

System Maintenance and Preservation

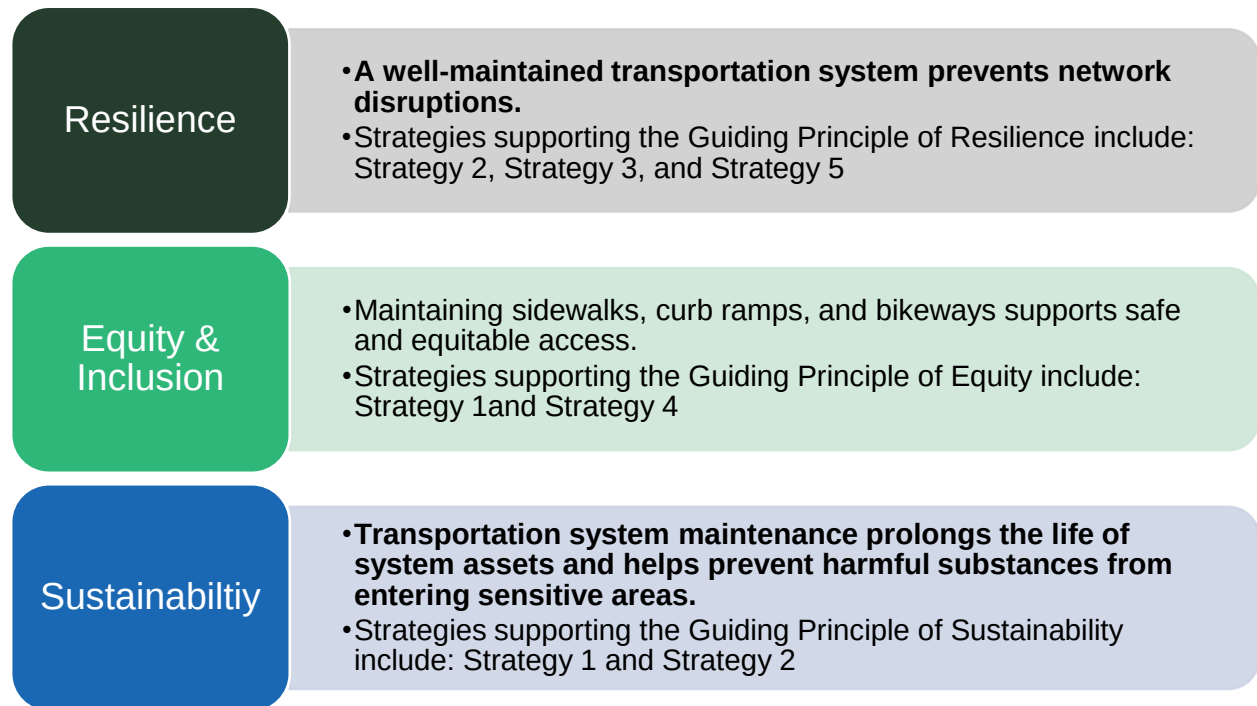
TMP Update



1. Introduction

A well-maintained transportation system is critical to ensuring that all people living in, working in, or visiting Redmond can get around safely, conveniently, and comfortably. It is also critical to Redmond's long-term fiscal well-being and sustainability goals. Redmond's transportation infrastructure is aging, highlighting the importance of maintenance and lifecycle planning. The City must proactively assess, plan and budget maintenance and repair needs so that infrastructure can be maintained at or returned to identified level of service.

2. Advancing Redmond 2050 Guiding Principles



3. Overview of Transportation System Assets and Maintenance Needs

The City of Redmond maintains a wide range of transportation-related assets that require periodic maintenance, repair, or replacement. These assets are discussed in other chapters of the TMP and summarized below:

Table 1 Summary of Transportation System Assets

Asset	Number/Mileage
Street Centerline Miles	152
Street Lane Miles	364
Bridges	20
Sidewalks	240

Curb ramps	1308
Bike lanes	61.7
Separated bike lanes	2.7
Neighborhood Connections (Special Purpose Pathways)	5.8
Traffic Signals	112
Street Lights	2100 City-owned and 2700 PSE-owned
Signs	9,301
Pavement Markings	14,180 Markings (X-walk, Stop Bar, Legends)

Maintenance and Preservation Needs

Redmond's transportation system requires constant maintenance. The Public Works Department engages in a variety of maintenance activities, including pothole and pavement repair, ensuring signs and markings are visible, street lighting is operational, street sweeping, snow and ice response, and vegetation management. Routine maintenance of the system is prioritized based on quantitative measures such as Pavement Condition Index (PCI), the anticipated life cycle of a given asset, and inspections. The Public Works Department also responds to community requests or identified safety risks.

The City of Redmond is contending with aging infrastructure that requires more maintenance than current funding levels can address. Although regular maintenance is carried out each year, a funding gap exists. Addressing the funding gap is critical and actions such as the development of asset management plans and condition analysis will assist in identifying where to allocate limited resources to provide maximum benefit

Pavement Management

The City oversees approximately 364 lane miles of pavement, representing an infrastructure asset with a replacement value of \$300+million.

To monitor pavement condition, the City uses the Pavement Condition Index (PCI), a standardized method for evaluating roadway health. PCI scores categorize pavement as being in very good, good, poor, or very poor condition. A PCI above 70 indicates a street is in good condition, while a PCI below 55 signifies poor condition, often characterized by widespread cracking, ruts, and potholes. Figure 1 provides a visual representation of the PCI scale.

Figure 1- Visual Examples of Pavement Condition



Currently, Redmond's average PCI is 65—below the level of service target of 70. This figure has declined over the past two decades, largely due to an increase in vehicular traffic, the growth of the system, and underinvestment in pavement management. Preliminary estimates suggest that bringing the network back to a PCI of 70 and maintaining it through 2050 would require an average annual investment of \$11 million.

About 30% of the City's principal arterials are in poor condition with a PCI below 55. These roadways serve as high-capacity corridors for vehicular traffic and often support transit routes and truck traffic. Several arterials have up to four through lanes and additional turn lanes. Examples include Avondale Road, Redmond Way, and Bellevue-Redmond Road. Rehabilitation of streets that are in poor condition typically involves full-depth removal and replacement at an estimated cost of \$700,000 per lane mile. Preventative maintenance treatments such as crack sealing help to extend the life of pavement and reduce costs associated with full-depth removal and replacement. Minor arterials often connect major corridors and have less traffic than principal arterials. Collector arterials carry traffic from local roads to the arterial network. Examples include NE 40th Street and NE 116th Street. Approximately 40% of the City's minor and collector arterials have a PCI below 70, and about 12% fall below a PCI of 55. Over the next five years, more than half of these roads are expected to require major rehabilitation. The PCI of Redmond's arterial network is shown in Figure 2.

In contrast, Redmond's local and neighborhood streets are generally in better shape and are prime candidates for preventative maintenance. Techniques such as slurry seals, chip seals, and crack sealing are cost-effective ways to extend pavement life and are most effective when applied to roads with a PCI over 70. Currently, about 240 lane miles in Redmond meet this criterion.

To slow deterioration, the Public Works Department is expanding its crack seal program and has begun applying slurry seals to neighborhood streets. Still, without increases in funding, maintaining a citywide PCI of 70 will be a challenge. Projections show that by 2030, over 55% of the arterial network could have a PCI below 55, and the citywide network average may fall below that threshold within the next decade.

In response to these challenges, the City is developing a formal Pavement Strategic Plan. This strategic plan will explore funding scenarios, maintenance techniques, and resource needs to improve and preserve the condition of Redmond's roadway infrastructure for the long term.

Figure 2- Arterial Pavement Condition Index (PCI)

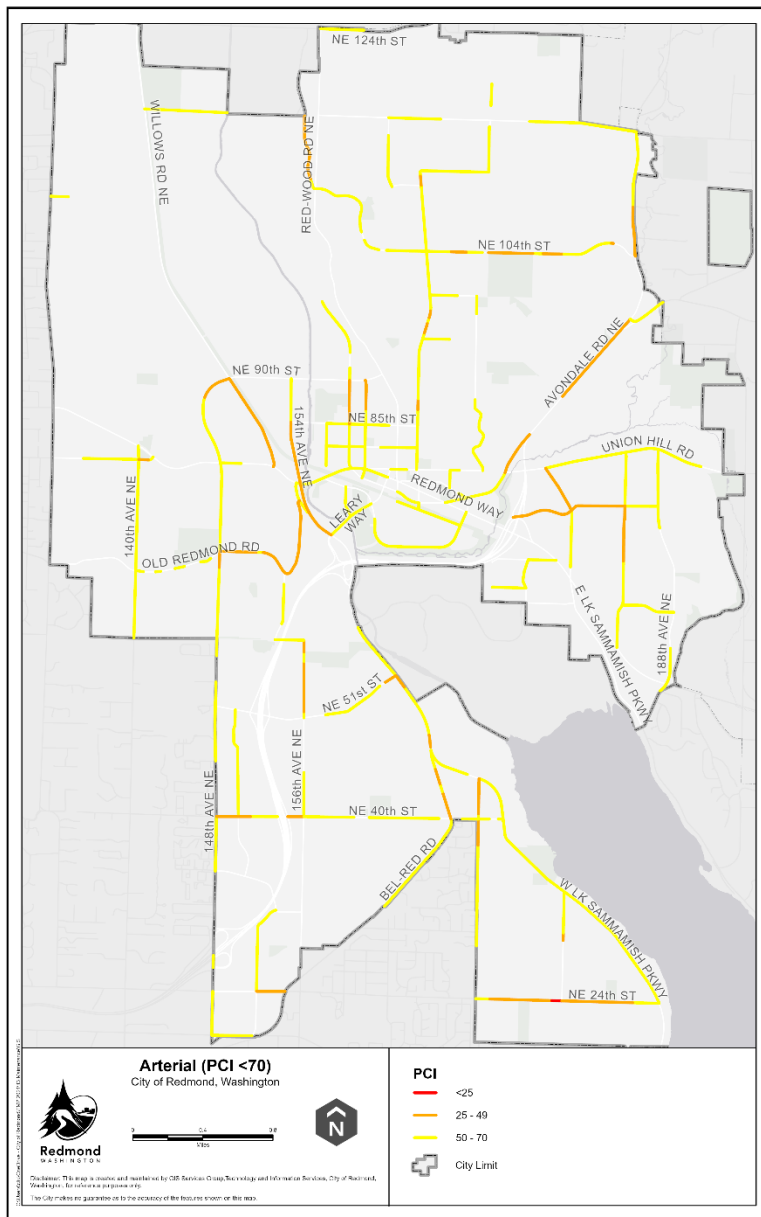
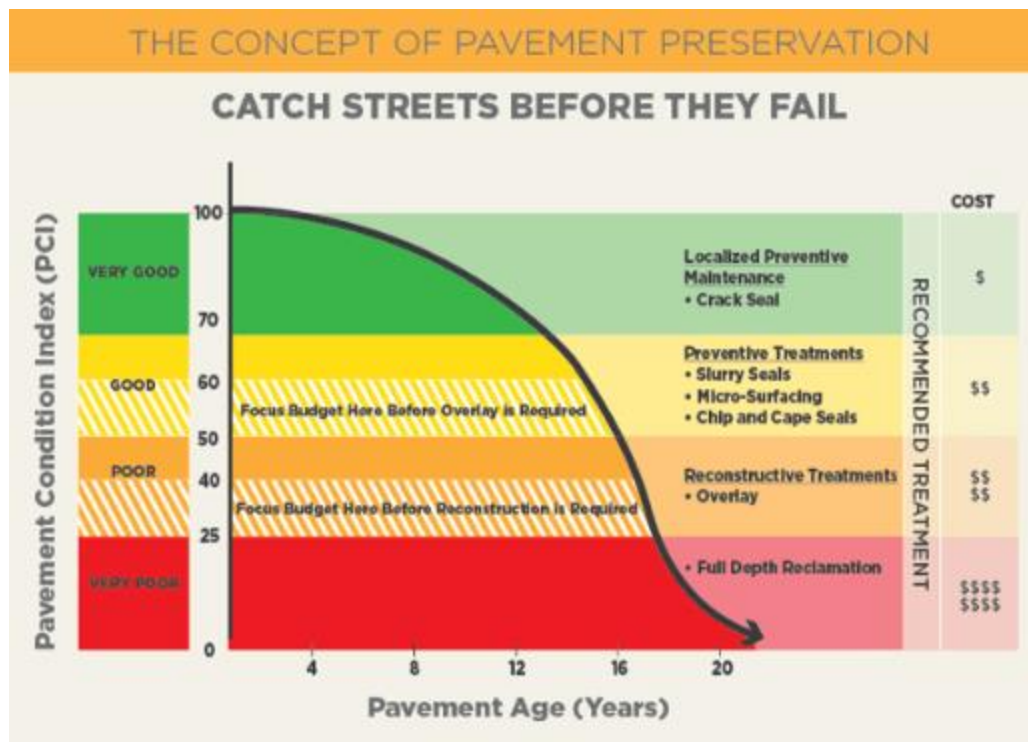


Figure 3- Pavement Preservation Concept



Sidewalks

Redmond has over 240 miles of sidewalks and continues to construct sidewalks to fill gaps in the sidewalk network and provide better access to transit, schools, parks, and other destinations people want to walk and roll. Sidewalk condition varies throughout the city. In areas where a substantial amount of new development is occurring, older sidewalks are replaced and new sidewalks are constructed, so sidewalk conditions are generally good. In older areas of the city, such as parts of downtown and some residential neighborhoods, sidewalks may be in poor condition due to tree root upheaval and other factors.

Redmond's trees are part of what makes it a livable community. Many trees along Redmond's streets and sidewalks were planted decades ago. A combination of inadequate soil structure for tree root growth and inappropriate tree species selection has resulted in sidewalks that have major heaves and cracks, creating challenging conditions for people using mobility devices or pushing strollers. Fortunately, much more is now understood about soil structure and tree selection, which is currently being applied in new sidewalk projects that include street trees, so these conditions can be avoided in the future. However, many damaged sidewalks in Redmond will need to be reconstructed to meet ADA requirements and make them accessible. An example of a sidewalk that is being reconstructed due to damage from adjacent trees is NE 40th St. **[Before/after photo?]**

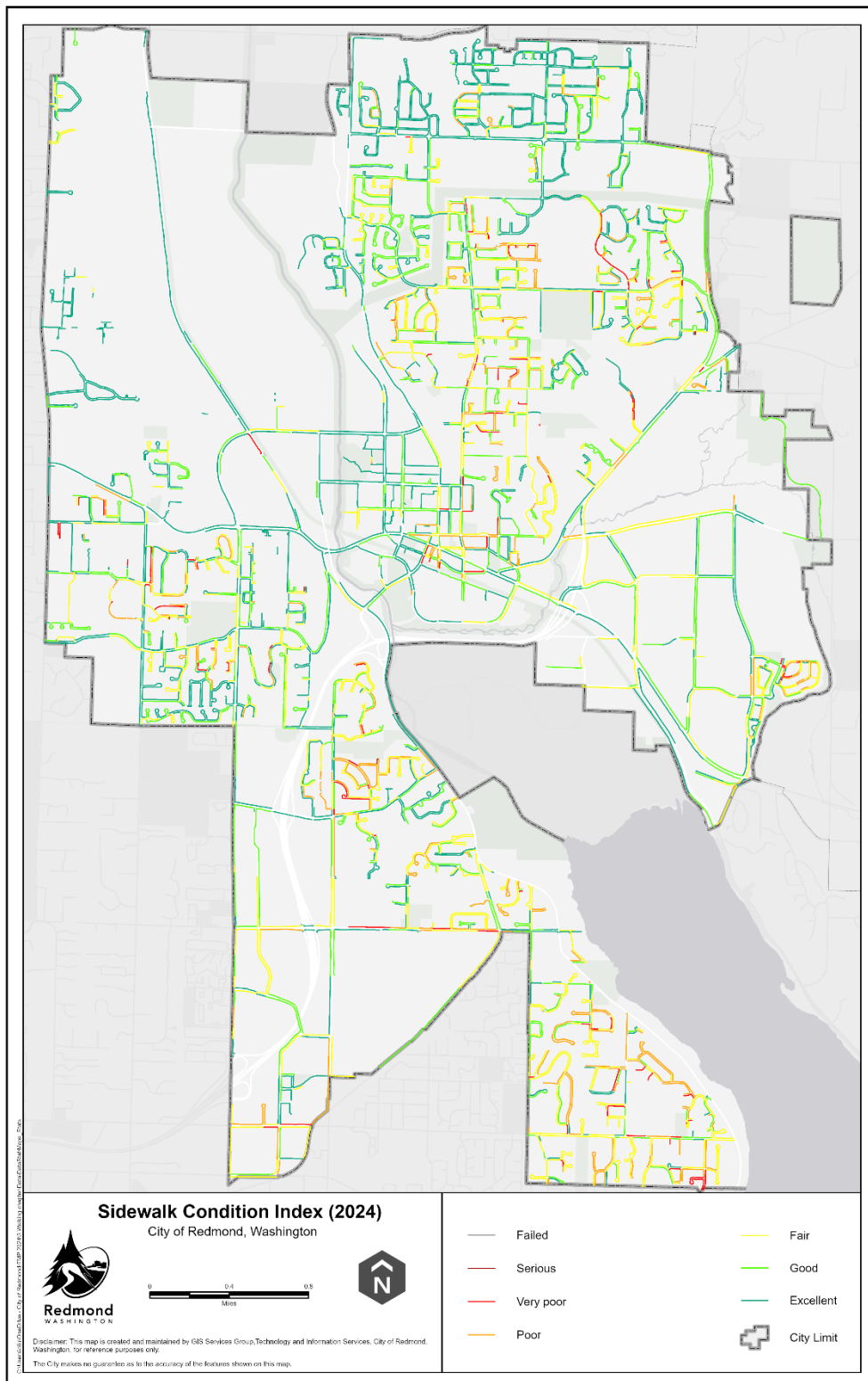
In 2024, the City collected sidewalk condition data for arterial streets, which is summarized in Table 2. Over half of arterial sidewalks are in good to excellent condition. Sidewalks found to be in fair to failed condition will be prioritized for repair or replacement by the City's concrete crew or will be replaced as part of capital improvement or development projects. See Figure 4 below for a summary of Redmond's Sidewalk Condition Index data.

In 2025-2026, the City will develop its Americans with Disabilities Act (ADA) Transition Plan for the Public Right-of-Way, which will identify deficiencies in the pedestrian network that impact accessibility and make it difficult or impossible for persons with disabilities to travel using this network. The plan will identify a list of sidewalks, paths, accessible push buttons, and curb ramps that need to be repaired or replaced to comply with the ADA and requirements in the Public Right-of-Way Accessibility Guidelines (PROWAG). Sidewalks with Sidewalk Condition Index (SCI) of Fair to Failed will be evaluated to determine whether they exceed ADA thresholds.

Table 2 Sidewalk Condition Index (SCI) for Arterial Streets

Sidewalk Condition Index	Length (miles)	Percent of Total Sidewalk Network
Excellent (93-100)	40.83	43%
Good (85-92)	26.71	28%
Fair (71-84)	20.65	22%
Poor (55-70)	5.18	5%
Very Poor (30-54)	1.55	2%
Serious (11-29)	0	<1%
Failed (0-10)	0.02	<1%

Figure 4- Sidewalk Condition Index



4. Trends Impacting System Maintenance and Preservation Now and in the Future

Impacts of Heavier Vehicles

As the level of transit service increases in Redmond, so too do the impacts of heavy buses on pavement condition. These impacts are most pronounced at bus stops where buses decelerate and accelerate, applying additional forces on the underlying pavement structure. Asphalt pavement, which comprises the majority of Redmond's arterial street network, is particularly susceptible to the impacts of heavy buses.

Heavier passenger vehicles also negatively impact pavement conditions. The average weight of a passenger vehicle in the U.S. has been trending upward since the early 1980s. The average weight across all passenger vehicle types is just over 4,000 pounds. As the number of heavier passenger vehicles increases, street pavement will deteriorate more quickly, requiring more frequent maintenance.

Changing the city's arterial street standard to be concrete instead of asphalt is a strategy that can extend pavement life, but concrete is more costly. Applying a concrete standard along frequent transit routes, at intersections, or at bus stops may be another more cost-effective strategy to reduce long-term maintenance costs. The use of asphalt and concrete both comes with environmental benefits and drawbacks; the use of these materials can be evaluated for alignment with the priorities of the Environmental Sustainability Action Plan (ESAP).



Figure 5- Concrete bus pads reduce impacts of heavy buses on pavement

Multimodal Streets Require a Different Maintenance Approach

As Redmond streets are redesigned to better accommodate walking, biking, transit, and auto traffic the methods and equipment that are used to maintain streets must also change. For example, the TMP Bicycle Strategy calls for a network of high comfort bikeways, many of which will be separated bike lanes. Separated bike lanes typically can't be swept with conventional street sweepers, so they require smaller specialized sweepers or other equipment, and additional staff resources since the sweeping would be a separate activity from sweeping the adjacent street. Similarly, snow removal for separated bike lanes requires special equipment and additional staff resources. Table 3 compares maintenance costs of conventional bike lanes (i.e., no vertical elements between the bike and vehicle lanes) and separated bike lanes.

Multimodal streets also may incorporate features such as pavement markings, signage, vertical delineators, etc. which require maintenance. Each of these features has a life cycle and needs to be replaced on a routine basis. Further, multimodal streets that divide available street space create more constrained conditions to conduct maintenance.

Table 3 - Maintenance cost comparison between conventional and separated bike lanes

Category	Open Bike Lanes (per mile/year)	Separated Bike Lanes (per mile/year)
Sweeping & Debris Removal	\$500–\$2,000	\$2,000–\$5,000
Snow Removal (where applicable)	\$1,000–\$3,000	\$2,500–\$6,000 (May require dedicated staff or closing facility until conditions improve)
Markings & Signage Maintenance	\$200–\$700	\$300–\$1,000
Barrier/Planter/Bollard Maintenance	N/A	\$500–\$2,000
Equipment Depreciation (Annual Share)	Minimal (shared sweeper fleet)	Moderate–High (dedicated sweeper fleet)
Total Annual Maintenance (Estimate)	\$1,700–\$5,700	\$5,300–\$14,000

More People Walking, Biking, and Rolling Requires a Higher Level of Maintenance

Redmond’s transportation policies and planning efforts are focused on encouraging more people to walk, bike, and roll. These human-powered modes of travel are more susceptible to injurious crashes resulting from poorly maintained infrastructure – whether it’s a crack in the pavement, or ice on a sidewalk. To maintain a safe system, it is important to establish a higher maintenance standard for sidewalks, bike lanes, and multiuse trails.

Reducing Environmental Impacts

Redmond’s Environmental Sustainability Action Plan (ESAP) calls for increasing City-led tree planting on public properties (including public rights-of-way) and increasing the use of pervious pavement. Both actions have maintenance implications. More trees result in the need for more vegetation management (e.g., pruning, clearing tree litter). Over time, trees can also impact sidewalks and streets; however, better planting techniques and proper tree species selection can minimize these impacts. Pervious pavement, which is more appropriate for low volume parking lots, maintenance access roads, and sidewalks, requires different maintenance practices than more traditional pavements to prevent these pavements from being clogged by dirt, moss, etc., which compromise their pervious function.

As Redmond continues to grow and prioritize sustainability, transitioning the maintenance fleet toward electric-powered vehicles is a key strategy to reduce environmental impacts, enhance operational efficiency, and align with climate goals. By converting an increasing share of its vehicle inventory to electric models, Redmond can lower greenhouse gas emissions, decrease dependency on fossil fuels, and potentially realize long-term cost savings through reduced fuel consumption and simplified routine maintenance. 

However, electrifying the fleet also introduces new operational considerations. Maintenance personnel may require specialized training to safely handle high-voltage equipment and address the diagnostic

needs of electric drivetrains. Infrastructure investments, such as installing charging stations at municipal facilities, represent up-front costs that must be integrated into the City’s capital planning. Additionally, thoughtful scheduling and route planning will be necessary to account for charging times and vehicle ranges, ensuring that critical maintenance tasks remain on track.

Over time, these costs can be offset by savings from less frequent vehicle servicing and reduced fuel expenditures. Grants, rebates, and other funding opportunities may further streamline this transition. By systematically evaluating vehicle types, developing a phased replacement schedule, and monitoring performance, Redmond can maintain a strong and reliable maintenance program while embodying the City’s commitment to a cleaner, more sustainable future.

5. Strategies

Strategy 1: Establish a Maintenance Level of Service Standard for Infrastructure Assets

For sidewalks, federal laws and guidelines such as the Americans with Disabilities Act (ADA) and the Public Right of Way Accessibility Guidelines (PROWAG), establish accessibility standards that dictate when assets such as sidewalks and curb ramps need to be maintained for accessibility. For other assets, a level of service standard - both for seasonal maintenance and longer-term system maintenance - is established by the City. A level of service standard may be tied to safety, longevity, aesthetics, user comfort, and other factors. This standard, in turn, dictates the frequency and level of maintenance performed.

[insert photo of seasonal maintenance]

Actions

Action 1A: Establish asset management plans that include a level of service maintenance standard for all transportation system assets and incorporate them into the City’s asset management system. (Public Works)

Action 1B: Modify seasonal maintenance practices, staffing, and budget to meet the established level of service standard. (Public Works)

Strategy 2: Plan for and adequately fund maintenance and preservation of Redmond’s transportation system.

Ensuring sidewalks, streets, and other transportation assets are well-maintained is critical to achieving a safe, multimodal network. Funding for ongoing maintenance and preservation in Redmond is drawn from various sources—the General Fund, the Transportation Benefit District (TBD), and grant programs—which can fluctuate in availability from year to year. As the city grows and travel demands increase, allocating sufficient, stable funding is essential to meet safety and mobility goals. Robust financial support for maintenance not only addresses immediate repair needs but also helps avoid more costly overhauls in the future.

Capital Projects

For new capital projects, long-term maintenance costs are calculated, and sufficient budgets are set aside during the capital improvement program (CIP) project scoping phase to ensure there is sustainable funding for the maintenance requirements. Maintenance costs should account for all aspects of life-cycle asset management and replacement.

Transportation Benefit District

Redmond's Transportation Benefit District (TBD) was formed in 2023 to fund maintenance and improvements to city streets, public transportation, strategies aimed at maximizing safety and traveling choices, and other transportation projects designed to reduce congestion. The TBD is funded through a sales tax of 1/10th of one percent. In its first year, Redmond's TBD generated approximately \$5 million and is expected to generate a similar amount each year. TBD funds have been used to improve the City's capabilities to build and repair sidewalks, curb ramps, and other transportation features typically constructed of concrete, and augmenting paving projects with additional resources to expand existing scope. *Grants*

The City has received federal funding for pavement preservation projects via the Puget Sound Regional Council (PSRC) grant competitions, which occur in even years. Grant amounts are generally in the range of \$1.3 and \$1.5 million, and typically include separate design and construction phases. Pavement Condition Index for the road segment is the biggest factor in scoring for these grants, with a PCI of 50-59 receiving the highest points. Roads must be functionally classified (i.e., part of the arterial network) to be eligible, with higher functional classes receiving higher points. Freight routes and bus service can also contribute to higher scores.

Project Piggybacking

As Redmond's stormwater, sewer, and water utilities age, there is a need to replace underground infrastructure that is placed within the street right-of-way. These utility projects offer opportunities to resurface streets, fix sidewalks, and conduct other maintenance activities. Asset management planning efforts will allow the City to better align priority infrastructure projects and identify opportunities to achieve cost savings by piggybacking different types of infrastructure projects occurring within the same corridor. The City should also continue to coordinate with private development projects and Puget Sound Energy (PSE) projects to find opportunities for project piggybacking.

Actions

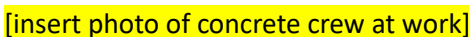
Action 2A: Incorporate, as standard practice, the cost of annual maintenance into all operational budgets. Update existing cost-estimation tools and CIP processes to ensure accurate maintenance costs are identified early and long-term funding is appropriately allocated as part of the biennial budget process. (Public Works)

Action 2B: Establish a Project Transportation Maintenance Fund to ensure sustained financial support for maintaining Redmond's transportation system, preventing deferred maintenance and unexpected funding shortfalls. (Public Works)

Action 2C: Create an asset management dashboard that more easily allows identification of opportunities to combine infrastructure maintenance/replacement projects across functional areas and coordinate with non-City utility providers and private development. The dashboard may also be used to report on capital project and programmatic efforts. (Public Works)

Redmond's Concrete Crew Improves Pedestrian Access While Saving the City Money

Redmond's newly formed Concrete Crew is already demonstrating the value of relying on internal resources to address the City's infrastructure needs. Their recent work at the 90th Street and Woodinville-Redmond Road intersection illustrates both the flexibility and cost-effectiveness this approach can offer. After a car accident damaged a traffic signal pole, the crew quickly removed the old foundation, prepared a new one, and took the opportunity to remove and replace the curb and gutter at the corner. They also upgraded two ADA-compliant wheelchair ramps and repaired sections of sidewalk to restore safe and accessible conditions for all users.

Without this in-house capability, these repairs would have required a lengthier contracting process and higher overall costs, likely delaying completion and inconveniencing residents. In addition to saving time and money, the project showcased strong coordination between the Concrete Crew and the Traffic Operations and Safety Engineering Division, reflecting the benefits of enhanced collaboration within the City's maintenance operations. By investing in a dedicated crew, Redmond can respond more rapidly to unanticipated infrastructure needs, maintain higher quality standards, and reduce reliance on outside contractors, ultimately supporting a more resilient and efficient transportation system. 

Strategy 3: Explore alternative approaches to addressing bikeway, sidewalk, and shared-use path maintenance needs

Community-driven maintenance initiatives

As the City continues to build out its active transportation network and encourages year-round walking and biking, the maintenance needs for sidewalks, paths, and bikeways will continue to grow. This is particularly true for seasonal maintenance such as the clearing of leaves or other tree litter, and snow and ice removal from sidewalks and bikeways to maintain safe and accessible facilities. City maintenance crews may not always be able to address these seasonal maintenance needs in a timely manner. In some communities across the US community organizations have formed to address certain maintenance needs such as trimming vegetation and clearing debris from sidewalks and bike lanes. Examples include StreetFixers in Seattle, which organizes groups of people to sweep, rake, trim vegetation, etc. to make sidewalks and bikeways more passable.

Another approach to community-driven maintenance initiatives is to establish an "Adopt-a-Neighbor" program, which pairs neighbors who are unable to rake or shovel their sidewalk with volunteers who are willing to help.

City-subsidized sidewalk maintenance

The Revised Code of Washington 35.70.020 establishes that it's the responsibility of the abutting property owner to bear the burden and expense of constructing or repairing existing sidewalks along the side of any street or public place. This approach to sidewalk maintenance can lead to inequitable outcomes and often results in maintenance being deferred or not happening at all unless there are complaints from the public or a compliance program in place. In Redmond, adjacent property owners are responsible for maintaining the sidewalk in front of their homes, but historically there has been little enforcement or formal procedure in place to address degrading conditions. The City remains ultimately responsible for ensuring the sidewalks are safe for all users, and it typically responds to customer requests on a case-by-case basis to provide temporary or interim fixes.

To ensure an accessible sidewalk network the City should enforce the city ordinance requiring adjacent property owners to address sidewalk conditions that are impacting accessibility. Property owners can choose to hire a contractor or request the City to make the repair and be billed for the work. In some cases, repairing or replacing a sidewalk can be a financial burden to lower-income households. Income-qualifying households could have a portion, or all of the costs covered by the City using funds from the Transportation Benefit District.

Actions

Action 3A: Assess the viability of establishing volunteer programs such as “Adopt-a-Neighbor” for seasonal sidewalk maintenance or “Adopt-a-Bike-Lane” program where organized groups commit to performing seasonal maintenance activities such as leaf clearing within defined segments. (Planning, Public Works)

Prioritizing Transportation Infrastructure Maintenance

Redmond's transportation system should serve everyone equitably, ensuring that no person or neighborhood is left behind due to historical underinvestment or physical barriers. Older residential areas can sometimes lack the infrastructure and maintenance levels found in newer developments, resulting in uneven conditions for sidewalks, streets, and transit access. Redmond's approach to equity in transportation maintenance focuses on identifying and prioritizing high-need locations to ensure a consistent and reliable level of service throughout the city.

To achieve this, the City considers demographic data, infrastructure conditions, and community input to guide where resources are most urgently required. Areas with a greater proportion of older adults, people with disabilities, or households without access to a personal vehicle may receive additional attention for sidewalk repairs, curb ramp upgrades, and street resurfacing. Beyond physical improvements, Redmond will continue to refine how it engages with these neighborhoods—whether by holding workshops in multiple languages, meeting people where they are, or partnering with local organizations to identify and address maintenance concerns. By applying an equity lens to all aspects of maintenance and preservation, the City seeks to create a transportation network that works for every resident, regardless of age, ability, or income.

Action 3B: Develop a policy and guidelines to facilitate community-driven maintenance initiatives and ensure that such initiatives are safe for participants and meet defined level of service maintenance standards. (Planning, Public Works)

Action 3C: Increase compliance efforts for inaccessible sidewalks and establish a program to assist property owners in addressing sidewalk maintenance needs, which could include providing a list of contractors, having City crews conduct the maintenance activity and bill the property owner, and establishing an income-qualifying sidewalk maintenance subsidy program. (Public Works)

Strategy 4: Coordinate Regional Shared Use Path Maintenance

Redmond is fortunate to have several regional shared use paths that serve both a recreation and transportation function. These include the SR 520 Trail, West Lake Sammamish Trail, and East Lake Sammamish Trail, and Pipeline Trail. These trails are owned and maintained by other entities, including WSDOT, King County, and PSE. The condition of trails can impact the safety and comfort of users, as well as people's willingness to use them. The City of Redmond has a role to play in advocating for consistent trail maintenance that meets its level of service standard and potentially partner with the agencies who

own and operate regional trails to help expedite maintenance activities.



Figure 6-Many shared use paths in Redmond are maintained by other agencies.

Actions

Action 4A: Document maintenance needs on regional shared use path facilities. (Parks)

Action 4B: Coordinate with agencies to understand their maintenance schedules for regional trail facilities, and to potentially enter into maintenance agreements that would allow the City of Redmond (or its contractors) to perform maintenance and be compensated by the trail owner. (Parks, Public Works)

Strategy 5: Assess Feasibility of Shifting Major Maintenance Activities to Off-Peak Hours

As Redmond transitions from a suburb to a city, the activity and demands on its streets will continue to increase, adding to the complexity of performing maintenance and resulting in greater disruptions to traffic from maintenance activities. Shifting maintenance activities that require street or lane closures or

other significant modifications to traffic flow to off-peak hours is a strategy to mitigate traffic impacts, but doing so would be a fundamental shift for Redmond's maintenance crews.

If the City were to pursue off-peak maintenance, several considerations would need to be evaluated. Such a shift may necessitate redefining roles to oversee night or weekend work, as well as engaging in discussions with labor unions regarding contract terms and work schedules. Pilot programs could be conducted to determine whether scheduling certain maintenance activities outside of peak hours effectively reduces congestion, remains cost-effective, and is operationally feasible. Coordination with other agencies would also be needed to minimize noise or other disturbances to businesses and residents. In addition, the City would need to ensure adequate budgeting for any specialized equipment, training, and ongoing performance monitoring. Although not a preferred approach, implementing off-peak maintenance could be further examined as the demands on Redmond's transportation system continue to grow.

Actions

Action 5A: Establish criteria that would help determine when off-peak maintenance may be justified. Such criteria may relate to the scale and duration of the maintenance activity, anticipated impacts on traffic, emergency response times, businesses, and whether there are viable detour routes. (Public Works)

Action 5B: Investigate and document the resources needed to stand up a night maintenance crew on an as-needed basis. (Public Works)