# Chapter 6: Maintenance and Operations

## Introduction

Maintenance and operations of the transportation system is about taking care of what we have and maximizing the use of the current system. A well-maintained and operated infrastructure is vital to an effective and functional transportation system. However, the needs for keeping up the transportation system in Redmond have become greater with the overall aging of the infrastructure, continued system expansion, increased travel on the system, and compliance requirements for the Americans with Disabilities Act (ADA) and environmental mandates. This chapter establishes the approach that Redmond will strengthen its efforts in maintenance and operations and describes the major needs.

## Strengthen Maintenance and Operations Efforts

Currently the Transportation Facilities Plan (TFP) does not identify funding for the full range of maintenance and operations activities. Only a few capital improvement[1] projects and certain specific programs in the TFP are targeted specifically for major maintenance (for example: seismic repair of the 148th Avenue NE Bridge and the Pavement Management Program). This represents only a portion of systematic maintenance and operations activities needed to keep up the transportation system. Day-to-day maintenance and operations, such as routine cleaning, pothole filling, and signal operations, are part of Redmond's operating budget and achieved through a blend of City staff and contracted services. Though seemingly less noticeable than capital improvements, the day-to-day maintenance and operations are essential to the City vision aspiration for "high-quality services" and a critical part of the systematic efforts by Redmond in helping people get to where they need to go in a safe and efficient manner.

These two joint resources (TFP and maintenance operating budgets) are not adequate to maintain current levels of service into the year 2030. To keep up with the increased demands as the system ages and expands, Redmond must invest significantly more into maintenance and repair between 2013 and 2030. Correspondingly, the Three-Year Action Plan provides direction to examine and assess the appropriate funding levels for maintenance and operations of the entire transportation system and the funding levels for all programs in the TFP, including those dedicated to maintenance and operations.

In addition, Redmond will incorporate maintenance considerations into the design of capital projects, and will include funding for maintenance and operations at the earliest stages of new capital project development. Determining needs and resources for maintaining and operating future transportation facilities will become an essential part of the planning and budgeting efforts for new improvements. Therefore, how to maintain and

[1] A capital improvement is a public facility expenditure costing $25,000 or more with a useful life of five or more years.

operate new transportation facilities needs to be planned into the design well before final design and construction of new facilities to the transportation system. One practice that many jurisdictions use in accounting for maintenance and operations is that a certain portion of the capital improvement budget is explicitly allotted to maintenance and operations of new facilities.

Finally, in order to accurately capture the needs in maintenance and operations, Redmond will ensure that its inventory of the transportation infrastructure is updated regularly. The comprehensive information of what the transportation infrastructure consists of, and the status of individual facilities, will help Redmond use its resources where most needed.

# Major Needs in Maintenance and Operations

## Maintenance

### Pavement

Redmond owns and maintains 143 centerline miles of pavement, including 54 miles of arterials and 89 miles of residential streets. Approximately five miles of new streets are expected to be constructed between 2013 and 2030. Other streets could be added by annexation and development in the future.

Redmond proactively preserves the City's pavement infrastructure in good condition to maintain a safe transportation system and minimize life-cycle costs of capital facilities by resurfacing streets regularly (Figure 1).

The performance target for pavement management is an average pavement condition index score above 70 of a possible 100. The current average pavement condition index score, 79, is the lowest score since 1995 when Redmond started surveying pavement conditions biannually. Declining condition scores are due to the aging of our street network, utility and construction related trenching operations, and increased vehicular traffic, especially heavy trucks and buses. All of our arterial streets will require resurfacing by 2027.

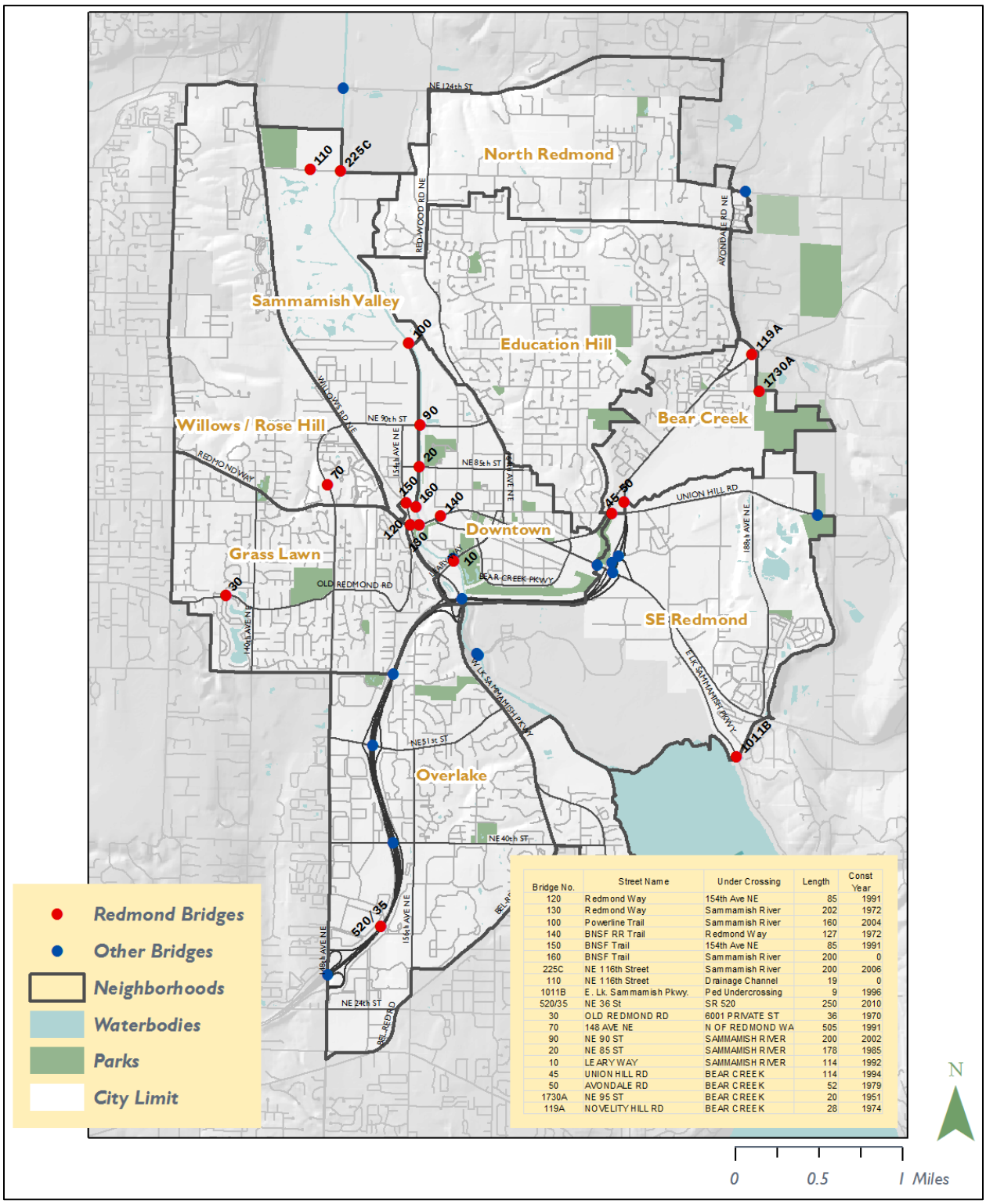
**Figure 1. An example of pavement management activities.**

In addition to resurfacing pavement, upgrading sidewalk curb ramps into compliance with the Americans with Disabilities Act (ADA) was included in all resurfacing projects starting in 2007. Although important and necessary, this requirement of upgrading curb ramps has lessened the available funds for resurfacing by about 20 percent. Also, deteriorated sidewalks, curbs, and gutters in poor condition within the overlay project area are also often replaced to achieve efficiency and cost savings. To maintain service levels above a PCI rating of 70 through the year 2030 will require a significant increase in funding.

## Bridges

Redmond owns 18 bridges. They are regularly inspected and repaired to maintain structural integrity and safety (Figure 2). The conditions of the City's bridges are maintained to meet the National Bridge Inspection Standards (NBIS) and pertinent state requirements.

Two bridges have structural deficiencies, which make them susceptible to damage caused by earthquakes. Both of these need replacement or major repairs in the next six years: the NE 95th Street Bridge over Bear Creek and the 148th Avenue NE Bridge north of Redmond Way. Both projects are included in the 2013-2030 Transportation Facilities Plan.




| Bridge No. | Street Name | Under Crossing | Length | Const Year |
|---|---|---|---|---|
| 120 | Redmond Way | 154th Ave NE | 85 | 1991 |
| 130 | Redmond Way | Sammamish River | 202 | 1972 |
| 100 | Powerline Trail | Sammamish River | 160 | 2004 |
| 140 | BNSF RR Trail | Redmond Way | 127 | 1972 |
| 150 | BNSF Trail | 154th Ave NE | 85 | 1991 |
| 160 | BNSF Trail | Sammamish River | 200 | 0 |
| 225C | NE 116th Street | Sammamish River | 200 | 2006 |
| 110 | NE 116th Street | Drainage Channel | 19 | 0 |
| 1011B | E. Lk. Sammamish Pkwy. | Ped Undercrossing | 9 | 1996 |
| 520/35 | NE 36 St | SR 520 | 250 | 2010 |
| 30 | OLD REDMOND RD | 6001 PRIVATE ST | 36 | 1970 |
| 70 | 148 AVE NE | N OF REDMOND WA | 505 | 1991 |
| 90 | NE 90 ST | SAMMAMISH RIVER | 200 | 2002 |
| 20 | NE 85 ST | SAMMAMISH RIVER | 178 | 1985 |
| 10 | LEARY WAY | SAMMAMISH RIVER | 114 | 1992 |
| 45 | UNION HILL RD | BEAR CREEK | 114 | 1994 |
| 50 | AVONDALE RD | BEAR CREEK | 52 | 1979 |
| 1730A | NE 95 ST | BEAR CREEK | 20 | 1951 |
| 119A | NOVELITY HILL RD | BEAR CREEK | 28 | 1974 |

**Figure 2. Redmond bridges.**

## Sidewalks, Curbs, and Gutters

Redmond owns 235 miles of sidewalks. Preliminary estimates show that about 4 percent (nine miles) of sidewalks are in poor condition. Maintenance activities for sidewalks should focus on those in poor condition. Two segments of sidewalks in very poor condition have been included as separate projects in the TFP:

- NE 40th Street between 164th Avenue NE and Bel-Red Road; and
- Cleveland Street between 164th and 168th Avenues NE.

Along with replacing sidewalks in poor condition, sidewalk and curb ramps that are not compliant with ADA requirements will need to be replaced. Also, new curb ramps will be added to intersections where they do not exist in compliance with Redmond's ADA transition plan. The City of Redmond owns about 4,000 ramps and approximately 70% of them significantly deviate from ADA requirements.

In addition to damaged sidewalks, concrete curbs and gutters in poor condition will also need to be replaced. There currently is no systematic program or specific funding to replace long segments of sidewalks or curbs and gutters. Most replacement and repairs are currently done on an interim basis by City crews through grinding or asphalt ramps to reduce trip hazards or through other City capital improvements, such as pavement management projects, and private development projects.

## Transit Stops

The Power and Facilities Section of King County Metro Transit maintains all Metro Transit properties and provides services such as graffiti removal, vandalism repairs, and bus stop upkeep. It also handles environmental issues as they occur and maintains the safety and overall appearance of Metro's transit facilities. Redmond coordinates with King County Metro for the maintenance needs of transit stops within the City of Redmond and works to ensure compliance with Redmond design standards and ADA accessibility standards.

## Traffic Signal and Communications Devices

Redmond currently owns 104 traffic signals. Twenty-five additional traffic signals are expected to be constructed by 2030. The signal and communications devices for these traffic signals have a useful life ranging from 5 to 30 years. The devices that need to be replaced over time include:

- Signal hardware - signal poles, mast arms, signal heads, pedestrian indications and push buttons, junction boxes, conduit, electrical wiring, and in-pavement/video vehicle detection.
- Signal control equipment - signal cabinets, electrical service cabinets, UPS (backup battery power) cabinets, and ITS (Intelligent Transportation System) cabinets, as well as electronics inside cabinets, such as signal controllers, conflict monitors, and detection systems.
- Transportation Management Center (TMC)/Communications – CCTV cameras, video display, PCs, signal and camera control software, communication systems with fiber-optic and copper cables, modems, and switches.
- Flashing Beacons/Special Equipment/Signs – includes school zone flashers, pedestrian crosswalks, illuminated speed limit signs, and overhead and pole mount signage at traffic signals.

There currently is no systematic program to replace electronic traffic signal devices. For example, the traffic signal controllers within each signal cabinet are essentially computers that need to be replaced periodically (about every 5-7 years). Equipment replacements are currently done as failures occur or more sporadically through other capital improvement projects.

### Street Lights

Redmond currently owns 1,300 street lights. An additional 1,000 street lights are expected to be constructed by 2030. In addition, Puget Sound Energy (PSE) owns 2,700 street lights in the City of Redmond. Redmond maintains City-owned street lights and pays for the maintenance of PSE-owned street lights.

### Regular Street Upkeep

Regular street upkeep is provided through continuing daily operations of the City's Maintenance Division including:

- Minor repairs of assets in the right-of-way, including pavement, sidewalks, signs, markings, pathways, curbs, and gutters;
- Regular street sweeping;
- Designated snow/ice response routes clear of snow/ice is a priority commitment during adverse weather conditions and events {insert a picture of snow plow truck};
- Landscape management in the right-of-way, including vegetation control, irrigation, and plants; and
- Inspection and repair of stormwater infrastructure, such as catch basin, underground vault, and pond.

## Operations

### Traffic Signal Operations

Intelligent Transportation Systems (ITS) improves transportation safety and mobility through the integration of advanced communications technologies into the transportation infrastructure and within vehicles. There are a broad range of ITS applications, such as web-based traffic cameras, traffic signal coordination, and a traveler information system via dynamic message signs. ITS technologies have resulted in a wide range of benefits, such as decreased fuel consumption and travel time, and improved traffic flow. Currently, most ITS applications focus on vehicle and transit operations. Future applications will have the capability to provide additional emphasis on improving safety and mobility for pedestrians, cyclists, and special needs populations.

Due to the proven benefits of ITS, Redmond relies on ITS to reduce delay and improve safety for travelers. The current ITS captures traffic information from the field and feeds traffic information to two sources in real time:

1. To travelers via a web-based traffic camera display
2. To Redmond's Traffic Management Center (Figure 2)

The other important components of ITS include:

- Advanced signal control and detection at intersections for efficient traffic signal operations,
- Closed circuit television (CCTV) installed at intersections that collect real time travel information, and
- A high-speed communications channel to relay information between the field and the Traffic Management Center.

**Figure 3. Redmond Traffic Management Center.**

To improve its ITS as a tool in managing traffic and providing travelers with up-to-date traffic information, Redmond will explore the following:

1. Improving its use of reliable ITS technologies for all modes of travel, including pedestrians, bicyclists, transit, drivers, and freight;
2. Creating web- or mobile-based applications to provide traffic flow information on a network level;
3. Increasing the coverage of CCTV in Redmond;
4. Installing dynamic message signs at key locations in Redmond;
5. Providing a reliable communications system by filling in missing fiberoptic links and installing redundant path; and
6. Updating traffic signal control and detection devices/software where they are missing or outdated.

## Parking Management

In response to the community's request for increased availability of on-street parking, the City of Redmond started monitoring parking duration for on-street parking spaces in Downtown Redmond. This practice has proven effective. Overall parking availability and efficiency have increased, improving access and economic vitality to Downtown Redmond. In the future, Redmond will continue to explore how to further improve parking availability and efficiency in Downtown Redmond. Similarly, Redmond will explore appropriate parking management methods in Overlake and employment centers such as Southeast Redmond.