%	1.1%	0.2%
Evans GMA	24,402	32,216	8,405	12,085	5,166	9,907	0.9%	1.2%	2.2%
Fort Collins GMA	174,380	268,872	72,643	118,811	110,526	128,310	1.5%	1.7%	0.5%
Greeley GMA	97,085	159,744	36,930	63,491	71,061	114,235	1.7%	1.8%	1.6%
Johnstown GMA	16,863	43,984	5,884	17,318	6,205	17,331	3.2%	3.7%	3.5%
LaSalle GMA	2,380	2,789	890	1,033	1,038	1,096	0.5%	0.5%	0.2%
Loveland GMA	79,986	130,245	33,565	57,067	57,087	120,810	1.6%	1.8%	2.5%
Milliken GMA	6,894	26,993	2,271	10,595	2,325	4,383	4.7%	5.3%	2.1%
Severance GMA	4,898	60,858	1,779	24,894	1,083	8,876	8.8%	9.2%	7.3%
Timnath GMA	3,456	37,355	1,278	15,287	1,196	6,547	8.3%	8.6%	5.8%
Wellington GMA	7,063	22,052	2,655	9,116	892	3,171	3.9%	4.2%	4.3%
Windsor GMA	24,465	60,380	8,905	25,348	9,297	29,432	3.1%	3.5%	3.9%
NFR Metropolitan Planning Area	465,702	876,735	184,864	367,467	275,155	459,442	2.1%	2.3%	1.7%
Modeled Larimer County	321,629	554,897	133,534	241,559	187,421	294,272	1.8%	2.0%	1.5%
Modeled Weld County	197,129	403,579	72,416	159,458	103,026	191,065	2.4%	2.7%	2.1%
NFR Modeling Area	**518,758**	**958,476**	**205,950**	**401,017**	**290,447**	**485,337**	**2.1%**	**2.2%**	**1.7%**

***Source**: NFRMPO 2010 LUAM*

The location of households in 2015 and the location of new household growth out to 2045 within the North Front Range Metropolitan Planning Area is illustrated in **Figure 7**. The Baseline Scenario forecasts much of the household growth will occur in the center of the region along I-25, as well as in western Greeley, Severance, and the communities in the southern portion of the region.

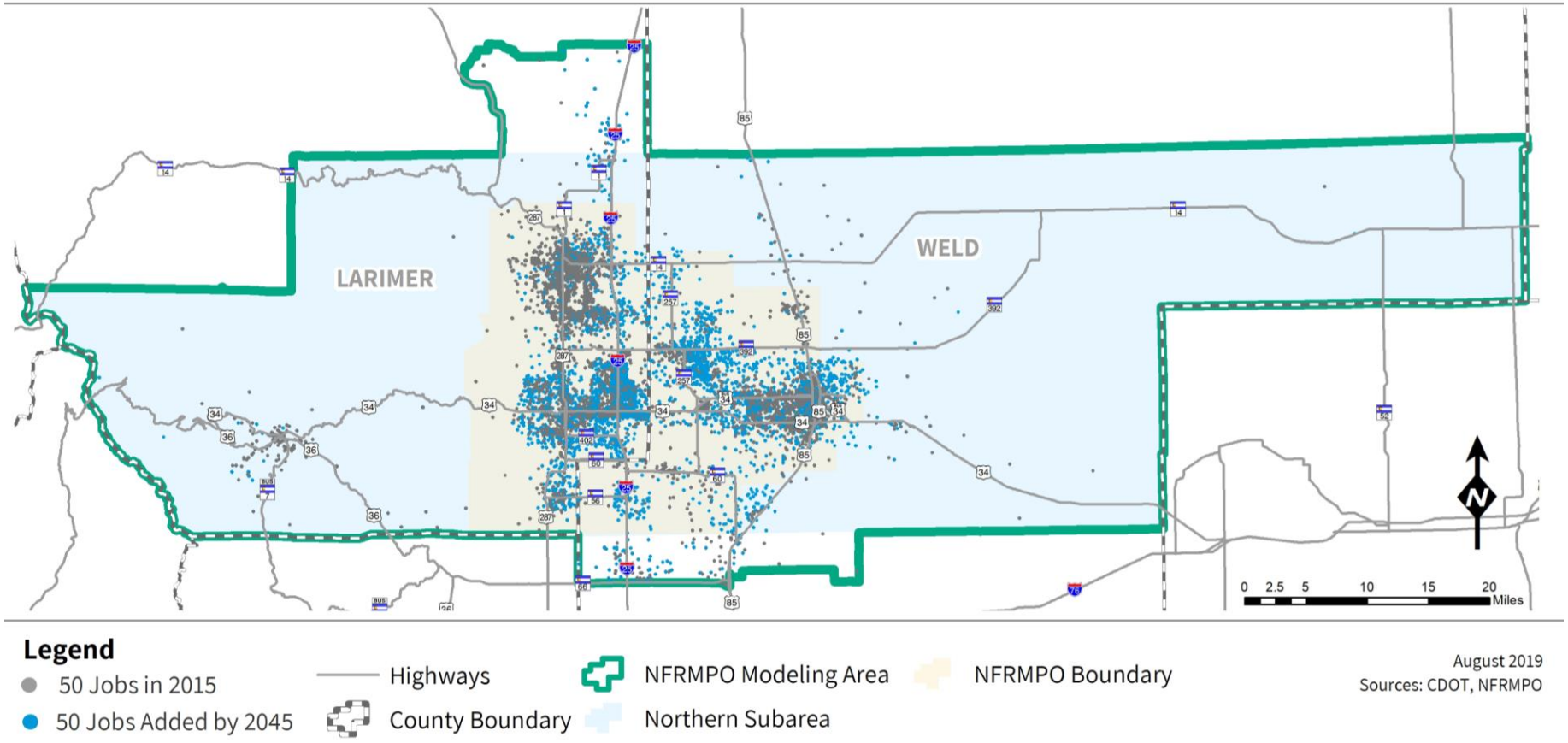
Figure 7. Baseline Scenario Household Growth, 2015 to 2045



Note: Households are distributed randomly within TAZs, the boundaries of which are not identified on the map.

The location of jobs in 2015 and the location of new job growth out to 2045 is illustrated in **Figure 8**. The Baseline Scenario forecasts much of the employment growth out to 2045 will occur along I-25 near US34 and Crossroads Boulevard, with additional growth scattered throughout the rest of the region.

Figure 8. Baseline Scenario Job Growth, 2015 to 2045



Note: Jobs are distributed randomly within TAZs, the boundaries of which are not identified on the map.

Disaggregated socioeconomic data at the TAZ level, including household income, household size, and number of workers per household from the 2010 LUAM serve as inputs in the 2015 RTDM to estimate trip making behavior. Three household income categories are used by the 2015 RTDM: low income (less than $29,999), medium income ($30,000-$99,999) and high income ($100,000 and above). **Table 7** displays the number of households in each of the three income categories by household size for the Modeling Area in 2015 and **Table 8** displays the same information for 2045.

Table 7. 2015 Household Size and Income Forecast

Household (HH) Income (2010 dollars)	1-person HH	2-person HH	3-person HH	4-person HH	5+ person HH	Total HH	Percent
Less than $29,999 (Low Income)	23,924	15,493	7,020	4,058	2,291	**52,786**	**26%**
$30, 000 - $99,999 (Medium Income)	19,467	44,890	18,526	13,945	9,874	**106,702**	**52%**
$100,000 and above (High Income)	2,532	19,282	10,207	8,915	5,526	**46,462**	**23%**
Total	**45,923**	**79,665**	**35,753**	**26,918**	**17,691**	**205,950**	**100%**
Percent	**22%**	**39%**	**17%**	**13%**	**9%**	**100%**	**-**

***Source**: NFRMPO 2010 LUAM*

Table 8. 2045 Household Size and Income Forecast

Household (HH) Income (2010 dollars)	1-person HH	2-person HH	3-person HH	4-person HH	5+ person HH	Total HH	Percent
Less than $29,999 (Low Income)	50,659	31,924	13,273	6,533	3,526	**105,915**	**26%**
$30, 000 - $99,999 (Medium Income)	41,109	93,316	35,294	22,682	15,373	**207,774**	**52%**
$100,000 and above (High Income)	5,278	39,578	19,405	14,496	8,571	**87,328**	**22%**
Total	**97,046**	**164,818**	**67,972**	**43,711**	**27,470**	**401,017**	**100%**
Percent	**24%**	**41%**	**17%**	**11%**	**7%**	**100%**	**-**

***Source**: NFRMPO 2010 LUAM*

The 2010 LUAM forecasts the number of employees in each Block within 20 industries identified by their 2-digit NAICS code. These forecasts are collapsed into four employment type categories and aggregated to the TAZ level prior to incorporation into the 2015 RTDM to estimate trip making behavior. **Table 9** displays the number of employees by industry and by employment type in 2015 and 2045 within the North Front Range Modeling Area.

Table 9. Employment by Industry, 2015 and 2045

Employment Type	NAICS Code	Industry	2015 Employment	2045 Employment
Basic / Industrial	11	Agriculture, Forestry, Fishing and Hunting	3,941	6,577
	21	Mining, Quarrying, and Oil and Gas Extraction	4,107	6,986
	22	Utilities	1,277	2,112
	23	Construction	15,335	25,627
	31-33	Manufacturing	29,112	48,356
	42	Wholesale Trade	8,521	14,294
	48-49	Transportation and Warehousing	6,039	10,256
		Total Basic/Industrial Employment	**68,332**	**114,208**
Medical	62	Health Care and Social Assistance	40,757	68,444
		Total Medical Employment	**40,757**	**68,444**
Retail	44-45	Retail Trade	31,464	52,589
	72	Accommodation and Food Services	27,272	45,311
		Total Retail Employment	**58,736**	**97,900**
Service	51	Information	4,561	7,600
	52	Finance and Insurance	9,281	15,570
	53	Real Estate and Rental and Leasing	4,485	7,480
	54	Professional, Scientific, and Technical Services	18,207	30,575
	55	Management of Companies and Enterprises	2,895	4,784
	56	Administrative and Support and Waste Management and Remediation Services	13,434	22,583
	61	Educational Services	41,936	69,760
	71	Arts, Entertainment, and Recreation	4,652	7,862
	81	Other Services (except Public Administration)	8,069	13,499
	92	Public Administration	15,102	25,072
		Total Service Employment	**122,622**	**204,785**
Total Employment			**290,447**	**485,337**

***Source**: NFRMPO 2010 LUAM*

High-Density Scenario

The MST and TAC identified potential scenarios for the 2010 LUAM and 2015 RTDM, while the TAC made the final decision on which scenarios to develop and include in the 2045 RTP. In addition to the 2010 LUAM Baseline Scenario, the TAC requested development of a higher density land use scenario.

To develop a higher density scenario, NFRMPO staff identified urban cores and applied a scaling factor of 2 to those areas. The scaling factor doubles the capacity allowed in the identified urban cores, allowing the model to place more households and businesses in those areas. The urban cores were selected by identifying TAZs with a household or job density greater than the mean in 2015 in the 2010 LUAM Baseline Scenario. TAZs were selected instead of Census Blocks to provide a more contiguous geography. **Figure 9** shows the NFRMPO Urban Cores.

The forecasted household and job density in 2045 for each of the two land use scenarios are shown in **Figure 10** through **Figure 13**.

Figure 9. NFRMPO Urban Cores

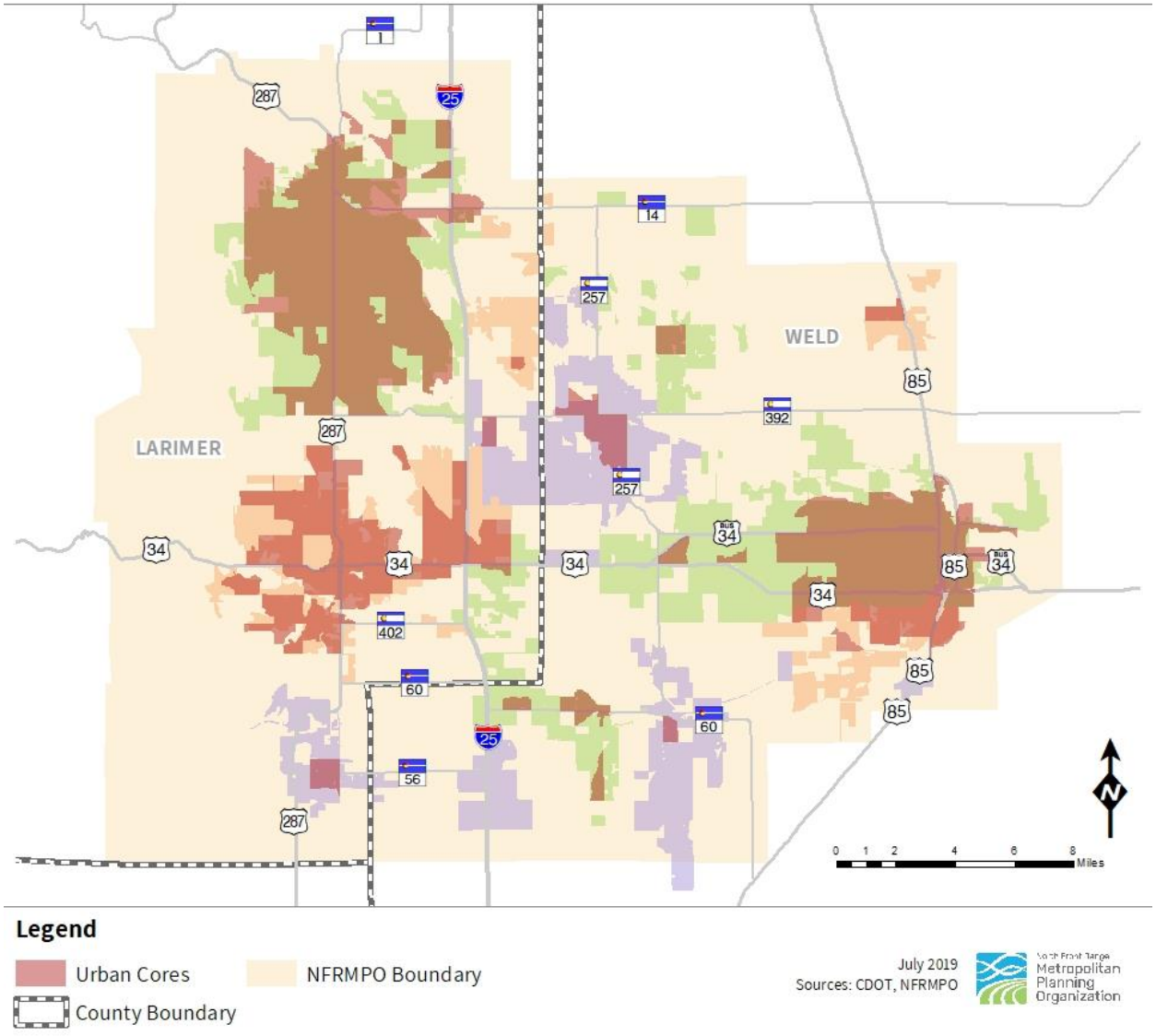
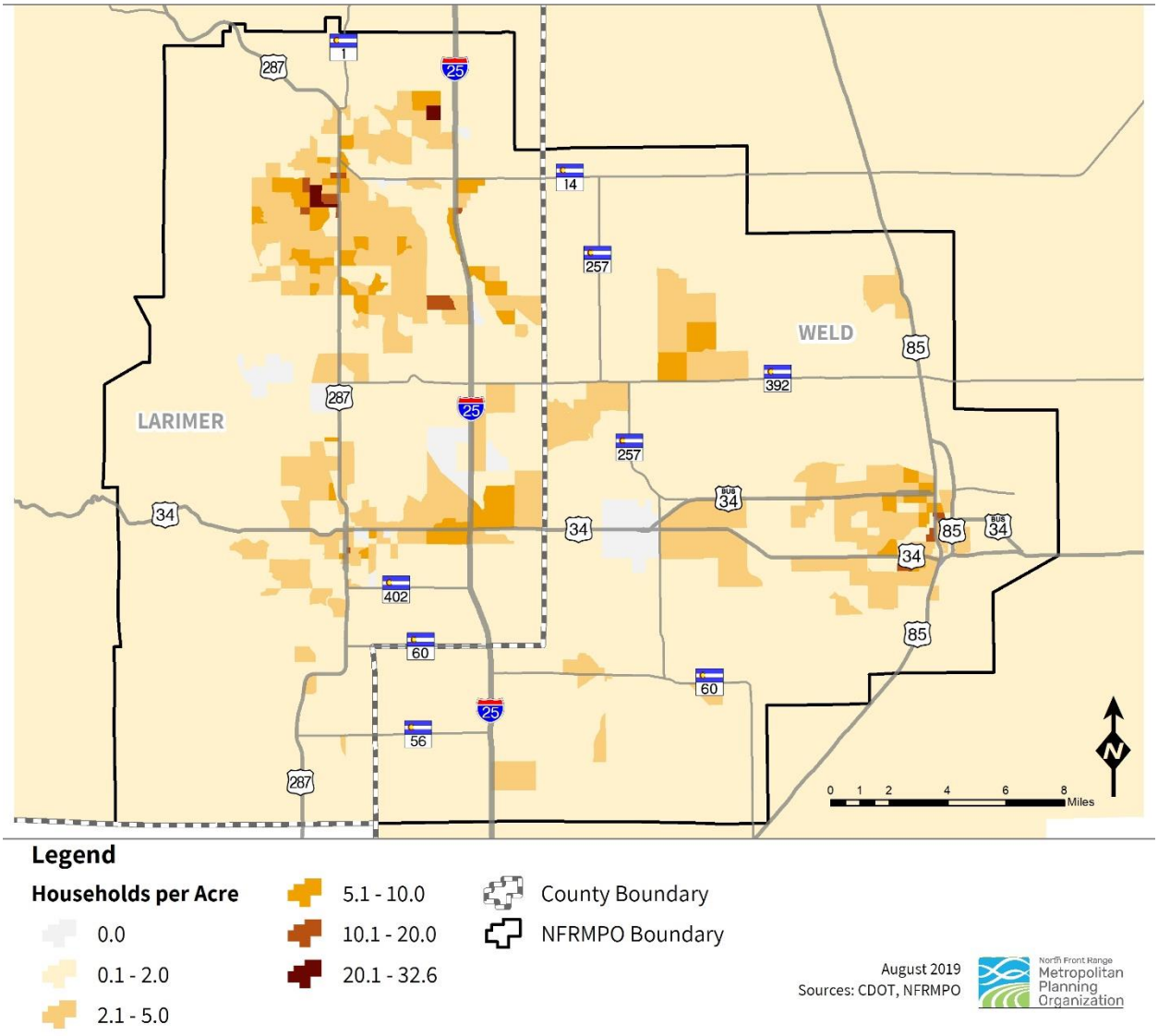
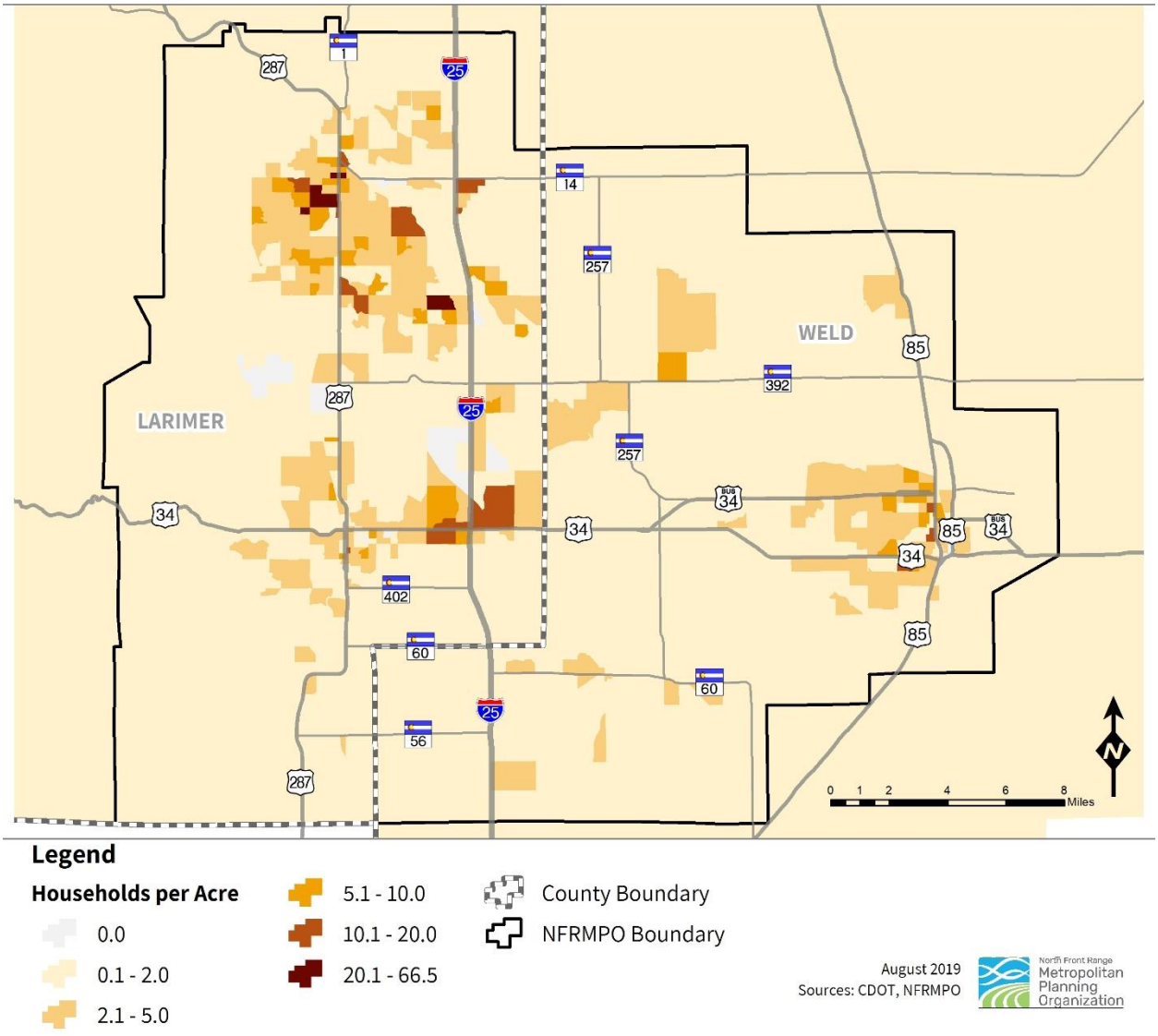


Figure 10. Baseline Scenario Household Density, 2045



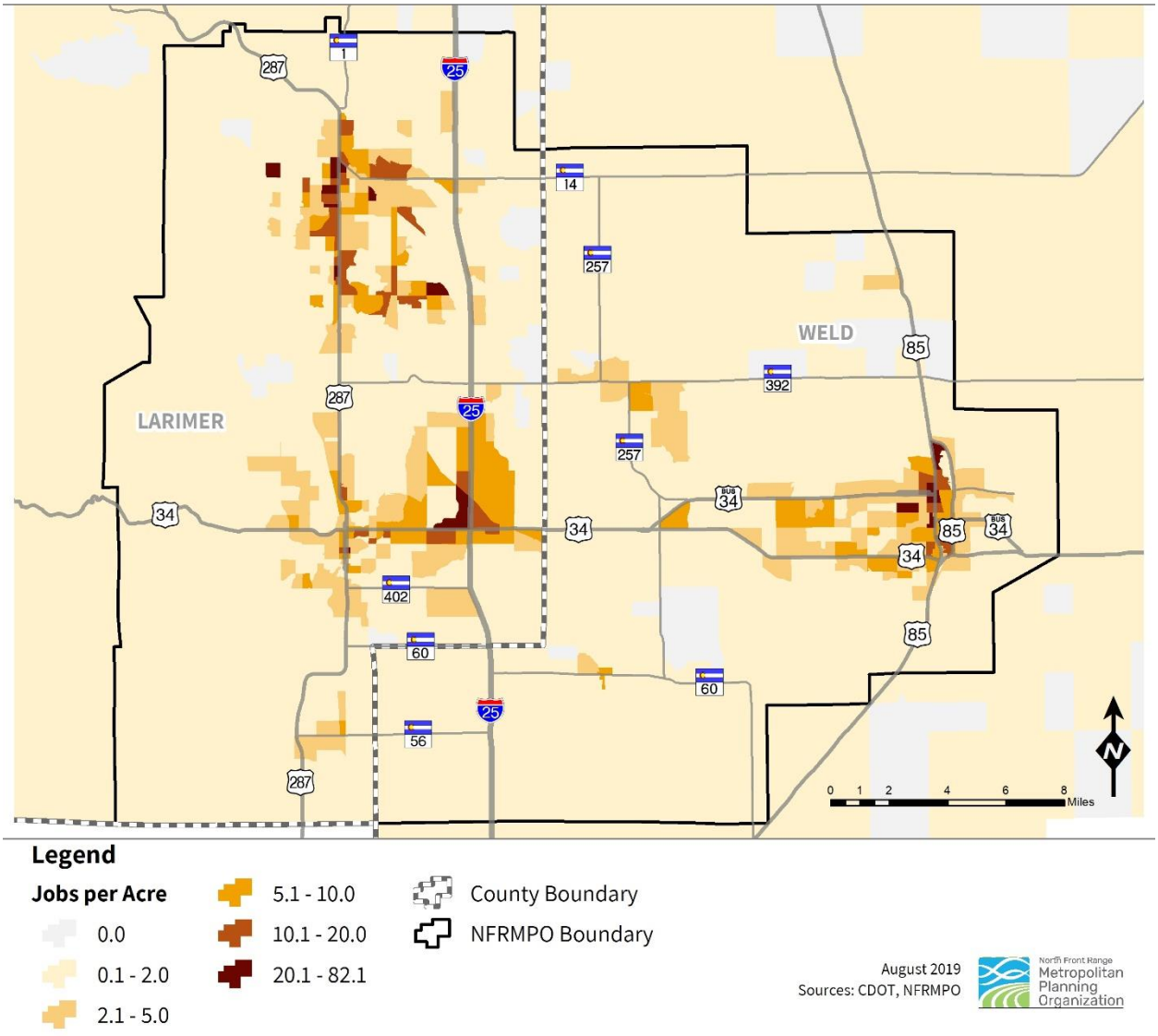
Note: Household density is displayed by TAZ. To improve readability, TAZ boundaries are not delineated.

Figure 11. High-Density Scenario Household Density, 2045



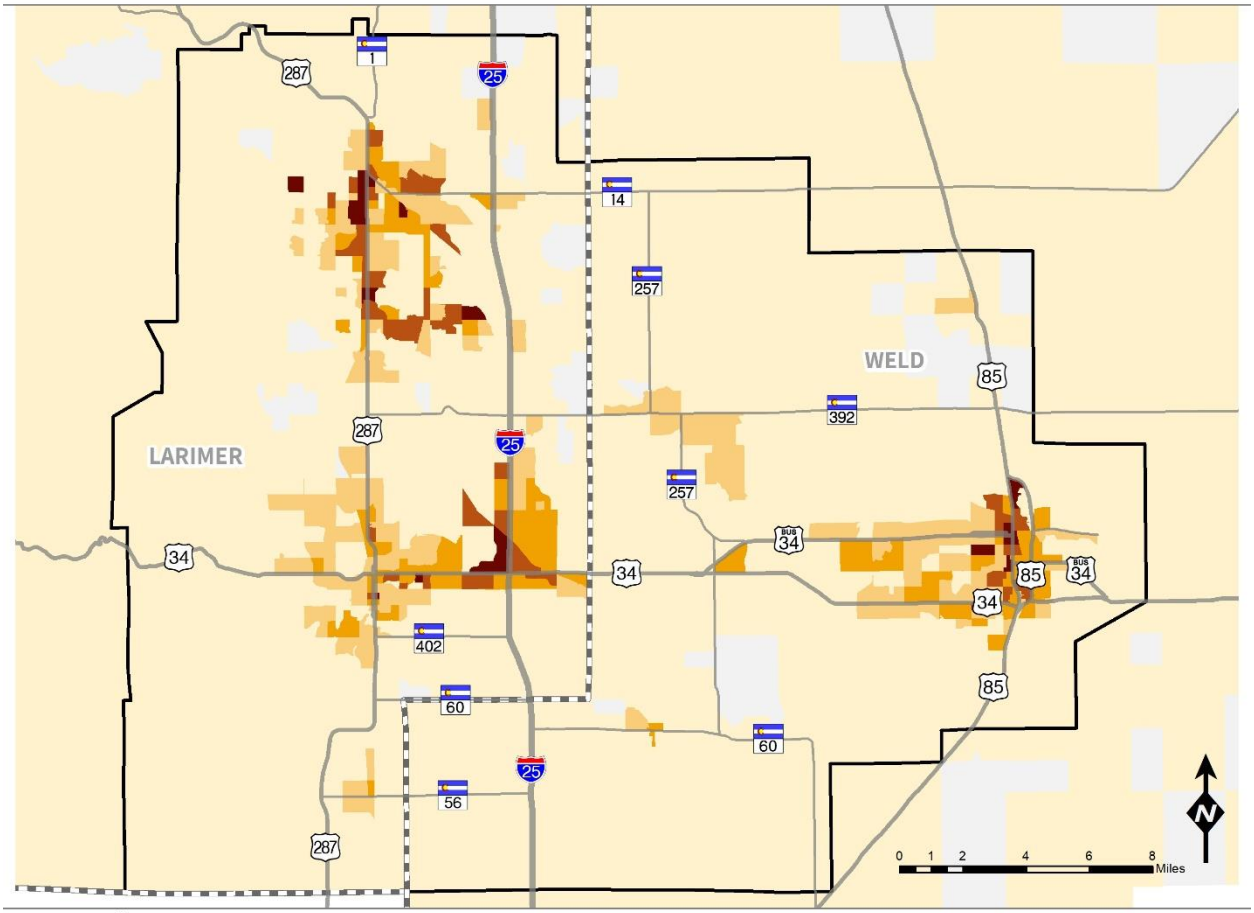
Note: Household density is displayed by TAZ. To improve readability, TAZ boundaries are not delineated.

Figure 12. Baseline Scenario Job Density, 2045



Note: Job density is displayed by TAZ. To improve readability, TAZ boundaries are not delineated.

Figure 13. High-Density Scenario Job Density, 2045



Note: Job density is displayed by TAZ. To improve readability, TAZ boundaries are not delineated.

Appendix A: SDO Methodology for Population, Household, and Job Control Totals

The State Demography Office (SDO) of the Colorado Department of Local Affairs (DOLA) used the following 3-step methodology for developing control totals for population, households, and jobs for the 2010 LUAM.

1. Prepare 2040 population, household and job projections for Larimer and Weld County

The NFRMPO projections start with population, household and job projections for Larimer and Weld County out to 2040. The population projections are produced by an economic-demographic system which models the intra- and interrelationships of demographic and economic change at the county, region, and state level. The overall process can be summarized as follows:

- A series of separate procedures involving two distinct models, one economic and one demographic, projects the demand and supply for labor, respectively, in a region's economy for the projection period.
- The demand for labor is projected by an econometric model which relates the region's industrial structure to demand for that sector's output at the state and national level.
- The supply of labor is projected in two steps. A cohort-component, demographic model survives the resident population forward in time based on specified fertility and mortality assumptions. Assumed age-sex-specific labor force participation rates are then applied to this population to create the indigenous supply of labor.
- Where demand for labor exceeds supply, equilibrium is restored by migrating people into the region. Where the supply exceeds demand, out-migration is assumed to occur. Thus, the bulk of the amount of migration to or from a given region is determined by projected labor supply and demand at each period.

2. Prepare 2010–2016 estimates for the NFRMPO Modeling Area

To prepare the smaller area NFRMPO projections, a 2010 estimate of population, households and jobs was prepared using Census tract level data from the 2010 Census, the NFR metropolitan planning area (MPA), and the NFRMPO Modeling Area which was provided by the NFRMPO. The April 2010 population estimates were then adjusted to be consistent with July 2010 population estimates for Larimer and Weld County to account for births, deaths, and net migration and new housing units which occurred from the 2010 Census count date of April 1 to July 1 using a simple ratio. The population estimates for the NFRMPO Modeling Area for 2011 through 2016 were then prepared moving the July 1, 2010 estimate forward using 2011 through 2016 municipal estimates for those municipalities contained within the NFRMPO Modeling Area prepared by our office and a share of the unincorporated areas within the boundary within both Larimer and Weld County. The household estimates were prepared for 2011 through 2016

using county specific estimates of household size from the SDO estimate program for the share of each within the NFRMPO Modeling Area and the population estimates for the NFRMPO Modeling Area.

The Enhanced Quarterly Unemployment Insurance (EQUI) file containing establishment level data from the Quarterly Census of Employment & Wages (QCEW) was used to estimate the number of jobs in the NFRMPO Modeling Area in both Larimer and Weld counties using the 2016 annual average data. About 95 percent of the data on the file is geocoded and the GIS staff at the state demography office assigned geocodes to the remaining establishments. Once this was done, it was determined that 98.94 percent of Larimer County employment and 73.42 percent of Weld county employment was located within the MPO boundaries. Combined, the NFRMPO accounted for 88.55 percent of all wage & salary jobs in Larimer & Weld County and the NFRMPO Modeling Area accounted for 90.6 percent of all jobs in the two counties. These two shares of employment were then applied to the SDO total estimated jobs series, which captures both wage & salary and proprietor jobs. Since geocoding was not as prevalent in prior years QCEW data, the shares of employment in each county and the NFRMPO Modeling Area were held constant and applied to total estimated employment for Larimer and Weld from 2010 to 2015 to estimate the NFR Modeling Area employment in those years.

3. Prepare projections for the NFRMPO Modeling Area for 2017–2050

The population projections for the NFRMPO Modeling Area were then prepared based on the estimates for 2010–2016 of the NFRMPO provided boundaries and the SDO population projections for Larimer and Weld County.

First, county specific ratios were determined for the share of Larimer and Weld County population within the NFRMPO Modeling Area for 2010 through 2015 from the estimates determined in Step 1. For each 5-year period of the forecast, the county specific ratios were held constant and multiplied by the projected population within Larimer and Weld. The household projection was prepared using the resulting projection of population and a share of each counties projected household size within the NFRMPO Modeling Area. Due to aging within the NFRMPO, household size is projected to decline from 2.62 in 2010 to 2.46 by 2050.

SDO employment projections for Larimer and Weld counties are updated each year through 2040. For this project, the growth rates in both Larimer and Weld counties were projected forward another decade through 2050. The share of employment in both Larimer and Weld was held constant at the 2016 shares throughout the forecast period. The projected county employment in each 5-year segment of the forecast was multiplied by the 2016 share of employment in Weld (73.42 percent) and Larimer (98.94 percent) to come up with a projection of employment levels within the NFRMPO between 2017 and 2050. Since Weld county employment is expected to grow about 60 percent faster than Larimer and more than ¼ of Weld's employment is in the southern part of the county outside the NFR metropolitan planning area and the NFRMPO Modeling Area, the share of employment in both Larimer and Weld that is expected to be located within both of those areas falls by just over one percentage point over the forecast period from 2017 to 2050.

Appendix B: Zoning District Densities

The short-term constraint layer, which constrains model years 2011 through 2019, uses local government zoning codes to determine Dwelling Units per Acre (DUA) and Floor Area Ratio (FAR) for the majority of local governments. The DUA and FAR based on zoning codes for each district are identified in **Table 11**. Instead of using the zoning code, the short-term constraint layer for the City of Greeley is based on the Future Land Use Plan, per the City's request. In addition, several communities outside of the NFRMPO were assigned estimated DUA and FAR without referencing their zoning code.

The table**Table 11** specifies the update date for the zoning code referenced by the constraint layer and is color coded to identify the method used to determine the maximum DUA and FAR. **Table 10** provides a legend for the color coding, with values explicitly stated in the zoning code in green, estimated values in yellow, values calculated from aerial imagery in red, and values provided by local government staff in blue. District codes are color coded to indicate if they were developed by the community (green) or created by NFRMPO staff (yellow).

Table 10: Zoning District Densities Table Legend

Source of DUA/FAR	Background Color
Zoning Code	
Estimated	
Aerial Imagery	
Local Government Staff	

Source of District Code	Background Color
Community	
NFRMPO Staff	

All zoning district information was collected during 2017 and reflects the most recently adopted or amended zoning code available at that time. Each district within the model region was assigned a unique identifier. Zoning districts were then dissolved so that each zone was assigned one shape per community.

Whenever possible, existing shapefiles for each jurisdiction's zoning maps were used as the basis for the regional constraint layer. Attributes were assigned to identify the jurisdiction, zoning districts and abbreviations, and fields for max DUA and max FAR. In many cases, shapefiles did not exist and had to be created from PDFs in GIS. For these communities, maps were imported and georeferenced in GIS. Maps drawn by NFRMPO staff may less accurately reflect the boundaries of zones. For all drawn layers, zoning boundaries were snapped to surrounding County, City, and/or Census Block boundaries where applicable. Several communities had multiple zones per Block.

Table 11: Zoning District Densities

Local Government/ Date of Zoning Code Update	Zoning District Name	District Code	DUA	FAR
Ault*	None	N/A	6	0.5
Berthoud 10/19/2017	Agricultural	AG	1	0
	Traditional Neighborhood	TN	6	0
	Single Family	R1	6	0
	Limited Multi-Family	R2	8	0
	Multi-Family	R3	12	0
	Mixed Use	R4	14	1.6
	Manufactured/Mobile Home	R5	12	0
	Neighborhood Commercial	C1	10	2
	General Commercial	C2	10	0.75
	Light Industrial	M1	10	0.6
	Industrial	M2	10	1
	Transitional	T	0	0
	Planned Unit Development	PUD	14	2
Eaton 2/1/2010	Single-Family Residential	R-1	6	0
	Lower Density Single-Family Residential	R-2	6	0
	Medium Density Single-Family Residential	R-3	15	0
	Residential Mixed Use	R-MU	15	2.8
	Neighborhood Commercial	C-1	15	2
	Downtown Commercial	C-2	6	2.8
	Highway Commercial	HC	0	2.2
	Limited Impact Industrial	I-1	0	2.1
	Industrial and Manufacturing	I-2	0	2
	Agricultural	A-1	0	0
	PUD	PUD	15	2.8
Estes Park 8/1/2017	Rural Estate	RE-1	0.1	0
	Rural Estate	RE	0.4	0
	Estate	E-1	1	0
	Estate	E	2	0
	Residential	R	4	0
	Residential	R-1	8	0
	Two Family Residential	R-2	4	0
	Multi-Family Residential	RM	8	0
	Accommodations/Highway Corridor	A	8	0.5
	Accommodations/Low Intensity	A-1	4	0.2
	Downtown Commercial	CD	24	1

* Community was assigned an estimated DUA and FAR without referencing their zoning code.

Local Government/ Date of Zoning Code Update	**Zoning District Name**	**District Code**	**DUA**	**FAR**
Estes Park, Continued	Outlying Commercial	CO	0	0.25
	Office	O	2	0.25
	Heavy Commercial	CH	0	0.5
	Restricted Industrial	I-1	0	0.3
	Planned Mixed-Use	PUD-M	8	1
Evans 8/1/2017	Agricultural	AG	0.025	0
	U.S. 85 Office	85-0	0	0.5
	U.S. 85 Retail and Commercial - Neighborhood	85-RC-N	10	0.5
	U.S. 85 Retail and Commercial - Auto	85-RC-A	0	0.3
	U.S. 85 Retail and Commercial - Regional Corridor	85-RC-R	0	0.3
	Commercial Low Intensity	C1	10	0.3
	Commercial Medium Intensity	C2	10	0.5
	Commercial High Intensity	C3	10	0.8
	Light Industrial	I1	0	0.3
	Medium industrial	I2	0	0.5
	High Industrial	I3	0	0.5
	Public Facilities	PF	0	0.5
	Planned Unit Development	PUD	15	0.7
	Single-Family Estate Residential	R1E	0.5	0
	Single-Family Residential Development	R1	7	0
	Two-Family Residential	R2	8.5	0
	Multifamily Residential	R3	15	0
	Residential Commercial	RC	10	0.5
	Manufactured Housing	RMFH	8	0
	Mobile Home Community	RMH	8	0
Fort Collins 8/1/2017	Rural Lands	RUL	0.1	0
	Urban Estate	UE	2	0
	Residential Foothills	RF	0.43	0
	Low Density Residential	RL	7	0
	Low Density Mixed-Use	LMN	9	0.5
	Medium Density Mixed-Use	MMN	25	1
	Neighborhood Conservation Low Density	NCL	7	0
	Neighborhood Conservation Medium Density	NCM	20	0
	Neighborhood Conservation Buffer	NCB	24	0.3
	High Density Mixed-Use Neighborhood	HMN	45	1.5
	Transition	T	0	0
	Public Open Lands	POL	0	0
	River Conservation	RC	0.025	0
	Downtown	D	149	4

Local Government/ Date of Zoning Code Update	**Zoning District Name**	**District Code**	**DUA**	**FAR**
Fort Collins, Continued	Colorado State University	CSU	149	4
	River Downtown Redevelopment	RDR	77	2.5
	Community Commercial	CC	50	2
	Community Commercial North College	CCN	12	1.2
	Community Commercial-Poudre River	CCR	12	1
	General Commercial	CG	50	1.2
	Service Commercial	CS	5	0.6
	Neighborhood Commercial	NC	25	0.6
	Limited Commercial	CL	7	0.6
	Harmony Corridor	HC	20	1.5
	Employment	E	20	1.5
	Industrial	I	0	1
Garden City 8/1/2017	Residential	R	6	0
	Residential Business	RB	15	0.3
	Business	B	0	0.5
	Commercial	C	0	0.5
Gilcrest 3/1/2017	Agricultural	A-1	0.2	1
	Low Density Residential	R-1	4	1
	Medium Density Residential	R-2	8.7	1
	High Density Residential	R-3	14	1
	Manufactured (Mobile) Home	MH	14	1
	Light Commercial	C-1	0	1
	Heavy Commercial	C-2	0	1.5
	Light Industrial	I-1	0	1.5
	Heavy Industrial	I-2	0	1.5
	Parks and Open Spaces	P	0	0
	Mixed-Use Overlay	M-U	14	1.5
	Planned Unit Development	PUD	14	1.5
Greeley	*See Appendix C: Future Land Use Plan (FLUP) Densities*			
Johnstown 1/1/2011	Single-Family Residential	SF-1	4	0
	Single-Family Attached Residential	SF-2	8	0
	Multifamily Residential	MF-1	18	0
	Central Business	CB	0	0.5
	Industrial	I	0	0.3
	Gateway	GW	0	0.3
	Holding Agricultural	HA	0.025	0
	Open Space	O	0	0

Local Government/ Date of Zoning Code Update	Zoning District Name	District Code	DUA	FAR
Johnstown, Continued	Planned Unit Development – Residential	PUD-R	8	0.2
	Planned Unit Development – Industrial Park	PUD-I	0	0.3
	Planned Unit Development – Business	PUD-B	12	0.3
	Planned Unit Development – Mixed-Use	PUD-MU	12	0.3
	Planned Mobile Home Park	PD-M	8	0
Kersey*	None	N/A	4	0.5
Larimer County 8/1/2017	Farming	FA	2	0
	Farming	FA-1	0.5	0
	Forestry	FO	0.1	0
	Forestry	FO-1	0.1	0
	Open	O	0.1	0
	Estate	E	0.4	0
	Estate	E-1	1	0
	Rural Estate	RE	0.1	0
	Rural Estate	RE-1	0.1	0
	Residential	R	3	0
	Residential	R-1	4	0
	Residential	R-2	5	0
	Multiple-Family	M	6	0
	Multiple-Family	M-1	8	0
	Accommodations	A / A-1	3	0.3
	Tourist	T	3	0.3
	Business	B	0	0.3
	Commercial	C	0	0.3
	Commercial Outlying	CO	0	0.3
	Industrial	I	0	0.3
	Heavy Industrial	I-1	0	0.3
	Airport	AP	0	0.3
	Planned Development	PD	4	0.3
	Red Feather Lakes Business	RFLB	0.5	0.3
LaSalle 1988	Low Density Residential	R-1	5.8	0.4
	Medium Density Residential	R-2	8.7	0.5
	High Density Residential	R-3	14	0
	Central Business District	CBD	15	2
	Commercial	C	14	2
	Light Industrial	I-1	0	0.5
	Heavy Industrial	I-2	0	0.5
	Parks and Open Space	P	0	0

* Community was assigned an estimated DUA and FAR without referencing their zoning code.

Local Government/ Date of Zoning Code Update	Zoning District Name	District Code	DUA	FAR
LaSalle, Continued	Agricultural	A	0	0
	Planned Unit Development	PUD	15	2
Loveland	Estate Residential	ER	2	0
8/1/2017	Established Low-density Residential	R1e	4	0
	Developing Low-Density Residential	R1	4	0
	Developing Two-Family Residential	R2	6	0
	Established High-density Residential	R3e	16	0.5
	Developing High-density Residential	R3	16	0.3
	Established Business	BE	16	2
	Developing Business	B	4	1
	Mixed-use Activity Center	MAC	16	3
	Employment Center	E	16	3
	Public Park	PP	0	0
	Developing Industrial	I	0	0.5
	Developing Resource	DR	0	0
	PUD	PUD	16	2
Mead	Residential Single-Family-Estate	RSF-E	0.4	0
3/1/2017	Residential Single-Family	RSF-1	1	0
	Residential Single-Family	RSF-4	4	0
	Residential Multi-Family	RMF-8	8	0.5
	Residential Multi-Family	RMF-14	14	0.8
	Downtown mixed-Use	DMU	14	4
	Highway Commercial	HC	8	0.5
	General Commercial	GC	8	0.5
	Light Industrial	LI	8	0.25
	Agricultural	AG	0.2	0
Milliken	Developing Resource	DR	0	0
6/27/2017	Agricultural	A	0	0
	Agricultural Estate	AE	0.66	0
	Conservation	CD	0	0
	Estate Zoning - Rural Subdivision	E-1	0.2	0
	Single-Family Residential	R-1	5	0
	Single-Family Estate Residential	R-1E	3	0
	Two-Family Residential	R-2	7	0
	Multi-Family Residential	R-3	20	1
	Mobile Home Community	RM	5	0
	Factory Built Housing	R-FH	5	0
	Office	C-1	0	0.5
	Local Business	C-2	0	0.5
	General Business	C-3	0	1

Local Government/ Date of Zoning Code Update	Zoning District Name	District Code	DUA	FAR
Milliken, Continued	Service Business	C-4	0	1
	Mixed Use Commercial - Downtown	MU-C-D	7	2
	Light Industrial	I-1	0	0.5
	Medium Industrial	I-2	0	1
	Heavy Industrial	I-3	0	2
	Planned Unit Development	PUD	20	2
	Hillside/Ridgeline Protection Overlay	HSP	0	0
Nunn*	None	N/A	2	0.5
Pierce*	None	N/A	4	0.5
Platteville*	None	N/A	6	0.5
Raymer*	None	N/A	2	0.3
Severance 8/21/2017	Rural Residential	RR	0.4	0
	Sub-Urban Perimeter	SP	6	0.3
	Town Core	TC	15	1
	Development Nodes	DN	8	1
Timnath 6/9/2017	Agriculture	A	1	0
	Estate Residential	R-E	1	0
	Old Town Residential	R-1	3	0
	Single-Family Residential	R-2	4	0
	Mixed Residential	R-3	8	0
	Multi-Family Residential	R-4	24	0
	Residential Mixed-Use	RMU	16	1.5
	Commercial Mixed-Use	CMU	16	2
	Business	B	8	2
	Neighborhood Commercial	NC	0	0.5
	General Commercial	C-2	0	1
	Community Commercial	CC	0	1
	Regional Commercial	RC	0	0.5
	Industrial	I-1	0	0.3
Weld County 8/1/2017	Agricultural	A	1	0
	Low Density Residential	R-1	7	0
	Duplex Residential	R-2	14.5	0
	Medium-Density Residential	R-3	14.5	0
	High-Density Residential	R-4	29	0
	Mobile Home Residential	R-5	5	0
	Neighborhood Commercial	C-1	0	0.5
	General Commercial	C-2	0	0.5
	Business Commercial	C-3	0	0.5

* Community was assigned an estimated DUA and FAR without referencing their zoning code.

Local Government/ Date of Zoning Code Update	**Zoning District Name**	**District Code**	**DUA**	**FAR**
Weld County, Continued	Highway Commercial	C-4	0	0.5
	Industrial	I-1	0	0.5
	Industrial	I-2	0	0.5
	Industrial	I-3	0	0.75
	Estate	E	0.4	0
	Planned Unit Development	PUD	45	1
Wellington 9/4/2013	Agriculture	A	0.2	0
	Residential Single-family Rural Density	R-1	1	0
	Residential Single-family Medium Density	R-2	4	0
	Residential Single-family Senior Housing	R-3	7	0
	Residential Multi-family	R-4	12	0
	Mobile/Manufactured Home Park	MH	7	0
	Community Commercial	C-1	12	1
	Downtown Commercial	C-2	12	2
	Highway Commercial	C-3	12	1
	Light Industrial	LI	0	1
	Industrial	I	0	1
	Public	P	0	0
Windsor 8/1/2017	Single-Family Residential	SF-1	4	0
	Single-Family Attached Residential	SF-2	8	0
	Estate Residential	E-1	1	0
	Estate Residential	E-2	1.25	0
	Multifamily Residential	MF-1	12	0
	High-Density Multifamily	MF-2	20	0
	Neighborhood Commercial	NC	0	0.3
	Central Business	CB	0	1.5
	General Commercial	GC	0	0.5
	Heavy Industry	I-H	0	0.3
	Limited Industrial	I-L	0	0.5
	Recreation and Open Space	O	0	0
	Residential Mixed Use	RMU	20	1
	Planned Mobile Home Park	PMU	8	0

Appendix C: Future Land Use Plan (FLUP) Densities

The long-term constraint layer, which constrains model years 2020 through 2045, uses Future Land Use Plans (FLUPs) to calculate Dwelling Units per Acre (DUA) and Floor Area Ratio (FAR) for the majority of local governments. The maximum DUA and FAR based on local government FLUPs for each land use category are identified in **Table 13**. For Local governments without a FLUP, as well as the City of Fort Collins which was in the process of updating their FLUP, the long-term constraint layer is based on the zoning code, as indicated in **Table 13**. In addition, several communities outside of the NFRMPO were assigned estimated DUA and FAR without referencing their FLUP.

The table specifies the year the plan was adopted (plan year) and the future year for which the plan was created (out year) and is color coded to identify the method used to calculate the maximum DUA and FAR. **Table 12** provides a legend for the color coding, with values explicitly stated in the land use plan in green, estimated values in yellow, and values provided by local government staff in blue. Land use codes are color coded to indicate if they were developed by the community (green) or created by NFRMPO staff (yellow).

Table 12: Future Land Use Densities Table Legend

Source of DUA/FAR	Background Color
Land Use Plan	
Estimated	
Local Government Staff	

Source of Land Use Code	Background Color
Community	
NFRMPO Staff	

All future land use information was collected during 2017 and reflects the most recently adopted or amended FLUP available at that time. Each land use category within the model region was assigned a unique identifier. Land use categories were then dissolved so that each category was assigned one shape per community.

Whenever possible, existing shapefiles for each jurisdiction's land use maps were used as the basis for the regional constraint layer. Attributes were assigned to identify the jurisdiction, land use category names and abbreviations, and fields for max DUA and max FAR. In many cases, shapefiles did not exist and had to be created from PDFs in GIS. For these communities, maps were imported and georeferenced in GIS. Maps drawn by NFRMPO staff may less accurately reflect the boundaries of land use categories. For all drawn layers, land use boundaries were snapped to surrounding County, City, and/or Census Block boundaries where applicable. Several communities had multiple land use categories per Block.

Table 13: Future land Use Densities

Local Government	Plan Year/Out Year	Future Land Use Category Name	Code	DUA	FAR
Ault*		None	N/A	6	0.5
Berthoud		Low Density Rural Residential	LDRR	0.5	0
2014	2019	Low Density Suburban Residential	LDSR	2	0
		Moderate Density Residential	MDR	6	0.5
		High Density Mixed Use-Residential	HDMU-R	14	1.6
		Commercial-Office	C-O	0	2
		Employment	E	0	1
		Park, Civic, Natural Preserve, and Open	O	0	0
		I-25 Sub-area: Mixed Use	MU	6	0.5
		I-25 Sub-area: General Commercial	GC	0	2
		I-25 Sub-area: Neighborhood Commercial	NC	0	0.5
		I-25 Sub-area: Convenience Commercial	CC	0	0.3
		I-25 Sub-area: Employment	E	0	1
		I-25 Sub-area: Flex-Office/Residential	F-OR	14	1.6
		I-25 Sub-area: Low Density Residential	LDR	0	3
		I-25 Sub-area: Medium Density Residential	MDR	0	8
		I-25 Sub-area: High Density Residential	HDR	0	20
		I-25 Sub-area: Parks and Open Space	PO	0	0
Eaton		*See Appendix B: Zoning District Densities*			
Estes Park		Rural Estate	RE-1	0.2	0
2008	N/A	Rural Estate	RE	0.4	0
		Estate	E-1	1	0
		Estate	E	2	0
		Single Family Residential	R	4	0
		Two-Family Residential	R-2	6	0
		Multi-Family	MF	8	0
		Downtown	CBD	24	2
		Commercial	C	8	1
		Office	O	0	0.3
		Accommodations	A	0	0.5
		Accommodations	A-1	4	0.3
		Commercial Recreation	CR	0	0.2
		Light Industrial	I-1	0	0.3
		Commercial Planned Unit Development	PUD-C	8	2
		Residential Planned Unit Development	PUD-R	24	0
		Institutional	INS	0	0.3
		Parks/Recreation/Open Space	PR	0	0

* Community was assigned an estimated DUA and FAR without referencing their Future Land Use Plan.

Local Government	Plan Year/Out Year	Future Land Use Category Name	Code	DUA	FAR
Evans		Rural Residential Neighborhood	RRN	2	0.15
2010	2030	Urban Residential Neighborhood	URN	8.5	0.5
		High Density Residential	HDR	15	0.5
		Office	OF	0	0.5
		Automotive Commercial	AC	0	0.3
		Commercial	C	0	0.3
		Community Commercial	CC	0	0.3
		Neighborhood Retail Commercial	NRC	0	0.5
		High Retail Commercial	HRC	0	1
		Historical Mixed Use	HMU	4	0.3
		Industrial Rail Access	IRA	0	0.3
		Industrial Business Park	IBP	0	0.3
		Industrial Clean Energy	ICE	0	0.3
		Park n Ride	PNR	0	0.5
		Public Facilities	PF	0	0.3
		Existing Parks, Open Space and Recreation	EO	0	0
		Potential Parks, Open Space and Trail Corridors	PO	0	0
Fort Collins		*See Appendix B: Zoning District Densities*			
Garden City		*See Appendix B: Zoning District Densities*			
Gilcrest		Agriculture/Large Lot Residential	AG	1	0
2017	N/A	Low Density Residential	LDR	3	0
		Medium Density Residential	MDR	8	0
		High Density Residential	HDR	12	0
		Downtown Mixed Use	DMU	12	1
		Neighborhood Commercial	NC	0	0.5
		Regional Commercial	RC	0	0.5
		Employment	E	0	0.5
		Civic/Public Facility	PF	0	0.3
		Parks	P	0	0
		Open Space	OS	0	0
Greeley		Airport Area	AP	0	0.3
2017	2060	Higher Education Hubs	EDU	10	0.5
		Employment, Industrial, and Commercial Areas	E-I-C	10	0.3
		North Annexation Area	NAA	0.1	0
		Mixed Use High Intensity	MUHI	20	2
		Urban Reserve	UR	0	0.3
		Bluffs	BL	0	0
		Community Separator	CS	2	0
		Entryway Character Corridor	ECC	0	0
		Riparian Land	RL	0	0
		City Owned Natural Areas	CONA	0	0

Local Government Plan Year/Out Year	Future Land Use Category Name	Code	DUA	FAR
Greeley, Continued	Rural	RU	2	0.3
	Suburban	SUB	10	0
	Legacy Urban	LU	20	0.5
	Mixed Use	MU	20	0.5
	Downtown	DT	20	2
Johnstown	Village Center	VC	10	0.5
2006 2035	Johnstown Gateway	JG	12	0.5
	Gateway Center	GC	12	0.3
	Downtown	DT	12	0.5
	Employment	E	0	0.3
	Commercial	C	0	0.3
	Commercial Mixed Use	CMU	0	0.3
	Conservation-oriented Agricultural/Large Lot	A-R	2	0
	Residential Mixed-Use	RMU	10	0.3
	Low Density Residential	LDR	4	0
	Medium Density Residential	MDR	8	0
	Public Institutional	P	0	0.3
	Greenways	G	0	0
	Park/Cemetery	O	0	0
Kersey*	None	N/A	4	0.5
Larimer County	*See Appendix B: Zoning District Densities*			
LaSalle	*See Appendix B: Zoning District Densities*			
Loveland	Estate Residential	ER	2	0
2016 2025	Low Density Residential	LDR	4	2
	Medium Density Residential	MDR	10	2
	High Density Residential	HDR	20	2
	Regional Activity Center	RAC	10	2
	Downtown Activity Center	DAC	16	2
	Community Activity Centers	CAC	16	3
	Neighborhood Activity Centers	NAC	16	2
	Corridor Commercial	CC	16	2
	Employment	E	16	1.5
	Industrial	I	0	1
	Public Quasi Public	PQP	0	0.5
	Parks, Open Lands, and Environmentally	POL/OS	0	0
	Big Thompson River Area	BTRAREA	0	0
	Complete Neighborhoods Overlay	CN	8	2
	Enhanced Corridor Overlay	EC	30	3
	River Adjacent Overlay	RA	0	0
Mead	*See Appendix B: Zoning District Densities*			

* Community was assigned an estimated DUA and FAR without referencing their Future Land Use Plan.

Local Government Plan Year/Out Year	Future Land Use Category Name	Code	DUA	FAR
Milliken	Estate Residential	ER	0.05	0
2015 2035	Residential Neighborhood	RN	20	0
	Downtown	DT	20	2
	Commercial/Mixed Use	CMU	20	1
	Business/Industrial	BI	0	1
	Urban Reserve	UR	0	0
	Agriculture	AG	0.66	0
	Parks and Recreation	PR	0	0
	Greenway	GW	0	0
	Public/Quasi-Public	PUB	0	1
	Floodplain Overlay	FO	0	0
	Urban Growth Area	UGA	0	0
	Influence Area	IA	0	0
Nunn*	None	N/A	2	0.5
Pierce*	None	N/A	4	0.5
Platteville*	None	N/A	6	0.5
Raymer*	None	N/A	2	0.3
Severance	Rural Residential	RR	0.4	0
2011 2025	Suburban Perimeter	SP	10	0.5
	Development Node	DN	12	1.5
	Town Core	TC	15	1.5
Timnath	County Density Residential	CDR	0.5	0
2013 2033	Very Low Density Residential	VLR	1	0
	Low Density Residential	LDR	3	0
	Low Density Mixed Use	LDMU	16	1.5
	Residential Mixed Use	RMU	16	1.5
	Medium Density Residential	MDR	8	0
	High Density Residential	HDR	24	0
	Regional Commercial	RC	0	0.5
	Downtown Core	DC	8	2
	Commercial	C	0	1
	Commercial Mixed Use	CMU	16	2
	Employment	E	0	0.25
	Mixed Use	MU	16	2
	Open Space/Trail Corridors	O	0	0
Weld County	*See Appendix B: Zoning District Densities*			
Wellington	Rural Density	RUR	2	0
2014 N/A	Urban Density	URB	4	0
	Multi-Family	MF	12	0
	Highway Commercial	HC	0	1

* Community was assigned an estimated DUA and FAR without referencing their Future Land Use Plan.

Local Government Plan Year/Out Year	Future Land Use Category Name	Code	DUA	FAR
Wellington, Continued	Community Commercial	CC	0	1
	Light Industrial	LI	0	1
	Reservoirs	RES	0	0
	Schools	SCH	0	0.5
	Other Public and Quasi-Public	OPQP	0	0.5
	Parks/Open Space	POS	0	0
Windsor 2016 2036	Estate Residential	ER	2	0
	Single Family Detached Residential	SFDR	4	0
	Single Family Attached Residential	SFAR	5	0
	Multi-Family Residential	MF	10	0.5
	Residential Mixed Use	RMU	6	1
	Downtown Mixed Use	DMU	2	2
	General Commercial	GC	0	1
	Regional Commercial	RC	0	1
	Light Industrial	LI	0	0.5
	Heavy Industrial	HI	0	0.5
	Public/Semi-Public	P	0	1
	Agriculture	A	1	0
	Parks/Recreation and Open Space	O	0	0
	Utilities/Transportation	U	0	0
	Intergovernmental Planning Area	IPA	0	0
	Temporary Mining Activities	TMA	0	0