

Washington County
Transportation Futures Study
Exploring options • Informing choices

Appendix C: Scenarios and Future Drivers Impacting Transportation

Prepared for

Washington County

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1. Introduction

Washington County has experienced dramatic changes over the past few decades. It has developed into a vibrant urban metropolitan area that also supports a thriving rural community and economy. It is important that the county's transportation system meets the needs of all community members as and growth continues to expand and diversify the mix of people, jobs and land uses both in established cities and in "Urban Reserves" – designated areas for development over the next 50 years.

The Study is an evaluation of transportation investments relative to two alternative visions (referred to as scenarios) for how the county might grow in the next 40-50 years. The future scenarios reflect differing factors, or drivers of change, that are likely to influence the amount of population and jobs growth, and land development patterns in the county.

The scenario planning process engaged multiple perspectives from local, regional and national resources and industry experts to identify key influencing factors or drivers of change that shape the future. The team selected a set of drivers that the research had identified as some of the most important and that local agency staff and the Study Advisory Committee (SAC) felt were most applicable to the Portland Metropolitan region.

This memorandum describes the process of developing two land use scenarios, defines the scenarios, and depicts future demographic characteristics of the region.

2. Scenarios Planning Overview

It is not possible to accurately predict with certainty the amount of growth, land development patterns and transportation technologies in Washington County thirty or more years into the future. Scenario planning is an accepted approach in planning to address circumstances - such as the future of transportation in Washington County - that are complex, uncertain, and have long-term implications.

The purpose of developing scenarios is to understand what potential changes are most likely or plausible, so that the county can strategically develop transportation policies and plans that are most resilient to uncertain future conditions. The project team and Study Advisory Committee determined that due to the uncertainty of predicting growth, two divergent land use scenarios would be developed. Both scenarios would include existing land use assumptions but would use different growth rates and make up of population and employment. Using two different land use scenarios provides information about the difference in travel behavior that can be attributed to land use and can show the resiliency of transportation investments in an uncertain future.

3. Scenarios Development and Methodology

The scenarios are defined by assumptions about the future. The Study Team began the development process by engaging local, regional and national planning experts, and industry experts to identify key influencing factors ("drivers of change") that shape the future. This section begins with a summary of what the Study Team learned about drivers of change. It then describes assumptions for the two primary drivers of change that shaped

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scenario definitions: demographic and land-use growth. It concludes with a graphic that show the drivers led to scenario definitions.

Understanding “Drivers”

In developing the two scenarios, the Study Team engaged planning and economics experts who considered and broadly described what Washington County could plausibly look like in the future. They considered big national forces over which the County has little control (e.g., the strength of the national economy, advancements in transportation technology) and forces that could be affected by regional and local policy (e.g., the type and pattern of land development). The Study Team worked closely with staff at Metro and local agencies to develop longer-run regional and County growth forecasts for population and employment. Concurrently, the Study Team reviewed national literature and solicited input from various local and national experts on potential changes in demographics, economics, land use, transportation systems, and travel behavior.

From this research, the team identified *drivers* judged to have potentially significant effects on future land use and transportation in the County. Those drivers would be a primary basis for creating growth scenarios in a later phase of the Study.

The drivers were grouped into five categories: (1) demographics and societal factors, (2) economics, (3) technology, (4) environment and energy, and (5) government and policy. Experts consulted as part of the research took part in two surveys. In the first survey, they identified top drivers of change likely to influence transportation supply and demand in the next 20 – 30 years. In the second survey, they commented on the expected effects of these factors in metropolitan areas in the United States. The Study team

consolidated and scored responses; the drivers experts thought most significant were:

- Road pricing, including congestion pricing and VMT taxes
- Demographic changes, including the aging population
- Urbanization
- Autonomous and connected vehicles
- Regulations intended to reduce or mitigate climate change
- Changes in transportation infrastructure finance, including public-private partnerships
- Natural resource constraints

The experts unanimously thought population in metropolitan areas will continue to grow and that federal funding for transportation will continue to decrease. There was less consensus about whether there will be a ubiquitous system of road pricing in 20-30 years, but 2/3 of the experts thought it more likely than not.

The Study team used some of these drivers of change—specifically demographics and land use—to help develop scenarios. Other drivers were used later in the evaluation process to develop transportation investment packages.

Assumptions for Demographic and Land Use Growth

The Study Team used adopted land use plans, concept plans for new urban areas, and urban reserve estimates as the basis for estimating the supply of buildable land in the region. The development of the mixed-use, residential,

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and employment areas in these plans varied with the different demand for jobs and housing in the two scenarios.

The forecasting for job and housing growth build from the forecasts available at the regional level, adjusted for the longer horizon of this study. Metro is required by statute to develop 20-year regional population and employment forecasts for use in assessing the residential and employment needs and coordinating growth management.

Metro produces a range forecast with high, low and middle points that reflect the uncertainty of the future. These forecasts are peer-reviewed and used throughout the region. In this Study, Scenario 1 used the middle range of the 20-year forecast continued out to the year 2055 as the control total because it reflects the most recent growth trends; Scenario 2 used the high end of the forecast continued out to the year 2055 as the control total because of the ambitious economic growth selected for that scenario. The range in employment forecasts is higher than for household forecasts because of the greater variability and difficulty in forecasting job growth. Metro's forecast do not extend as far as this Study's horizon year; this Study simply extends the trajectory of Metro's forecast to get to horizon-year estimates.

To allocate forecast for jobs and housing and allocate them to specific locations, the Study used Metroscope, which is an integrated transportation/land use model developed by Metro. Metroscope covers the 4-County region, including Clark County, and was chosen as the tool for this project because of the desire to show regional growth, not just growth in Washington County. Metroscope determines the demand for housing and employment by type of home and job, based on the forecast for household income and other socioeconomic factors. The model then finds locations for

jobs and housing based on land supply and prices. Project consultants at ECONorthwest developed the scenario descriptions, made the changes to the model input data based on the selected drivers, and ran the two scenarios. The output from the model includes the number of jobs by type of employment, the number of households by age of the head of householder, income, and household size, and the percent of housing units that are single family homes in each Transportation Analysis Zone (a unit of geography similar to a Census Block Group or Tract, but which can vary greatly in size). Those outputs are, in turn, input to the regional travel demand model that tests the transportation investment packages

The Study team made several modifications to the land use assumptions in the Metro baseline model, including:

- Buildable land is from the most recent regional analysis by Metro, with adjustments to reflect updates from local governments in Washington County.
- All of the urban reserves become available for development during the study period. The Metro baseline prepared allocations to 2040, when only a small amount of the reserves were expected to be available.
- The supply of multi-family housing and mixed-uses created through redevelopment in Washington County's centers was increased, to reflect the longer-term compared to the horizon year for the Metro baseline.
- The model's factor for relative attractiveness for development was increased in some areas to reflect the characteristics of newly planned urban neighborhoods and other areas anticipated to undergo redevelopment. Metro calculated the factor based a formula that includes home sales price. Given that very few homes are sold in the

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new urban areas and urban reserves, the factor does not accurately describe the future character of those areas.

These scenario development parameters also include explicit and implicit assumptions about demographic, political, economic, technological, and environmental trends.

The scenarios are consistent with local plans, which reflect the Metro 2040 vision for the region. With increased population and employment growth, town center and corridor areas develop to higher densities than today due to redevelopment. Rural areas outside of the Urban Growth Boundary and Urban Reserves maintain their rural character. Existing single family neighborhoods with single family zoning remain that way in both scenarios.

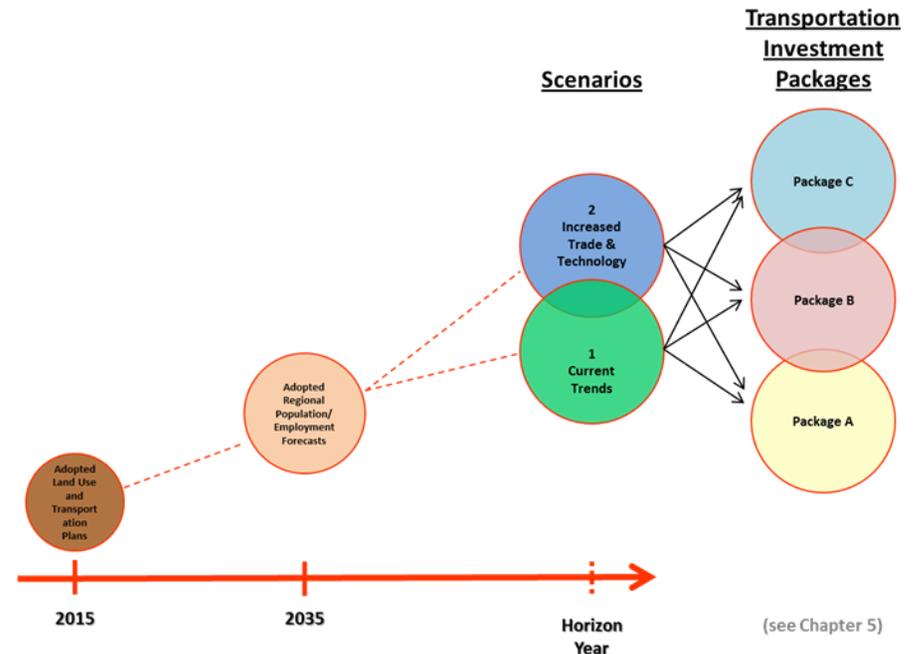
Scenario Development Process

Figure 1 illustrates how the Study scenarios were developed. Members of the Study team started with Metro’s adopted regional forecast (indicated in orange) and adjusted its planning horizon year and “drivers” to create Scenario 1 (“S1” [green]). Scenario 2 (“S2” [blue]) started with Scenario 1 (and has many drivers in common with Scenario 1), but it changes some assumptions to create an alternative for growth future.

Both scenarios assumed increases in residential capacity in Columbia, Marion, Yamhill and Clark Counties, consistent with the assumptions in the regional forecasts.

Figure 1: Overview of the Study Scenarios

Relationship between adopted plans, scenarios, and transportation investment packages



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4. Scenario Results and Findings

The two scenarios, in summary:

- Scenario 1, Current Trends. A continuation of observed growth patterns. Many of the drivers identified by the outreach process as most likely to occur, such as an aging population and increased in-migration, are already reflected in the Regional Forecast.
- Scenario 2, Increased Trade and Technology. Reflecting the changing drivers identified by national experts and local input, this scenario assumes that the emergence of the global middle class and increased reliance on technology will result in increased growth for the high-tech manufacturing jobs clustered in Washington County, as well as the region as a whole. There will also be additional transportation and warehousing employment, as goods produced locally are shipped around the world. In this scenario, the increased job growth would be accompanied by higher in-migration rates. Since people will be able to purchase so many goods online with the increase in technology, the share of retail jobs in the future decreases. This scenario adjusts the share of certain employment types to reflect an increase in the trade and technology sectors and adjusts the related income increases associated with these jobs.

The remainder of this section describes the points of agreement and divergence between the two definitions.

Based on findings from the Study team's work on drivers, both scenarios assume the Portland region and Washington County will have an aging population, increased percentage of in-migration (compared to natural population growth), decreased household size and lower number of

automobiles per household over time. Both scenarios are consistent with community plans that reflect housing and transportation preferences that place relatively high value on complete and compact neighborhoods with a mix of housing types and destinations, and walkable environments.

The model results produced jobs and household growth in all counties in the region under both scenarios. The model shows favorable conditions for high levels of new growth or redevelopment in the urban reserves, centers, corridors, and employment areas in Washington County. Although based on the same land use plans as Scenario 1, Scenario 2 shows higher density for both jobs and housing, and increased redevelopment, as illustrated in Figures 2 and 3.

Figure 2 shows the number of households by county for the four largest counties in the region. The county totals came directly from MetroScope output. Prior to being used as an input to the travel demand model, some adjustments were made to these numbers by project team members and local jurisdictional staff. The model results show that the number of households in the region increase by 46% between 2010 and 2055 in Scenario 1, and by 62% in Scenario 2. Because Multnomah County is the most populous in the region and has the most zoned capacity for multi-family development, it has the largest number of households in both scenarios. Washington County has the second most households, followed by Clackamas and Clark County. Figure 3 shows the number of employees by county for the same four counties. The model results show an increase in jobs in the region by 51% between 2010 and 2055 in Scenario 1, and by 59% in Scenario 2. Although not shown on this chart, the model results also show favorable conditions for growth in satellite cities, especially as the single-family housing stock is consumed quickly in the Metro region.

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Under Scenario 1, Current Trends, the Portland region will grow by 45 percent between 2015 and 2055, adding over one million new people. During that same period, Washington County will grow to a population of 770,000 by 2055 from its current population of 554,000. This is like adding the current populations of Hillsboro, Beaverton, and Tigard to the county over this time period. The urban reserve areas in Washington County available for development over the next 40-50 years is approximately the current size of Tigard. Therefore, the urban areas of Washington County in 2055 will be more densely populated, approximately 5,500 people per square mile under Scenario 1 compared to 4,150 today.

Under Scenario 1, the proportion of multifamily housing in the county would be 31% compared to 30% multifamily today. The share of multifamily would increase in Scenario 2 for a total of 34%. Multifamily housing is primarily located in downtowns, centers, and along corridors while single family is located in the new urban areas.

In Scenario 1, the number of jobs in the county would increase from 234,000 today to about 475,000 in 2055, doubling the county's current employment. The county's concentrated employment areas are expected to

increase most dramatically in Hillsboro, along the Highway 217 corridor, and south of Tualatin-Sherwood Road in the South County industrial areas of Tualatin, Sherwood and Wilsonville.

Satellite cities outside of Washington County, including communities in Columbia, Yamhill and Marion counties, will also grow, and the Study team anticipates an increase in people commuting from these areas to jobs within the County and the Metro area.

In Scenario 2 ("Increased Trade and Technology"), the County will grow by an additional 76,000 people, which is like adding the populations of today's Tualatin, Sherwood, and Wilsonville compared to Scenario 1. Therefore, Scenario 2 is more intensively developed in areas with planned growth compared to Scenario 1; approximately 6,000 people per square mile under Scenario 2 in the urban area compared to 5,500 under Scenario 1. Multifamily housing, located in centers, corridors and downtowns is expected to increase to 34% of new residential construction in Scenario 2. More growth in outlying "satellite" communities including some outside Washington County is also anticipated in Scenario 2, compared to Scenario 1.

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Figure 2: Total Households by County

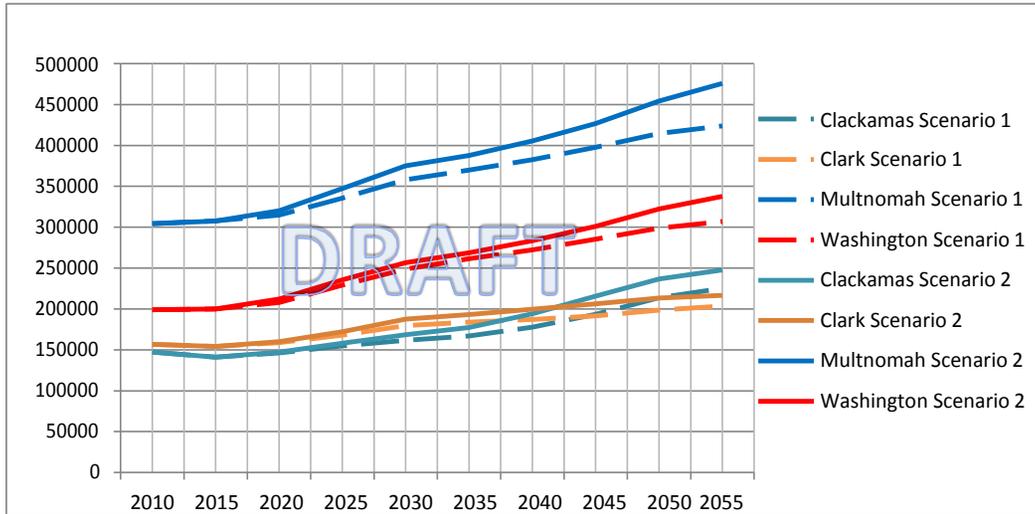
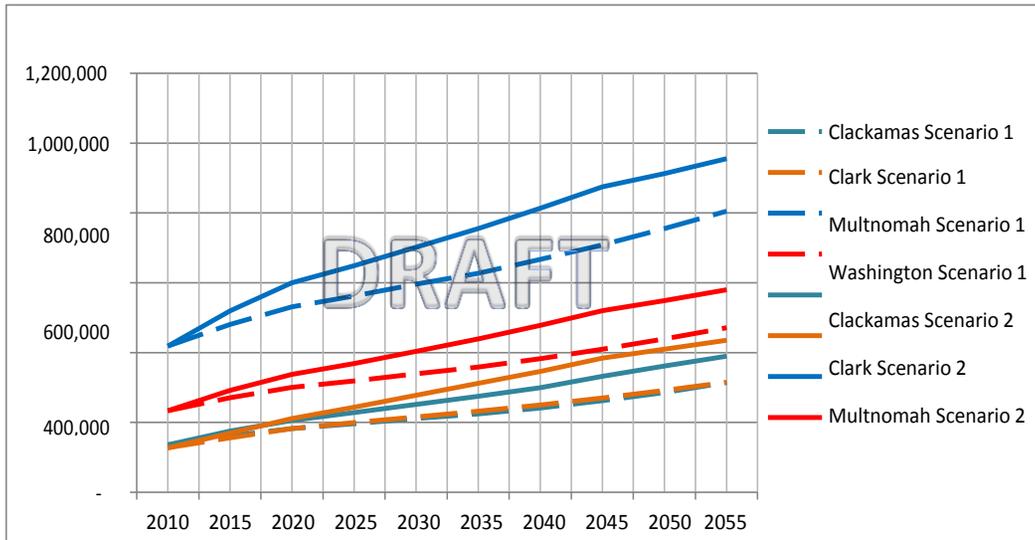


Figure 3: Total Employees by County



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Compared to Scenario 1, Scenario 2 will create 97,000 more jobs for a total of 572,000.

How Will We Live and Travel in the Future?

The modeled household and employment growth translates directly into transportation system needs within Washington County. Population and employment growth under Scenario 2 will result in significantly more trips that need to be served by the transportation system. Trips that originate and stay within Washington County are projected to be nearly double what they were in 2010. As the centers and corridors develop with higher densities, there will be increased accessibility to destinations which may result in shorter trips and more non-motorized trips in the future

With all this growth in demand for travel it is anticipated that a person traveling on an average weekday in the future will experience more congested roadway miles and the duration of congestion will be substantially longer. However, in response to a number of factors, such as smaller households, aging population and increased urbanization, people may shift to non-auto modes, including biking or walking to work, using light rail in conjunction with “first and last mile” solutions such as ride, bike or car share and shuttle services.