Chapter 3: Performance Measurement

Introduction

Performance monitoring and reporting is the regular measurement, analysis, and reporting of the results of projects, programs, and policies. It is an integral part of the City of Redmond's approach to delivering the Transportation Master Plan (TMP), and offers several benefits for the City and stakeholders:

- Direction: Performance measurement reveals whether City activities are achieving the strategies and citywide principles set forth in the TMP. If they are not, the process gives decision makers the information they need to change course.
- Accountability: Citizens can judge how well the City of Redmond is delivering public services and whether those services are creating value for the public. Additionally, the City can use performance measurement data to improve efficiency within departments.
- Motivation: Seeing progress toward goals can energize staff, decision makers, and the public.
- Communication: The results of a performance measurement system can form the basis of a discussion among community stakeholders, and elected officials about the progress toward achieving the vision of the City of Redmond.
- Funding: MAP-21, the federal transportation bill passed in 2012, will require performance monitoring and reporting as a condition for federal grants, and requires state and regional funding agencies to begin using performance monitoring as part of their funding allocation and grants processes.

During the development of the TMP, the City of Redmond identified nine performance measures that, together, demonstrate whether implementation of the TMP is achieving the strategies and citywide general principles laid out in Chapter 1. These are referred to as the "dashboard" measures:

- Connectivity
- Network Completion
- Mode Share
- Vehicular Congestion
- Transit Ridership
- Concurrency
- Safety
- Air and Water Quality
- Street Preservation

These nine measures are central to the evaluation of the progress of the TMP, and will be highlighted in the City's regular transportation performance measurement report, the Mobility Report Card. The Mobility Report Card is an annual summary of the progress made by the City toward the goals laid out in the TMP, and has been published annually from 2007 through 2011. In future years, the Mobility Report Card will evolve into a continuously updated online resource, where data will be published as they become available.

For each measure in this chapter, the TMP identifies the current or "baseline" condition, a target for the year 2030 when the Transportation Facilities Plan will be complete, and an aspirational target. Aspirational targets are the City's performance goals for the years beyond 2030. They represent outcomes that the City eventually wants to achieve, but which are not expected to result from the level of investment proposed in the 2013-2030 Transportation Facilities Plan (TFP). The rationale for each aspirational target is described in each measure's subsection, below.

In addition to the measures listed above, the City of Redmond collects data on several additional measures for the purpose of assisting staff and elected officials with more detailed decision making. These measures are listed in Appendix B: Supplementary Performance Measures, and will be included in the Mobility Report Card as they are generated.

Dashboard Measures

Connectivity

The main purpose of the transportation system is to facilitate access: the ability of people to reach goods, services, and activities. Access can be improved in several ways, from decreasing travel times to locating complementary land uses close together. Another way to improve access is to increase the number of connections in the transportation network, which shortens the distances between origins and destinations. This concept is known as connectivity. Connectivity is important for all modes, but is particularly supportive to pedestrian and bicycle travel, which are more sensitive to travel distance than vehicular trips.

Connectivity in Redmond today varies widely by neighborhood. In the Downtown urban center, where blocks are short and there are many through streets, connectivity is high. Connectivity is lower in the residential neighborhoods, which were originally designed to limit through traffic and subsequently have fewer connecting streets and paths.

Connectivity is a significant measure for the TMP key strategies Travel Choices and Mobility and Strong Support for Urban Centers.

Methodology

Connectivity is expressed as the percentages of the Downtown urban center and Overlake Village, by developed square footage, that achieve connectivity levels of "medium" or higher. The Downtown urban center and Overlake Village are reported because of the City's goal of developing a fine-grained network of streets in those areas. New connections within Redmond's residential neighborhoods are important, and several such projects are included in the Transportation Facilities Plan. These projects improve connectivity locally, but have a limited impact on area-wide connectivity, and will be evaluated on an individual basis rather than as part of this dashboard measure.

Connectivity is calculated by finding the average route directness value for each parcel, and then determining the percentage of developed floor area within Downtown and Overlake Village that falls within parcels that have a connectivity level of medium or above. In other words, it tells us the percentage of our land use that is in areas of high connectivity. Average pedestrian route directness is the ratio of straight-line distances to real-world travel distances for sets of points along the pedestrian network, and it indicates how far pedestrians must go out of their way to reach surrounding destinations. Low values indicate a relatively high amount of out-of-direction travel, while high values indicate more direct travel.

Connectivity Level	Average Pedestrian Route Directness
Very High	0.75 – 1.00
High	0.70 – 0.75
Medium	0.65 – 0.70
Low	0.60 – 0.65
Very Low	0.00 – 0.60

Figure 1. Connectivity categories.

Targets

Targets are based on the connectivity outcomes of projects in the TFP and the long-term Buildout Plan. The 2030 target includes projects and programs named in the TFP, as well as planned private connections identified in development agreements. All other connections, including planned private connections that are not yet subject to a development agreement (such as many of the new roads west of 152nd Avenue NE in Overlake Village) are included in the aspirational target.

<u>2013 Baseline</u>

Downtown: 73% with connectivity level "medium" or higher

Overlake Village: 13%

2030 Target

Downtown: 81%

Overlake Village: 31%

Aspirational Target

Downtown: 82%

Overlake Village: 74%

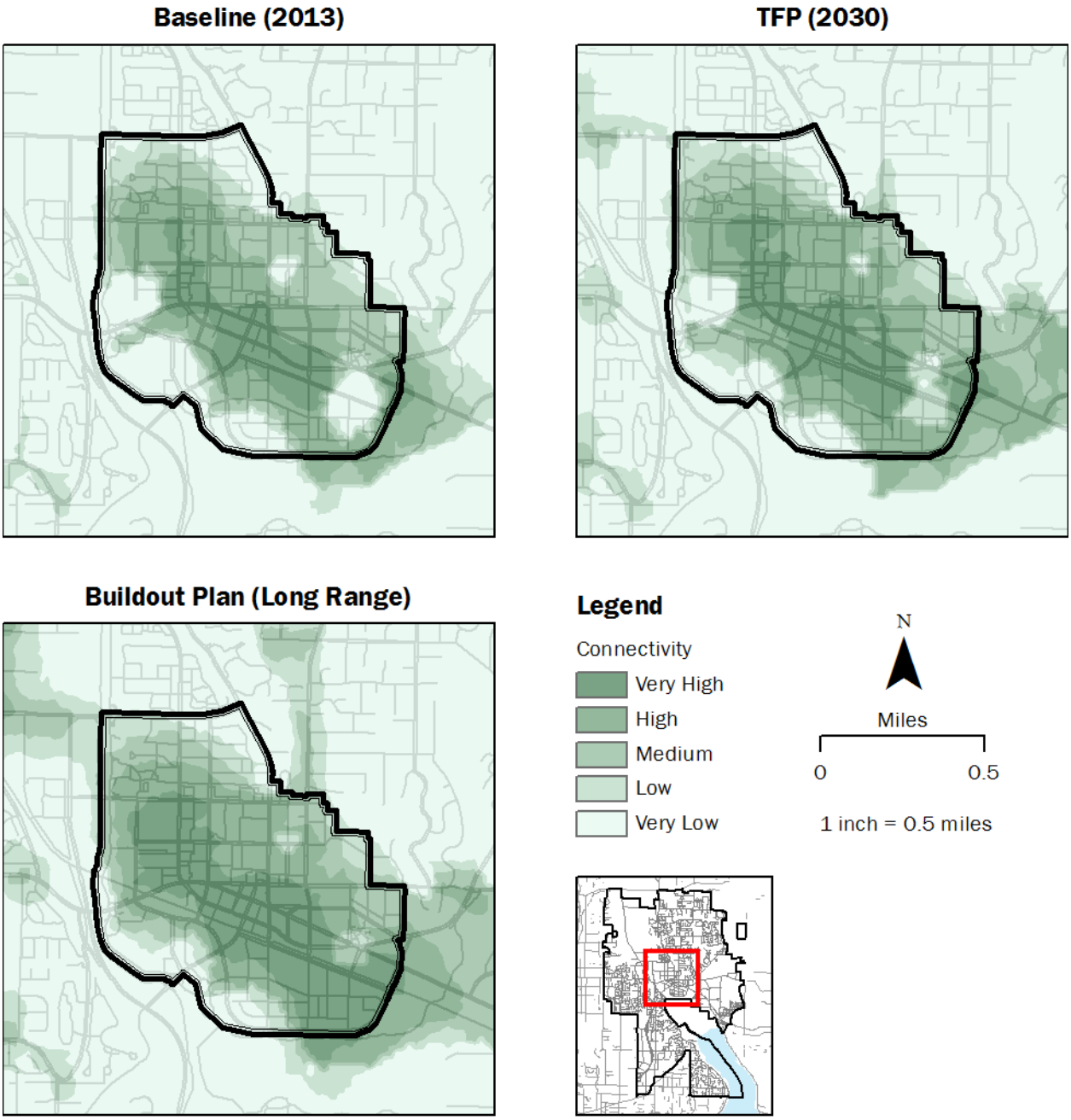

Figure 2. Connectivity levels in Downtown.

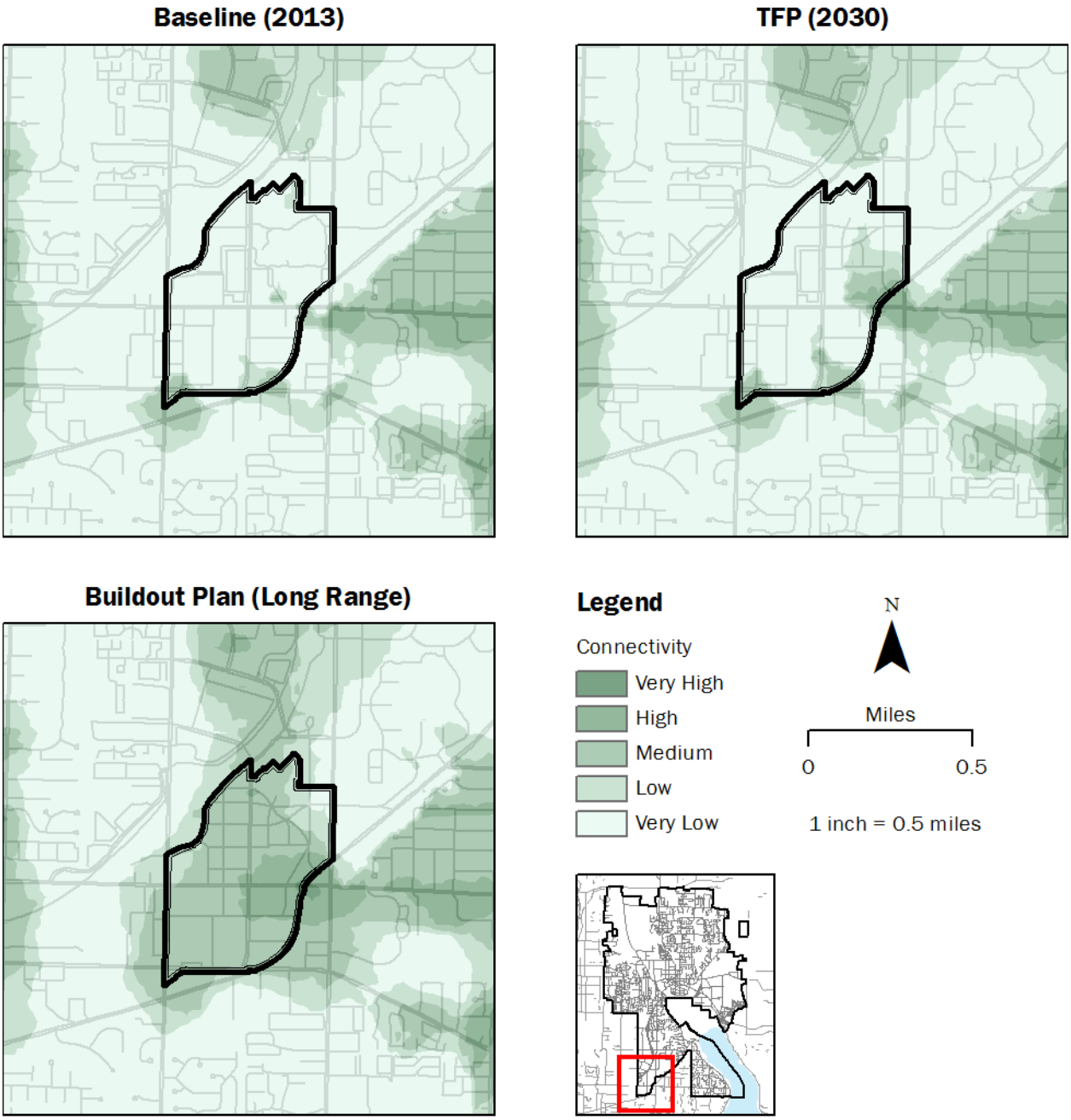

Figure 3. Connectivity levels in Overlake Village.

Network Completion

The TMP identifies five modal corridor networks: automobile, bicycle, pedestrian, transit, and truck. The corridors are intended to highlight modally specific routes that connect major local and regional destinations. The corridors also help the City allocate limited street space, and in some cases they establish design standards and service levels to ensure adequate mobility for all modes. For more information about modal corridors, including maps, see Chapter 4 - The Multimodal Transportation System.

Progress toward the completion of these networks is an indication that the City is successfully delivering the TFP and implementing the policies contained in the TMP. The network completion measures support the Strong Support for Urban Centers, Travel Choices and Mobility, and Neighborhood Access strategies. It also indicates progress toward implementing the City's Complete Streets policy, which requires that projects accommodate the full range of transportation users.

Methodology

Network completion is expressed as the percent of each modal corridor that is considered complete, by length. The definitions of completion vary by modal network. The City will explore expanding this measure to all city streets as part of the Mobility Report Card, in order to better measure progress on implementing Redmond's Complete Streets ordinance.

Automobile

Segments of the automobile network are considered "complete" if they are in their final configuration, and do not have a reconfiguration project identified for them in the TFP or the Buildout Plan, which is the City's long-term list of planned transportation improvements. Intersection improvements are assumed to influence the portions of connecting streets within 300 feet of the center of the intersection.

Bicycle

Segments of the bicycle modal corridor network are considered "complete" if they are served by a trail or another type of physically separated bikeway, such as a cycle track. Bicycle lanes are not considered physically separated bikeways. This reflects the standard set forth in bicycle section of Chapter 4 - Multimodal Transportation.

Pedestrian

Pedestrian network completion is reported as 1) the percent of connections within Redmond's pedestrian priority zones (Downtown and Overlake urban centers, together with the area within one-half mile of a light rail station areas) that achieve a high level of pedestrian-oriented design, including increased width and landscaping; and 2) the percent of the transportation network in Redmond's neighborhoods that has some pedestrian facility present.

Transit

Segments of the transit network are considered complete if they carry transit service that meets the City's standards for that corridor. On "high frequency" corridors, that standard is 15-minute headways (the time between vehicles) between 7 a.m. and 6 p.m. On "regular" corridors, that standard is 30-minute headways during the same period.

Truck

The method for calculating truck network completion is the same as the automobile network.

The Network Completion measure is produced by the City of Redmond Department of Planning and Community Development. It will be calculated and reported annually.

Targets

Baseline (2013)

Automobile: 60% complete

Bicycle: 37%

Pedestrian: 23% for pedestrian priority zones, 75% for neighborhoods (see Chapter 8 - Three-Year Action Plan)

Transit: 81%

Truck: 65%

2030 Target

Automobile: 68%

Bicycle: 51%

Pedestrian: 53% for pedestrian zones, 79% for neighborhoods (see Chapter 8 - Three-Year Action Plan)

Transit: 100%

Truck: 76%

Aspirational Target

Automobile: 100%

Bicycle: 100%

Pedestrian: 100%

Transit: 100%

Truck: 100%

Vehicular Congestion

Congestion is a familiar frustration for almost everyone who drives or takes transit. Congestion is the result of a mismatch between demand for space on a street and the street's capacity. Unfortunately there is no easy fix for congestion. Large-scale road widening projects are extremely expensive, only temporarily effective, and out-of-sync with Redmond's land use vision. An expanded system of variable tolling could result in long-term congestion reductions, but would require coordinated effort at the regional level or beyond and currently is politically unviable. For the foreseeable future, congestion will remain a fact of life in growing communities like the City of Redmond. Nevertheless, the City does track congestion levels. Growth of congestion beyond expected levels suggests additional investments in non-single occupancy vehicle travel choices, expanded efforts to reduce demand, and potentially, projects to increase roadway capacity.

Congestion is a key measure for the Freight Mobility and Strong Support for Urban Centers strategies.

Methodology

Vehicular congestion is expressed as the average delay (in minutes) incurred during a one-mile trip on principal, minor, and collector arterials in Redmond during the p.m. peak (5 p.m.-6 p.m.). "Delay" is defined as the mid-block travel time for the average trip taken at a typical urban travel speed (see below) minus the mid-block travel time of the average trip as estimated by the City's travel demand forecast model. This includes trips on uncongested streets and in non-peak directions, so the citywide average is lower than the delays that travelers would experience along the city's most congested segments of roadway. Because of technical limitations, the model does not include delay from traffic signals or delays related to collisions, construction, weather, and other periodic phenomena.

Also reported for context is the average travel time (in minutes) for peak period, peak-direction travel on principal arterials in Redmond, which reflects the most severe congestion conditions in the city.

The data is generated by the City's travel demand forecast model, and will be reported once every three years.

Targets

Both the 2030 and long-term aspirational targets acknowledge that delay for roadways users will continue to grow as long as the number of jobs and housing units increases in Redmond. Individually, travelers can avoid peak period congestion-related delay by choosing travel modes that are not subject to congestion like biking, walking, or transit that operates in its own lane; shifting the timing of trips; and by reducing unnecessary trips during peak periods. Data for Bellevue and Kirkland are provided for context.

The 2030 target is the result of travel demand forecast model projections for 2030, which take into account land use changes, the transportation improvements included in the TFP, and changes in mode share and trip length. The aspirational target reflects the City's anticipation that a combination of policies and programs that affect travel demand; a shift in mode share toward biking, walking, and transit; and improvements to vehicle and transportation system technology will combine to help to limit travel delay in the long term. These targets will be reevaluated as needed.

City	2010	2030	Aspirational Goal
	Average Delay per Mile	Average Delay per Mile	Average Delay per Mile
Redmond	0:24	0:46	0:46
Bellevue	0:15	0:34	-
Kirkland	0:39	1:18	-

Mode Share

Redmond's transportation system is a limited resource, constrained by its physical geometry. Today, the single occupancy vehicle (SOV) is the most common form of travel in Redmond. While drive-alone trips can be convenient, they are an inefficient way to use this limited resource, and they contribute disproportionately to congestion. The City of Redmond seeks to provide a range of transportation options so that residents, employees, and visitors are able to choose alternatives to the SOV when this makes sense and, in doing so, can prevent congestion, or avoid it when it occurs.

Mode share is a key measure for the TMP strategies Strong Support for Urban Centers and Travel Choices and Mobility. It is an indicator of how well the City and other agencies have provided attractive transportation choices for the public, and whether Redmond's urban centers are successfully accommodating the increase in

travel demand that accompanies growth. But, like transit ridership, non-SOV mode share is influenced by external factors, and the City's influence on this measure is limited.

Methodology

Mode share is defined as the percentage of daily trips made by means other than the single occupant vehicle (i.e., walking, bicycling, transit, and carpooling) among Redmond residents within the city, with breakouts for the urban centers provided for context. This is referred to as "non-SOV mode share." The data is generated by the City of Redmond Department of Planning and Community Development using a community travel survey, and is reported once every three to six years.

Targets

The baseline data is from the results of a travel survey of Redmond households and employees that the Redmond Public Works Department administered in 2010. The 2030 target is based on computerized travel modeling, which takes into account the projects in the Transportation Facilities Plan and the land use changes the City expects by 2030. The aspirational target is based on a 40-year planning horizon and assumes continued shift toward travel by non-SOV modes, though at a lower rate than the years prior to 2030. This reflects the fact that land use changes in the urban centers and the arrival of light rail will yield large, early shifts in mode share.

2010 Baseline

	Shared Ride (% of trips)	*Walk (% of trips)*	*Bicycle (% of trips)*	*Transit (% of trips)*
	33	8	1	2
Drive Alone	Non-SOV Mode Share (% of trips)			
56	44			

2030 Target

	Shared Ride (% of trips)	*Walk (% of trips)*	*Bicycle (% of trips)*	*Transit (% of trips)*
	33	13	1	6
Drive Alone	Non-SOV Mode Share (% of trips)			
47	53			

Aspirational Target

	Shared Ride (% of trips)	*Walk (% of trips)*	*Bicycle (% of trips)*	*Transit (% of trips)*
	31	15	5	7

Drive Alone	Non-SOV Mode Share (% of trips)
42	58

Transit Ridership

Increasing transit ridership has multiple benefits for the City of Redmond and the region, and is a critical component of the City's growth strategy, which directs most additional housing and employment to the Downtown and Overlake urban centers. With proper design and service standards, transit systems can move large numbers of people quickly and comfortably.

In the context of the TMP, transit ridership is an indicator of how well the City is building the market for light rail, which is currently scheduled to reach the Overlake Transit Center in 2023. A trend of increasing transit ridership can demonstrate the success of transit access improvements, direct service purchases by the City, and education and encouragement efforts by the City and its partners. It also helps the City monitor transit demand in light of changes in service levels and system capacity.

Methodology

Transit ridership is defined as average weekday boardings for all transit stops within the Redmond city limits. Today this includes boardings on Metro and Sound Transit buses. Light rail will be included once service begins. Vanpools, carpools, and other forms of paratransit are not included. Peak period and weekend ridership figures will be provided for context in future performance monitoring reports.

Data is provided by King County Metro transit. The data includes passenger count figures for the spring service period in the given year, which runs from mid-February through early June. It will be reported annually.

Targets

Transit ridership targets are derived from the non-SOV mode share measure above. The target for 2030 is based on the arrival of light rail and expected land use changes; the aspirational target is based on continued, but slowed rates of transit ridership to 2050.

2012 Baseline

9,200 boardings per day

2030 Target

26,700

Aspirational Target

31,000

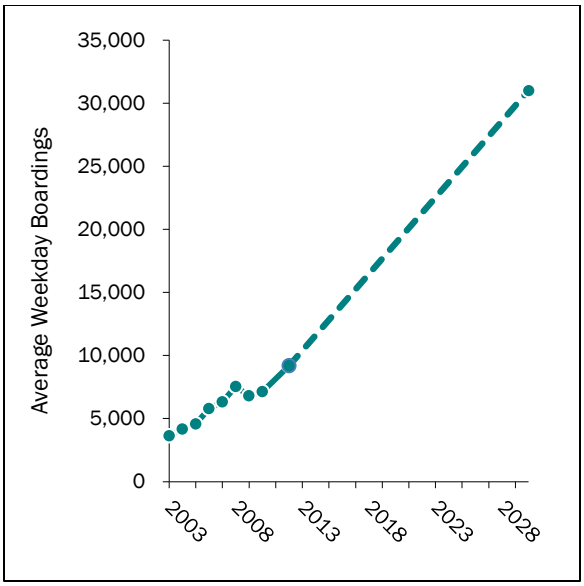

Figure 4. Transit Ridership, 2005–2030 (projected).

Concurrency

Concurrency is an indicator of whether the City is delivering TFP projects at a pace commensurate with growth, and is a key measure for the Improve Travel Choices and Mobility strategy. It is also a requirement of Washington State law, which mandates that local jurisdictions ensure that the travel demand created by development does not overwhelm transportation systems.

The state gives local jurisdictions considerable leeway in defining level of service standards for their communities. In 2009, after several years of development, the City of Redmond implemented its current "plan-based" concurrency system, which tracks the state of the transportation system using the concept of "mobility units." Mobility units establish a common unit of comparison between transportation demand (defined as person-miles of travel) and transportation supply (projects and programs that provide transportation capacity). As the City commits to funding projects and programs in the TFP, mobility units of supply are generated. When developers apply for building permits, they create mobility units of demand. Redmond remains "in concurrency" as long as the mobility units of supply equal or exceed the mobility units of demand. If supply falls below demand, then permit applicants must undertake mitigation or delay their projects. For a more detailed explanation of plan-based concurrency and mobility units, see Appendix C: Concurrency Management and LOS or http://www.redmond.gov/PlansProjects/Transportation/concurrency/.

In addition to its role as a dashboard measure, concurrency indicates progress toward implementing the City's Complete Streets policy, since it measures delivery of the TFP projects and programs.

Methodology

Concurrency is expressed as the ratio between mobility units of supply and mobility units of demand, with the total number of mobility units of supply that are available for new development supplied for context. A ratio exceeding 1.0 indicates a positive balance of mobility units, and additional development activity is permissible. A ratio of 1.0 or below indicates that no more development is permissible without mitigation by the developer or until further transportation projects are committed. The number of available mobility units of supply was

approximately 8,600 at the beginning of 2013. This is enough to accommodate significant development. For example, phase one of the Group Health Overlake Master Plan incurred 3,500 mobility units of demand with a 180-room hotel and conference center, two 4- to 10-story office buildings, and 25,000 square feet of retail space.

Concurrency is tracked on an ongoing basis by the City of Redmond Department of Planning and Community Development. It is reported annually.

Targets

Under plan-based concurrency, the programs and projects in the 2030 TFP by definition provide a number of mobility units of supply equal to the mobility units of demand incurred by the development projected to occur by 2030. Therefore, if the projected amount of development occurs and the City delivers the TFP in its entirety, supply and demand will be balanced and the concurrency ratio will be 1.0 in 2030. This is the basis of the 2030 target. However, the City has an ongoing goal of maintaining a concurrency ratio above 1.05, which limits the risk that the City will need to delay or condition development projects. This is practical, assuming periodic updates of the TMP and continuous delivery of TFP projects.

Baseline (2013)

1.2 ratio of mobility units of supply to mobility units of demand, 8,631 units available for development

2030 Target

1.0

Aspirational Target

1.05 or higher

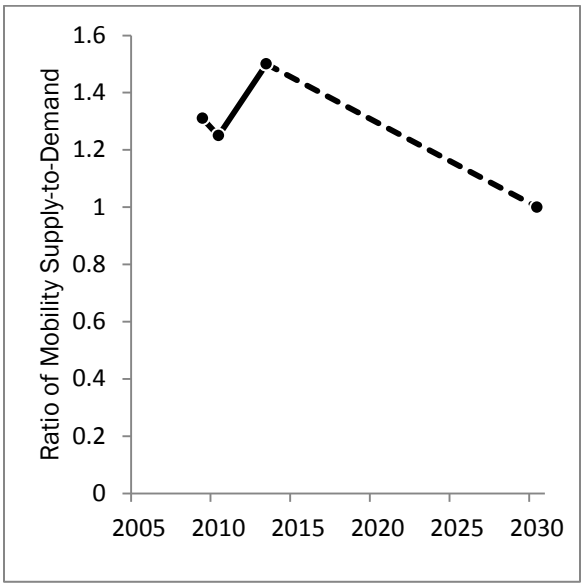

Figure 5. Ratio of mobility units of supply to mobility units of demand, 2009-2030.

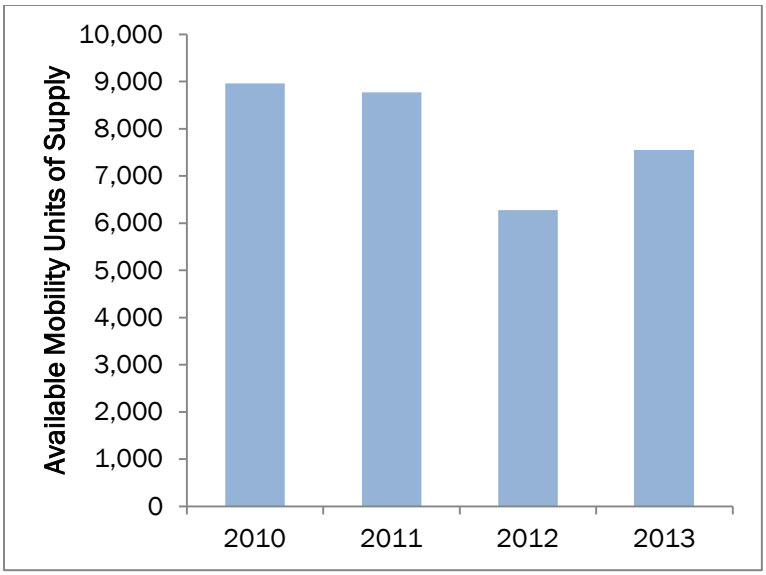

Figure 6. Available mobility units of supply as of 1/1/13.

Safety

Ensuring the safety of travel in Redmond is a fundamental goal for the City as it builds and maintains the transportation system. Traffic-related injuries and deaths have a variety of causes, not all of which can be addressed by local government. The City can help create a transportation environment where the safest choices are the easiest choices, such as providing sidewalks and crossing facilities where they are needed, installing traffic calming treatments on streets with speeding problems, and reconfiguring streets and intersections with known safety issues. Safety trend data from this measure will be used to determine whether the City of Redmond is maintaining its strong safety record.

Methodology

Safety is expressed as the per capita traffic-related injury and fatality rate for Redmond. Redmond's daytime population—rather than residential population—is used to calculate the per capita rates, which controls for the influence of commuting. The injury rate is calculated by the City of Redmond Department of Planning and Community Development using collision data from WSDOT and the U.S. Census, and is reported annually.

Targets

The City of Redmond's goal is to continue its trend of decreasing per capita injury rates and reaching 1.3 injuries per 1,000 daytime population by 2030. The aspirational goal is to maintain that low level while eliminating fatalities and serious injuries, a goal which corresponds to the Washington State Department of Transportation's "Target Zero" campaign. This is an aggressive goal. To succeed will require action by several actors, including the City of Redmond, state and regional transportation agencies, auto manufacturers, enforcement agencies, and all transportation system users. Its success will also depend on the impact of increasing numbers of jobs and residents in Redmond.

2010 Baseline

3.2 injuries per 1,000 persons

2030 Target

No more than 1.3 injuries per 1,000 persons

Aspirational Target

No more than 1.3 injuries per 1,000 persons, eliminate fatalities and serious injuries

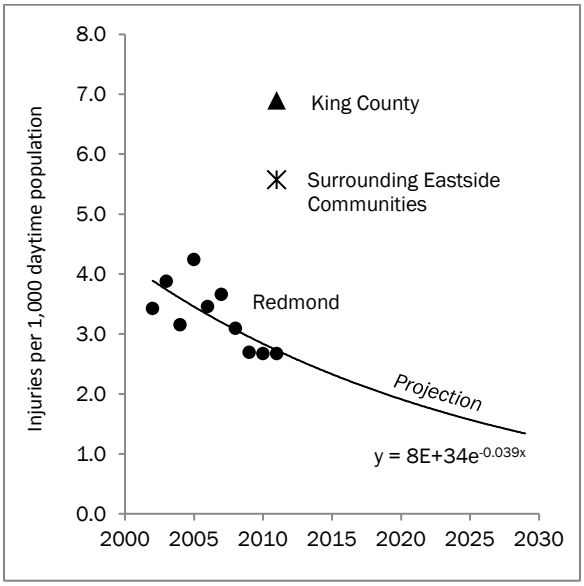

Figure 7. Traffic-related injuries per 1,000 daytime population.

Environment

Redmond residents have repeatedly emphasized the importance of maintaining Redmond's clean, green character. The City has responded by recognizing the environment as a community priority and including it as a criterion in budgeting decisions. The TMP responds to this value by improving access to environmentally friendly travel choices, and through individual project design. The following measures, which focus on air quality and water quality, provide insight into whether the transportation system in and around Redmond is doing its part for the environment.

Methodology

Air quality is expressed as the number of incidents in which the annual average concentration of particulate matter with a diameter smaller than 2.5 microns (PM 2.5) exceeds the primary federal standard for PM (currently 12 $\mu g/m^3$) as measured by the closest public air quality monitoring station (currently the Puget Sound Clean Air Agency station at NE 4th Street in Bellevue). Results are reported annually.

Water quality is expressed as the percentage of right-of-way within Redmond city limits, by area, that is subject to basic water quality treatment. Basic water quality treatment includes facilities such as bioswales and other

natural drainage features that slow the delivery of runoff to local waterways and reduce its pollutant load. Currently not all of Redmond's right-of-way has basic water quality treatment; the long-term goal is to reach 100 percent coverage. Data is provided by the City of Redmond Department of Public Works. Results are reported annually.

Targets:

Air quality: Redmond and the region are in "attainment" for PM 2.5 under the federal Clean Air Act as long as average annual concentrations remain below the federal standard, which is currently 12 $\mu g/m^3$. PM 2.5 concentrations are influenced by several factors including vehicle miles traveled (VMT), vehicle emissions technology, and fuel mix, so decisions made at the local level have limited impact. Nevertheless, PM 2.5 is an important measure to follow since it is one of the most harmful pollutants to human health. Exceeding EPA's standard would result in increased risks to human health and would trigger a federal regulatory response. Redmond's goal for 2030 and beyond is to achieve 100 percent attainment.

Water quality: The City of Redmond Department of Public Works has established a goal to provide basic water quality treatment to 100 percent of City right-of-way that does not yet have it by 2112. The 2030 and aspirational targets here are derived from that goal, with the assumption that Redmond's rights-of-way will receive basic treatment at a rate proportional to the rest of the city.

<u>Baseline (2013)</u>

Air quality: Attainment

Water quality: 22% of right-of-way subject to basic treatment

<u>2030 Target</u>

Air quality: Attainment

Water quality: 36%

<u>Aspirational Target</u>

Air quality: Attainment

Water quality: 100%

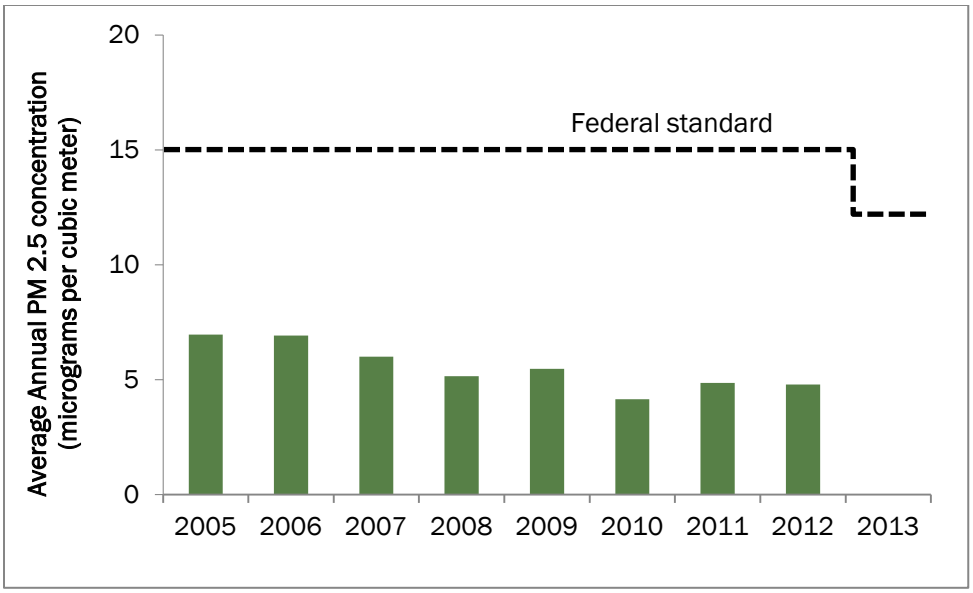

Figure 7. PM 2.5 concentrations, 2005-2012.

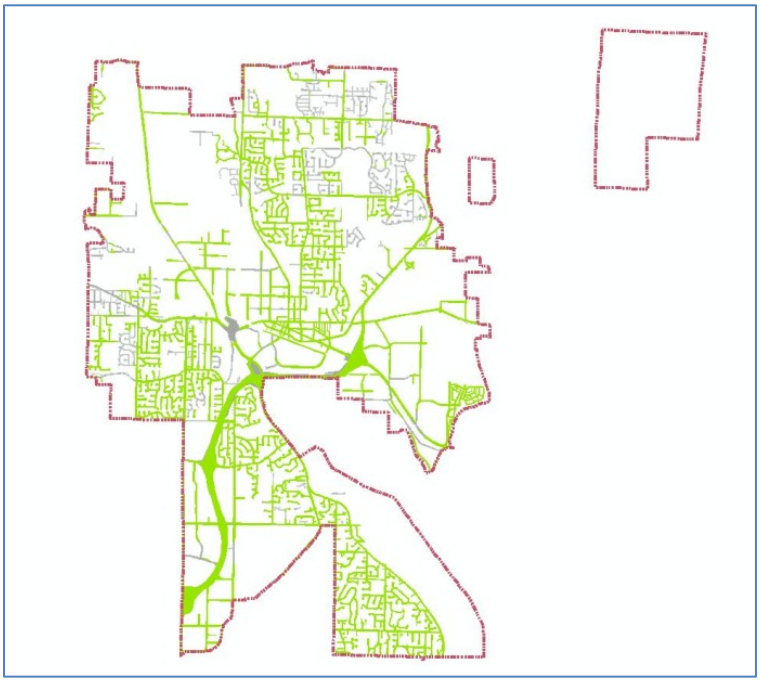

Figure 8. Road area without runoff treatment facilities, 2013.

Street Preservation

The transportation system requires constant maintenance to function effectively. The City conducts a wide range of activities to preserve the physical and information technology components of this system, the most

costly of which is the preservation of roadway pavement. As noted in Chapter 2 – Trends and Conditions, deferred pavement maintenance can lead to far more costly repairs once road surfaces become degraded.

Adequate pavement condition is essential to the proper functioning of the roadway network for private travel and for freight operations, which is why it is a key measure for the Improve Travel Choices and Mobility and Enhance Freight Mobility strategies.

Methodology

Street preservation is expressed as the average Pavement Condition Index (PCI) for arterial lane mileage within the Redmond city limits. PCI is a standardized 0 – 100 scale that indicates the overall condition of a given section of pavement. Pavements scoring a PCI value of 70 or above are considered to be in adequate condition. PCI can be applied to sidewalks as well, but the City does not yet have that data collected. The measure may be adjusted in the future as the City begins to collect sidewalk condition data.

Targets

The long-term goal of the City of Redmond is to maintain a citywide average pavement rating of PCI of 70 or higher. At an average PCI of 70, roadways can be maintained at minimal lifetime cost while ensuring an adequately smooth surface.

2010 Baseline

Average arterial PCI of 73

2030 Target

70

Aspirational Target

70

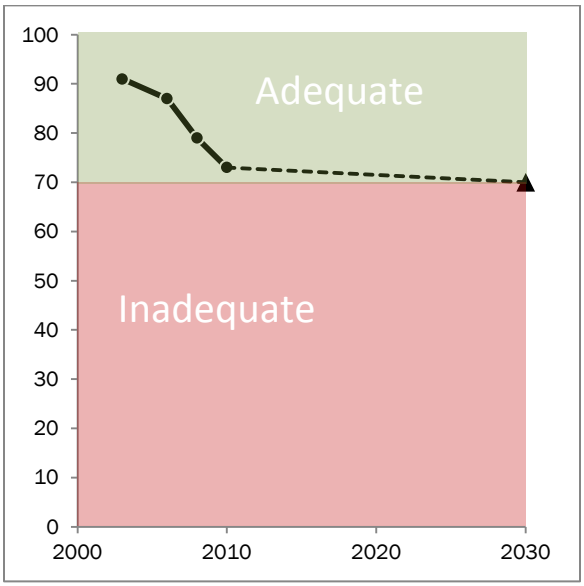

Figure 9. Average arterial pavement condition, 2003-2030 under current TFP funding proposal.

Conclusion

The performance measures listed in this chapter are a key component of the City of Redmond's delivery of the projects in the TFP and of the policies contained in the TMP document. They will give staff, elected officials, and the public insight into how well the City is achieving the TMP strategies, and will serve as an early warning system if part of the TMP implementation is not occurring at the needed pace or in the intended manner. Positive results can provide motivation to those who are involved in delivering the TMP and can help identify notable successes.