City of Tualatin

Economic Opportunities Analysis

August 2019

Prepared for:

City of Tualatin

***DRAFT* REPORT**

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Executive Summary

This report presents an economic opportunities analysis consistent with the requirements of statewide planning Goal 9 and the Goal 9 administrative rule (OAR 660-009). Goal 9 describes the EOA as "an analysis of the community's economic patterns, potentialities, strengths, and deficiencies as they relate to state and national trends" and states that "a principal determinant in planning for major industrial and commercial developments should be the competitive advantage of the region within which the developments would be located."

Note to reviewers: The final version of the EOA will include an executive summary

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1. Introduction

This report presents an Economic Opportunities Analysis (EOA) for the City of Tualatin. The purpose of an EOA is to develop information as a basis for policies that capitalize on Tualatin opportunities and help address the City's challenges. The EOA includes technical analysis to address a range of questions that Tualatin faces in managing its commercial and industrial land. For example, the EOA includes an employment forecast that describes how much growth Tualatin should plan for over the 2020 to 2040 period and identifies the amount and type of employment land necessary to accommodate growth in Tualatin over that period. The EOA also includes an inventory of commercial and industrial land within Tualatin's Planning Area to provide information about the amount of land available to accommodate employment growth.

This EOA complies with the requirements of statewide planning Goal 9, the Goal 9 administrative rules (OAR 660 Division 9), and the court decisions that have interpreted them. Goal 9 requires cities to state objectives for economic development (OAR 660-009-0020(1)(a)) and to identify the characteristics of sites needed to accommodate industrial and other employment uses (OAR 660-009-0025(1)) over the 20-year planning period. This approach could be characterized as a *site-based* approach that projects land need based on the forecast for employment growth, the City's economic development objectives, and the specific needs of target industries.

Background

Tualatin last evaluated economic trends in a 2014 update to the City's Economic Development Strategic Plan. Around that same time, Greater Portland Inc. completed a five-year economic development strategy, Greater Portland 2020, for the Portland region in 2015 which defined emerging industry clusters and policies for economic development in the region. In 2018, Tualatin also completed a concept plan for the Basalt Creek Planning Area which allocated substantial land as a Manufacturing Park, expected to accommodate 1,897 new jobs.

The purpose of this project was to develop a factual base to provide the City with information about current economic conditions. This factual basis, presented in this report, provides information necessary for updating the City's economic development Comprehensive Plan policies. This report identifies opportunities to meet the City's economic development objectives and develop Comprehensive Plan policies and implementation strategies that capitalize on the City's comparative advantages and address areas of economic weakness.

The EOA provides information that the City can use to identify and capitalize on its economic opportunities. It also provides information essential to addressing the City's challenges in managing economic development, such as a lack of commercial sites to support growth of businesses that require office space, underutilized industrial and commercial land, and a lack of policy direction to address these issues.

The EOA draws on information from numerous data sources, such as the Oregon Employment Department, U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, and the U.S. Census.

Framework for an Economic Opportunities Analysis

The content of this report is designed to meet the requirements of Oregon Statewide Planning Goal 9 and the administrative rule that implements Goal 9 (OAR 660-009). The analysis in this report is designed to conform to the requirements for an Economic Opportunities Analysis in OAR 660-009 as follows.

1. *Economic Opportunities Analysis (OAR 660-009-0015).* The Economic Opportunities Analysis (EOA) requires communities to identify the major categories of industrial or other employment uses that could reasonably be expected to locate or expand in the planning area based on information about national, state, regional, county or local trends; identify the number of sites by type reasonably expected to be needed to accommodate projected employment growth based on the site characteristics typical of expected uses; include an inventory of vacant and developed lands within the planning area designated for industrial or other employment use; and estimate the types and amounts of industrial and other employment uses likely to occur in the planning area. Local governments are also encouraged to assess community economic development potential through a visioning or some other public input-based process in conjunction with state agencies.

2. *Industrial and commercial development policies (OAR 660-009-0020).* Cities are required to develop commercial and industrial development policies based on the EOA. Local comprehensive plans must state the overall objectives for economic development in the planning area and identify categories or particular types of industrial and other employment uses desired by the community. Local comprehensive plans must also include policies that commit the city or county to designate an adequate number of employment sites of suitable sizes, types and locations. The plan must also include policies to provide necessary public facilities and transportation facilities for the planning area. Tualatin's draft economic development policies will be in the Tualatin Economic Development Strategy memorandum, which will accompany this report.

3. *Designation of lands for industrial and commercial uses (OAR 660-009-0025).* Cities and counties must adopt measures to implement policies adopted pursuant to OAR 660-009-0020. Appropriate implementation measures include amendments to plan and zone map designations, land use regulations, public facility plans, and transportation system plans. More specifically, plans must identify the approximate number, acreage and characteristics of sites needed to accommodate industrial and other employment uses to implement plan policies and must designate serviceable land suitable to meet identified site needs.

Organization of this Report

This report is organized as follows:

- **Chapter 2.** Factors Affecting Future Economic Growth summarizes historic economic trends that affect current and future economic conditions in Tualatin as well as Tualatin's competitive advantages for economic development.
- **Chapter 3.** Employment Growth and Site Needs presents a forecast for employment growth in Tualatin and describes the City's target industries and site needs for potential growth in industries.
- **Chapter 4.** Buildable Lands Inventory presents a summary of the inventory of employment lands.
- **Chapter 5.** Land Sufficiency and Conclusions compares the supply of and demand for buildable lands and presents key concluding recommendations for Tualatin.

This report also includes two appendices:

- **Appendix A.** National, State, and Regional and Local Trends
- **Appendix B.** Buildable Lands Inventory Methodology

2. Factors Affecting Future Economic Growth

Tualatin exists as part of the economy of the Portland Region. While Portland is the economic center of the region, providing urban amenities (such as stores, medical services, or personal financial services) to residents, Tualatin also provides similar amenities to its residents and visitors.

This chapter describes the factors affecting economic growth in Tualatin within the context of national and regional economic trends. The analysis presents the City's competitive advantages for growing and attracting businesses, which forms the basis for identifying potential growth industries in Tualatin.

Factors that Affect Economic Development[1]

The fundamental purpose of Goal 9 is to make sure that a local government plans for economic development. The planning literature provides many definitions of economic development, both broad and narrow. Broadly,

> "Economic development is the process of improving a community's well-being through job creation, business growth, and income growth (factors that are typical and reasonable focus of economic development policy), as well as through improvements to the wider social and natural environment that strengthen the economy."[2]

That definition acknowledges that a community's wellbeing depends in part on narrower measures of economic wellbeing (e.g., jobs and income) and on other aspects of quality of life (e.g., the social and natural environment). In practice, cities and regions trying to prepare an economic development strategy typically use a narrower definition of economic development; they take it to mean business development, job growth, and job opportunity. The assumptions are that:

- Business and job growth are contributors to and consistent with economic development, increased income, and increased economic welfare. From the municipal point of view, investment and resulting increases in property tax are important outcomes of economic development.
- The evaluation of tradeoffs and balancing of policies to decide whether such growth is likely to lead to overall gains in wellbeing (on average and across all citizens and

[1] The information in this section is based on previous Goal 9 studies conducted by ECONorthwest and the following publication: *An Economic Development Toolbox: Strategies and Methods*, Terry Moore, Stuart Meck, and James Ebenhoh, American Planning Association, Planning Advisory Service Report Number 541, October 2006.

[2] *An Economic Development Toolbox: Strategies and Methods*, Terry Moore, Stuart Meck, and James Ebenhoh, American Planning Association, Planning Advisory Service Report Number 541, October 2006.

businesses in a jurisdiction, and all aspects of wellbeing) is something that decision makers do after an economic strategy has been presented to them for consideration.

That logic is consistent with the tenet of the Oregon land-use planning program: all goals matter, no goal dominates, and the challenge is to find a balance of conservation and development that is acceptable to a local government and state. Goal 9 does not dominate, but it legitimizes and requires that a local government focus on the narrower view of economic development that focuses on economic variables.

In that context, a major part of local economic development policy is about local support for business development and job growth; that growth comes from the creation of new firms, the expansion of existing firms, and the relocation or retention of existing firms. Specifically, new, small businesses are accounting for a larger share of the job growth in the United States.[3] This shift toward a focus on entrepreneurship, innovation, and small businesses presents additional options for local support for economic development beyond firm attraction and retention. Thus, a key question for economic development policy is, *What are the factors that influence business and job growth, and what is the relative importance of each?* This document addresses that question in depth.

What Factors Matter?

Why do firms locate where they do? There is no single answer—different firms choose their locations for different reasons. Key determinants of a location decision are a firm's *factors of production*. For example, a firm that spends a large portion of total costs on unskilled labor will be drawn to locations where labor is relatively inexpensive. A firm with large energy demands will give more weight to locations where energy is relatively inexpensive. In general, firms choose locations they believe will allow them to maximize net revenues: if demand for goods and services are held roughly constant, then revenue maximization is approximated by cost minimization.

The typical categories that economists use to describe a firm's production function are:

- **Labor.** Labor is often the most important factor of production. Other things equal, firms look at productivity—labor output per dollar. Productivity can decrease if certain types of labor are in short supply, which increases the costs by requiring either more pay to acquire the labor that is available, the recruiting of labor from other areas, or the use of the less productive labor that is available locally.
- **Land.** Demand for land depends on the type of firm. Manufacturing firms need more space and tend to prefer suburban locations where land is relatively less expensive and

[3] According to the 2018 Small Business Profile from the US Small Business Office of Advocacy, small businesses account for over 99 percent of total businesses in the United States, and their employees account for nearly 50% of American workers. https://www.sba.gov/sites/default/files/advocacy/2018-Small-Business-Profiles-US.pdf

less difficult to develop. Warehousing and distribution firms need to locate close to interstate highways.

- **Local infrastructure.** An important role of government is to increase economic capacity by improving quality and efficiency of infrastructure and facilities, such as roads, bridges, water and sewer systems, airport and cargo facilities, energy systems, and telecommunications.
- **Access to markets.** Though part of infrastructure, transportation merits special attention. Firms need to move their product, either goods or services, to the market, and they rely on access to different modes of transportation to do this.
- **Materials.** Firms producing goods, and even firms producing services, need various materials to develop products that they can sell. Some firms need natural resources (i.e., raw lumber) and others may need intermediate materials (i.e., dimensioned lumber).
- **Entrepreneurship**. This input to production may be thought of as good management, or even more broadly as a spirit of innovation, optimism, and ambition that distinguishes one firm from another even though most of their other factor inputs may be quite similar. Entrepreneurial activity, even when unsuccessful, can offer information about the local market that other entrepreneurs can use in starting a new firm. Entrepreneurs are typically willing to take on more risk in uncertain markets, and a strengthened entrepreneurial environment can help to reduce that risk and uncertainty. [4] Entrepreneurs also tend to have more mobility than larger firms, and are more likely to locate in areas with a strong entrepreneurial environment.[5] To some degree, local governments can promote the high-quality of life in an area to attract entrepreneurs, in addition to adopting regulations with minimal barriers—or at least, clear guidelines—for new, small businesses.

The supply, cost, and quality of any of these factors obviously depend on market factors: on conditions of supply and demand locally, nationally, and even globally. But they also depend on public policy. In general, public policy can affect these factors of production through:

- **Regulation.** Regulations protect the health and safety of a community and help maintain the quality of life. Overly burdensome regulations, however, can be disincentives for businesses to locate in a community. Simplified bureaucracies and straightforward regulations can reduce the burden on businesses and help them react quickly in a competitive marketplace.
- **Taxes**. Firms tend to seek locations where they can optimize their after-tax profits. Tax rates are not a primary location factor—they matter only after businesses have made decisions based on labor, transportation, raw materials, and capital costs. The costs of these production factors are usually similar within a region. Therefore, differences in tax

[4] Tessa Conroy and Stephan Weiler "Local and Social: Entrepreneurs, Information Network Effects, and Economic Growth" (2017). https://redi.colostate.edu/wp-content/uploads/sites/50/2017/05/gender_gia_Jun2017-2.pdf

[5] Emil E. Malizia and Edward J. Feser. *Understanding Local Economic Development. (*1999).

levels across communities within a region are more important in the location decision than are differences in tax levels between regions.

- **Financial incentives**. Governments can offer firms incentives to encourage growth. Most types of financial incentives have had little significant effect on firm location between regions. For manufacturing industries with significant equipment costs, however, property or investment tax credit or abatement incentives can play a significant role in location decisions. Incentives are more effective at redirecting growth within a region than they are at providing a competitive advantage between regions.

This discussion may make it appear that a location decision is based entirely on a straight-forward accounting of costs, with the best location being the one with the lowest level of overall costs. Studies of economic development, however, have shown that location decisions depend on a variety of other factors that indirectly affect costs of production. These indirect factors include agglomerative economies (also known as industry clusters), quality of life, and innovative capacity.

- **Industry clusters**. Firms with similar business activities can realize operational savings when they congregate in a single location or region. Clustering can reduce costs by creating economies of scale for suppliers. For this reason, firms tend to locate in areas where there is already a presence of other firms engaged in similar or related activities.
- **Quality of life.** A community that features many quality amenities, such as access to recreational opportunities, culture, low crime, good schools, affordable housing, and a clean environment can attract people simply because it is a nice place to be. A region's quality of life can attract skilled workers, and if the amenities lure enough potential workers to the region, the excess labor supply pushes their wages down so that firms in the region can find skilled labor for a relatively low cost. The characteristics of local communities can affect the distribution of economic development within a region, with different communities appealing to different types of workers and business owners. Sometimes location decisions by business owners are based on an emotional or historical attachment to a place or set of amenities, without much regard for the cost of other factors of production.
- **Innovative capacity.** Increasing evidence suggests that a culture promoting innovation, creativity, flexibility, and adaptability is essential to keeping U.S. cities economically vital and internationally competitive. Innovation is particularly important in industries that require an educated workforce. High-tech companies need to have access to new ideas typically associated with a university or research institute. In addition to innovations in research and development within firms or research institutions, firms may also draw on the innovative capacity of entrepreneurs in an area. These entrepreneurs may be former employees of the larger firm or businesses that relocated to an area because of the proximity to an industry cluster. Strong networks and communication between firms, research institutions, and entrepreneurs are key

components to leveraging innovative capacity in an area.[6] Local governments are well-equipped to help foster these networks through supporting economic development tools such as small business assistance centers or incubation centers. Government can also be a key part of a community's innovative culture, through the provision of services and regulation of development and business activities that are responsive to the changing needs of business.

How Important Are These Factors?

To understand how changes in public policies affect local job growth, economists have attempted to identify the importance for firms of different locational factors. They have used statistical models, surveys, and case studies to examine detailed data on the key factors that enter the business location decision.

Economic theory says that firms locate where they can reduce the costs of their factors of production (assuming demand for products and any other factors are held constant). Firms locate in regions where they have access to inputs that meet their quality standards, at a relatively low cost. Because firms are different, the relative importance of different factors of production varies both across industries and, even more importantly, across firms.

No empirical analysis can completely quantify firm location factors because numerous methodological problems make any analysis difficult. For example, some would argue simplistically that firms would prefer locating in a region with a low tax rate to reduce tax expenses. However, the real issue is the value provided by the community for the taxes collected. Because taxes fund public infrastructure that firms need, such as roads, water, and sewer systems, regions with low tax rates may end up with poor infrastructure, making it less attractive to firms. When competing jurisdictions have roughly comparable public services (type, cost, and quality) and quality of life, then tax rates (and tax breaks) can make a difference.

Further complicating any analysis is the fact that many researchers have used public expenditures as a proxy for infrastructure quality. But large expenditures on roads do not necessarily equal a quality road system. It is possible that the money has been spent ineffectively and the road system is in poor condition.

An important aspect of this discussion is that the business function at a location matters more than a firm's industry. A single company may have offices spread across cities, with headquarters located in a cosmopolitan metropolitan area, the research and development divisions located near a concentration of universities, the back office in a suburban location, and manufacturing and distribution located in areas with cheap land and good interstate access.

The location decisions of businesses are primarily based on the availability and cost of labor, transportation, raw materials, and capital. The availability and cost of these production factors are usually similar within a region. Most economic development strategies available to local

[6] Nancey Green Leigh and Edward Blakely. *Planning Local Economic Development: Theory and Practice.* 2013.

governments, however, only indirectly affect the cost of these primary location factors. Local governments can most easily affect tax rates, public services, and regulatory policies. Economists generally agree that these factors do affect economic development, but the effects on economic development are modest. Thus, most of the strategies available to local governments have only a modest effect on the level and type of economic development in the community.

Local governments can provide support for new and existing small businesses through policies and programs that support entrepreneurship and innovation. The National League of Cities suggests strategies for local governments including strong leadership from elected officials; better communication with entrepreneurs, especially about the regulatory environment for businesses in the community; and partnerships with colleges, universities, small business development centers, mentorship programs, community groups, businesses groups, and financial institutions.[7]

Local governments in Oregon also play a central role in the provision of buildable land through inclusion of lands in the Urban Growth Boundary, as well as through determination of plan designations and zoning, and through provision of public services. Obviously, businesses need buildable land to locate or expand in a community. Providing buildable land alone is not sufficient to guarantee economic development in a community—market conditions must create demand for this land, and local factors of production must be favorable for business activity. In the context of expected economic growth and the perception of a constrained land supply in Tualatin, the provision of buildable land has the potential to strongly influence the level and type of economic development in the City. The provision of buildable land is one of the most direct ways that Tualatin can affect the level and type of economic development in the community.

[7] National League of Cities "Supporting Entrepreneurs and Small Businesses" (2012). https://www.nlc.org/supporting-entrepreneurs-and-small-business

Summary of the Effect of National, State and Regional Trends on Economic Development in Tualatin

This section presents a summary and the implications of national, state, and regional economic trends on economic growth in Tualatin, which are presented in Appendix A. Employment growth in Tualatin is closely related to trends that affect economic growth in Washington County and the broader Portland region.

- **Recovery from the national recession.** Incomes grew faster in Washington County than Oregon since 2001 and the unemployment rate in Washington County was lower than the statewide average.
    - The unemployment rate in Washington County declined since the recession, consistent with trends in the U.S. and Oregon. In 2018, the unemployment rate was 3.5% in Washington County, 4.2% in Oregon, and 3.9% in the U.S. Comparatively, in 2009, unemployment was 9.5% in Washington County, 11.3% in Oregon, and 9.3% in the U.S. As of 2018, the unemployment rates for Washington County is similar to its 2000 rate.
    - Employment increased in Washington County since 2001, with a gain of about 66,799 employees between 2001 and 2018. The largest increases were in professional / business services and health care / social assistance, while the largest decreases were in wholesale trade and information. Tualatin accounts for about 11% of employment in Washington County.

- **Growth in manufacturing and health care / social assistance sectors.** Employment in manufacturing and the health care / social assistance sectors accounted for about 37% of employment in Tualatin in 2017. In 2007, employment in these industries accounted for about 36% of the employment in Tualatin, an increase of about 3,299 employees between 2007 and 2017. Employment in both of these sectors support above average wages.

  In Washington County, employment in manufacturing and the health care / social assistance sectors accounted for 23% of employment in 2017, down from 24% in 2007. While the overall share of employment decreased, total employment increased by about 9,809 employees between 2007 and 2017.

- **Availability of trained and skilled labor.** Availability of labor depends, in part, on population growth and in-migration. Tualatin's population increased by 4,344 people between 2000 and the 2013-2017 period, at an average growth rate of 1.0%. In comparison, Oregon's population also grew at an average rate of 1.0%, between 2000 and 2017, with 66% of population coming from in-migration.

  The current labor force participation rate is another important consideration in the availability of labor. The labor force in any market consists of the adult population (16 and over) who are working or actively seeking work. The labor force includes both the employed and unemployed. Children, retirees, students, and people who are not actively seeking work are not considered part of the labor force. According to the 2013-

2017 American Community Survey, Tualatin had about 15,643 people in its labor force and Washington County had over 310,400. The labor force participation rate in Tualatin (73%) was higher than Washington County (69%) and the Portland Region (68%) in the 2013-2017 period. A higher concentration of older residents in an area or a mismatch of the types of jobs available in an area and the types of skills of the labor force can contribute to low labor force participation rates.

Businesses in Tualatin draw employees from across Washington County as well as Multnomah and Clackamas Counties. Relative to Washington County and the Portland Region, Tualatin residents have a slightly higher level of educational attainment.

- **Aging of the population.** Tualatin has a smaller percentage of residents 60 years and older relative Washington County and the Portland Region. Tualatin's median age, which was 31.9 in 2000, increased to 38.2 by the 2013-2017 period. In comparison, Washington County's median age was 36.4 in the 2013-2017 period.

  Washington County's population is expected to continue to age, with people 60 years and older forecast to grow from 20% of the population in 2020 to 24% of the population in 2040, consistent with Statewide trends. Tualatin may continue to attract mid-life and older workers over the planning period. People in this age group may provide sources of skilled labor, as people continue to work until later in life. These skilled workers may provide opportunities to support business growth in Tualatin.

- **Increases in racial and ethnic diversity.** Overall, the nation and Oregon are becoming more racially and ethnically diverse. Between 2000 and 2013-2017, the Latinx population in Oregon increased from 8% to 13%, and the Latinx population in Tualatin increased from 12% to 16% in that same time. Growth in the Latinx community will drive continue to economic development in Oregon. The share of Oregon's non-Caucasian population increased from 13% to 15% and stayed static in Tualatin at 13%. Tualatin is less racially diverse but more ethnically diverse than Oregon.

- **Importance of small businesses in Oregon's economy.** Small business, those with 100 or fewer employees, account for 66% of private-sector employment in Oregon. The average size for a private business in Tualatin is 13 employees per business, compared to the State average of 11 employees per private business. Businesses with five or fewer employees in Tualatin account for 64% of private employment and businesses with fewer than 20 employees account for 89% of private employment. Only 2% of businesses in Tualatin have more than 100 employees.

- **Increases in energy prices.** In 2018, lower energy prices have decreased the costs of commuting. Over the long-term, if energy prices increase, these higher prices will likely affect the mode of commuting before affecting workers' willingness to commute. For example, commuters may choose to purchase a more energy-efficient car or carpool. Very large increases in energy prices may affect workers' willingness to commute, especially workers living the furthest from Tualatin or workers with lower paying jobs. In addition, very large increases in energy prices may make shipping freight long distances less economically feasible, resulting in a slow-down or reversal of off-shore manufacturing, especially of large, bulky goods.

- **Increases in remote workers.** Working from home has increased in Oregon in both urban and rural areas. Firms that allow workers to work remotely cover a variety of industries, allowing their employees to continue working for that firm but enjoy the quality of life and amenities of the location that the workers prefer to live. While data on remote workers is difficult to obtain, about 6% of workers in Tualatin reported that they work from home in the 2013-2017 period (according to Census data), up from 4.6% in 2000. In comparison, 6.0% of workers in Washington County worked from home in 2013-2017.

Employment Trends in Tualatin and Washington County

The economy of the nation changed substantially between 1980 and 2018. These changes affected the composition of Oregon's economy, including Tualatin's economy. At the national level, the most striking change was the shift from manufacturing employment to service-sector employment. The most important shift in Oregon during this period has been the shift from a timber-based economy to a more diverse economy, with the greatest employment in services.

This section focuses on changes in the economy in Washington County since 2001 and in Tualatin since 2007.

Exhibit 1 shows covered employment[8] in Washington County for 2001 and 2018. Employment increased by 66,799 jobs, at an average annual growth rate (AAGR) of 1.5% over this period. The sectors with the largest increases in numbers of employees were professional and businesses services, healthcare and social assistance, and accommodation and food services. The average annual wage for employment in Washington County in 2018 was about $70,308.

[8] **Covered** employment includes employees covered by unemployment insurance. Examples of workers not included in covered employment are sole proprietors, some types of contractors (often referred to as "1099 employees"), or some railroad workers. Covered employment data is from the Oregon Employment Department.

Exhibit 1. Covered Employment by Industry, Washington County, 2001 and 2018

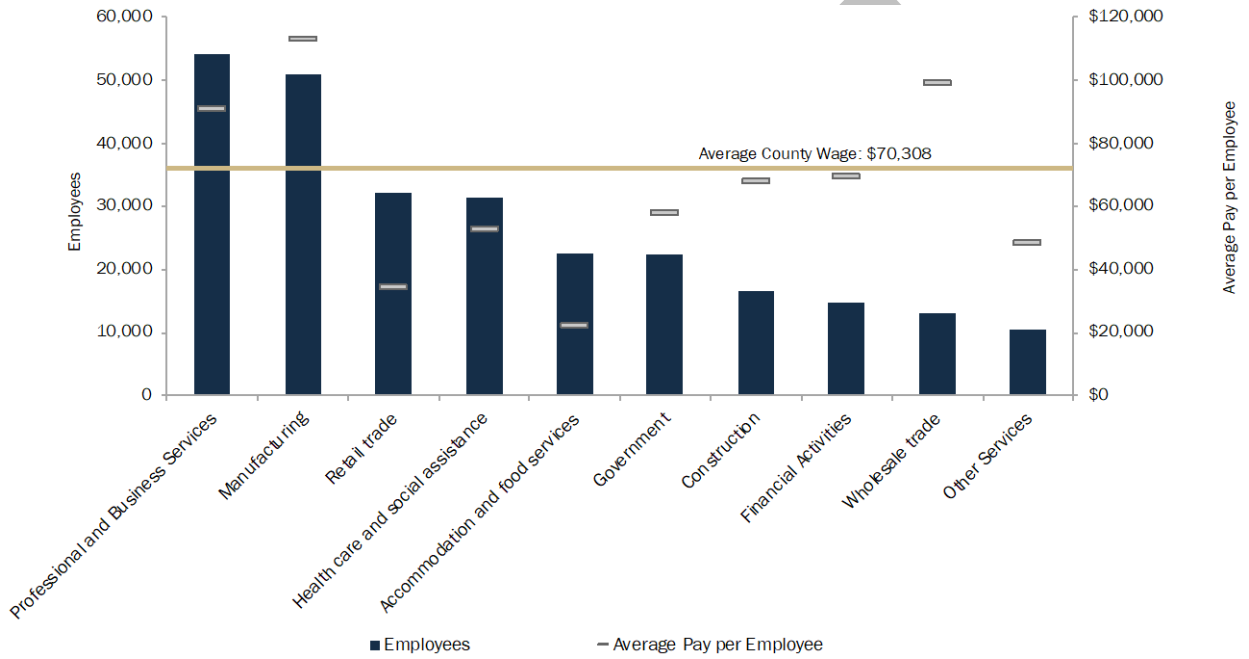
Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2001 and 2018.
Note: AAGR is Average Annual Growth Rate

Sector	2001	2018	Change 2001 to 2018		
			Difference	Percent	AAGR
Natural Resources and Mining	3,607	3,090	-517	-14%	-0.9%
Construction	12,611	16,629	4,018	32%	1.6%
Manufacturing	50,872	51,028	156	0%	0.0%
Wholesale trade	14,476	13,131	-1,345	-9%	-0.6%
Retail trade	26,850	32,092	5,242	20%	1.1%
Trade, Transportation, and Utilities	4,501	5,253	752	17%	0.9%
Information	8,688	7,543	-1,145	-13%	-0.8%
Financial Activities	13,181	14,874	1,693	13%	0.7%
Professional and Business Services	34,275	54,220	19,945	58%	2.7%
Educational Services	3,598	5,723	2,125	59%	2.8%
Health care and social assistance	15,616	31,405	15,789	101%	4.2%
Arts, entertainment, and recreation	2,372	4,749	2,377	100%	4.2%
Accommodation and food services	14,253	22,691	8,438	59%	2.8%
Other Services	7,151	10,468	3,317	46%	2.3%
Unclassified	78	108	30	38%	1.9%
Government	16,517	22,441	5,924	36%	1.8%
Total	228,646	295,445	66,799	29%	1.5%

Exhibit 2 shows covered employment and average wage for the 10 largest industries in Washington County. Jobs in professional and business services, as well as manufacturing, each account for about 18% of the county's covered employment, and these sectors pay more per year than the county average ($91,027 and $113,297, respectively). Jobs in wholesale trade and information also pay more per year than the county average, but account for a smaller share of covered employment in the County.

Exhibit 2. Covered Employment and Average Pay by Sector, 10 Largest Sectors Washington County, 2018

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2018. Note: largest sectors are defined by number of employees.



Employment in Tualatin accounts for about 11% of employment in Washington County. Exhibit 3 shows a summary of covered employment data for the Tualatin Planning Area in 2017. The sectors with the largest number of employees in Tualatin were manufacturing (27%), health care and social assistance (11%), and wholesale trade (10%). These sectors accounted for 14,897 jobs or 48% of Tualatin's employment.

Exhibit 3. Covered Employment and Average Pay by Sector, Tualatin Planning Area, 2017[9]

Source: Oregon Employment Department, Quarterly Census of Employment and Wages, 2017.

Sector/Industry	Establishments	Employees	Payroll	Average Pay / Employee
Agriculture, Forestry, and Mining	7	162	$9,551,473	$58,960
Construction	142	2,384	$161,457,609	$67,726
Construction of Buildings	45	529	$33,683,731	$63,674
Heavy and Civil Engineering Construction	9	289	$29,245,674	$101,196
Specialty Trade Contractors	88	1,566	$98,528,204	$62,917
Manufacturing	150	8,371	$641,666,664	$76,654
Food, Beverage, and Apparel Manufacturing	22	856	$90,298,572	$105,489
Wood, Paper, and Other Material Product Manufacturing	34	1,191	$66,438,149	$55,784
Metal Manufacturing	38	1,520	$77,992,172	$51,311
Machinery Manufacturing	19	2,801	$296,449,663	$105,837
Computer and Electronic Product Manufacturing	10	506	$30,635,840	$60,545
Electrical Equipment, Appliance, and Component Manufacturing	6	514	$36,321,867	$70,665
Transportation Equipment Manufacturing	5	96	$6,628,519	$69,047
Furniture and Related Product Manufacturing	10	787	$30,948,048	$39,324
Miscellaneous Manufacturing	6	100	$5,953,834	$59,538
Wholesale Trade	262	3,235	$196,579,720	$60,767
Retail Trade	108	2,429	$68,643,958	$28,260
Building Material and Garden Equipment and Supplies Dealers	13	255	$13,882,178	$54,440
Food and Beverage Stores	8	454	$12,722,710	$28,024
Health and Personal Care Stores	11	199	$7,360,231	$36,986
Gasoline Stations	5	68	$1,476,441	$21,712
Clothing and Clothing Accessories Stores	35	448	$8,657,769	$19,325
Other Retailers	36	1,005	$24,544,629	$24,423
Transportation and Warehousing and Utilities	37	1,337	$82,171,091	$61,459
Information	39	195	$18,180,409	$93,233
Finance and Insurance	75	380	$30,078,816	$79,155
Real Estate and Rental and Leasing	74	294	$15,317,961	$52,102
Professional and Technical Services	175	1,044	$69,192,933	$66,277
Management of Companies	14	789	$57,891,957	$73,374
Administrative / Support; Waste Mngmt/ Remediation	101	2,366	$81,771,708	$34,561
Private Education Services	11	296	$7,385,926	$24,952
Health Care and Social Assistance	178	3,291	$206,495,765	$62,746
Health Care	143	2,535	$185,684,497	$73,248
Social Assistance	35	756	$20,811,268	$27,528
Arts, Entertainment, and Recreation	23	846	$15,349,722	$18,144
Accommodation and Food Services	103	2,017	$41,014,523	$20,334
Accommodation	5	97	$2,320,012	$23,918
Food Services and Drinking Places	98	1,920	$38,694,511	$20,153
Other Services	212	879	$35,547,519	$40,441
Government	14	787	$43,330,609	$55,058
Federal	3	74	$4,661,596	$62,995
State	3	94	$6,666,134	$70,916
Local	8	619	$32,002,879	$51,701
Educational Services	5	393	$18,859,472	$47,988
Total	1,725	31,102	$1,781,628,363	$57,283

Exhibit 4 shows the employment and average pay per employee for sectors in Tualatin. Average pay for all employees ($57,283) is shown as a light brown line across the graph and average pay for individual sectors are shown as short red lines. The exhibit shows that Tualatin's retail,

[9] The following sectors were combined due to confidentiality of QCEW data: Utilities, Transportation and Warehousing; Manufacturing and Wholesale Trade; Finance and Insurance, Real Estate and Rental and Leasing; Health Care and Social Assistance and Private Education; Arts, Entertainment and Recreation and Accommodation and Food Services.

administrative/waste management, and accommodations / food service sectors have below average wages. The highest wages are in manufacturing (Exhibit 5).

Exhibit 4. Covered Employment and Average Pay by Sector, Tualatin, 2017

Source: Oregon Employment Department, Quarterly Census of Employment and Wages, 2017.

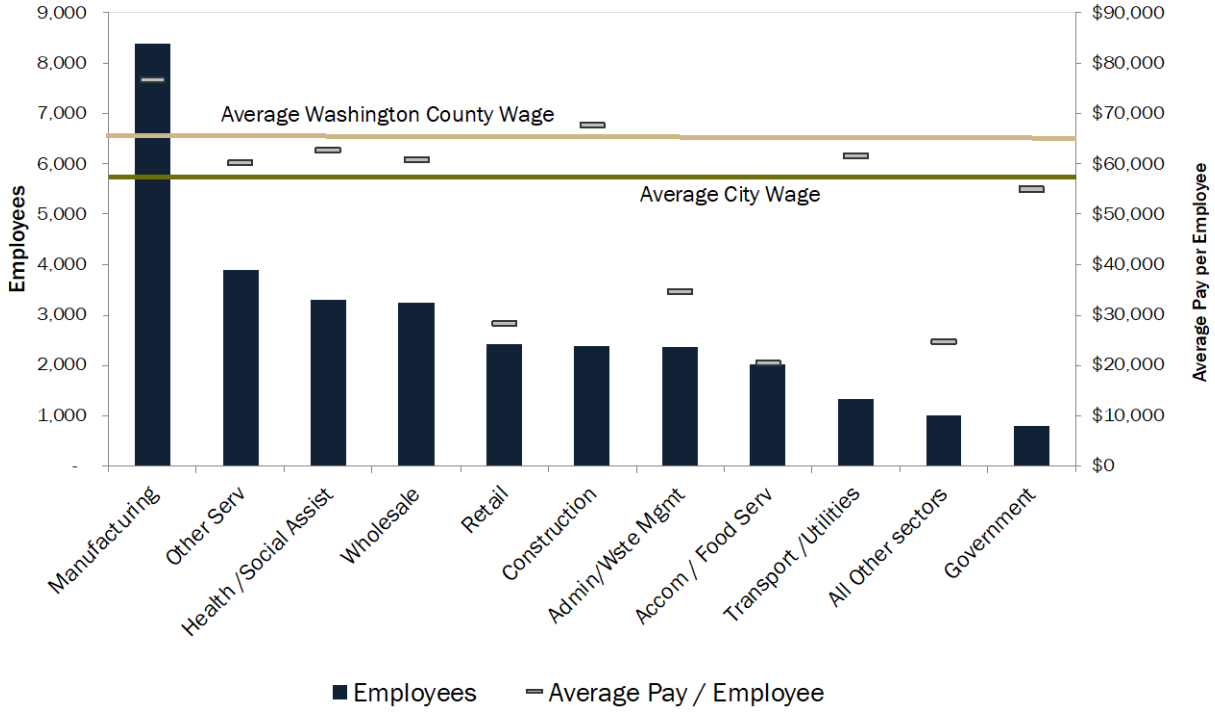


Exhibit 5. Covered Employment and Average Pay by Manufacturing Sub-Sector, Tualatin, 2017

Source: Oregon Employment Department, Quarterly Census of Employment and Wages, 2017.

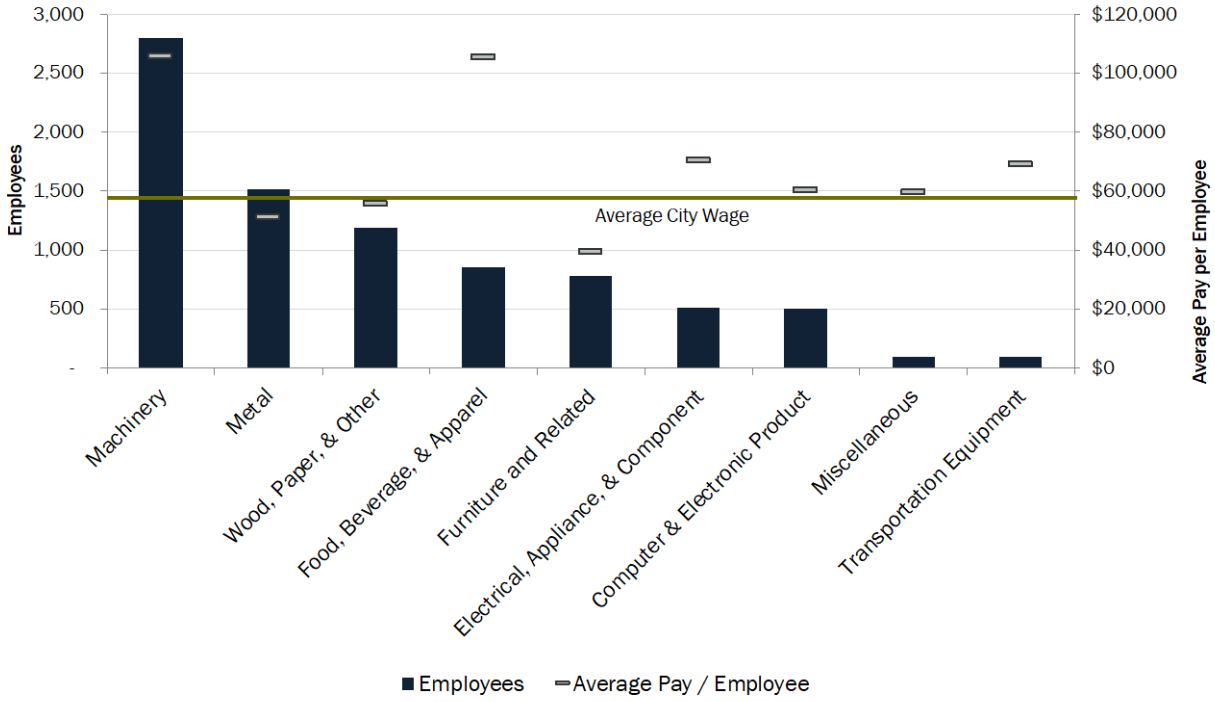


Exhibit 6 shows that employment in Tualatin grew by nearly 7,800 employees between 2007 and 2017 at an average annual growth rate of 2.9%. All sectors grew in employment, with three exceptions: (1) agriculture, forestry, and mining; (2) finance and insurance, and (3) private education services. The sectors with the largest growth were manufacturing, health care and social assistance, and administrative support/waste management and remediation services.

Exhibit 6. Change in Covered Employment, Tualatin, 2007—2017

Source: Oregon Employment Department, Quarterly Census of Employment and Wages, 2007 and 2017. Note: AAGR is Average Annual Growth Rate.

Sector	Establishments		Employees		Change in Employment 2007-2017		
	2007	2017	2007	2017	Number	Percent	AAGR
Agriculture, Forestry, & Mining	5	7	199	162	(37)	-19%	-2%
Construction	145	142	1,707	2,384	677	40%	3%
Manufacturing	139	150	6,332	8,371	2,039	32%	3%
Wholesale Trade	213	262	2,909	3,235	326	11%	1%
Retail Trade	141	108	2,348	2,429	81	3%	0%
Transportation, Warehousing & Utilities	27	37	926	1,337	411	44%	4%
Information	20	39	87	195	108	124%	8%
Finance & Insurance	81	75	435	380	(55)	-13%	-1%
Real Estate, Rental, & Leasing	59	74	258	294	36	14%	1%
Professional &Technical Services	112	175	581	1,044	463	80%	6%
Management of Companies	14	14	574	789	215	37%	3%
Admin. & Support / Waste Mgmt & Remediation Serv.	83	101	1,400	2,366	966	69%	5%
Private Education Services	16	11	299	296	(3)	-1%	0%
Health Care & Social Assistance	141	178	2,031	3,291	1,260	62%	5%
Arts, Entertainment, & Recreation	10	23	490	846	356	73%	6%
Accommodation & Food Services	92	103	1,352	2,017	665	49%	4%
Other Services	163	212	655	879	224	34%	3%
Government	13	14	743	787	44	6%	1%
Total Non-Farm Employment	**1,474**	**1,725**	**23,326**	**31,102**	**7,776**	**33%**	**2.9%**

Outlook for growth in Washington County

Exhibit 7 shows the Oregon Employment Department's forecast for employment growth by industry for the Portland Region (Clackamas, Multnomah, and Washington Counties) over the 2017 to 2027 period. Employment in the region is forecasted to grow at an average annual growth rate of 1.2%.

The sectors that will lead employment in the region for the 10-year period are: professional and business services (adding 28,100 jobs); private education and health services (adding 27,300 jobs); trade, transportation, and utilities (adding 21,400); and leisure and hospitality (adding 13,800 jobs). In sum, these sectors are expected to add 90,600 new jobs or about 74% of employment growth in the Portland Region. As of 2017, Washington County accounts for about 36% of employment in these three counties (the Portland Region), and Tualatin accounts for about 10% of the County's employment.

Exhibit 7. Regional Employment Projections, Portland Region (Clackamas, Multnomah, and Washington County), 2017 and 2027

Source: Oregon Employment Department. Employment Projections by Industry 2017-2027. Note: AAGR is average annual growth rate.

Industry Sector	2017	2027	Change 2017 - 2027		
			Number	Percent	AAGR
Total private	856,800	971,800	115,000	13%	1.3%
Natural resources and mining	9,800	10,600	800	8%	0.8%
Mining and logging	700	700	0	0%	0.0%
Construction	50,500	59,100	8,600	17%	1.6%
Manufacturing	101,100	106,000	4,900	5%	0.5%
Durable goods	76,300	79,200	2,900	4%	0.4%
Nondurable goods	24,800	26,700	1,900	8%	0.7%
Trade, transportation, and utilities	176,900	198,300	21,400	12%	1.1%
Wholesale trade	48,000	51,800	3,800	8%	0.8%
Retail trade	95,000	104,900	9,900	10%	1.0%
Transportation, warehousing, and utilities	33,900	41,600	7,700	23%	2.1%
Information	21,700	24,300	2,600	12%	1.1%
Financial activities	60,000	63,400	3,400	6%	0.6%
Professional and business services	155,500	183,600	28,100	18%	1.7%
Private educational and health services	140,800	168,100	27,300	19%	1.8%
Health care and social assistance	118,000	141,500	23,500	20%	1.8%
Leisure and hospitality	101,100	114,900	13,800	14%	1.3%
Arts, entertainment, and recreation	14,800	17,200	2,400	16%	1.5%
Accommodation and food services	86,300	97,800	11,500	13%	1.3%
Other services and private households	39,400	43,500	4,100	10%	1.0%
Government	114,100	122,000	7,900	7%	0.7%
Federal government	14,200	14,900	700	5%	0.5%
State government	7,600	8,200	600	8%	0.8%
Local government	92,300	98,900	6,600	7%	0.7%
Local education	47,200	51,500	4,300	9%	0.9%
Total payroll employment	970,900	1,093,800	122,900	13%	1.2%

Tualatin's Strengths, Weaknesses, Opportunities and, Threats

OAR 660-009-0015(4) requires that cities conduct an assessment of community economic development potential, as part of the EOA. This assessment considers: market factors, infrastructure and public facility availability and access, labor, proximity to suppliers and other necessary business services, regulations, and access to job training.

The local factors that form Tualatin's competitive advantage are summarized in the subsections below.

Note to CAC: We will update this section with more input, as we gather it.

Strengths

- **Location.** Tualatin is located in Washington County, about 13 miles south of Portland and about 36 miles north of Salem, along the I-5 corridor. Tualatin is located about mid-way between Hillsboro and Gresham. Other nearby and relatively large cities include Tigard, Lake Oswego, and Wilsonville. These locational aspects allow both goods and workers to move in and out of Tualatin relatively efficiently. Tualatin's location is an advantage, especially for freight transportation and households composed of workers that commute to different cities for work.

  Due to Tualatin's prime location along the I-5 corridor, about 93% of employees who work in Tualatin commute into Tualatin from other areas. This reality is advantageous for Tualatin as they can attract workers (at a range of skill sets) from around the region.

- **Availability of transportation.** All firms are heavily dependent upon surface transportation for efficient movement of goods, customers, and workers. Access to an adequate highway and arterial roadway network is needed for all industries. Close proximity to a highway or arterial roadway is critical for firms that generate a large volume of truck or auto trips as well as firms that rely on visibility from passing traffic to help generate business.

  Businesses and residents in Tualatin have access to a variety of modes of transportation: automotive (I-5, 99W, and local roads); commuter train (West Side Express Service (WES)); light rail (Metropolitan Area Express (MAX) connection to WES at Lombard); bus (TriMet lines 96,97, 76); and air (Portland Airport and Hillsboro Airport). These options provide options for residents and workers in Tualatin to commute in and out of the city, though traffic congestion is a growing concern. Additionally, Tualatin's easy access to I-5 is an advantage for attracting many types of businesses, such as warehouse and distribution or manufacturers that need close access to I-5 for heavy freight

- **Quality of life.** Tualatin residents' value the city's many urban services and amenities available to residents, while maintaining a small-town character. Tualatin residents and workers have access to numerous local businesses, high-quality school system, access to retail shopping opportunities, and parks system (which includes 90 park sites, 60 miles

of trails, and 1,500 acres of natural area). Tualatin also provides access to medical care services through the Legacy Meridian Park Medical Center and Kaiser Permanente Tualatin Medical Office. Tualatin is also a relatively safe community; in 2018, criminal citations, traffic citations, total arrests, and traffic crashes (activities) each amounted to less than 0.1 activity per capita.[10]

- **Support for local businesses.** Successful local economic development is often a result of effective collaboration among governments, business owners, and community members. To support new and existing small businesses in Tualatin, the City and Chamber of Commerce have developed a small business toolkit. The toolkit helps business owners with permitting their business in Tualatin.[11]
- **Existing businesses.** Tualatin has several key sectors (e.g. manufacturing, health care, social assistance) which present key opportunities for the creation of local clusters. These sectors may build off of regional clusters on the westside of the Metro region. Tualatin also has many small businesses in a range of industries, including those listed above. Tualatin's existing businesses provide a base to build upon and expand.
- **Access to workers.** Tualatin pulls workers from across the Portland Metropolitan Area. The types of jobs available at businesses in Tualatin range from highly skilled professional and technical service jobs to service-sector jobs, such as retail services. These jobs require a range of educational background or specialized training.
- **Access to education and training.** Tualatin is also close to higher education facilities, including Clackamas Community College in Wilsonville, Portland Community College (Sylvania), Portland State University, Lewis and Clark, Oregon Institute of Technology, and Reed College. Businesses in Tualatin are able to attract workers from these schools.

Weaknesses

- **Traffic congestion**. Tualatin's location along the I-5 corridor introduces congestion within city limits, particularly during peak hours. Without a robust public transportation system, and limited opportunities for cyclists and pedestrians, traffic congestion is amplified.
- **Limited access to transit**. Tualatin residents and commuters have access to TriMet bus lines 76, 96 and 97; the WES commuter rail line; and the Tualatin Shuttle operated by Ride Connection. These alternative modes of transportation are important, but do not meet the scale of the community's public transportation needs. More public transit routes, that are more convenient and accessible, is desired by the community to reduce congestion and to allow employees to get to work more efficiently.

[10] City of Tualatin. (2018). Tualatin Police Annual Report. https://www.tualatinoregon.gov/sites/default/files/fileattachments/police/page/4885/2018_annual_report.pdf

[11] Tualatin's Small Business Toolkit: www.tualatinoregon.gov/sites/default/files/fileattachments/economic_development/page/4725/small_business_toolkit_final_draft_webpdf.pdf

- **Commuting trends**. While employee commuting trends in Tualatin has its advantages (ability to attract a workforce from across the region), it also presents disadvantages. As Tualatin's population grows and as employment in Tualatin grows, it is likely that the number of employees commuting in and out of Tualatin will grow too. Commuting increases road congestion, and with limited access to transit to alleviate this problem, Tualatin's transportation infrastructure will become overloaded.
- **Affordable housing for workers.** A significant concern among Tualatin leaders and community members is the lack of affordable and available housing for people who work at businesses in Tualatin. The cost of housing does not align with the existing salaries of the workforce which may prevent households from living and working in Tualatin.
- **Downtown area that looks dated and has limited draw for residents and visitors**. A perception that Tualatin lacks urban design standards, architectural variety, and amenities in close proximity has resulted in many community members feeling that Tualatin looks dated. Specifically, community members note a need for a refined downtown center to draw visitors to Tualatin from I-5. Potential improvements to the physical appearance of the built environment in the city include increases to allowed building heights in specific areas, more mixed-use development, and improved connectivity to increase walkability.
- **Availability of high-wage jobs.** The average wage in Tualatin is $57,283, while the average wage in Washington County is $70,308. The largest sector of employment in Tualatin is in manufacturing industries, which pay higher-than-average wages. Tualatin also has many service-sector jobs, which tend to provide lower-than-average wages. Tualatin's location and cluster of manufacturing industries may help to attract more businesses with high wages, which may allow more workers in Tualatin to afford to also live in the City.
- **Retention of businesses.** Tualatin's Business Outreach Survey uncovered several issues that may make business retention less than ideal. Issues include: the perception of public safety in Tualatin, the lack of transportation and freight access, inconvenient public transit, slowness on part of the City to modify the Development Code, lack of incentives for development, and general difficulty to retain their workforce.

Opportunities

- **Public transportation.** Tualatin may work with Tri-Met to expand public transportation to promote connectivity, reduce reliance on cars thereby reducing congestion, and to encourage alternative modes of transportation. While local jurisdictions are not mandated to offer transit services, public transit is essential to the households that need it to access services or to get to work.
- **Redevelopment and infill development.** Community members noted the lack of a downtown center of Tualatin to draw visitors. Along with improvements to the physical appearance and urban form of commercial areas in Tualatin, the City can continue to

attract small businesses to locate in Tualatin, especially those that would attract visitors and residents to a core area. One potential area for this type of development would be the redevelopment of The Commons, to create a more pedestrian-oriented center.

- **Small business retention and growth.** Issues with business retention have created vacant storefronts. The City could develop and promote initiatives that encourage use of currently vacant storefronts through continued support for small businesses and entrepreneurs.

Threats

- **Aging population.** Tualatin's population is aging. From 2000 to the 2013-2017 period, residents over the age of 60 increased by 2,643 (or 148%). As workers in Tualatin retire, the need for skilled, educated workers will increase.
- **Environmental and climate change risks.** Environmental factors, including climate change, can threaten the success of a variety of industries that rely on key infrastructure that may not be adapted to growing environmental pressures (e.g. flooding, seismic hazards, or powerful storms). The risk of these natural hazards is likely to increase as a result of climate change.[12] Forest fires and urban heat islands also cause poor air quality, which can decrease quality of life for residents and impact their health.
- **Potential for decline in the state and national economies.** Changes in the state and national economies are beyond local control and directly affect Tualatin's economy. National recessions generally have a greater effect on Oregon, with higher job losses and longer recovery periods than the national average.

[12] Oregon Climate Change Research Institute. *Fourth Oregon Climate Assessment Report*. January 2019.

Summary of Tualatin's Competitive and Comparative Advantages

The prior sections presented the Tualatin's strengths, weaknesses, opportunities, and threats for economic development. Based on this, Tualatin's competitive and comparative advantages are:

- **Location.** Tualatin is located along a major transportation corridor (the I-5 corridor) and is 13 miles from downtown Portland. While Tualatin is not an especially large city, it is in close proximity to all of the urban amenities and services one would expect in a large metropolitan area. Residents of Tualatin have access to cultural activities such as concerts and events (like the West Coast Giant Pumpkin Regatta) at the Tualatin Commons and museums, markets, and concert halls in Portland. Residents also have access to outdoor recreational activities such as the Tualatin Hills Nature Park, Browns Ferry Park, and the Tualatin River National Wildlife Refuge in Sherwood. These locational aspects are attractive to businesses who prioritize quality of life for their employees.

  Additionally, most of Tualatin's workers commute to the city from other areas. Businesses that need access to or want to attract customers across the Portland Region may locate in Tualatin. Tualatin's location will impact the area's future economic development.

- **Regional Labor Market.** The availability of labor is critical for economic development. Availability of labor depends not only on the number of workers available but the quality, skills, and experience of available workers. Businesses in Tualatin have access to workers in Tualatin and from neighboring communities. Businesses need access to reliable skilled workers, both with and without higher education. The multitude of higher education institutions located in and around the Portland Metro area, means that Tualatin has sufficient access to skilled workers.

Target Industries

The characteristics of Tualatin will affect the types of businesses most likely to locate in the city. Tualatin's attributes that may attract firms are Tualatin's access to industrial land, access to workers, and its location along the I-5 corridor.

Tualatin's industry concentrations with a potential competitive advantage are defined in Exhibit 8. Tualatin has categorized its existing businesses into four main categories, based on analysis of location quotients (i.e., highly specialized industries), differential shift (i.e., competitive advantage compared to the national level), and critical concentration (i.e., with at least five establishments in a defined cluster). These four categories are: Growing Base, Emerging Clusters, Mature Clusters, and Transformation Clusters. Exhibit 8 and Exhibit 9 list the specific industries by each category.

Exhibit 8. Concentration of Industries and Employment, Tualatin, 2017

Source: City of Tualatin, Economic Development Department using data from EMSI and Oregon Department of Employment (QECW data).
Note: not pictured is "Food Processing and Manufacturing," with an LQ of 2.73 and DS 142%. "Automotive" is also not displayed, with an LQ of 0.51 and DS of -62%.

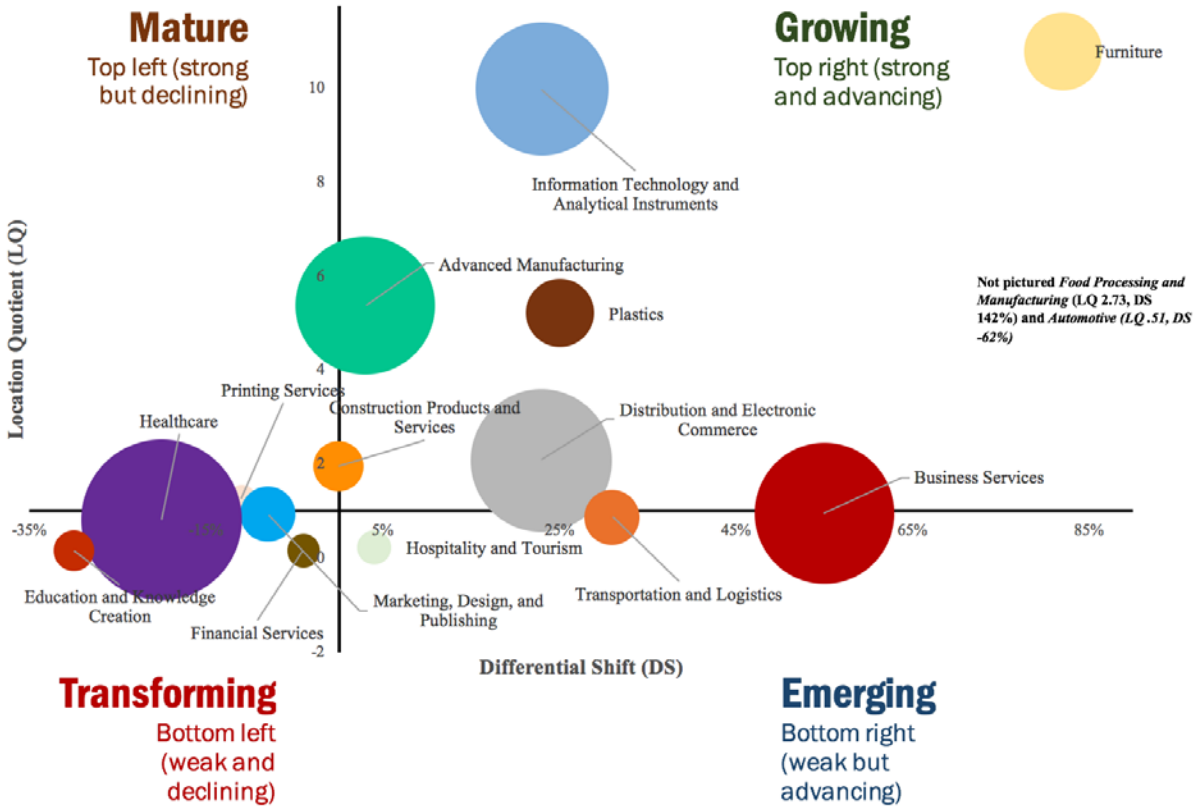


Exhibit 9. Industries Ranked Based on Differential Shift and Location Quotient

Source: City of Tualatin, Economic Development department using EMSI data (2018).

Rank	Cluster	Location Quotient (LQ)	Cluster Employment, 2017	Number of Establishments, 2016	Differential Shift (DS)
GROWING BASE					
1	Food Processing and Manufacturing	2.73	564	6	142%
2	Furniture	10.79	776	6	82%
3	Plastics	5.21	587	10	25%
4	Information Technology and Analytical Instruments	9.99	2,270	37	23%
5	Distribution and Electronic Commerce	2.08	2,535	193	23%
6	Advanced Manufacturing	5.38	2,433	46	3%
EMERGING CLUSTERS					
7	Business Services	0.96	2,506	131	55%
8	Transportation and Logistics	0.88	378	16	31%
9	Hospitality and Tourism	0.22	144	8	4%
MATURE CLUSTERS					
10	Construction Products and Services	1.96	331	7	-0.4%
11	Printing Services	1.26	110	11	-11%
TRANSFORMATION CLUSTERS					
12	Financial Services	0.17	141	35	-4%
13	Marketing, Design, and Publishing	0.93	385	28	-8%
14	Healthcare	0.82	3,279	153	-20%
15	Education and Knowledge Creation	0.16	199	16	-30%

The potential growth industries in Tualatin will draw from existing industry concentration in the City, Washington County, and the Portland Region, along with the City's economic development policies that align with changing or emerging industries and result in employment growth in Tualatin. Tualatin may also have opportunities for employment growth in industries without a concentration of employment or a high location quotient.

Potential Growth Industries

An analysis of growth industries in Tualatin should address two main questions: (1) Which industries are most likely to be attracted to Tualatin? and (2) Which industries best meet Tualatin's economic development goals? The selection of target industries is based on Tualatin's goals for economic development, economic conditions in Tualatin and Washington County, and the City's competitive advantages.

Given the current employment base, which is composed of small- and mid-sized businesses, it is reasonable to assume that much of the city's business growth will come from small- and mid-sized businesses. This growth will either come from businesses already in Tualatin or new businesses that start or relocate to Tualatin from within the Portland Region or from outside of the region.

The industries identified as having potential for growth in Tualatin are outlined below. This section primarily draws from the City of Tualatin's cluster analysis and reports developed for the Portland Region.

- **Manufacturing.** Tualatin's manufacturing sector accounts for 27% of the city's employment base. Greater Portland, Inc. (GPI) described Portland as a hotspot for manufacturing growth for key sub clusters (footwear, apparel, knives, and sporting; machinery; and medical devices). [13] Tualatin's potential growth industries in manufacturing are:
    - *Advanced manufacturing.* This industry is an internally preferred grouping of five independent traded clusters: (1) Downstream Metal Products, (2) Lighting and Electrical Equipment, (3) Metalworking Technology, (4) Production Technology and Heavy Machinery, and (5) Upstream Metal Manufacturing. In a report by the U.S. sub-committee on advanced manufacturing, this industry is challenged by "a shortage of Americans with the science, technology, engineering, and mathematics knowledge and technical skills needed for advanced manufacturing jobs."[14] Tualatin has a larger share of highly educated residents, compared to Washington County and the Portland Region, alleviating some concerns related to not having sufficient levels of skilled workers.

      Greater Portland Global (GPG), in its latest Investment Plan,[15] states that: "[t]he region is rich with firms in legacy industries such as metals manufacturing and wood processing that use advanced processes and possess a highly skilled labor pool, [motor vehicle manufacturing, and computers and electronics]." While GPG indicates that there is "a limited economic development role to play,"

[13] Greater Portland, Inc. (n.d.). Regional Trends in Greater Portland's Target Clusters. Greater Portland 2020.

[14] The United States, Subcommittee on Advanced Manufacturing. *Strategy for American Leadership in Advanced Manufacturing*. Office of the President, Committee on Technology of the National Science and Technology Council.

[15] Greater Portland Global. (n.d.). *Global Trade and Investment Plan.* Global Cities Initiative, A Join Project of Brookings and JPMorgan Chase.

Tualatin has substantial access to labor talent and may continue to support expansions of existing advanced metals manufacturing, family-owned operations, and wood products manufacturing.

- *Food processing and manufacturing.* The Bureau of Labor Statistics describes this industry cluster as one that takes livestock and agricultural products (raw food materials) and transforms them into products for intermediate or final consumption (sold to wholesalers or retailers for distribution). Tualatin's food processing and manufacturing cluster is its fastest growing industry (projected to grow 64% from 2017 to 2028). GPG cites the region's food processing sector as an established sector, requiring support in the form of industrial lands readiness and continued recruitment.
- *Furniture.* The furniture industry cluster comprises establishments that manufacture furniture, cabinets, shelving, and manufactured homes using products made of wood, metal, plastic, or textiles. While the furniture cluster provides the lowest annual wage of $38,911 per year (almost $19,000 less than the city average), it is the most concentrated cluster in Tualatin (with an LQ of 10.79).
- *Plastics.* Wages in the plastics industry cluster (comprising establishments that manufacture plastic materials and other plastic components / products) grew 14% from 2012 to 2017. As the fourth most concentrated cluster in Tualatin (with an LQ of 5.21), this industry presents objective growth potential for lower skilled workers.
- *Consumer products.* Per a 2019 discussion with GPI, the consumer products sector was described as an important industry target for Oregon, particularly for food and beverage products but also apparel, outdoor wear, and footwear as well as health and beauty products, home accessories, and pet products. Built Oregon, purposed to make Oregon the leader in consumer product innovation and development, launched the United State's first non-profit consumer product accelerator in Oregon. Tualatin may support efforts to connect consumer product businesses with BuiltOregon to encourage growth in its manufacturing target industries (e.g. advanced manufacturing, food processing, furniture manufacturing, etc.).

- **Information technology and analytical systems.** This industry cluster comprises establishments that work in computers, software, audio visual equipment, laboratory instruments, and medical apparatus development (e.g. standard and precision electronics like circuit boards and semiconductors). As of 2017, employees working in this industry cluster maintain an average wage of $109,832 (about $52,000 above the city's average) – representing the highest, average-waged industry in Tualatin. Tualatin's Information Technology and Analytical System industry has however, grown slower (17%) than the nation.
- **Distribution and e-commerce.** This cluster consists primarily of traditional wholesalers, mail order houses, and electronic merchants. Establishments comprising this industry

cluster buy, hold, and distribute a wide range of products from apparel and food to chemicals, gases, and minerals to farm materials, machinery, and other merchandise. This industry also contains establishments that support distribution and electronic commerce operations, including packaging, labeling, and equipment rental / leasing. This industry is forecast for job growth (26% change in jobs from 2017 to 2028).

- **Business services.** Business services establishments including corporate headquarters and other professional services (e.g. consulting, back office services, financial services / legal services, facilities support, computer services, etc.). In Tualatin, this industry is expected to see the largest growth in total jobs and had the largest growth in average wage.

3. Employment Growth and Site Needs

Goal 9 requires cities to prepare an estimate of the amount of commercial and industrial land that will be needed over a 20-year planning period. The estimate of employment land need and site characteristics for Tualatin is based on expected employment growth and the types of firms that are likely to locate in Tualatin over the 20-year period. This section presents an employment forecast and analysis of target industries that build from recent economic trends.

Forecast of Employment Growth and Commercial and Industrial Land Demand

Demand for industrial and non-retail commercial land will be driven by the expansion and relocation of existing businesses and by the growth of new businesses in Tualatin. This employment land demand is driven by local growth independent of broader economic opportunities, including the growth of target industries.

The employment projections in this section build off of Tualatin's existing employment base, assuming future growth is similar to the Portland Region's long-term historical employment growth rates. The employment forecast does not take into account a major change in employment that could result from the location (or relocation) of one or more large employers in the community during the planning period. Such a major change in the community's employment would exceed the growth anticipated by the city's employment forecast and its implied land needs (for employment, but also for housing, parks, and other uses). Major economic events, such as the successful recruitment of a very large employer, are difficult to include in a study of this nature. The implications, however, are relatively predictable: more demand for land (of all types) and public services.

Projecting demand for industrial and non-retail commercial land has four major steps:

1. **Establish base employment for the projection.** We start with the estimate of covered employment in Tualatin presented in Exhibit 3. Covered employment does not include all workers, so we adjust covered employment to reflect total employment in the City.
2. **Project total employment.** The projection of total employment considers forecasts and factors that may affect employment growth in Tualatin over the 20-year planning period.
3. **Allocate employment.** This step involves allocating types of employment to different land-use types.
4. **Estimate land demand.** This step estimates general employment land demand based on employment growth and assumptions about future employment densities.

The remainder of this section follows this outline to estimate employment growth and commercial and industrial land demand for Tualatin.

Employment Base for Projection

The purpose of the employment projection is to model future employment land need for general employment growth. The forecast of employment growth in Tualatin starts with a base of employment growth on which to build the forecast.

Exhibit 10 shows ECONorthwest's estimate of total employment in Tualatin in 2017. Tualatin had an estimated 38,838 *total* employees in 2017.

To develop the figures, ECONorthwest started with estimated covered employment in the Tualatin from confidential Quarterly Census of Employment and Wages (QCEW) data provided by the Oregon Employment Department. Based on this information, Tualatin had about 31,102 covered employees in 2017.

Covered employment, however, does not include all workers in an economy. Most notably, covered employment does not include sole proprietors. Analysis of data shows that *covered* employment reported by the Oregon Employment Department for Washington County is only about 77% of *total* employment reported by the U.S. Department of Commerce.[16] We evaluated this ratio for each industrial sector for Washington County and used the resulting ratios to determine the number of non-covered employees. This allowed us to determine the total employment in Tualatin.

[16] **Covered employment** includes employees covered by unemployment insurance. Examples of workers not included in covered employment are sole proprietors, some types of contractors (often referred to as "1099 employees"), or some railroad workers. Covered employment data is from the Oregon Employment Department.

Total employment includes all workers based on date from the U.S. Department of Commerce. Total employment includes all covered employees, plus sole proprietors and other non-covered workers.

Exhibit 10. Estimated total employment by sector, Tualatin Planning Area, 2017
Source: 2017 covered employment from confidential Quarterly Census of Employment and Wage (QCEW) data provided by the Oregon Employment Department.

Sector	Covered Employment	Estimated Total Employment	Covered % of Total
Agriculture, Forestry, & Mining	162	162	100%
Construction	2,384	3,018	79%
Manufacturing	8,371	8,761	96%
Wholesale Trade	3,235	3,805	85%
Retail Trade	2,429	2,926	83%
Transportation, Warehousing & Utilities	1,337	1,734	77%
Information	195	235	83%
Finance & Insurance	380	675	56%
Real Estate, Rental, & Leasing	294	1,175	25%
Professional &Technical Services	1,044	1,821	57%
Management of Companies	789	827	95%
Admin. & Support / Waste Mgmt & Remediation Serv.	2,366	2,942	80%
Private Education Services	296	552	54%
Health Care & Social Assistance	3,291	4,019	82%
Arts, Entertainment, & Recreation	846	1,658	51%
Accommodation & Food Services	2,017	2,201	92%
Other Services	879	1,532	57%
Government	787	795	99%
Total Non-Farm Employment	**31,102**	**38,838**	**77%**

Exhibit 11 shows that industrial employment (i.e., manufacturing, warehousing, or construction) is predominantly located in Industrial plan designations, with small amounts of employment located in Commercial plan designations (such as contractors and delivery or transportation logistics services) and in Residential plan designations (such as contractors, plumbers, electricians, contractors, and delivery or transportation logistics services).

In contrast, about one-fifth of commercial employment (i.e., retail, health care, financial services, and other commercial uses) are located in Industrial plan designations (such as gas stations, auto body shops, storage facilities, and professional or technical-service businesses) and 12% are located in Residential plan designations (such as financial institutions, property management or real estate offices, cafes, restaurants, and professional or technical-service businesses).

In the future, it is reasonable to expect that employment in Tualatin will continue to mix within existing plan designations, with substantial amounts of commercial employment locating in Industrial and Residential plan designations.

Exhibit 11. Location of Employment by Plan Designation, Tualatin Planning Area, 2017

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wage, summarized by ECONorthwest. Note: Data is organized by 2-digit NAICS and ONLY includes employment at businesses with private ownership.

General Plan Designation	Industrial employment		Commercial employment		Total	
	Employees	Percent	Employees	Percent	Employees	Percent
Industrial	13,985	94%	3,090	20%	17,075	56%
Commercial	547	4%	10,352	67%	10,899	36%
Residential	382	3%	1,881	12%	2,263	7%
Institutional	-	0%	78	1%	78	0%
Total	**14,914**	**100%**	**15,401**	**100%**	**30,315**	100%

Employment Projection

The employment forecast covers the 2020 to 2040 period, requiring an estimate of total employment for Tualatin in 2020. Tualatin does not have an existing employment forecast, and there is no required method for employment forecasting. OAR 660-024-0040(9) sets out some optional "safe harbors" that allow a city to determine employment land need.

ECONorthwest modeled four scenarios of employment growth. The employment growth assumption and basis for the scenarios are outlined below and in Exhibit 12:

- **Metro's Household Growth Rate for Tualatin:** The growth rate of 0.44% based on Tualatin's household growth forecast for the 2020-2040 period. This rate is consistent with the household forecast used in Tualatin's Housing Needs Analysis (2020-2040). Use of this growth rate is consistent with the safe harbor in OAR 660-024-0040(9)(a).
- **OED's Employment Growth Rate for the Tri-County Region:** The growth rate of 1.2% based on Oregon Employment Departments' (OEDs') forecast for employment growth for the Portland Region (Clackamas County, Multnomah County, and Washington County). Use of this growth rate is consistent with the safe harbor in OAR 660-024-0040(9)(a).
- **Metro's Employment Growth Rate for Tualatin:** The growth rate of 1.4% based on Metro's employment forecast for Tualatin for the 2015 to 2040 period.
- **Tualatin's Historic Employment Growth Rate:** The growth rate of 2.9% based on Tualatin's employment growth for the 2007 to 2017 period.

Exhibit 12. Employment Growth Scenarios, Tualatin Planning Area, 2020—2040

Source: (1) Metro's *2040 Household Distributed Forecast*, July 12, 2016. Metro's 2040 TAZ Forecast for households, November 6, 2015. Calculations by ECONorthwest. (2) State of Oregon Employment Department, Employment Projections by Industry, 2017-2027. (3) Metro's 2040 Employment Distributed Forecast, July 12, 2016. (4) Bureau of Labor Statistics, Quarterly Census of Employment and Wage, 2007 and 2017. Note: "HH" is household and "Emp." Is employment.

Year	Total Emplyment Scenarios			
	Metro's HH Growth for Tualatin	OED's Emp. Growth for Tri-County Region	Metro's Emp. Growth for Tualatin	Historic Emp. Growth for Tualatin
2020	39,355	40,252	40,478	42,339
2040	42,985	51,089	53,332	75,272
Change 2020 to 2040				
Employees	3,630	10,837	12,854	32,933
Percent	9%	27%	32%	78%
AAGR	0.44%	1.20%	1.39%	2.92%

Tualatin is assuming that the City will grow at the rate forecast by Metro, 1.4% average annual growth rate. This assumption is based on the fact that Tualatin grew at a substantially faster rate over the 2007 to 2017 period (2.9% average annual growth rates), as well as Tualatin's key comparative advantages such as the city's location along I-5 and land base of industrial land.

Exhibit 13 shows employment growth Tualatin between 2020 and 2040, based on the assumption that the City will grow at an average annual growth rate of 1.4%. Tualatin will have 53,332 employees by 2040, which is an increase of 12,854 employees (32%) between 2020 and 2040.

Tualatin is forecast to have 12,854 new employees over the 20-year period.

Exhibit 13. Forecast of Employment Growth, Tualatin Planning Area, 2020–2040

Source: ECONorthwest.

Year	Total Employment
2020	40,478
2040	53,332
Change in Employees (2020 to 2040)	
Employees	12,854
Percent	32%
AAGR	1.39%

Allocate Employment to Different Land Use Types

The next step in forecasting employment is to allocate future employment to broad categories of land use. Firms wanting to expand or locate in Tualatin will look for a variety of site characteristics, depending on the industry and specific circumstances. We grouped employment into four broad categories of land use based on North American Industrial Classification System (NAICS): industrial, retail commercial, office and commercial services, and government.

Exhibit 14 shows the expected share of employment by land-use type in 2020 and the forecast of employment growth by land-use type in 2040 in Tualatin. For each land-use type, we assumed that the share of total employment will stay the same.

Exhibit 14. Forecast of employment growth by land use type, Tualatin Planning Area, 2020–2040

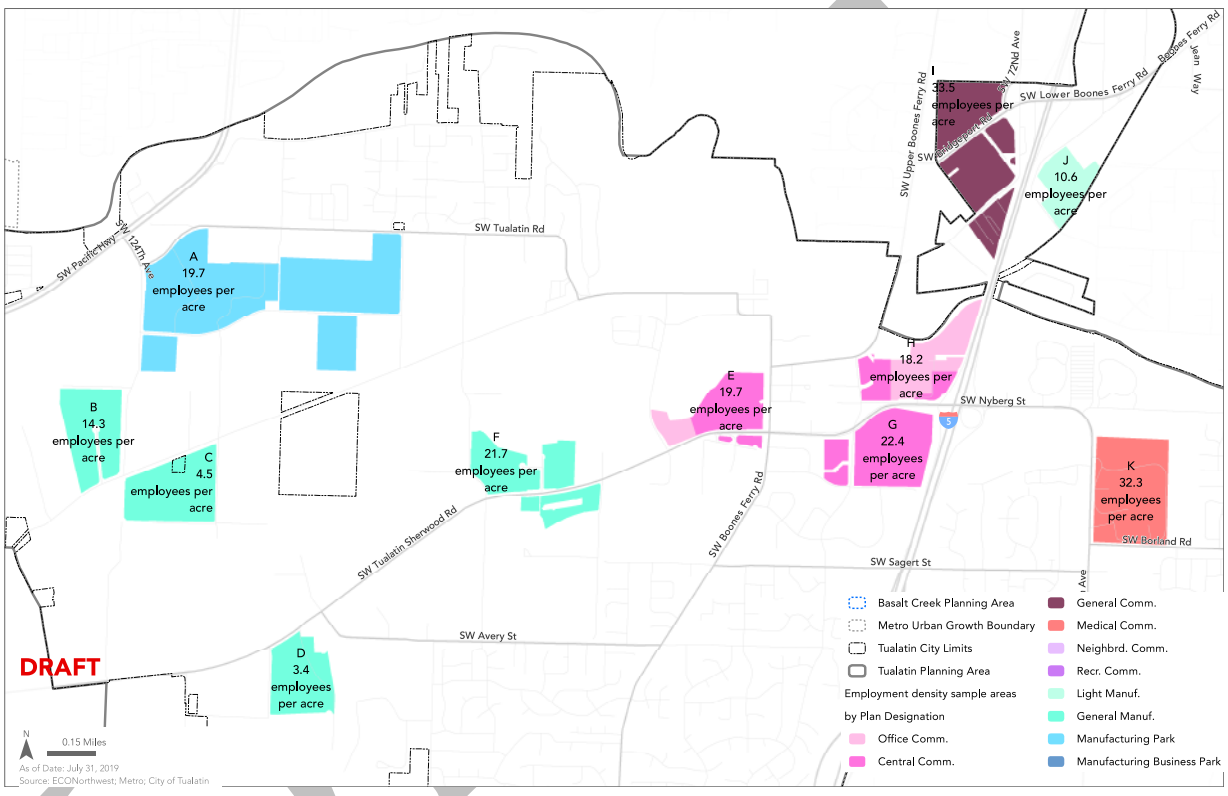
Source: ECONorthwest. Note: The shaded percentages denote an assumption about the future share of employment (as a percent of total) by land use type. It assumes that the share of employment by land use type will remain the same.

Land Use Type	2020		2040		Change
	Employment	% of Total	Employment	% of Total	2020 to 2040
Industrial	18,218	45%	24,004	45%	5,786
Retail Commercial	3,050	8%	4,018	8%	968
Office & Commercial Services	18,382	45%	24,219	45%	5,837
Government	829	2%	1,092	2%	263
Total	**40,478**	**100%**	**53,332**	**100%**	**12,854**

Estimate of Demand for Commercial and Industrial Land

Converting from employment growth to land need (in acres) requires assumptions about future employment densities. Employees per acre is a measure of employment density based on the ratio of the number of employees per acre of employment land that is developed for employment uses. Exhibit 15 displays sample sites that informed ECONorthwest's analysis of employment densities for businesses and at sites in Tualatin based on existing employment. Results of the employment density analysis are summarized in Exhibit 16.

Exhibit 15. Employment Densities in Tualatin, Tualatin Sample Sites, 2019
Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wage, 2017; analysis by ECONorthwest.



Based on a sampling of sites in Tualatin, Industrial areas average about 15 people per acre (EPA) and Commercial areas average about 27 EPA.

Exhibit 16. Summary of Employment Average Employment Densities, Tualatin Planning Area, 2018

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wage; summarized by ECONorthwest. Note1: Area names (A through K) correspond to areas mapped in Exhibit 15. Note2: "EPA" is employees per acre.

Land Use Type/ Area Name on Map	Type of Use	Average density (EPA)
Industrial		15
A	Manufacturing Park	20
B	General Manufacturing	14
C	General Manufacturing	5
D	General Manufacturing	3
F	General Manufacturing	22
J	Light Manufacturing	11
Commercial and Retail		27
E	Office/Central Commercial	20
G	Central Commercial	22
H	Office/Central Commercial	18
I	General Commercial	34
K	Medical Commercial	32

Exhibit 17 shows demand for vacant (including partially vacant) land in Tualatin over the 20-year period. ECONorthwest uses two assumptions in Exhibit 17: (1) employment density and (2) net-to-gross conversion factor.

- **Employment density.** Exhibit 17 displays the density assumptions as net employees per acre (EPA) for use in the analysis of employment land demand assumes: Industrial will have an average of 15 EPA, Retail Commercial will have an average of 25 EPA, and Office Commercial will have an average of 40 EPA.

  These employment densities are consistent with Tualatin's historic densities and employment densities in Oregon cities of a similar size as Tualatin. Some types of employment will have higher employment densities (e.g., a multi-story office building), and some will have lower employment densities (e.g., a convenience store with a large parking lot).

  This analysis assumes 15 EPA for industrial uses as it is consistent with the EPA weighted average of industrial sample sites. This analysis assumes 25 EPA for retail as it is consistent with the weighted average of sample site G, H, and I. This analysis assumes 40 EPA for office based on the assumption that Tualatin will encourage more two- and three-story office buildings over the 20-year planning period.

- **Conversion from net-to-gross acres**. The data about employment density is in *net* acres, which does not include land for public right-of-way. Future land need for employment should include land in tax lots needed for employment plus land needed for public right-of-way. One way to estimate the amount of land needed for employment, including public right-of-way, is to convert from *net* to *gross* acres based on assumptions about the amount of land needed for public right-of-way.[17] A net-to-gross conversion is expressed as a percentage of gross acres that are in public right-of-way.

  Based on empirical evaluation of Tualatin's existing net-to-gross ratios, ECONorthwest uses a net-to-gross conversion factor of 9% for industrial and 27% for commercial.

Using these assumptions, the forecasted growth of 12,854 new employees. Exhibit 17 displays and accounts for 12,591 new employees as government employees (263 employees) were deducted from the analysis of land demand. Tualatin will accommodate government employees in Institutional plan designations. The 12,591 new employees will result in the following demand for vacant (and partially vacant) employment land: 424 gross acres of industrial land, 53 gross acres of retail commercial land, and 200 gross acres of office and commercial services land.

Exhibit 17. Demand for Vacant Land to Accommodate Employment Growth, Tualatin Planning Area, 2020–2040
Source: ECONorthwest.

Land Use Type	New Emp. on Vacant Land	Employees per Acre (Net Acres)	Land Demand (Net Acres)	Land Demand (Gross Acres)
Industrial	5,786	15	386	424
Retail Commercial	968	25	39	53
Office & Commercial Services	5,837	40	146	200
Total	**12,591**	**-**	**570**	**677**

Exhibit 18 shows land demand by general plan designation based on the existing distribution of employment in Exhibit 11. For example, Exhibit 18 assumes that 94% of growth in industrial employment (demand for 424 acres shown in Exhibit 17) will occur in industrial plan designations, with 4% in commercial plan designations and 3% in residential plan designations.

[17] OAR 660-024-0010(6) uses the following definition of net buildable acre. "Net Buildable Acre" consists of 43,560 square feet of residentially designated buildable land after excluding future rights-of-way for streets and roads. While the administrative rule does not include a definition of a gross buildable acre, using the definition above, a gross buildable acre will include areas used for rights-of-way for streets and roads. Areas used for rights-of-way are considered unbuildable.

Exhibit 18. Demand for Vacant Land to Accommodate Employment Growth by Generalized Plan Designation, Tualatin Planning Area, 2020—2040
Source: ECONorthwest.

Land Use Type	General Plan Designation				Total (Acre)
	Industrial	Commercial	Residential	Institutional	
Industrial	397	16	11	-	424
Retail, Office, & Com Services	51	170	31	1	253
Total (Acres)	**448**	**186**	**42**	**1**	**677**

Site Needs for Potential Growth Industries

Note to reviewers: We will add more to this section after discussions with CAC and other stakeholders.

OAR 660-009-0015(2) requires the EOA to "identify the number of sites by type reasonably expected to be needed to accommodate the expected [20-year] employment growth based on the site characteristics typical of expected uses." The Goal 9 rule does not specify how jurisdictions conduct and organize this analysis.

The rule, OAR 660-009-0015(2), does state that "[i]ndustrial or other employment uses with compatible site characteristics may be grouped together into common site categories." The rule suggests, but does not require, that the city "examine existing firms in the planning area to identify the types of sites that may be needed." For example, site types can be described by: (1) plan designation (e.g., heavy or light industrial), (2) general size categories that are defined locally (e.g., small, medium, or large sites), or (3) industry or use (e.g., manufacturing sites or distribution sites). For purposes of the EOA, Tualatin groups its future employment uses into categories based on their need for land with a particular plan designation (i.e., industrial or commercial) and by their need for sites of a particular size.

Based on the forecast of employment growth in Exhibit 14 and the average business size of business in Tualatin in 2017 (using analysis of Quarterly Census of Employment and Wage data), employment growth in Tualatin will require:

- **Industrial** employment will grow by 5,785 employees, with 5,785 employees requiring vacant land. The average site of industrial employers in Tualatin in 2017 was 26 employees per business. At that average size, Tualatin will need 223 industrial sites. Exhibit 24 (in Chapter 4) shows that Tualatin has 697 sites for industrial development (with a total of 374 vacant buildable acres of land). The majority of these sites (626 sites) are smaller than 0.5 acres. Tualatin has seven industrial sites between 10 and 20 acres and 2 industrial sites larger than 20 acres. These sites provide a range of sizes that may be needed by future industrial businesses in Tualatin.
- **Commercial** employment will grow by 6,805 employees, with 6,805 employees requiring vacant land. The average site of commercial employers in Tualatin in 2017 was 13 employees per business. At that average size, Tualatin will need 511 commercial sites. Exhibit 24 (in Chapter 4) shows that Tualatin has 149 sites for commercial development (with a total of 10.5 vacant buildable acres of land). The majority of these sites (143 sites)

are smaller than 0.5 acres. Tualatin has four commercial sites between 0.5 and 1 acre, 1.0 commercial between 1 and 2 acres, and one commercial site between 2 and 5 acres. Limited available sites will affect commercial development in Tualatin.

The potential growth industries described in the prior section are a mixture of business sizes, from small businesses to larger businesses. For the most part, Tualatin's potential growth industries need relatively flat sites, especially for industrial or manufacturing businesses, with access to arterial roads to connect with I-5 or key employment centers in Beaverton, Hillsboro, and Portland.

Manufacturing and other industrial businesses that are likely to locate in Tualatin will have a range of space needs:

- **Small-scale manufacturing spaces.** Businesses would be located in an industrial building with many other users.
- **Space in flex-service buildings.** These businesses may locate in a building that includes other industrial businesses, as well as commercial businesses that prefer to locate in flex space buildings. Per a 2019 discussion with GPI, we find that vacancy rates in flex-service buildings are exceptionally low, compared to more traditional employment spaces.
- **Mid-sized manufacturing**. Businesses would be located potentially in a building with a few other businesses. Between 2015 and 2019, Greater Portland Inc. (GPI) reported manufacturing projects in its pipeline that requested an average square footage between 35,000 square feet (approximately two to four-acre sites) and 118,000 square feet (approximately eight to 10-acre sites).[18] Average space needs (per square foot) have increased each year, between 2015 and 2019.

Retail, Office, and Commercial Service businesses have a range of space needs, ranging from:

- **Small-sized or mid-sized space**. Between 2015 and 2019, on average, GPI reported office projects seeking sites that range from about 14,045 square feet to about 39,000.
- **Space in a building dominated by one firm or in a building with many other businesses**. Some commercial employment will locate in a newly constructed building with other commercial businesses of all types. This could potentially be with other commercial (or light industrial) uses in the building. Other businesses may require or desire their own space.
- **Land for construction of a building designed for the firm.** However, in the case where the business needs to build a building, they are typically seeking existing space rather than land to build a new facility.

[18] Greater Portland Inc. (May 2019). "Almost Mid-Year Pipeline Analysis."

Overall, of the businesses included in GPI's 2019 pipeline analysis—both office and manufacturing projects—consistently requested existing space over "greenfield" space for their facility. In 2019, about 33% requested either greenfield space specifically (12%) or existing *or* greenfield space (21%), up from 21% in 2017.

4. Buildable Lands Inventory

This chapter provides a summary of the commercial and industrial buildable lands inventory (BLI) for the Tualatin Planning Area. The buildable lands inventory analysis complies with statewide planning Goal 9 policies that govern planning for employment uses. The detailed methodology used to complete the buildable lands inventory completed is presented in Appendix B.

First, the analysis established the employment land base (parcels or portion of parcels with appropriate zoning), classified parcels by buildable status, identified/deducted environmental constraints, and lastly summarized total buildable area by plan designation.

Definitions

ECONorthwest developed the buildable lands inventory with a tax lot database from Metro Regional Land Information Systems (RLIS). Maps produced for the buildable lands inventory used a combination of GIS data based on the Metro BLI for the 2018 Urban Growth Report, adopted maps, and visual verification to verify the accuracy of Metro data. The tax lot database is current as of 2016, accounting for changes and development updates through April 2019. The inventory builds from the database to estimate buildable land per plan designations that allow employment uses. The following definitions were used to identify buildable land for inclusion in the inventory:

- *Vacant land.* Tax lots designated as vacant by Metro based on the following criteria: (1) fully vacant based on Metro aerial photo; (2) tax lots with less than 2,000 square feet developed and developed area is less than 10% of lot; (3) lots 95% or more vacant from GIS vacant land inventory.
- *Partially vacant land.* Tax lots located on land designated for employment uses but have an existing single-family structure. These lots are assumed to likely develop with an employment use within the planning period.
- *Potentially redevelopable land.* Lots determined to have redevelopment capacity based on Metro's Threshold Price methodology. This method identifies lots that meet size and price thresholds based on location in the Metro UGB and plan designation. The methods use property value thresholds where it is economically viable to for a lot to redevelop. For example, if the unconstrained area of tax lot in a Central Commercial plan designation is greater than 0.249 acres, and the real market value per square foot is below $12, then the unconstrained acreage is considered as potentially redevelopable.
- *Public or exempt land.* Lands in public or semi-public ownership are considered unavailable for commercial or industrial development. This includes lands in Federal, State, County, or City ownership as well as lands owned by churches and

other semi-public organizations and properties with conservation easements. These lands are identified using the Metro's definitions and categories.

- *Developed land*. Lands not classified as vacant, partially vacant, or public/exempt are considered developed. Developed land includes lots with redevelopment capacity, which are also included in BLI. The capacity of developed but redevelopable lots is based on Metro's estimates.

Development Constraints

Consistent with state guidance on buildable lands inventories, ECONorthwest deducted the following constraints from the buildable lands inventory and classified those portions of tax lots that fall within the following areas as constrained, unbuildable land:

- *Lands within floodplains*. Flood Insurance Rate Maps from the Federal Emergency Management Agency (FEMA) were used to identify lands in floodways and 100-year floodplains, as well as lands identified in Metro's Title 3 Stream and Floodplain Protection Plan.
- *Land within natural resource protection areas*. The Locally Significant Wetlands shapefile was used to identify areas within wetlands. Riparian corridors and other natural resource areas identified in Tualatin's Natural Resource Protection Overlay District were all considered undevelopable. These areas are consistent with the City's Development Code Chapter 72.
- *Land with slopes over 15%*. Lands with slopes over 15% are considered unsuitable for commercial or industrial development.

Buildable Lands Inventory Results

Land Base

Exhibit 19 shows commercial and industrial land in Tualatin by classification (development status). The results show that the Tualatin Planning Area has 2,731 total acres in commercial or industrial plan designations. Of these 2,731 acres, about 1,534 acres (56%) are classified as Developed or Public (or Exempt) and do not have development capacity, about 683 acres (25%) are on lots classified as potentially redevelopable, and the remaining 514 acres (19%) are Vacant or Partially Vacant and have development capacity (not including development constraints).

Exhibit 19. Commercial and industrial acres by classification and plan designation, Tualatin Planning Area, 2019

Source: Metro BLI, ECONorthwest Analysis. Note: The numbers in the table may not sum to the total as a result of rounding.

Generalized Plan Designation	Vacant	Partially Vacant	Developed	Public or Exempt	Potentially Redevelopable	Total Acres	Percent of Total
Commercial							
Central Commercial	-	-	0	4	-	4	0%
General Commercial	4	-	125	3	3	134	5%
Medical Commercial	-	-	-	46	-	46	2%
Neighborhood Commercial	-	-	-	-	-	-	0%
Office Commercial	3	-	53	19	3	78	3%
Recreational Commercial	-	-	9	-	-	9	0%
Industrial							
General Manufacturing	184	-	569	97	264	1,114	41%
Light Manufacturing	35	-	214	54	43	346	13%
Manufacturing Business Park	107	-	3	1	260	372	14%
Manufacturing Park	60	-	40	27	89	216	8%
Mixed-Use Commercial Overlay Zone							
General Commercial	-	-	25	-	-	25	1%
Central Tualatin Overlay Zone							
Central Commercial	3	-	95	50	5	153	6%
General Commercial	-	-	7	0	-	7	0%
Office Commercial	-	-	23	-	-	23	1%
General Manufacturing	-	-	33	-	-	33	1%
Light Manufacturing	-	-	17	-	-	17	1%
Basalt Creek Planning Area							
Manufacturing Park	36	78	2	19	15	150	5%
Neighborhood Commercial	4	1	-	-	-	4	0%
Total	**436**	**78**	**1,215**	**319**	**683**	**2,731**	**100%**

Exhibit 20 shows land in all commercial and industrial plan designations by development and constraint status. After development constraints have been applied, about 63% of Tualatin's total employment land (1,714 acres) has no development capacity (i.e., committed), 23% (632 acres) is constrained, and 14% (385 acres) are unconstrained and buildable.

Exhibit 20. Commercial and industrial land by comprehensive Plan Designation and constraint status, Tualatin Planning Area, 2019

Source: Metro BLI, ECONorthwest Analysis. Note: The numbers in the table may not sum to the total as a result of rounding.

Generalized Plan Designation	Total acres	Committed acres	Constrained acres	Buildable acres
Commercial				
Central Commercial	4	0	4	0
General Commercial	134	117	13	4
Medical Commercial	46	43	3	0
Neighborhood Commercial	0	0	0	0
Office Commercial	78	63	12	3
Recreational Commercial	9	2	6	0
Industrial				
General Manufacturing	1,114	694	321	99
Light Manufacturing	346	283	34	29
Manufacturing Business Park	372	211	76	85
Manufacturing Park	216	129	31	56
Mixed-Use Commercial Overlay Zone				
General Commercial	25	20	5	0
Central Tualatin Overlay Zone				
Central Commercial	153	45	108	0
General Commercial	7	2	5	0
Office Commercial	23	18	4	0
General Manufacturing	33	28	6	0
Light Manufacturing	17	17	0	0
Basalt Creek Planning Area				
Manufacturing Park	150	41	4	105
Neighborhood Commercial	4	0	0	4
Total	**2,731**	**1,714**	**632**	**385**

Vacant Buildable Land

Exhibit 21 shows buildable acres (e.g., acres in tax lots after constraints are deducted) for vacant and partially vacant land by plan designation. Of Tualatin's 385 unconstrained buildable commercial or industrial acres, about 82% are in tax lots classified as vacant, and 18% are in tax lots classified as partially vacant. About 28% of Tualatin's buildable commercial and industrial land is located in the Basalt Creek Planning Area.

Exhibit 21. Buildable acres in vacant and partially vacant tax lots by plan designation and zoning, Tualatin Planning Area, 2019

Source: Metro BLI, ECONorthwest Analysis. Note: The numbers in the table may not sum to the total as a result of rounding.

Generalized Plan Designation	Total buildable acres	Buildable acres on vacant lots	Buildable acres on partially vacant lots
Commercial			
Central Commercial	0	0	0
General Commercial	4	4	0
Medical Commercial	0	0	0
Neighborhood Commercial	0	0	0
Office Commercial	3	3	0
Recreational Commercial	0	0	0
Industrial			
General Manufacturing	99	99	0
Light Manufacturing	29	29	0
Manufacturing Business Park	85	85	0
Manufacturing Park	56	56	0
Mixed-Use Commercial Overlay Zone			
General Commercial	0	0	0
Central Tualatin Overlay Zone			
Central Commercial	0	0	0
General Commercial	0	0	0
Office Commercial	0	0	0
General Manufacturing	0	0	0
Light Manufacturing	0	0	0
Basalt Creek Planning Area			
Manufacturing Park	105	35	70
Neighborhood Commercial	4	4	0
Total	**385**	**314**	**70**

Exhibit 22 and Exhibit 23 (upcoming pages) show the results of Tualatin's commercial and industrial BLI.

Exhibit 22. Commercial and industrial land by development status with constraints, Tualatin Planning Area, 2019

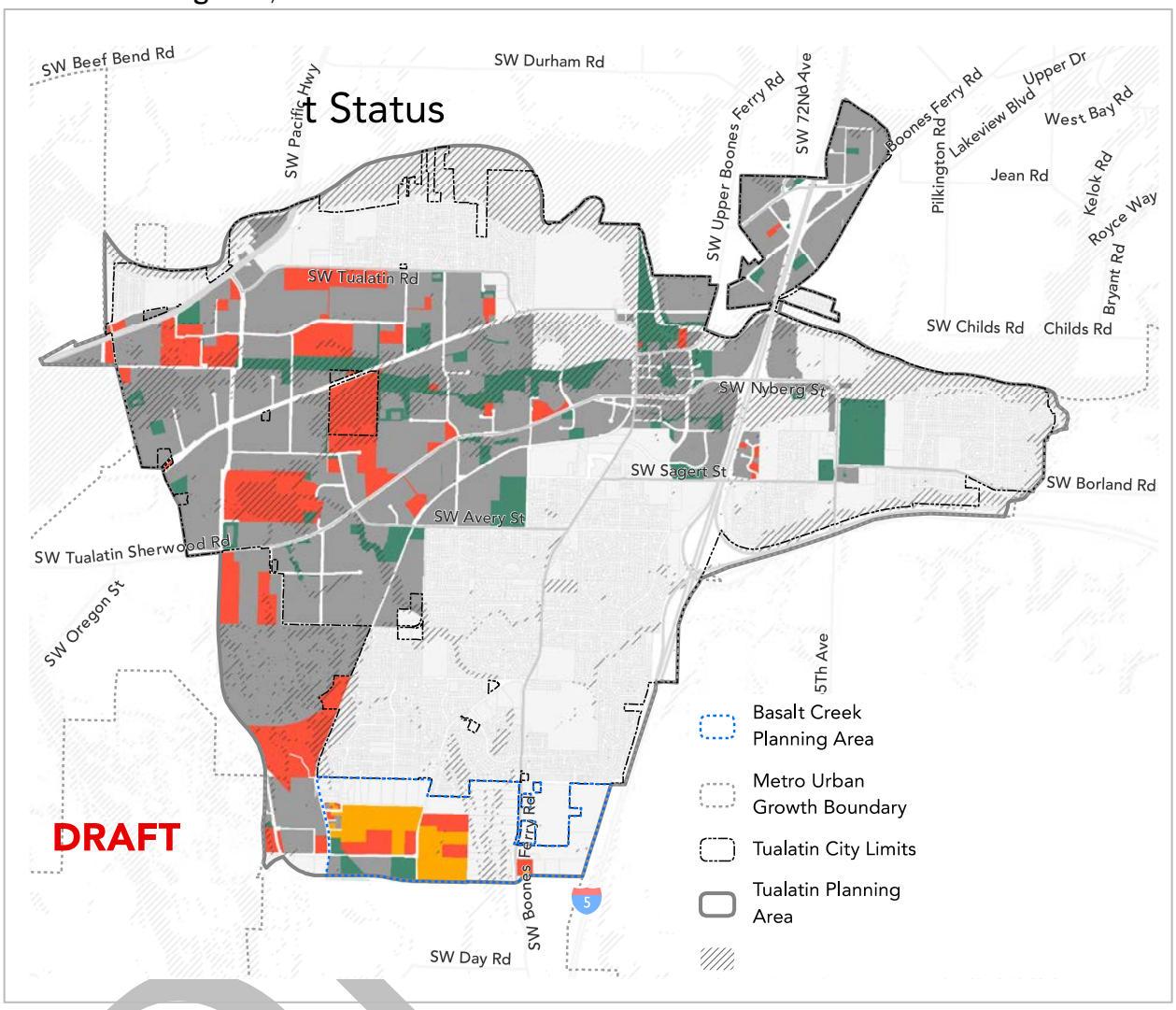


Exhibit 23. Unconstrained vacant and partially vacant commercial and industrial land, Tualatin Planning Area, 2019

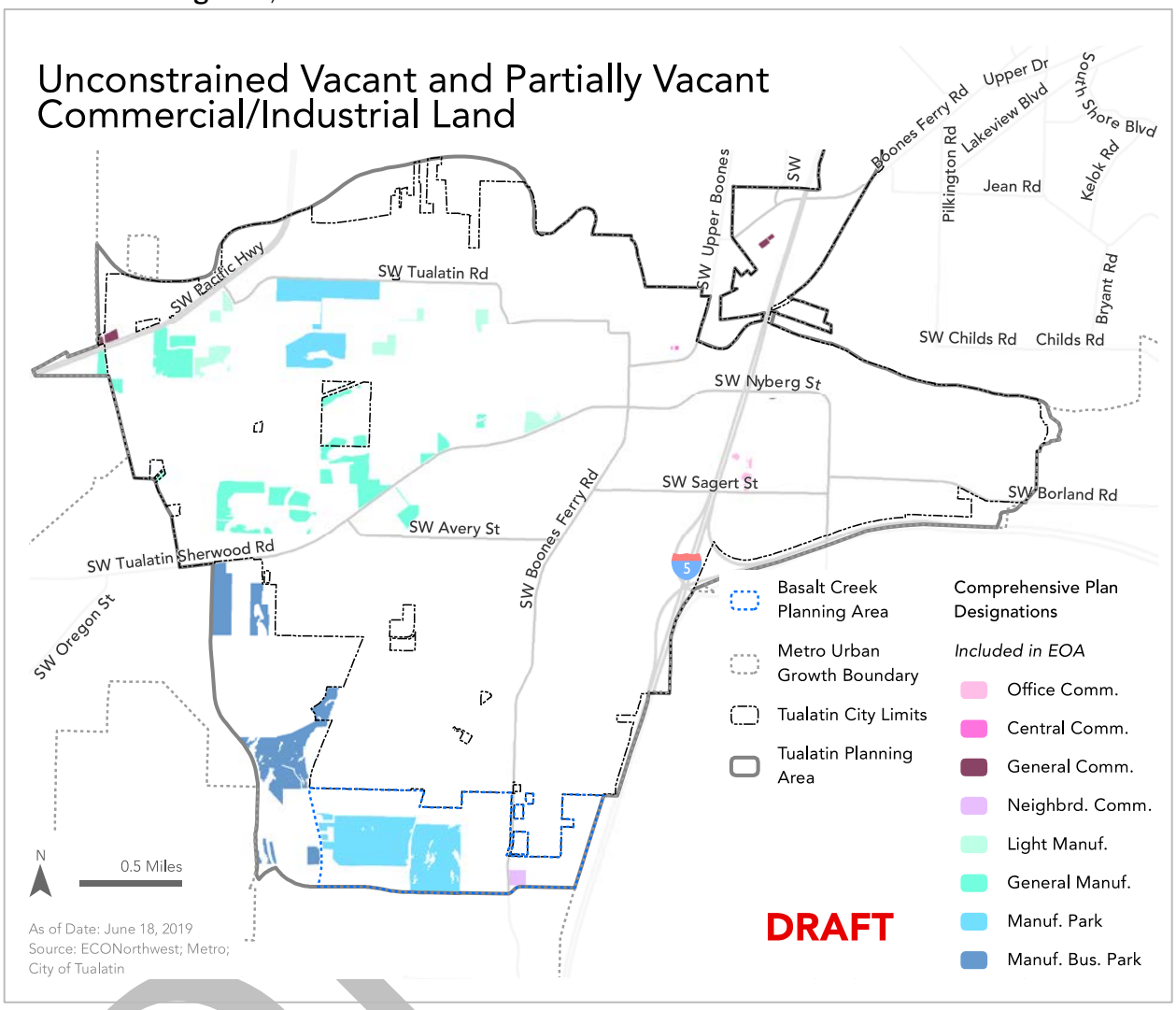


Exhibit 24 shows the size of lots by plan designations for buildable employment land. Tualatin has:

- 769 lots that are smaller than 0.5 acres (with 4.7 acres of land),
- 9 lots between 0.5 and 1 acres (6.3 acres of land),
- 13 lots between 1 and 2 acres (19.6 acres of land),
- 35 lots between 2 and 5 acres in size (132 acres of land),
- 11 lots between 5 and 10 acres in size (81 acres of land),
- 7 lots between 10 and 20 acres in size (95.5 acres of land), and
- 2 lots 20 acres or more in size (45.3 acres of land).

Exhibit 24. Lot size by plan designation, buildable acres, Tualatin Planning Area, 2019
Source: ECONorthwest analysis of data from Metro.

	Buildable acres in taxlots						
	<0.5 acres	0.5-1 acres	1-2 acres	2-5 acres	5-10 acres	10-20 acres	20+ acres
Buildable acres on tax lots							
Commercial							
General Commercial	0.4	1.5	1.9	0.0	0.0	0.0	0.0
Office Commercial	1.7	1.1	0.0	0.0	0.0	0.0	0.0
Industrial							
General Manufacturing	0.1	2.8	2.8	36.5	17.6	39.8	0.0
Light Manufacturing	0.0	0.0	9.7	13.3	5.8	0.0	0.0
Manufacturing Business Park	0.0	0.0	4.1	19.4	27.5	13.1	20.9
Manufacturing Park	0.0	0.0	0.0	0.0	0.0	31.5	24.4
Basalt Creek Planning Area							
Manufacturing Park	2.3	0.9	1.2	59.1	30.2	11.2	0.0
Neighborhood Commercial	0.3	0.0	0.0	3.7	0.0	0.0	0.0
Acreage subtotal	**4.7**	**6.3**	**19.6**	**132.0**	**81.0**	**95.5**	**45.3**
Number of taxlots with buildable acreage							
Commercial							
General Commercial	75	2	1	0	0	0	0
Office Commercial	67	2	0	0	0	0	0
Industrial							
General Manufacturing	432	4	2	10	2	3	0
Light Manufacturing	126	0	6	4	1	0	0
Manufacturing Business Park	28	0	3	6	4	1	1
Manufacturing Park	12	0	0	0	0	2	1
Basalt Creek Planning Area							
Manufacturing Park	28	1	1	14	4	1	0
Neighborhood Commercial	1	0	0	1	0	0	0
Tax lot count subtotal	**769**	**9**	**13**	**35**	**11**	**7**	**2**

Redevelopment Potential

Over the 20-year study period a share of developed lots are likely to redevelop within new buildings. To account for the development capacity on these developed lots, Metro identifies a subset of developed lots as "redevelopable". Metro has created two "filters" to identify lots with the potential to redevelop.

- **Threshold Method.** This method identifies lots that meet size and price thresholds based on location in the Metro UGB and plan designation. The method uses property value thresholds where it is economically viable to for a lot to redevelop. For example, if the *unconstrained* area of tax lot in a Central Commercial plan designation is greater than 0.249 acres, and the real market value per square foot is below $12, then the unconstrained acreage is considered as potentially redevelopable.[19]
- **Historic Probability Method.** This method determines the probably of a lot redeveloped based on a statistical analysis of lots that historically redeveloped within the region. The probability for each lot is multiplied by the total zoned capacity of the lot to determine the likely future capacity.

For the Tualatin BLI, ECONorthwest proposes to use redevelopable acreage identified based on the Threshold method, a recommendation that is based on discussion with Metro staff. Exhibit 6 shows the estimate of potentially redevelopable acreage by plan designation.

[19] "Appendix 2: Buildable Land Inventory." Oregon Metro. Urban Growth Report 2018. https://www.oregonmetro.gov/sites/default/files/2018/12/03/Appendix2-BuildableLandsInventory_12032018.pdf

Exhibit 25. Estimate of potentially redevelopable land by plan designation, Tualatin Planning Area, 2019

Source: Metro BLI, using 2016 data to calculate redevelopment potential.

Generalized Plan Designation	Potentially Redevelopable Acres
Commercial	
Central Commercial	0
General Commercial	3
Medical Commercial	0
Neighborhood Commercial	0
Office Commercial	1
Recreational Commercial	0
Industrial	
General Manufacturing	135
Light Manufacturing	37
Manufacturing Business Park	71
Manufacturing Park	36
Mixed-Use Commercial Overlay Zone	
General Commercial	0
Central Tualatin Overlay Zone	
Central Commercial	0
General Commercial	0
Office Commercial	0
General Manufacturing	0
Light Manufacturing	0
Basalt Creek Planning Area	
Manufacturing Park	15
Neighborhood Commercial	0
Total	**297**

5. Land Sufficiency and Conclusions

This chapter presents conclusions about Tualatin's employment land sufficiency for the 2020-2040 period. The chapter then concludes with a discussion about Tualatin's land base and its ability to accommodate growth over the next 20 years, as well as recommendations for the City to consider, ensuring it meets its economic growth needs throughout the planning period.

Land Sufficiency

Exhibit 26 shows commercial and industrial land sufficiency within the Tualatin Planning Area. It shows:

- **Vacant and Potentially Redevelopable Unconstrained Land** within the Tualatin Planning Area (see Exhibit 21). Exhibit 26 shows that Tualatin has 374 gross acres of industrial land and 11 gross acres of commercial land.
- **Demand for Commercial and Industrial Land** in the Tualatin Planning Area (see Exhibit 17 and Exhibit 18). Exhibit 26 shows Tualatin will need a total of 448 gross acres for industrial uses, and 186 gross acres for commercial uses (including retail and office) over the 2020—2040 period.

Exhibit 26 shows that Tualatin has:

- A 74-acre deficit of industrial land in the Tualatin Planning Area.
- A 175-acre deficit of commercial land (including retail and office) in the Tualatin Planning Area.

Exhibit 26. Comparison of the Capacity of Unconstrained Vacant and Potentially Redevelopable Land with Employment Land Demand by Land Use Type, Tualatin Planning Area, 2020—2040

Source: ECONorthwest. Note: Employment demand requires an additional 42 gross acres on land in residential plan designations and one gross acre on land in an institutional (public) plan designation.

General Plan Designation	Land Supply (Suitable Gross Acres)	Land Demand (Gross Acres)	Land Sufficiency (Deficit)
Industrial	374	448	(74)
Commercial (incl Retail and Office)	11	186	(175)

Conclusions

The conclusions about commercial and industrial land sufficiency in Tualatin are:

- Tualatin is forecast to grow by about 12,850 new employees over the 2020 to 2040 period, with about 5,800 new industrial employees, about 6,800 new employees in retail, office, and commercial services, with the remaining employees in government.
- Tualatin has a deficit of land to accommodate new employment growth. Tualatin has a deficit of about 74 acres of land in industrial plan designations and 175 acres of employment in commercial plan designations to accommodate employment. Tualatin will need to consider policies to increase the efficiency of employment land use within the City, such as policies to encourage denser employment development and redevelopment that results in higher density development.
- Tualatin's comparative advantages for economic development are its location along the I-5 corridor and proximity to urban and cultural amenities/services in the Portland Region making Tualatin an attractive place for businesses to locate. Tualatin is also advantaged by its access to the regional labor market and the region's growing labor force comprising diverse skill sets.
- Tualatin will need to address transportation capacity issues to accommodate growth.

Note to reviewers: The final version of the EOA will include more detailed conclusions, including conclusions related to the economic development strategy.

Appendix A. National, State, and Regional and Local Trends

National Trends

Economic development in Tualatin over the next 20 years will occur in the context of long-run national trends. The most important of these trends include:

- **Economic growth will continue at a moderate pace**. Analysis from the Congressional Budget Office (CBO) predicts real GDP to grow by 3.1% in 2018, 2.4% in 2019, and settle just under 2% growth for the rest of the decade (through 2028), assuming current laws remain intact.[20]

  The unemployment rate is expected to decrease to 3.6% by the end of 2018 and fall to 3.4% in 2019. Thereafter, the CBO predicts the unemployment rate will rise to 3.8% in 2020 and approach 4.8% through the end of the forecast period (2028).[21]

  As demand for labor increases and market competition for workers pushes the growth of hourly wage compensation, the CBO projects "the increase in labor compensation, in turn, dampens demand for labor, slowing employment growth and, by 2020, diminishing the positive employment gaps."[22]

- **The aging of the Baby Boomer generation accompanied by increases in life expectancy.** As the Baby Boomer generation continues to retire, the number of Social Security recipients is expected to increase from 61 million in 2017 to over 86 million in 2035, a 41% increase. However, due to lower-birth rate replacement generations, the number of covered workers is only expected to increase 9% over the same time period, from 174 million to almost 190 million in 2035. Currently, there are 35 Social Security beneficiaries per 100 covered workers in 2014 but by 2035 there will be 46 beneficiaries per 100 covered workers. This will increase the percent of the federal budget dedicated to Social Security and Medicare.[23]

  Baby Boomers are expecting to work longer than previous generations. An increasing proportion of people in their early- to mid-50s expect to work full-time after age 65. In 2004, about 40% of these workers expect to work full-time after age 65, compared with

[20] Congressional Budget Office. *An Update to the Economic Outlook: 2018 to 2028. August 2018*. Retrieved from: https://www.cbo.gov/system/files?file=2018-08/54318-EconomicOutlook-Aug2018-update.pdf.

[21] *Ibid*.

[22] *Ibid*.

[23] The Board of Trustees, Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, 2015, *The 2018 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*, June 5, 2018. Retrieved from: https://www.ssa.gov/oact/tr/2018/tr2018.pdf.

about 30% in 1992.[24] This trend can be seen in Oregon, where the share of workers 65 years and older grew from 2.9% of the workforce in 2000 to 4.1% of the workforce in 2010. In 2017, this share reached 5.5%, or a 90% increase over the 2000 to 2017 period. Over the same seventeen-year period, workers 45 to 64 years increased by about 7%.[25]

- **The population identifying as Latinx will continue to grow and be an important driver in the economy.** The U.S. Census projects that by about 2040, the Latinx population will account for one-quarter of the nation's population. The share of Latinx population in the Western U.S. is likely to be higher. The Latinx population currently accounts for about 16% of Tualatin's population. In addition, the Latinx population is generally younger than the U.S. average, with many Latinx individuals belonging to the Millennial generation.
- **Need for replacement workers.** The need for workers to replace retiring Baby Boomers will outpace job growth. According to the Bureau of Labor Statistics, total employment in the United States will grow by about 11.5 million jobs over 2016 to 2026. Annually, they estimate there will be 18.7 million occupational openings over the same period. This exhibits the need for employees over the next decade as the quantity of openings per year is large relative to expected employment growth. About 71% of annual job openings are in occupations that do not require postsecondary education.[26]
- **The importance of education as a determinant of wages and household income.** According to the Bureau of Labor Statistics, a majority of the fastest growing occupations will require an academic degree, and on average, they will yield higher incomes than occupations that do not require an academic degree. The fastest-growing occupations requiring an academic degree will be registered nurses, software developers, general and operations managers, accountants and auditors, market research analysts and marketing specialists, and management analysts. Occupations that do not require an academic degree (e.g., retail sales person, food preparation workers, and home care aides) will grow, accounting for approximately 71% of all new jobs by 2026. These occupations typically have lower pay than occupations requiring an academic degree.[27]

  The national median income for people over the age of 25 in 2017 was about $47,164. Workers without a high school diploma earned $20,124 less than the median income, and workers with a high school diploma earned $10,140 less than the median income. Workers with some college earned $6,916 less than median income, and workers with a bachelor's degree earned $13,832 more than median. Workers in Oregon experience the

[24] "The Health and Retirement Study," 2007, National Institute of Aging, National Institutes of Health, U.S. Department of Health and Human Services.

[25] Analysis of 2000 Decennial Census data, 2010 U.S. Census American Community Survey, 1-Year Estimates, and 2017 U.S. Census American Community Survey, 1-Year Estimates, for the table Sex by Age by Employment Status for the Population 16 Years and Over.

[26] "Occupational Employment Projections to 2016-2026," Bureau of Labor Statistics, 2018.

[27] "Occupational Employment Projections to 2016-2026," Bureau of Labor Statistics, 2018.

same patterns as the nation, but pay is generally lower in Oregon than the national average.[28]

- **Increases in labor productivity.** Productivity, as measured by output per hour of labor input, increased in most sectors between 2000 and 2010, peaking in 2007. However, productivity increases were interrupted by the recession. After productivity decreases from 2007 to 2009, many industries saw large productivity increases from 2009 to 2010. Industries with the fastest productivity growth were Information Technology-related industries. These include wireless telecommunications carriers, computer and peripheral equipment manufacturing, electronics and appliance stores, and commercial equipment manufacturing wholesalers.[29]

  Since the end of the recession (or 2010), labor productivity has increased across a handful of large sectors but has also decreased in others. In wholesale trade, productivity—measured in output per hour—increased by 19% over 2009 to 2017. Retail trade gained even more productivity over this period at 25%. Food services, however, have remained stagnant since 2009, fluctuating over the nine-year period and shrinking by 0.01% over this time frame. Additionally, the Bureau of Labor Statistics reports multifactor productivity in manufacturing has been slowing down 0.3% per year over the 2004 to 2016 period. Much of this, they note, is due to slowdown in semiconductors, other electrical component manufacturing, and computer and peripheral equipment manufacturing.[30]

- **The importance of entrepreneurship and growth in small businesses.** According to the 2018 Small Business Profile from the US Small Business Office of Advocacy, small businesses account for over 99% of total businesses in the United States, and their employees account for nearly 50% of American workers.[31] The National League of Cities suggests ways that local governments can attract entrepreneurs and increase the number of small businesses including strong leadership from elected officials; better communication with entrepreneurs, especially about the regulatory environment for businesses in the community; and partnerships with colleges, universities, small business development centers, mentorship programs, community groups, businesses groups, and financial institutions.[32]

[28] Bureau of Labor Statistics, Employment Projections, March 2018. http://www.bls.gov/emp/ep_chart_001.htm

[29] Brill, Michael R. and Samuel T. Rowe, "Industry Labor Productivity Trends from 2000 to 2010." Bureau of Labor Statistics, *Spotlight on Statistics,* March 2013.

[30] Michael Brill, Brian Chanksy, and Jennifer Kim. "Multifactor productivity slowdown in U.S. manufacturing," *Monthly Labor Review*, U.S. Bureau of Labor Statistics, July 2018. Retrieved from: https://www.bls.gov/opub/mlr/2018/article/multifactor-productivity-slowdown-in-us-manufacturing.htm.

[31] US Small Business Office of Advocacy. 2018 Small Business Profile. https://www.sba.gov/sites/default/files/advocacy/2018-Small-Business-Profiles-US.pdf

[32] National League of Cities "Supporting Entrepreneurs and Small Businesses" (2012). https://www.nlc.org/supporting-entrepreneurs-and-small-business

- **Increases in automation across sectors.** Automation is a long-running trend in employment, with increases in automation (and corresponding increases in productivity) over the last century and longer. The pace of automation is increasing, and the types of jobs likely to be automated over the next 20 years (or longer) is broadening. Lower paying jobs are more likely to be automated, with potential for automation of more than 80% of jobs paying less than $20 per hour over the next 20 years. About 30% of jobs paying $20 to $40 per hour and 4% of jobs paying $40 or more are at risk of being automated over the next 20 years.[33]

  Low- to middle-skilled jobs that require interpersonal interaction, flexibility, adaptability, and problem solving will likely persist into the future as will occupations in technologically lagging sectors (e.g. production of restaurant meals, cleaning services, hair care, security/protective services, and personal fitness).[34] This includes occupations such as (1) recreational therapists, (2) first-line supervisors of mechanics, installers, and repairers, (3) emergency management directors, (4) mental health and substance abuse social workers, (5) audiologists, (6) occupational therapists, (7) orthotists and prosthetists, (8) healthcare social workers, (9) oral and maxillofacial surgeons, and (10) first-line supervisors of firefighting and prevention workers. Occupations in the service and agricultural or manufacturing industry are most at-risk of automation because of the manual-task nature of the work.[35,36,37] This includes occupations such as (1) telemarketers, (2) title examiners, abstractors, and searchers, (3) hand sewers, (4) mathematical technicians, (5) insurance underwriters, (6) watch repairers, (7) cargo and freight agents, (8) tax preparers, (9) photographic process workers and processing machine operators, and (10) accounts clerks.[38]

- **Consolidation of Retail.** Historical shift in retail businesses, starting in the early 1960s, was the movement from one-off, 'mom and pop shops' toward superstores and the clustering of retail into centers or hubs. Notably, we still see this trend persist; for example, in 1997, the 50 largest retail firms accounted for about 26% of retail sales and by 2007, they accounted for about 33%.[39] The more recent shift began in the late 1990s, where technological advances have provided consumers the option to buy goods

[33] Executive Office of the President. (2016). Artificial Intelligence, Automation, and the Economy.

[34] Autor, David H. (2015). Why Are There Still So Many Jobs? The History and Future of Workplace Automation. Journal of Economic Perspectives, Volume 29, Number 3, Summer 2015, Pages 3–30.

[35] Frey, Carl Benedikt and Osborne, Michael A. (2013). The Future of Employment: How Susceptible Are Jobs to Computerisation? Oxford Martin School, University of Oxford.

[36] Otekhile, Cathy-Austin and Zeleny, Milan. (2016). Self Service Technologies: A Cause of Unemployment. International Journal of Entrepreneurial Knowledge. Issue 1, Volume 4. DOI: 10.1515/ijek-2016-0005.

[37] PwC. (n.d.). Will robots really steal our jobs? An international analysis of the potential long-term impact of automation.

[38] Frey, Carl Benedikt and Osborne, Michael A. (2013). The Future of Employment: How Susceptible Are Jobs to Computerisation? Oxford Martin School, University of Oxford.

[39] Hortaçsu, Ali and Syverson, Chad. (2015). The Ongoing Evolution of US Retail: A Format Tug-of-War. Journal of Economic Perspectives, Volume 29, Number 4, Fall 2015, Pages 89-112.

through e-commerce channels. The trend toward e-commerce has become increasingly preferential to millennials and Generation X, who are easier to reach online and are more responsive to digital ads than older generations.[40] Since 2000, e-commerce sales grew from 0.9% to 6.4% (2014) and are forecasted to reach 12% by 2020. It is reasonable to expect this trend to continue. With it has come closures of retail stores. By 2027 for example, an estimated 15% of about 1,050 U.S. malls in smaller markets will close, impacting local employment levels, local government revenue streams (tax dollars), and neighborhood character.

While it is unclear what impact e-commerce will have on employment and brick and mortar retail, it seems probable that e-commerce sales will continue to grow, shifting business away from some types of retail. Over the next decades, communities must begin considering how to redevelop and reuse retail buildings in shopping centers, along corridors, and in urban centers.

The types of retail and related services that remain will likely be sales of goods that people prefer to purchase in person or that are difficult to ship and return (e.g., large furniture), specialty goods, groceries and personal goods that maybe needed immediately, restaurants, and experiences (e.g., entertainment or social experiences).

- **The importance of high-quality natural resources.** The relationship between natural resources and local economies has changed as the economy has shifted away from resource extraction. High-quality natural resources continue to be important in some states, especially in the Western U.S. Increases in the population and in households' incomes, plus changes in tastes and preferences have dramatically increased demands for outdoor recreation, scenic vistas, clean water, and other resource-related amenities. Such amenities contribute to a region's quality of life and play an important role in attracting both households and firms.[41]
- **Continued increase in demand for energy.** Energy prices are forecasted to increase over the planning period. While energy use per capita is expected to decrease through 2050, total energy consumption will increase with rising population. Energy consumption is expected to grow primarily from industrial (0.9%) and, to a lesser extent, commercial users (0.4%). Residential consumption is forecasted to stagnate (0.0%), and transportation will slightly decrease (-0.1%). This decrease in energy consumption for transportation is primarily due to increased federal standards and increased technology for energy efficiency in vehicles. Going forward through the projection period, potential changes in federal laws (such as decreases in car emissions) leave energy demand somewhat uncertain.

[40] Pew Research Center (2010b). Generations 2010. Retrieved Online at: http://www.pewinternet.org/Reports/2010/Generations-2010.aspx

[41] For a more thorough discussion of relevant research, *see,* for example, Power, T.M. and R.N. Barrett. 2001. *Post-Cowboy Economics: Pay and Prosperity in the New American West*. Island Press, and Kim, K.-K., D.W. Marcouiller, and S.C. Deller. 2005. "Natural Amenities and Rural Development: Understanding Spatial and Distributional Attributes." *Growth and Change* 36 (2): 273-297.

Energy consumption by type of fuel is expected to change over the planning period. By 2050, the U.S. will continue to shift from crude oil towards natural gas and renewables. For example, from 2017 to 2050, the Energy Information Administration projects that U.S. overall energy consumption will average a 0.4% annual growth rate, while consumption of renewable sources grows at 1.4% per year. With increases in energy efficiency, strong domestic production of energy, and relatively flat demand for energy by some industries, the U.S. will be able to be a net exporter of energy over the 2017 to 2050 period. Demand for electricity is expected to increase, albeit slowly, over 2017 to 2050 as population grows and economic activity increases.[42]

- **Impact of rising energy prices on commuting patterns.** As energy prices increase over the planning period, energy consumption for transportation will decrease. These increasing energy prices may decrease willingness to commute long distances, though with expected increases in fuel economy, it could be that people commute further while consuming less energy.[43] Over 2019 to 2035, the U.S. Energy Information Administration estimates in its forecast that the decline in transportation energy consumption a result of increasing fuel economy more than offsets the total growth in vehicle miles traveled (VMT). VMT for passenger vehicles is forecasted to increase through 2050.
- **Potential impacts of global climate change.** The consensus among the scientific community that global climate change is occurring expounds important ecological, social, and economic consequences over the next decades and beyond.[44] Extensive research shows that Oregon and other western states already have experienced noticeable changes in climate and predicts that more change will occur in the future.[45]

  In the Pacific Northwest, climate change is likely to (1) increase average annual temperatures, (2) increase the number and duration of heat waves, (3) increase the amount of precipitation falling as rain during the year, (4) increase the intensity of rainfall events, (5) increase sea level, (6) increase wildfire frequency, and (7) increase forest vulnerability to tree disease.[46] These changes are also likely to reduce winter snowpack and shift the timing of spring runoff earlier in the year.[47]

[42] Energy Information Administration, 2018, *Annual Energy Outlook 2018 with Projections to 2050*, U.S. Department of Energy, February 2018. https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf. Note, the cited growth rates are shown in the Executive Summary and can be viewed here: https://www.eia.gov/outlooks/aeo/data/browser/#/?id=2-AEO2018&cases=ref2018&sourcekey=0.

[43] Energy Information Administration, 2018, *Annual Energy Outlook 2018 with Projections to 2050*, U.S. Department of Energy, February 2018.

[44] U.S. Global Change Research Program. *National Climate Assessment*. 2018. https://nca2018.globalchange.gov/

[45] Oregon Global Warming Commission. *2018 Biennial Report to the Legislature.* 2018. https://www.keeporegoncool.org/reports/

[46] U.S. Global Change Research Program. *National Climate Assessment*. "Chapter 24: Northwest." 2018. https://nca2018.globalchange.gov/chapter/24/

[47] Mote, P., E. Salathe, V. Duliere, and E. Jump. 2008. *Scenarios of Future Climate for the Pacific Northwest.* Climate Impacts Group, University of Washington. March. Retrieved June 16, 2009, from

These anticipated changes point toward some of the ways that climate change is likely to impact ecological systems and the goods and services they provide. There is considerable uncertainty about how long it would take for some of the impacts to materialize and the magnitude of the associated economic consequences. Assuming climate change proceeds as today's models predict, however, some of the potential economic impacts of climate change in the Pacific Northwest will likely include:[48]

- *Potential impact on agriculture and forestry.* Climate change may impact Oregon's agriculture through changes in growing season, temperature ranges, and water availability.[49] Climate change may impact Oregon's forestry through an increase in wildfires, a decrease in the rate of tree growth, a change in the mix of tree species, and increases in disease and pests that damage trees.[50]
- *Potential impact on tourism and recreation.* Impacts on tourism and recreation may range from (1) decreases in snow-based recreation if snow-pack in the Cascades decreases, (2) negative impacts to tourism along the Oregon Coast as a result of damage and beach erosion from rising sea levels,[51] (3) negative impacts on availability of water summer river recreation (e.g., river rafting or sports fishing) as a result of lower summer river flows, and (4) negative impacts on the availability of water for domestic and business uses.

Short-term national trends will also affect economic growth in the region, but these trends are difficult to predict. At times, these trends may run counter to the long-term trends described above. A recent example is the downturn in economic activity in 2008 and 2009 following declines in the housing market and the mortgage banking crisis. The result of the economic downturn was decreases in employment related to the housing market, such as construction and real estate. As these industries recover, they will continue to play a significant role in the

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http://cses.washington.edu/db/pdf/moteetal2008scenarios628.pdf; Littell, J.S., M. McGuire Elsner, L.C. Whitely Binder, and A.K. Snover (eds). 2009. "The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate - Executive Summary." *In The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate*, Climate Impacts Group, University of Washington. Retrieved June 16, 2009, from www.cses.washington.edu/db/pdf/ wacciaexecsummary638.pdf; Madsen, T. and E. Figdor. 2007. *When it Rains, it Pours: Global Warming and the Rising Frequency of Extreme Precipitation in the United States.* Environment America Research & Policy Center and Frontier Group.; and Mote, P.W. 2006. "Climate-driven variability and trends in mountain snowpack in western North America." *Journal of Climate* 19(23): 6209-6220.

[48] The issue of global climate change is complex and there is a substantial amount of uncertainty about climate change. This discussion is not intended to describe all potential impacts of climate change but to present a few ways that climate change may impact the economy of cities in Oregon and the Pacific Northwest.

[49] "The Economic Impacts of Climate Change in Oregon: A preliminary Assessment," Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon, October 2005.

[50] "Economic Impacts of Climate Change on Forest Resources in Oregon: A Preliminary Analysis," Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon, May 2007.

[51] "The Economic Impacts of Climate Change in Oregon: A preliminary Assessment," Climate Leadership Initiative, Institute for Sustainable Environment, University of Oregon, October 2005.

national, state, and local economy over the long run. This report takes a long-run perspective on economic conditions (as the Goal 9 requirements intend) and does not attempt to predict the impacts of short-run national business cycles on employment or economic activity.

State Trends

Short-Term Trends

According to the Oregon Office of Economic Analysis (OEA), the Oregon economy "continues to hit the sweet spot."[52] They also report, "job gains are enough to match population growth and absorb the workers coming back into the labor market. Wages are rising faster than in the typical state, as are household incomes."[53] Though they note recent growth is slower than growth experienced several years ago.

Wages in Oregon continue to remain below the national average, but they are at its highest point relative to the early 1980s. The OEA reports that new Oregon Employment Department research "shows that median hourly wage increase for Oregon workers since 2014 has been 3.1 percent annually for the past three years."[54] These wage increases are "substantially stronger for the Oregonians who have been continually employed over the last three years."[55]

By the end of 2018, the OEA forecasts 41,700 jobs will be added to Oregon's economy. This is an approximate 2.2% annual growth in total nonfarm employment relative to 2017 levels.[56] The leisure and hospitality, construction, professional and business services, and health services industries are forecasted to account for well over half of the total job growth in Oregon for 2018. Oregon continues to have an advantage in job growth compared to other states, due to its industrial sector and in-migration flow of young workers in search of jobs.

The housing market continues to recover as Oregon's economy improves. Oregon is seeing an increase in household formation rates, which is good for the housing market as this will "help drive up demand for new houses".[57] Though younger Oregonians are tending to live at home with their parents longer, the aging Millennial generation (from their early 20s to mid-to-late 30s) and the state's increase in migration will drive demand for homes in the coming years. Housing starts in 2018 are on track to just under 22,000 units annually. This is "driven in large part by a decline in multifamily permit activity."[58] Through 2020, the OEA forecasts moderate to strong housing growth. Beyond this time frame, the OEA forecasts an average growth of 24,000

[52] Office of Economic Analysis. Oregon Economic and Revenue Forecast, September 2018. Vol. XXXVIII, No. 3, page 2.

[53] *Ibid*, page 2.

[54] *Ibid*, page 5.

[55] *Ibid*, page 5.

[56] *Ibid*, page 13.

[57] *Ibid*, page 13.

[58] *Ibid*, page 13.

units per year to satisfy the demand for Oregon's growing population and to make up for the under development of housing post-recession.[59]

The Oregon Index of Leading Indicators (OILI) has grown quite rapidly since January 2017. The leading indicators showing improvement are: consumer sentiment, industrial production, initial claims, the manufacturing purchasing managers index (PMI), new incorporations, semiconductor billings, and withholdings. The indicators that are slowing include air freight and the Oregon Dollar Index and the indicators not improving include help wanted ads and housing permits.[60]

Oregon's economic health is dependent on the export market. The value of Oregon exports in 2017 was $21.9 billion. The countries that Oregon exports the most to are China (18% of total Oregon exports), Canada (11%), Malaysia (11%), South Korea (9%), Japan (8%), and Vietnam (7%).[61] With straining trade relations overseas, specifically with China, Oregon exports are left potentially vulnerable, as China is a top destination for Oregon exports.[62] An economic slowdown across many parts of Asia will have a spillover effect on the Oregon economy. Furthermore, with the United States' withdrawal from the Trans-Pacific Partnership in January 2017, it is unclear how much Pacific Northwest trade will be impacted in the years to come.

Long-term Trends

State, regional, and local trends will also affect economic development in Tualatin over the next 20 years. The most important of these trends includes continued in-migration from other states, distribution of population and employment across the state, and change in the types of industries in Oregon.

- **Continued in-migration from other states.** Oregon will continue to experience in-migration (more people moving *to* Oregon than *from* Oregon) from other states, especially California and Washington. From 1990 to 2017, Oregon's population increased by about 1.3 million, 66% of which was from people moving into Oregon (net migration). The average annual increase in population from net migration over the same time period was just over 33,200. During the early- to mid-1990's, Oregon's net migration was highest, reaching over 60,000 in 1991, with another smaller peak of almost 42,100 in 2006. In 2017, net migration reached just over 56,800 persons. Oregon has not seen negative net migration since a period of negative net migration in the early- to mid-1980's.[63] Oregon's population has continued to get more ethnically and racially diverse,

[59] *Ibid*, page 13.

[60] *Ibid*, page 10.

[61] United States Census Bureau. State Exports from Oregon, 2014-2017. Retrieved from: https://www.census.gov/foreign-trade/statistics/state/data/or.html.

[62] Office of Economic Analysis. Oregon Economic and Revenue Forecast, September 2018. Vol. XXXVIII, No. 3, page 14.

[63] Portland State University Population Research Center. 2017 Annual Population Report Tables. April 2017. Retrieved from: https://www.pdx.edu/prc/population-reports-estimates.

with Latinx populations growing from 8% of the population in 2000 to 13% of the population in 2013-2017. The non-white population grew from 13% of the population to 15% of the population over the same period. The share of Latinx population increased in Tualatin from 2000 to 2013-2017 while the share of the non-white population stayed the same.

- **Forecast of job growth.** Total nonfarm employment is expected to increase from 1.91 million in 2018 to just over 1.99 million in 2022, an increase of 80,000 jobs. The industries with the largest growth are forecasted to be Professional and Business Services, Health Services, and Retail, accounting for 61% of employment growth.[64]
- **Continued importance of manufacturing to Oregon's economy.** Oregon's exports totaled $19.4 billion in 2008, nearly doubling since 2000, and reached almost $22 billion in 2017. The majority of Oregon exports go to countries along the Pacific Rim, with China, Canada, Malaysia, South Korea, and Japan as top destinations. Oregon's largest exports are tied to high tech and mining, as well as agricultural products.[65] Manufacturing employment is concentrated in five counties in the Willamette Valley or Portland area: Washington, Multnomah, Lane, Clackamas, and Marion Counties.[66]
- **Shift in manufacturing from natural resource-based to high-tech and other manufacturing industries.** Since 1970, Oregon started to transition away from reliance on traditional resource-extraction industries. A significant indicator of this transition is the shift within Oregon's manufacturing sector, with a decline in the level of employment in the Lumber & Wood Products industry and concurrent growth of employment in other manufacturing industries, such as high-technology manufacturing (Industrial Machinery, Electronic Equipment, and Instruments), Transportation Equipment manufacturing, and Printing and Publishing.[67]
- **Income.** Oregon's income and wages are below that of a typical state. However, mainly due to the wage growth over the last two to three years, Oregon wages are at their highest point relative to other states since the recession in the early 1980's. In 2017, the average annual wage in Oregon was $51,117, and the median household income was $60,212 (compared to national average wages of $53,621 in 2017, and national household income of $60,336).[68] Total personal income (all classes of income, minus Social Security

[64] Office of Economic Analysis. Oregon Economic and Revenue Forecast, September 2018. Vol. XXXVIII, No. 3, page 38.

[65] United States Census Bureau. State Exports from Oregon, 2014-2017. Retrieved from: https://www.census.gov/foreign-trade/statistics/state/data/or.html.

[66] Oregon Employment Department. *Employment and Wages by Industry (QCEW)*. 2017 Geographic Profile, Manufacturing (31-33). Retrieved from: qualityinfo.org.

[67] Although Oregon's economy has diversified since the 1970's, natural resource-based manufacturing accounts for about 38% of employment in manufacturing in Oregon in 2017, with the most employment in Food Manufacturing (nearly 30,000) and Wood Product Manufacturing (nearly 23,000) (QCEW).

[68] Average annual wages are for "Total, all industries," which includes private and public employers. Oregon Quarterly Census of Employment and Wages, 2017. Retrieved from: https://www.qualityinfo.org; Bureau of Labor

contributions, adjusted for inflation) in Oregon is expected to increase by 22%, from $202.2 billion in 2018 to $247.5 billion in 2022.[69] Per capita income is expected to increase by 16% over the same time period, from $48,000 (thousands of dollars) in 2018 to $55,800 in 2022 (in nominal dollars).[70]

- **Small businesses continue to account for a large share of employment in Oregon**. While small firms played a large part in Oregon's expansion between 2003 and 2007, they also suffered disproportionately in the recession and its aftermath (64% of the net jobs lost between 2008 and 2010 was from small businesses).

  In 2017 small businesses (those with 100 or fewer employees) accounted for 95% of all businesses and 66% of all private-sector employment in Oregon. Said differently, most businesses in Oregon are small (in fact, 78% of all businesses have fewer than 10 employees), but the largest share of Oregon's employers work for large businesses.

  The average annualized payroll per employee for small businesses was $37,149 in 2015, which is considerably less than that for large businesses ($54,329) and the statewide average for all businesses ($47,278).[71] Younger workers are important to continue growth of small businesses across the nation. More than one-third of Millennials (those born between 1980 - 1999) are self-employed, with approximately half to two-thirds interested in becoming an entrepreneur. Furthermore, in 2011, about 160,000 startup companies were created each month; 29% of these companies were founded by people between 20 to 34 years of age.[72]

- **Entrepreneurship in Oregon.** The creation of new businesses is vital to Oregon's economy as their formations generate new jobs and advance new ideas and innovations into markets. They also can produce more efficient products and services to better serve local communities. According to the Kauffman Index, Oregon ranked 13th in the country in 2017 for its startup activity, a measurement comprised of three statistics: rate of new entrepreneurs, opportunity share of new entrepreneurs, and startup density.[73] This ranking is higher than its 2016 rank of 15. Oregon's rate of new entrepreneurs (the percent of adults that became an entrepreneur in a given month) was in steady decline post-recession, but since 2013, it has gradually recovered to about 0.34% in 2016. This

Statistics, Quarterly Census of Employment and Wages, 2017; Total, U.S. Census American Community Survey 1-Year Estimates, 2017, Table B19013.

[69] Office of Economic Analysis. Oregon Economic and Revenue Forecast, September 2018. Vol. XXXVIII, No. 3, page 39.

[70] *Ibid*, page 39.

[71] U.S Census Bureau, 2015 Statistics of U.S. Businesses, Annual Data, Enterprise Employment Size, U.S and States. https://www.census.gov/data/tables/2015/econ/susb/2015-susb-annual.html.

[72] Cooper, Rich, Michael Hendrix, Andrea Bitely. (2012). "The Millennial Generation Research Review." Washington, DC: The National Chamber Foundation. Retrieved from: https://www.uschamberfoundation.org/sites/default/files/article/foundation/MillennialGeneration.pdf.

[73] Kauffman Foundation. *The Kauffman Index, Oregon*. Retrieved from: https://www.kauffman.org/kauffman-index/profile?loc=41&name=oregon&breakdowns=growth|overall,startup-activity|overall,main-street|overall.

rate is still well below Oregon's pre-recession peak of 0.43% in 2000, but its recent growth broadly exhibits business ownership and formation is increasing.

Moreover, in 2018, the Oregon Office of Economic Analysis reports new business applications in Oregon are increasing. They do, however, simultaneously note startup businesses "are a smaller share of all firms than in the past."[74] Though this measurement of economic activity does not constitute a full understanding of how well entrepreneurship is performing, it does provide an encouraging signal.

Regional and Local Trends

Throughout this section and the report, Tualatin is compared to Washington County, the Portland Region, and the State of Oregon. These comparisons provide context for changes in Tualatin's socioeconomic characteristics.

Availability of Labor

A skilled and educated populace can attract well-paying businesses and employers and spur the benefits that follow from a growing economy. Key trends that will affect the workforce in Tualatin over the next 20 years include growth in its overall population, growth in the senior population, and commuting trends.

Growing Population

Population growth in Oregon tends to follow economic cycles. Oregon's population grew from about 2.8 million people in 1990 to 4.0 million people in the 2013-2017 period, an increase of almost 1.2 million people, at an average annual rate of 1.3%. Oregon's growth rate slowed to 1.0% annual growth between 2000 and 2017.

Tualatin's population increased over the 1990 to 2013-2017 period, by 12,122 residents. Washington County's population also grew over the same time, by 260,517 residents, at a similar rate of growth as Tualatin.

Exhibit 27. Population Growth, Tualatin, Washington County, Portland Region, Oregon U.S., 1990, 2000, 2010, 2017
Source: US Decennial Census 1990, 2000, 2010. ACS 2013-2017 5-year estimate.

					Change 1990 to 2013-2017		
	1990	2000	2010	2013-2017	Number	Percent	Growth Rate
U.S.	248,709,873	281,421,906	308,745,538	321,004,407	72,294,534	29%	0.9%
Oregon	2,842,321	3,421,399	3,831,074	4,025,127	1,182,806	42%	1.3%
Portland Region	1,174,291	1,444,219	1,641,036	1,760,492	586,201	50%	1.5%
Washington County	311,554	445,342	529,710	572,071	260,517	84%	2.3%
Tualatin	15,013	22,791	26,054	27,135	12,122	81%	2.2%

[74] Lehner, Josh. (August 2018). "Start-Ups, R&D, and Productivity." Salem, OR: Oregon Office of Economic Analysis. Retrieved from: https://oregoneconomicanalysis.com/2015/03/13/start-ups-and-new-business-formation/.

Age Distribution

The number of people aged 65 and older in the U.S. is expected to increase by nearly three-quarters by 2050, while the number of people under age 65 will only grow by 16%. The economic effects of this demographic change include a slowing of the growth of the labor force, need for workers to replace retirees, aging of the workforce for seniors that continue working after age 65, an increase in the demand for healthcare services, and an increase in the percent of the federal budget dedicated to Social Security and Medicare.[75]

Between 2000 and the 2013-2017 period, Tualatin grew older on average (6.3 years).

This increase suggests Tualatin attracted more workers in their later adult lives.

Exhibit 28. Median Age, Tualatin, Washington County, Clackamas County, Multnomah County, 2000 to 2013-2017

Source: U.S. Census Bureau, 2000 Decennial Census, Table P013; American Community Survey 2013-2017 5-year estimates, Table B01002.

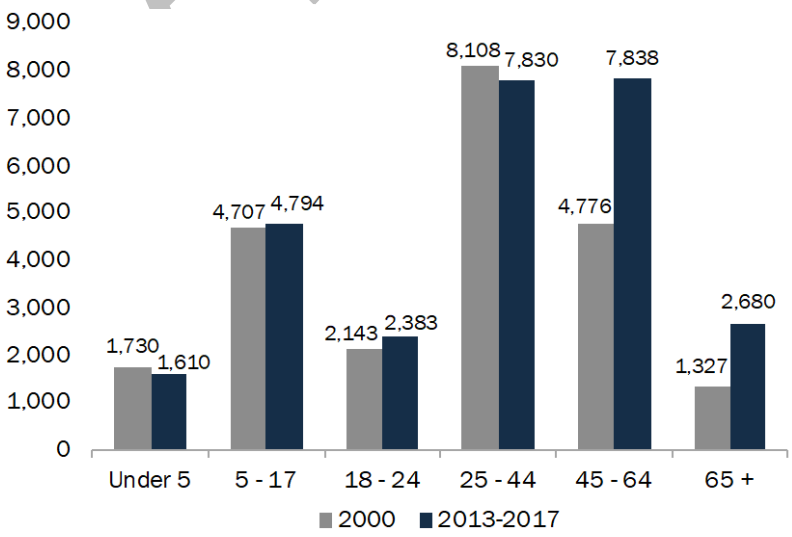
	Tualatin	Washington County	Clackamas County	Multnomah County
2000	31.9	33.0	37.5	34.9
2013-17	38.2	36.4	41.4	36.8

Over 2000 to 2013-2017, Tualatin's largest population increase was for those between 45 and 64 years of age.

This age group grew by 3,062 people between 2000 and 2013-2017.

Exhibit 29. Population Change by Age Group, Tualatin, 2000 and 2013-2017

Source: U.S. Census Bureau, 2000 Summary File; American Community Survey, 2013-2017, 5-year estimates, Table B01001.



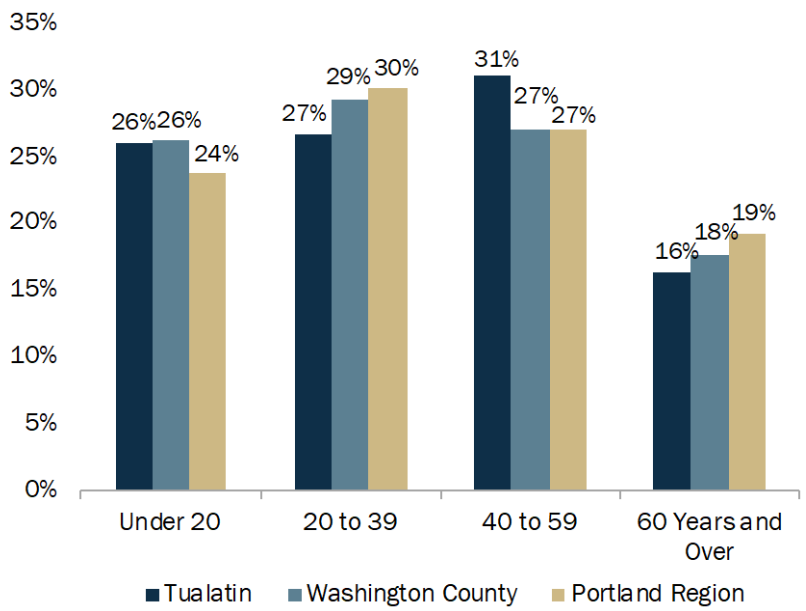
[75] The Board of Trustees, Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, 2017, *The 2017 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*, July 13, 2017. *The Budget and Economic Outlook: Fiscal Years 2018 to 2028*, April 2018.

Compared to Washington County and the Portland Region, Tualatin had a slightly larger proportion of adults aged 40 to 59.

During the 2013-2017 period, 58% of Tualatin residents were between 20 and 59 years of age.

Exhibit 30. Population Distribution by Age, Tualatin, Washington County, Portland Region, 2013-2017

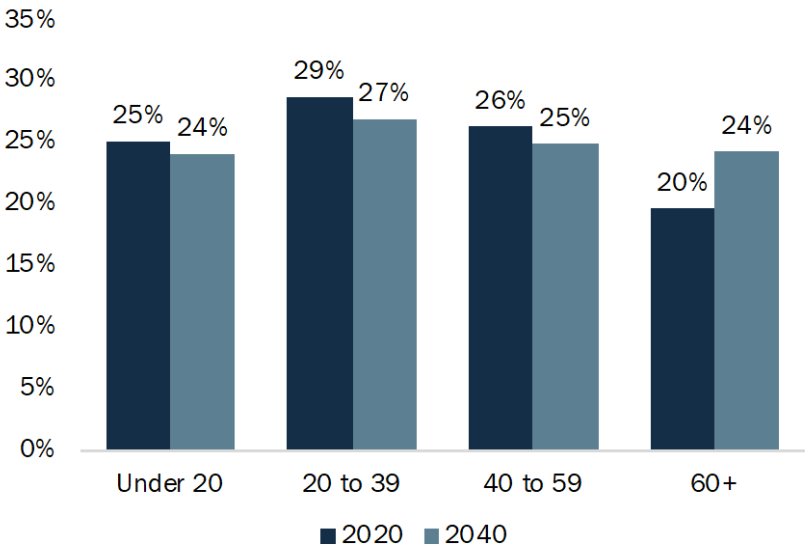
Source: U.S. Census Bureau, American Community Survey, 2013-2017 5-year estimate, Table B01001.



From 2020 to 2040, the share of residents 60 years and older in Washington County is forecast to grow while other age cohorts are forecast to decline proportionately.

Exhibit 31. Population Growth by Age Group, Washington County, 2020 and 2040

Source: Portland State University, Population Research Center, Washington County Forecast, June 2017.



Income

Income and wages affect business decisions for locating in a city. Areas with higher wages may be less attractive for industries that rely on low-wage workers. In the 2013-2017 period, Tualatin's median household income ($72,580) was similar to the County median ($74,033). In 2017 (inflation adjusted to 2018 $), average wages at businesses in Tualatin ($58,429) were below the County's average ($70,310, 2018).

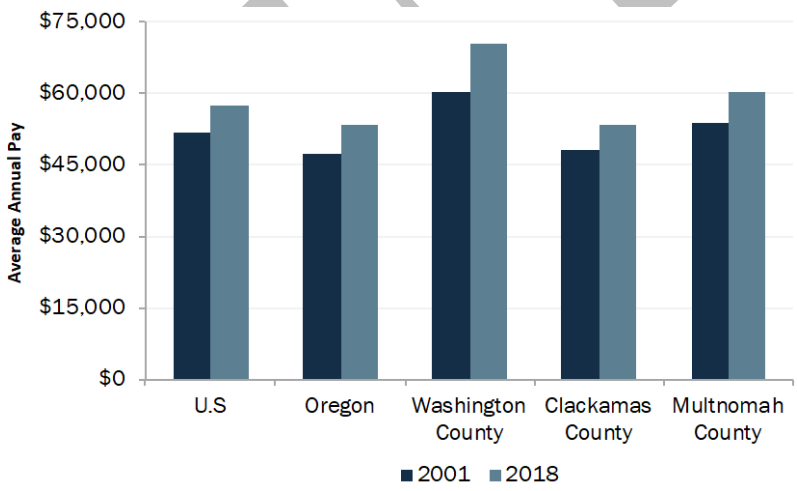
Adjusting for inflation, between 2000 and 2018, Washington County's average wages increased as they did in Oregon, the nation, and other counties in the Portland Region. When adjusted for inflation, average annual wages grew by 17% in Washington County and 13% in Oregon.

From 2000 to 2018, average annual wages increased in Washington County as well as other counties in the Portland Region, Oregon, and the nation.

In 2018, the average annual wage was $70,310 in Washington County, compared to 53,058 in Oregon.

Exhibit 32. Average Annual Wage (Inflation-adjusted 2018 $), Covered Employment, Washington County, Clackamas County, Multnomah County, Oregon, U.S., 2001 to 2018,

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.



Over the 2013-2017 period, the median household income (MHI) in Tualatin was below Washington County's MHI, comparable to Multnomah County's MHI, and above Clackamas County's MHI.

Exhibit 33. Median Household Income (MHI),[76] 2013-2017

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates, Table B19013.

$72,580 Tualatin	**$74,033** Washington County
$60,369 Clackamas County	**$72,408** Multnomah County

[76] The Census calculated household income based on the income of all individuals 15 years old and over in the household, whether they are related or not.

Tualatin median family income during the 2013-2017 period, similar to median household income, above the median family incomes of Washington County, Clackamas County, and Multnomah County.

Exhibit 34. Median Family Income,[77] 2013-2017

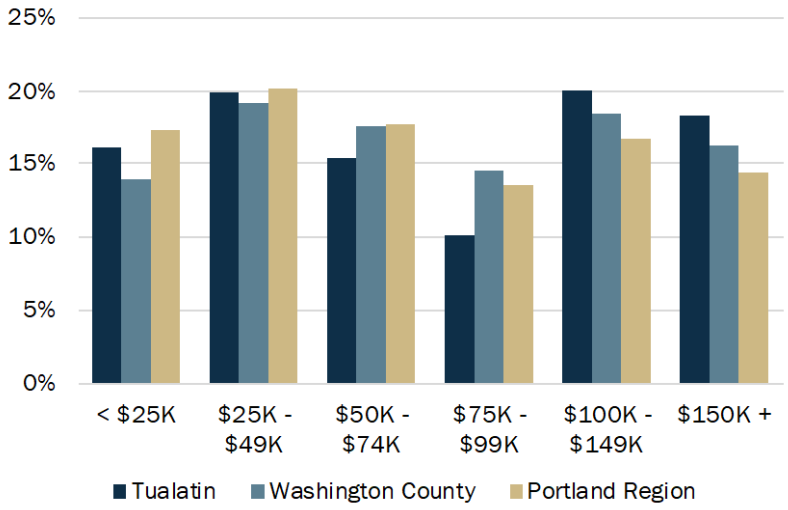
Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates, Table B19113.

$95,656 Tualatin	$85,993 Washington County
$87,858 Clackamas County	$76,557 Multnomah County

During the 2013-2017 period, 48% of Tualatin households earned over than $75,000 annually, which is comparable to Washington County.

Exhibit 35. Household Income by Income Group, Tualatin, Washington County, Portland Region, 2013-2017

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates, Table B19001.



[77] The Census calculated family income based on the income of the head of household, as identified in the response to the Census forms, and income of all individuals 15 years old and over in the household who are related to the head of household by birth, marriage, or adoption.

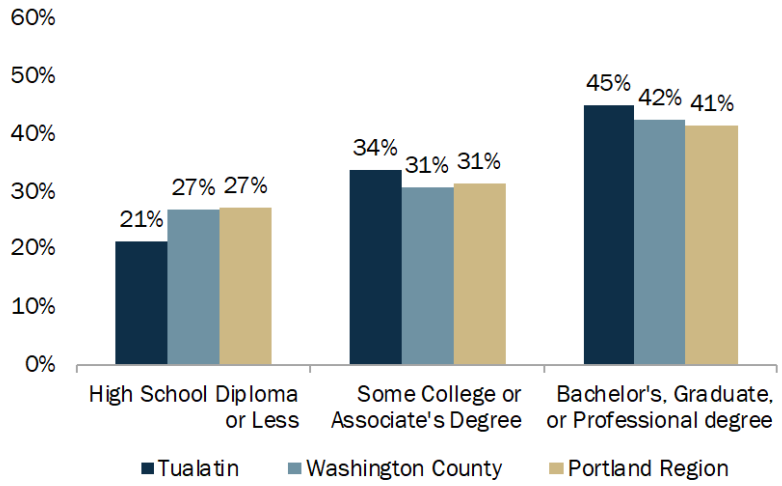
Educational Attainment

The availability of trained, educated workers affects the quality of labor in a community. Educational attainment is an important labor force factor because firms need to be able to find educated workers.

The share of residents, 25 years and older, with a bachelor's degree (or higher) is slightly larger in Tualatin than Washington County and the Portland Region.

Exhibit 36. Educational Attainment for the Population 25 Years and Over, Tualatin, Washington County, and the Portland Region, 2013-2017

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates, Table B15003.



Race and Ethnicity

Tualatin, like Oregon overall, is becoming more ethnically diverse (while racial diversity has remained about the same). The Latinx community increased in Tualatin between 2000 and 2013-2017, from 12% of the total population to 16%. The non-Caucasian[78] share of the population stayed the same, from 2000 to 2013-2017 at 13% of the population. The Latinx community in Washington County also increased from 11% to 16%, while the non-Caucasian population increased from 18% to 23% between 2000 and 2013-2017.

Exhibit 37 and Exhibit 38 show the change in the share of Latinx and non-Caucasian populations in Tualatin, compared to Washington County and the Portland Region, between 2000 and 2013-2017.

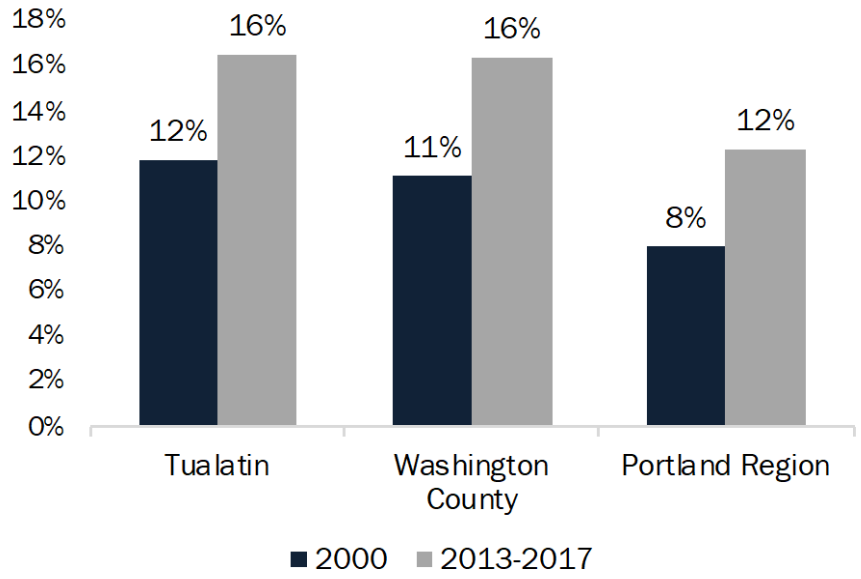
[78] The non-Caucasian population is defined as the share of the population that identifies as another race other than "White alone" according to Census definitions.

Tualatin's Latinx population increased between 2000 and 2013-2017 from 12% to 16%.

Tualatin and Washington County are more ethnically diverse than the Portland Region.

Exhibit 37. Latinx Population as a Percent of the Total Population, Tualatin, Washington County, and Oregon, 2000 and 2013-2017

Source: U.S. Census Bureau, 2000 Decennial Census Table P008, 2013-2017 ACS Table B03002.

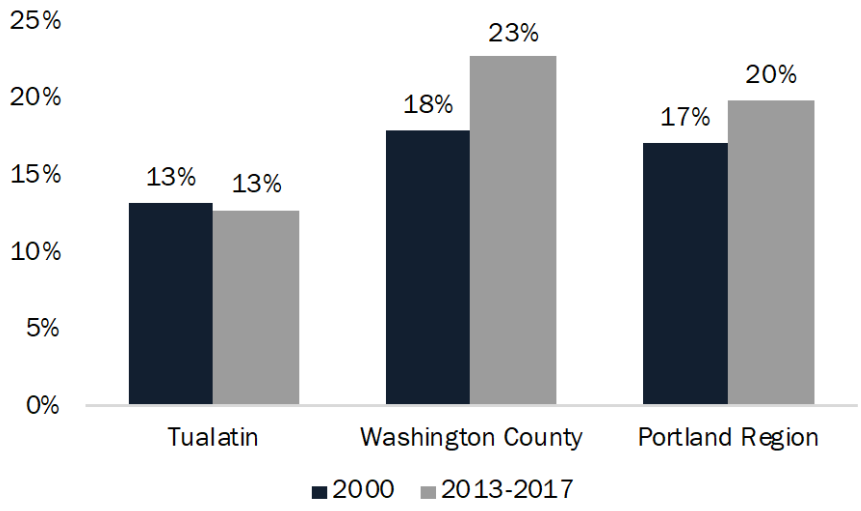


The non-Caucasian population in Tualatin stayed the same (at 13%) between 2000 and 2013-2017.

Tualatin is less racially diverse than Washington County and the Portland Region.

Exhibit 38. Non-Caucasian Population as a Percent of the Total Population, Tualatin, Washington County, and Oregon, 2000 and 2013-2017

Source: U.S. Census Bureau, 2000 Decennial Census Table P007, 2013-2017 ACS Table B02001.



Labor Force Participation and Unemployment

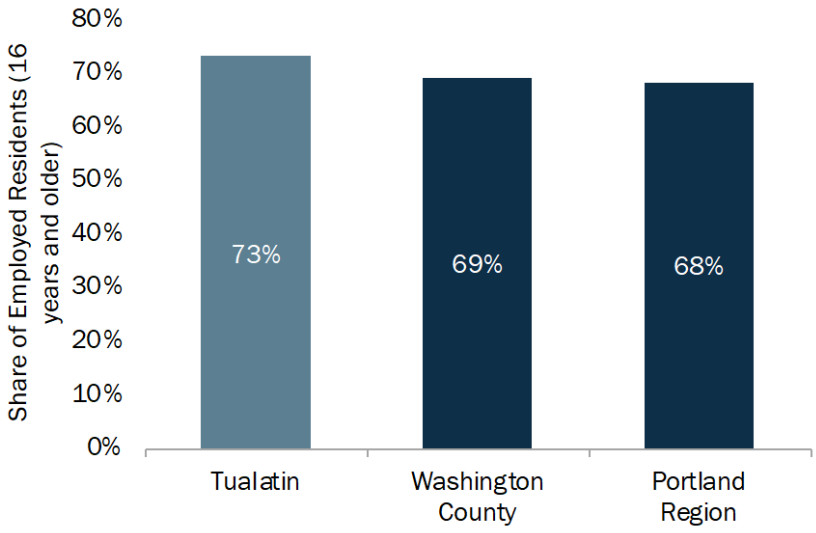
The current labor force participation rate is an important consideration in the availability of labor. The labor force in any market consists of the adult population (16 and over) who are working or actively seeking work. The labor force includes both the employed and unemployed. Children, retirees, students, and people who are not actively seeking work are not considered part of the labor force. According to the 2013-2017 American Community Survey, Washington County had more than 310,426 people in its labor force and Tualatin had 15,643 people in its labor force.

In 2017, the Oregon Office of Economic Analysis reported that 64% of job vacancies were difficult to fill. The most common reason for difficulty in filling jobs included a lack of applications (30% of employers' difficulties), lack of qualified candidates (17%), unfavorable working conditions (14%), a lack of soft skills (11%), and a lack of work experience (9%).[79] These statistics indicate a mismatch between the types of jobs that employers are demanding and the skills that potential employees can provide.

Tualatin has a higher labor participation rate than Washington County and the Portland Region.

Exhibit 39. Labor Force Participation Rate, Tualatin, Washington County, Portland Region, 2013-2017

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates, Table B23001.

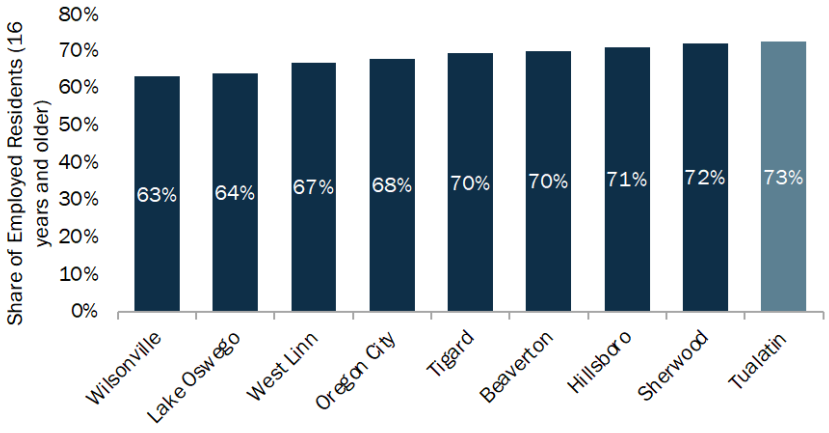


[79] *Oregon's Current Workforce Gaps: Difficult-to-fill Job Openings, Oregon Job Vacancy Survey*, Oregon Employment Department, June 2018.

Compared to neighboring cities, Tualatin has the highest labor force participation rate.

Exhibit 40. Labor Force Participation Rate, Tualatin and comparison cities, 2013-2017

Source: U.S. Census Bureau, American Community Survey 2013-2017 5-year estimates, Table B23001.

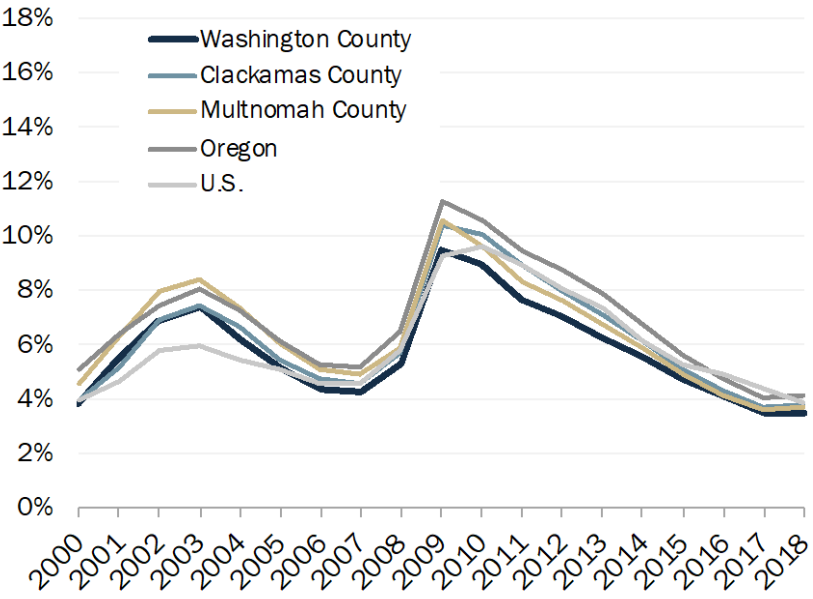


Alongside other counties in the Portland Region, Oregon, and the U.S., the unemployment rate in Washington County has declined since the Great Recession.

In general, Washington County's unemployment rate is below that of other regions.

Exhibit 41. Unemployment Rate, Washington County, Clackamas County, Multnomah County, Oregon, U.S., 2000 – 2018

Source: Bureau of Labor Statistics, Local Area Unemployment Statistics and Labor Force Statistics.



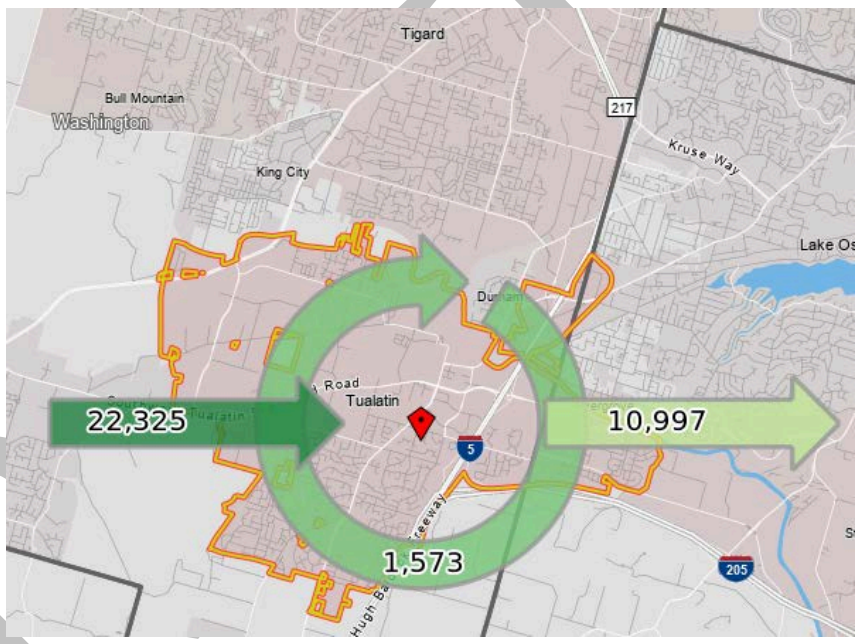
Commuting Patterns

Commuting plays an important role in the Tualatin's economy because employers in these areas are able to access workers from people living in cities across Washington County and the broader Portland Region.

Exhibit 42 shows commuting flows of employees. Of the employees who work in Tualatin (about 23,898 persons), 93% commute into Tualatin from other areas. Of the employees who live in Tualatin (about 12,570 persons), 87% of people commute out of Tualatin to work in other areas.

Tualatin is part of an interconnected regional economy.
More than 22,000 people commute into Tualatin for work, and nearly 11,000 people living in Tualatin commute out of the city for work.

Exhibit 42. Commuting Flows, Tualatin, 2015
Source: U.S. Census Bureau, Census On the Map.



About 7% of people who work at businesses located in Tualatin also live in Tualatin.
The remainder commute from Portland and other parts of the Region.

Exhibit 43. Places Where Workers at Businesses in Tualatin Live, 2015
Source: U.S. Census Bureau, Census On the Map.

15%	7%	6%	5%	4%
Portland	Tualatin	Tigard	Beaverton	Hillsboro

About 27% of Tualatin residents work in Portland.
About 13% of Tualatin residents live and work in Tualatin.

Exhibit 44. Places Where Tualatin Residents were Employed, 2015
Source: U.S. Census Bureau, Census On the Map.

27%	13%	9%	7%	6%
Portland	Tualatin	Tigard	Beaverton	Wilsonville

Exhibit 45. Commuting Patterns of Employees Living in Respective Communities, Tualatin and Comparison Cities in the Portland Region, 2015

Source: U.S. Census Bureau, Census On the Map.

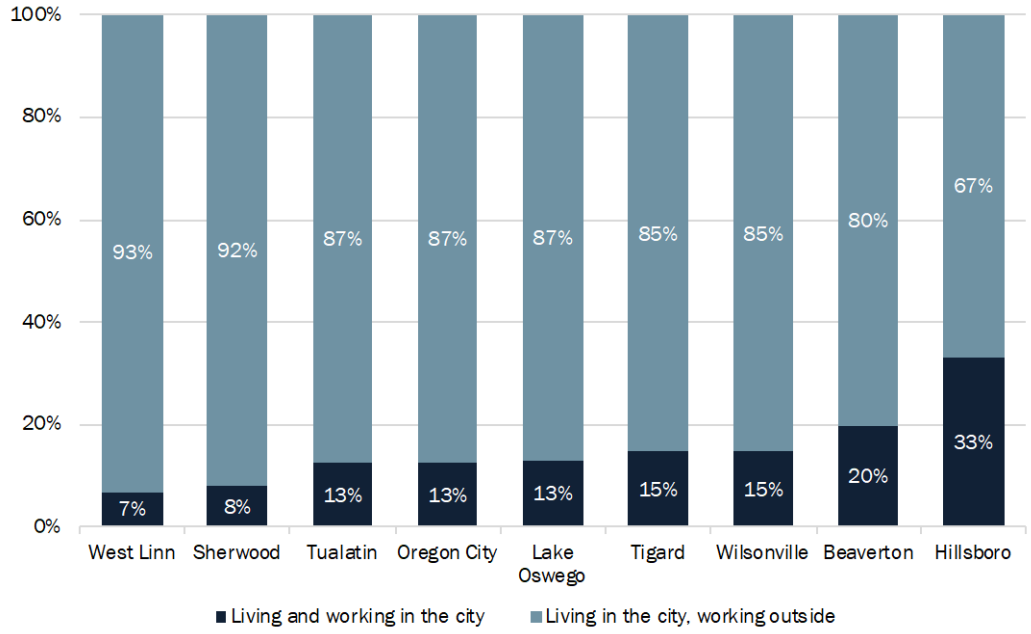
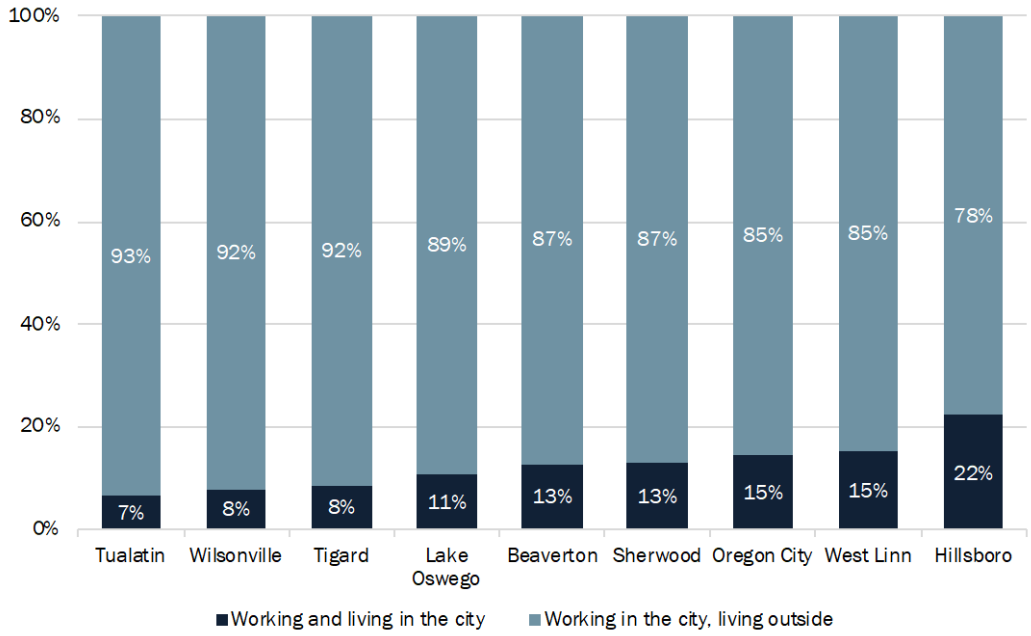


Exhibit 46. Commuting Patterns of Employees Working in Respective Communities, Tualatin and Comparison Cities in the Portland Region, 2015

Source: U.S. Census Bureau, Census On the Map.

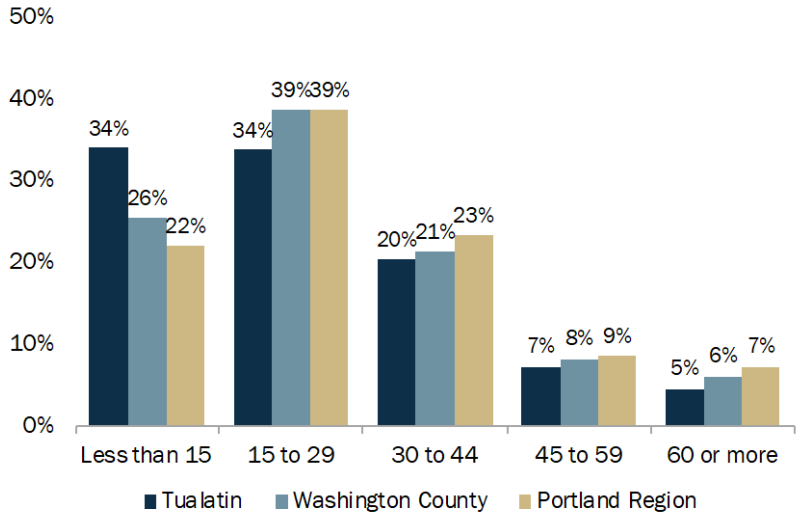


During the 2013-2017 period, about 34% of Tualatin residents had a commute of less than 15 minutes, compared to 26% of residents in Washington County and 22% of residents in the Portland Region.

Most of Tualatin residents (68%) have a commute time that takes less than 30 minutes.

Exhibit 47. Commute Time by Place of Residence, Tualatin, Washington County, and Portland Region, 2013-2017

Source: U.S. Census Bureau, 2013-2017 ACS 5-year estimate, Table B08303.



Over the 2000 to 2013-2017 period, the share of workers that worked from home increased slightly.

Exhibit 48. Percent of Workers Working from Home, Tualatin, 2000 and 2013-2017

Source: U.S. Census Bureau, 2000 Decennial Census Summary File 3 estimates, Table P030; 2013-2017 ACS 5-year estimate, Table B08303.

2000: 4.6%

2013-17: 6.8%

Tourism in the Portland Region and Washington County

Washington County's direct travel spending increased 103% from 2000 to 2017.

The Portland Region's direct travel spending increased by 89% over the same period.

Exhibit 49. Direct Travel Spending ($ millions), 2000 and 2017
Source: Dean Runyan Associates, Oregon Travel Impacts, 1992-2017.

2000:	$2,700 Portland Region	$410 Washington County
2017:	$5,100 Portland Region	$833 Washington County

Washington County's lodging tax receipts increased 243% over 2006 to 2017.

Exhibit 50. Lodging Tax Receipts ($ millions), 2006 and 2017
Source: Dean Runyan Associates, Oregon Travel Impacts, 1992-2017.

2006:	$4,900 Washington County
2017:	$16,800 Washington County

Washington County's largest visitor spending for purchased commodities is food services.

Exhibit 51. Largest Visitor Spending Categories ($ millions), Washington County, 2018
Source: Dean Runyan Associates, Oregon Travel Impacts, 1992-2017.

$236.5 Food Services	$137.1 Accommodations	$105.1 Retail Sales

Washington County's largest employment generated by travel spending is in the accommodations and food services industry.

Exhibit 52. Largest Industry Employment Generated by Travel Spending, Washington County, 2018
Source: Dean Runyan Associates, Oregon Travel Impacts, 1992-2017.

5,940 jobs Accommodations & Food Services	1,190 jobs Arts, Entertainment. and Recreation	290 jobs Ground Tran.

Appendix B. Buildable Lands Inventory

Oregon Administrative Rules provide guidance on conducting employment land BLIs:

OAR 660-009-0005:

(1) "Developed Land" means non-vacant land that is likely to be redeveloped during the planning period.

(2) "Development Constraints" means factors that temporarily or permanently limit or prevent the use of land for economic development. Development constraints include, but are not limited to, wetlands, environmentally sensitive areas such as habitat, environmental contamination, slope, topography, infrastructure deficiencies, parcel fragmentation, or natural hazard areas.

(11) "Site Characteristics" means the attributes of a site necessary for a particular industrial or other employment use to operate. Site characteristics include, but are not limited to, a minimum acreage or site configuration including shape and topography, visibility, specific types or levels of public facilities, services or energy infrastructure, or proximity to a particular transportation or freight facility such as rail, marine ports and airports, multimodal freight or transshipment facilities, and major transportation routes.

(12) "Suitable" means serviceable land designated for industrial or other employment use that provides, or can be expected to provide the appropriate site characteristics for the proposed use.

(13) "Total Land Supply" means the supply of land estimated to be adequate to accommodate industrial and other employment uses for a 20-year planning period. Total land supply includes the short-term supply of land as well as the remaining supply of lands considered suitable and serviceable for the industrial or other employment uses identified in a comprehensive plan. Total land supply includes both vacant and developed land.

(14) "Vacant Land" means a lot or parcel:

(a) Equal to or larger than one half-acre not currently containing permanent buildings or improvements; or

(b) Equal to or larger than five acres where less than one half-acre is occupied by permanent buildings or improvements.

Unlike with residential lands, the rules for employment lands include the concept of "suitability" which can be affected by factors other than the physical attributes of land. (See OAR 660-009-0005 (11) and (12) above.) The BLI methods do not fully address the suitability factors, rather, they more narrowly assess whether a parcel is buildable based solely on attributes of the land.

The methods used for conducting the Tualatin commercial and industrial BLI is consistent with Oregon statutes. However, the methods used for inventorying land within the city are based on the BLI completed by Metro for the 2018 Urban Growth Report (UGR). Metro is required to complete a BLI for land within the regional UGB every six years, and the agency updated the BLI (based on 2016 data) in January 2018. The methods used for inventorying Tualatin lands attempt to be consistent with Metro's results while also accounting for new development since 2016 and other local conditions, such as unique environmental constraints.

Overview of the Methodology

The BLI for Tualatin is based on the data and methods used by Metro. In addition, ECONorthwest's approach updated Metro's results to account for new development (the Metro 2018 UGR is based on 2016 data) and other potential local conditions, such as unique environmental constraints.

Study Area

The BLI for Tualatin includes all commercial and industrial land designated in the comprehensive plans within city limits and designated planning areas (referred to as Tualatin Planning Area). ECONorthwest used Metro's BLI, which used the 2016 RLIS tax lot database, as the basis for the BLI. We worked with city staff to identify new development or changes since 2016 to reflect Tualatin's commercial and industrial land base in 2019.

Inventory Steps

The BLI consisted of several steps:

1. Generating UGB "land base"
2. Classifying land by development status
3. Identify constraints
4. Verify inventory results
5. Tabulate and map results

Step 1: Generate "land base."

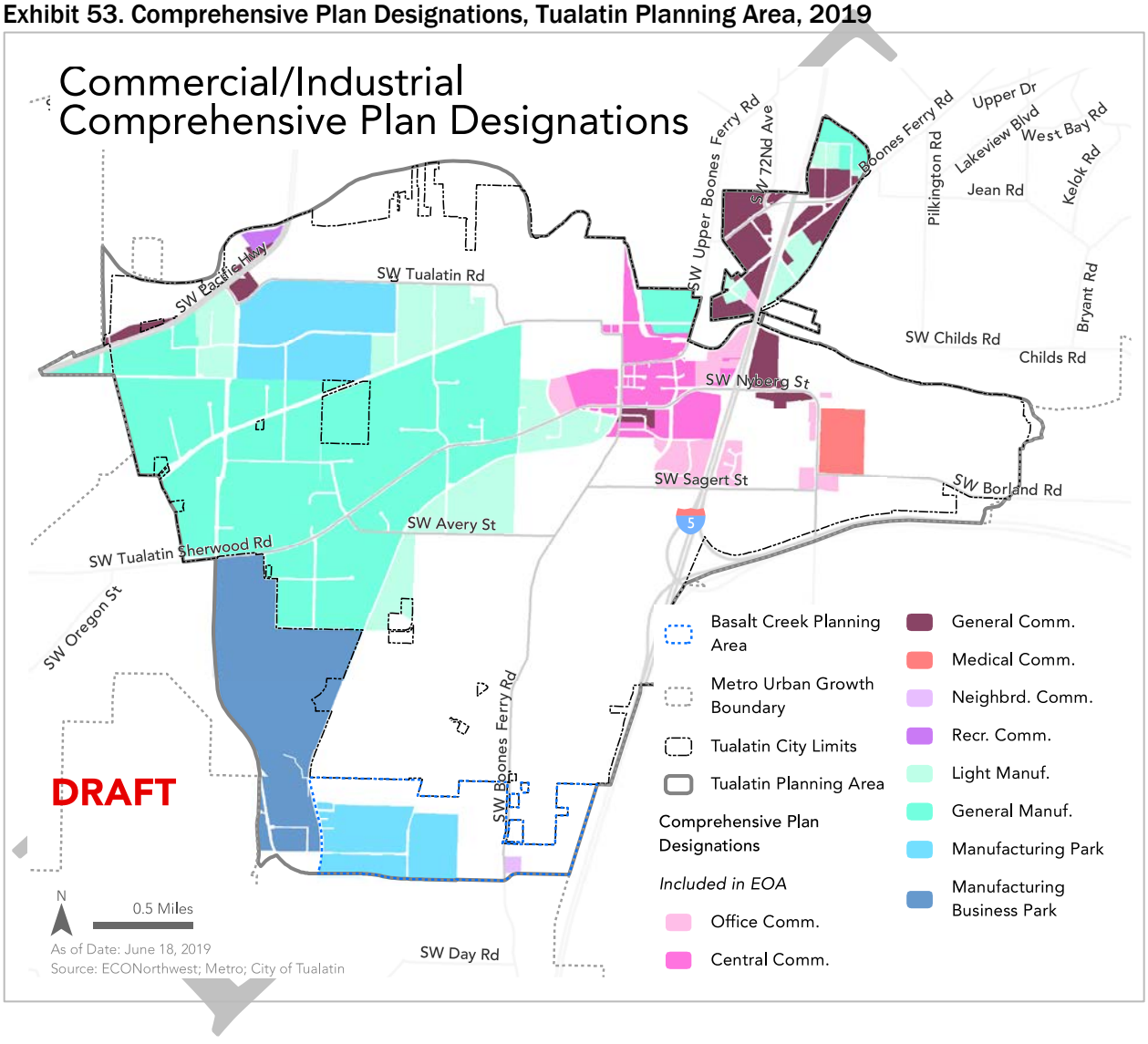
Per Goal 9 this involves selecting all of the tax lots with employment plan designations. Based on information provided by City staff, ECONorthwest included the following plan designations in the BLI:

- Office Commercial
- Central Commercial
- General Commercial
- Medical Commercial
- Neighborhood Commercial
- Recreational Commercial

- Light Manufacturing
- General Manufacturing
- Manufacturing Park
- Manufacturing Business Park

Exhibit 53 shows comprehensive plan designations for the City of Tualatin.

Exhibit 53. Comprehensive Plan Designations, Tualatin Planning Area, 2019



Step 2: Classify lands.

In this step, ECONorthwest classified each tax lot with a plan designation that allow employment uses into one of four mutually exclusive categories based on development status:

- Vacant
- Partially Vacant
- Potentially Redevelopable
- Public or Exempt
- Developed

ECONorthwest used the classification determined through Metro's model: Vacant, Ignore, and Developed. In addition, ECONorthwest included a new classification for partially vacant and potentially redevelopable lots. The definitions for each classification are listed below.

Development Status	Definition	Statutory Authority
Vacant	Tax lots designated as vacant by Metro based on the following criteria: 1) Fully vacant based on Metro aerial photo 2) Tax lots with less than 2,000 square feet developed AND developed area is less than 10% of lot 3) Lots 95% or more vacant from GIS vacant land inventory	OAR 660-009-005(14)
Partially Vacant	Lots with an existing single-family dwelling but have been redesignated for commercial or industrial use (e.g., lots in the Basalt Creek Planning Area). These lots are assumed to redevelop in the planning period.	No statutory definition
Potentially Redevelopable	Lots determined to have redevelopment capacity based on Metro's Threshold Price methodology.	No statutory definition
Ignore (Public or Exempt uses)	Lots in public or semi-public ownership are considered unavailable for commercial or industrial development. This includes lands in Federal, State, County, or City ownership as well as lands owned by churches and other semi-public organizations and properties with conservation easements. These lands are identified using the Metro's definitions and categories.	No statutory definition
Developed	Lots not classified as vacant, potentially redevelopable, or public/exempt are considered developed. Developed land includes lots with redevelopment capacity, which are also included in BLI. The capacity of developed but redevelopable lots is based on Metro's estimates.	OAR 660-009-005(1)

Step 3: Identify constraints

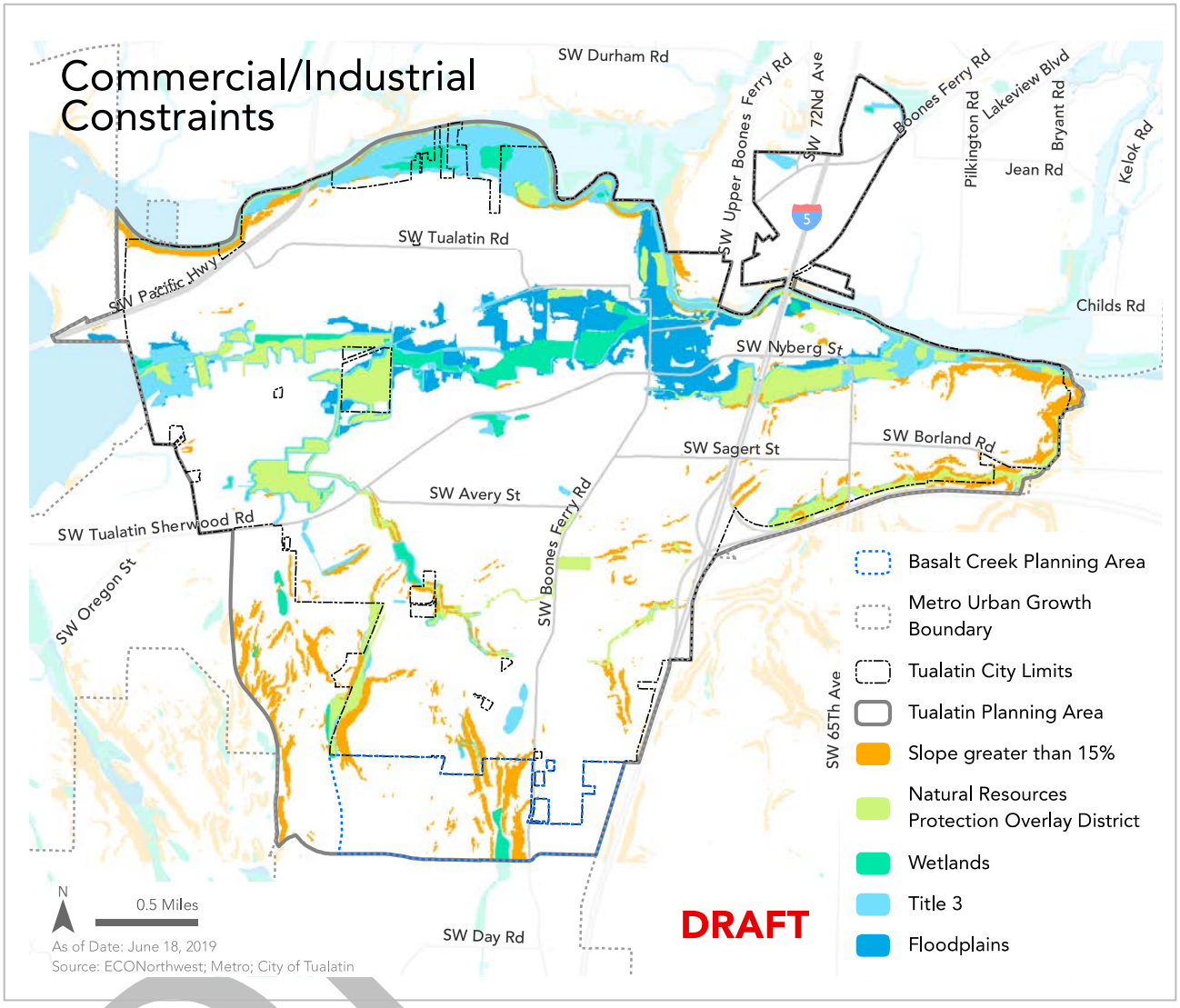
Consistent with OAR 660-008-0005(2) guidance on buildable lands inventories, ECONorthwest deducted certain lands with development constraints from vacant lands. We used some of the constraints established in Metro's methodology, with modifications to fit local considerations in Tualatin. These constraints are summarized in the table below.

Constraint	Statutory Authority	Threshold
Goal 5 Natural Resource Constraints		
Natural Resources Protection Overlay District	OAR 660-008-0005(2)	Areas in the NRPOD
Riparian Corridors	OAR 660-015-0000(5)	Areas protected by the Stream and Floodplain Plan
Wetlands	OAR 660-008-0005(2)	Areas in wetlands
Natural Hazard Constraints		
100 Year Floodplain	OAR 660-008-0005(2	Lands within FEMA FIRM 100-year floodplain
Steep Slopes	OAR 660-008-0005(2	Slopes greater than 15%

The lack of access to water, sewer, power, road or other key infrastructure cannot be considered a prohibitive constraint unless it is an extreme condition. This is because tax lots that are currently unserviced could potentially become serviced over the 20-year planning period.

Exhibit 54 maps the development constraints used for the commercial and industrial BLI.

Exhibit 54. Development Constraints, Tualatin Planning Area, 2019



Step 4: Verification

ECONorthwest used a multi-step verification process. The first verification step included a "rapid visual assessment" of land classifications using GIS and recent aerial photos. The rapid visual assessment involved reviewing classifications overlaid on recent aerial photographs to verify uses on the ground. ECONorthwest reviewed all tax lots included in the inventory using the rapid visual assessment methodology. The second round of verification involved City staff verifying the rapid visual assessment output. ECONorthwest amended the BLI based on City staff review and comments, particularly related to vacant land developed since 2016.

Step 5: Tabulation and mapping

The results are presented in tabular and map format. The Tualatin Commercial and Industrial BLI includes all employment land designated in the comprehensive plan within the Tualatin Planning Area. From a practical perspective, this means that ECONorthwest inventoried all lands within tax lots identified by Metro that fall within the Tualatin Planning Area. The inventory then builds from the tax lot-level database to estimates of buildable land by plan designation.