

SITE MAINTENANCE PLAN

GOAL

Maintain environmental quality and aesthetics of the roadway project during use.

REQUIREMENTS

Have and implement a comprehensive ongoing site maintenance plan that addresses (at a minimum) responsible parties/organizations, standards, schedule, methods to be used and funding source(s) for the following items (listed by major topics):

- Roadway maintenance
 - Pavement patching, repair and crack sealing
 - Shoulder/sidewalk maintenance and repair
- Stormwater system cleaning and repair
- Roadside vegetation
 - Landscaping
 - Control of noxious weeds and nuisance plants
- Snow and ice control
- Traffic control infrastructure
 - Pavement marking maintenance and repair
 - Sign maintenance and repair
 - Safety device maintenance and repair
 - Traffic signal maintenance and repair
 - Roadway lighting maintenance and repair
 - Intelligent transportation system maintenance and repair
- Cleaning
 - Pavement sweeping and cleaning
 - Litter control
 - Trash collection

If any items are not applicable they should be listed as such and accompanied with a short reason for the “not applicable” listing. The site maintenance plan should cover the expected lifetime of the roadway facility.

Details

It is likely that some or all of the required activities are addressed by different documents or by different organizations. A separate stand-alone site maintenance plan is not required; references to relevant existing documents are sufficient.

DOCUMENTATION

- A copy of the stand-alone site maintenance plan or copies of existing documentation or plans that address the items noted above.

OR

- A list of each item that addresses responsible parties/organizations, schedule, methods and funding source(s).



REQUIRED

RELATED CREDITS

- ✓ PR-9 Pavement Management System
- ✓ EW-2 Runoff Quality
- ✓ EW-3 Runoff Flow Control
- ✓ EW-4 Stormwater Cost Analysis
- ✓ EW-5 Site Vegetation

SUSTAINABILITY COMPONENTS

- ✓ Ecology
- ✓ Extent
- ✓ Expectations
- ✓ Experience

BENEFITS

- ✓ Improves Human Health & Safety
- ✓ Reduces Lifecycle Cost
- ✓ Improves Accountability
- ✓ Increases Aesthetics

APPROACHES & STRATEGIES

- Use standard agency maintenance guidelines and specifications.
- Seek a long-term maintenance contract or partnership. Long-term maintenance agreements can be an effective maintenance solution and improve cost efficiency over the lifetime of the facility.
- Initiate discussions and document the public involvement process of outlining design elements in relation to maintenance requirements during project planning. Discuss how maintenance partnerships are formed and explore the benefits of successful maintenance guidelines. (This may include initiation of a public involvement/volunteer program.)
- Establish a public involvement program and marketing strategy. For example, community-supported and volunteer programs like Adopt-a-Highway can be an effective approach to litter and graffiti control and increase community ownership of the infrastructure.

Example: Documentation

This is an example of documentation that meets the intent of this requirement. The example is for a fictional 2-lane road being expanded in to a multimodal facility (e.g., bicycles, pedestrians, new two-way left turn lane) in the greater Seattle, WA area for the Washington State Department of Transportation (WSDOT). This site maintenance requirement is met by existing programs within WSDOT. Therefore, documentation need only cite these programs and their relevant manuals and procedures. Note that Figures PR-10.1 and PR-10.2 show more than the required information of “funding source(s)” because they break down all funding sources for the entire Washington State Transportation budget (not just the funding source for site maintenance) and the entire distribution of state collected transportation revenues and funds (not required).

Documentation

For this particular project, WSDOT is the owner agency and is responsible for site maintenance (as defined by this requirement). This is true in many jurisdictions but not all. In some jurisdictions, the owner agency contracts out to private companies for portions of site maintenance. The overarching document that describes WSDOT site maintenance responsible parties, schedule and methods is the *WSDOT Maintenance Manual (M 51-01)* (<http://www.wsdot.wa.gov/Publications/Manuals/M51-01.htm>). The *WSDOT Maintenance Performance Measures* website (<http://www.wsdot.wa.gov/Maintenance/Accountability/default.htm>) describes the standards and targets for current and past years. Additional guidance on roadside vegetation is given in the *Northwest Region, Area 5: Integrated Roadside Vegetation Management Plan* (http://www.wsdot.wa.gov/Maintenance/Roadside/mgmt_plans.htm). Additional guidance on snow and ice control is given in the *Statewide Snow and Ice Plan: 2009-2010* (<http://www.wsdot.wa.gov/winter/SnowIcePlan.htm>). In WSDOT’s 2009-2011 transportation budget, “Highway Maintenance” is funded at \$355.4 million (about 6.1% of the total WSDOT budget). Figures PR-10.1 and PR-10.2 describe the collection and distribution of funds.

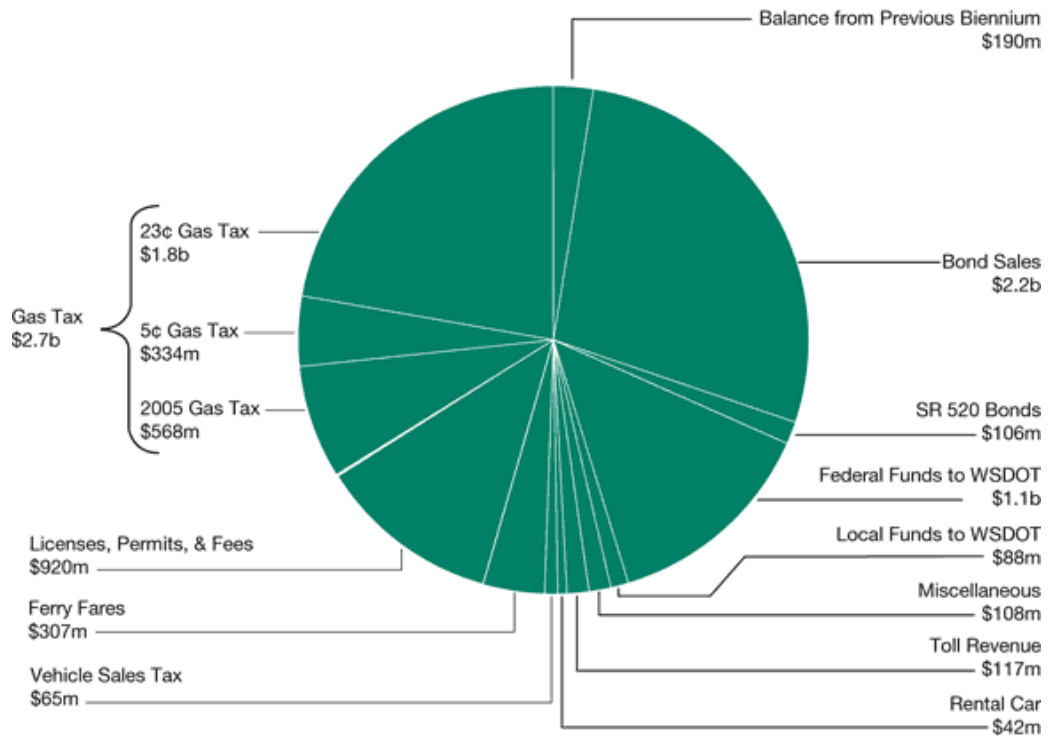


Figure PR-10.1: Transportation Revenues and Funds Collected by the State (WSDOT, 2009).

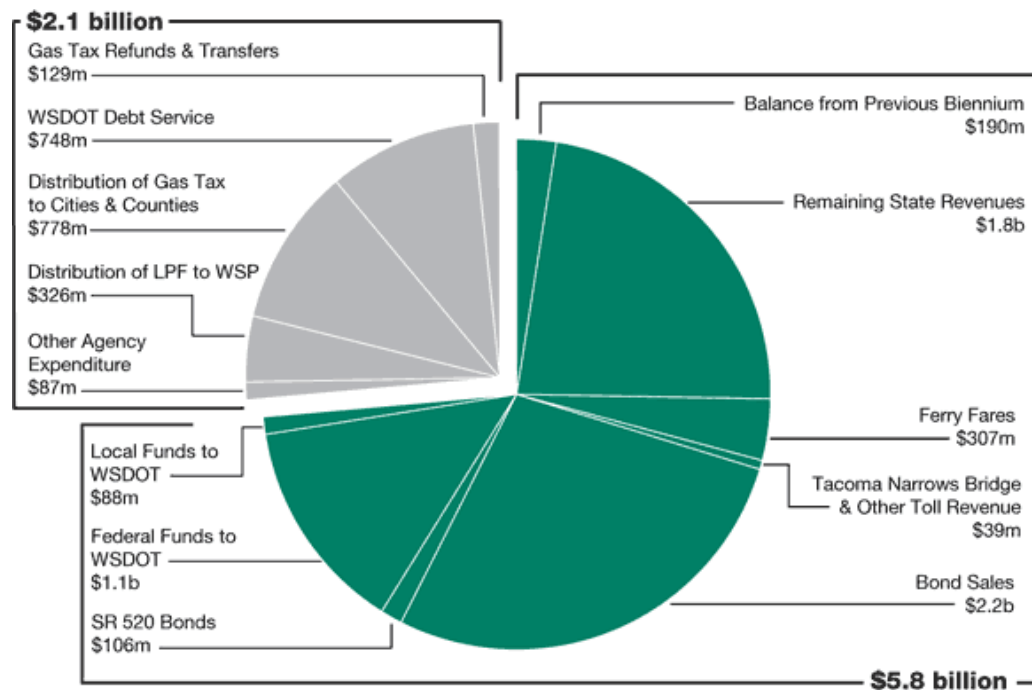


Figure PR-10.2: Distribution of State Collected Transportation Revenues and Funds (WSDOT, 2009).

More about the WSDOT Maintenance Accountability Program (MAP)

The Washington State Department of Transportation (WSDOT) has developed a Maintenance Accountability Program (MAP) designed to track, measure, and communicate the results of maintenance activities on state roadways (<http://www.wsdot.wa.gov/Maintenance/Accountability>). The program was developed in 1996 out of necessity as a response to impending budget cuts by the Washington State legislature for road maintenance.

The MAP exists to comprehensively measure the performance of road maintenance within the state by providing tools that link strategic planning, the budget and delivery of service, and analyzing the results quantitatively. To do this the MAP is divided into 33 distinct categories that aim to comprehensively cover the scope of road maintenance. Analysis is derived from data collected by randomly sampling roadways twice a year via comprehensive sampling procedures, and from records of accomplished work. The data is then compared with the established standards to arrive at a level of service (LOS) designation for each category. These LOS designations are then compared with WSDOT goals and targets to responsibly track progress and maintain accountability in all facets of maintenance operations.

The success of the MAP has been to the benefit of WSDOT and their maintenance division as the maintenance budget is now performance based. Thorough analysis of program successes and failures allows WSDOT to analyze budget proposals and accurately project the consequences of budget decisions on road maintenance performance, from which they can lobby the legislature to secure adequate funding. Thus, by being careful, logical, and doing their research, WSDOT is able to secure the money necessary to keep their roadway investments in good working condition, obviously to the benefit of all residents of the state. Furthermore, if the final budget falls short of funding everything that WSDOT desires, they can effectively scale back their goals and targets to produce ones that maximize the productivity of the road infrastructure and accurately evaluate the performance of maintenance based on the funding provided.

The MAP is considered to be a successful program. It has been heavily borrowed for use in other states, and its measurement techniques were so successful that part of the program was used as the pilot for performance based budgeting in Washington State.

POTENTIAL ISSUES

1. Some responsibilities, standards, schedules, methods and funding sources may not be known or are not documented. Such documentation may need to be created above the individual project level.
2. Funding for site maintenance may not be secured long-term. While this is certainly recommended, listing the current funding source is adequate for this requirement.
3. This requirement only specifies that a site maintenance plan exist. It does not ensure that site maintenance is actually done.
4. This requirement only specifies broad categories of site maintenance. It does not specify effectiveness, costs or utility of individual efforts.

RESEARCH

Maintenance can increase the useful life of most infrastructure components, promotes public safety, and benefits both public and ecosystem health. The following is a series of brief discussions on the value and nature of infrastructure maintenance broken down by general category.

Street Cleaning & Litter Removal

Street cleaning and litter removal retain the value of the roadway by sustaining the environmental and aesthetic benefits over its lifespan. During its operating cycle the roadway will, due to use and nature, necessarily accumulate various debris that, left alone, will negatively impact the roadway's relationship with its environment. Both dirt and dangerous pollutants (e.g. phosphorus, nitrogen, lead) will collect on the roadway over time and pose a legitimate threat to vegetation and water quality in the area (Hyman, 1999). Street sweeping has traditionally been viewed as effective against dirt and dust control only, but advancements in sweeper technology

have shown it to be very effective in removing small pollutants as well (James, 1997). Removal of dirt and dust from the roadway also improves safety by maximizing the surface area of tires that meet the road surface and enhances the aesthetics of the site for its users (Hyman, 1999). Similarly, litter on the site can be an eyesore and a gateway to pollution of earth and water. Volunteer litter removal programs, such as Adopt-a-highway, have been shown to be the most effective method of combating litter accumulation (Hyman, 1999).

Vegetation Maintenance

Native vegetation growth near the roadway is necessary for the roadway to maintain a good relationship with its environment, but unchecked vegetation growth can negatively affect the performance and safety of the roadway. Maintaining vegetation limits improve safety and traffic flow by maximizing sight distance for drivers, providing more accessible shoulders for emergencies, and preventing damage to and interference with roadside structures and signs (WSDOT, 2009; MassTran, 2003). Furthermore, keeping vegetation growth clear of the edge of the roadway helps prevent the pooling of water, prolonging the life of the pavement (WSDOT, 2009). The key is to maintain vegetation, since root systems can provide necessary support and stabilization of embankments supporting the road (MassTran, 2003). For an example discussion of the methods of vegetation maintenance including important sustainability aspects, see the Integrated Roadside Vegetation Management Program of MassHighway (2003).

Pavement Repair

Despite our best efforts, use of the roadway over its lifetime will cause it to begin to break down, resulting in small pavement failures that can negatively impact the performance of a roadway. Maintenance on the roadway has two main effects: it immediately improves the condition of the pavement and slows the rate of future deterioration (Deighton, 1997). These effects maintain life of the road for a longer period of time, maximizing the capital investment.

Aside from economic concerns, unmaintained paved surfaces can also become very dangerous safety risks to drivers, passengers, and pedestrians by damaging vehicles and requiring additional driver attention. While best management practices for pavement maintenance are widespread, comprehensive supporting research is not. However, the process of retaining the value and function of the roadway over time represents a significant portion of that roadway's sustainability benefit, so well designed maintenance procedures must be considered (Wei, 2004). For a comprehensive discussion of pavement maintenance benefits, definitions, costs, methods, and references see Pavement Interactive at <http://www.pavementinteractive.org>.

Storm Drain Maintenance and Cleaning

Drainage structures, essential for an environmentally sensitive and functioning roadway, require periodic maintenance to maintain efficiency. Without maintenance, significant declines in performance and flow rates have been well documented (Hyman, 1999). Best management practices are also well documented, and include routine maintenance (especially right before a rainy season) and data collection to track when and where storm drains tend to fail in an effort to clean and/or fix them before failure occurs. Hyman (1999) has a good baseline sampling of some effective best management practices.

Cost Analysis

While the benefits of site maintenance on a roadway have been relatively well-documented, cost analyses of these procedures are much less so. Since road maintenance costs vary considerably by roadway type, road use patterns, regional weather factors, and chosen best management practices by local agencies, there is no easy definition for the maintenance cost of any specific roadway. However, there are some commonly cited costs of site maintenance that can provide an understanding of the resources required to maintain the asset.

The Washington State Department of Transportation (WSDOT) has \$355.4 million allocated in the 2009-2011 budget for highway maintenance of roughly 7,000 centerline miles of roadway. Furthermore, their Maintenance Accountability Program divides that money into 33 distinct activities within site maintenance to measure resource distribution more accurately. Sub-budgets include \$137 million for roadway maintenance, including pavement patching & repair, shoulder repair, and cleaning & sweeping; \$27 million for drainage maintenance and slope

repair; and \$35 million for roadside and vegetation management, including litter pickup and control of intrusive and interfering vegetation (WSDOT, 2008).

REFERENCES

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