

## Maintenance of Bicycle and Pedestrian Facilities

Maintenance of bicycle and pedestrian facilities is an ongoing and necessary activity that ensures the continued safe use of a bike lane, sidewalk, or trail. This paper addresses:

- ▶ Establishing responsibility for maintenance
- ▶ Off-road trail maintenance tasks
- ▶ On-road bicycle facility and sidewalk maintenance tasks
- ▶ Improving facilities through maintenance
- ▶ Designing facilities to reduce maintenance costs
- ▶ Budgeting for maintenance

### Why is maintenance so important?

Doubling the amount of bicycling and walking in this country is the primary national goal established by the U.S. Department of Transportation in its National Bicycling and Walking Study final report. Maintenance of facilities is important in achieving this goal because, if facilities are not maintained, use by both current and potential bicyclists and pedestrians will be discouraged.

Neglected bicycle and pedestrian facilities send the

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wrong message to local citizens and reflect negatively on the character of a local community. Unkempt trails and sidewalks, and gravel strewn bike lanes suggest that government does not really intend for people to use these facilities and is not concerned with the transportation safety of those who do.

Neglecting to maintain bicycle and pedestrian facilities may cause accidents, creating a liability problem for the managing agency. According to *Trails for the Twenty-First Century*, a design manual published for Rails-to-Trails Conservancy, an agency is required to correct a particular safety-related maintenance problem within a reasonable period of time once they have been notified of the problem or else it will be considered negligent. In order to avoid liability problems, maintenance personnel as well as the facility's users and neighbors should be encouraged to report maintenance problems as they arise.

For off-road facilities, placing complaint/request forms at trailheads and nearby bike shops may be a good idea. According to the *Oregon Bicycle and Pedestrian Plan*, several cities have adopted "spot improvement programs". These programs allow bicyclists or pedestrians to bring problems to the attention of authorities quickly and efficiently. Postage-paid index cards are made available to people that can be sent in by users of the facility who "spot" an area needing "improvement." This allows for a quick response from the city's maintenance crew.

### Who is responsible?

The agency responsible for the management and maintenance of bicycle and pedestrian facilities should be established prior to construction. This can be a Federal, State or local agency, or even a non-profit group, depending on who owns the facility or land surrounding it, where it is located, and other factors. Different states may use different approaches for the maintenance of bicycle and pedestrian facilities.

The Oregon Department of Transportation uses a special budget to fund bicycle-specific maintenance work such as sweeping shoulders and striping bike lanes throughout the State. A different view is taken by the Minnesota Department of Transportation, where bicycle-related maintenance work is incorporated into the routine work of State crews, and main-

tenance responsibility for trail projects is often handed down to local agencies once the facilities are constructed (National Bicycling and Walking Study Case Study, No. 21: *Bicycle and Pedestrian Considerations in State and Local Transportation Planning*).

For facilities such as rail-trails and other multi-use paths, the length of the corridor and the number of jurisdictions it crosses are important considerations in deciding which agency will take management and maintenance responsibility. If a trail is limited to one community, a local parks department may be chosen as the management entity. If a trail extends beyond one community, a county or State managing entity may be best; however, if no such agency consents, it will be necessary to string together several local management agencies.

- ▶ The 41-mile Mohawk-Hudson Bikeway is managed by three towns and two counties in New York State. Under this type of cooperative arrangement, a trail may have differing support facilities and levels of maintenance along its route.

Once an agency has been designated to take primary responsibility for a trail or bikeway, volunteers are an excellent resource for performing periodic maintenance tasks. Such individuals may be available to work on a weekly, monthly, or seasonal basis. Many multi-use paths utilize trail user groups, community organizations, youth clubs and local businesses in order to help improve trail safety and keep maintenance costs down.

## Maintaining multi-use trails

A routine maintenance program is necessary to ensure bicyclist and pedestrian user safety and to prolong the life of a facility. Maintenance activities should be prioritized, with safety always being at the top of the list. The maintenance manual of the Baltimore and Annapolis Trail in Maryland lists maintenance tasks by season and by priority. For warm weather, safety tasks are first, followed by visitor management tasks, turf care, equipment maintenance, and special projects. In colder weather, instead of turf care and equipment maintenance tasks, more attention is focused on special projects.

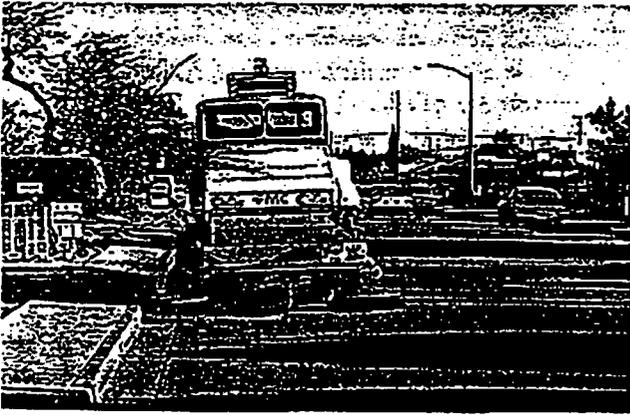
Specific maintenance tasks performed will vary considerably according to allowed uses, surface and the facility's geographic location. For example, a trail in the upper Midwest may need to be groomed for cross country skiers while a bike lane enduring the harsh freeze-and-thaw winters of the Northeast may need to be patched more often.

Necessary maintenance tasks for off-road facilities may include the following:

- ▶ patching or re-grading the trail surface on a regular basis
- ▶ inspecting and repairing/replacing signs, traffic markings, bollards and gates
- ▶ mowing shoulders and other areas
- ▶ trimming vegetation to meet sight-distance requirements
- ▶ removing fallen trees, limbs and debris
- ▶ repairing any damage from seasonal washouts
- ▶ cleaning culverts, catch basins and other drainage structures
- ▶ sweeping the trail to keep it free of debris
- ▶ removing snow and ice
- ▶ keeping lights clean and replacing fixtures as required
- ▶ maintaining support facilities such as benches and drinking fountains
- ▶ maintaining unique features such as bridges and tunnels
- ▶ inspecting trail-related structures to ensure they are in good condition
- ▶ picking up litter and emptying trash cans

## Maintaining on-road facilities

For on-road facilities, the Oregon Bicycle and Pedestrian Plan suggests that maintenance activities should reflect the specific needs of bicyclists and pedestrians. It states, "A bicyclist is riding on two very narrow, high-pressure tires. What may appear to be an adequate roadway surface for automobiles can be treacherous for cyclists. Fairly small rocks can deflect a bicycle wheel, a minor ridge in the pavement can cause a spill, a pot-hole can cause a wheel rim to bend. Wet leaves are slippery and can cause a bicyclist to fall. The gravel that gets blown off the travel lane by traffic accumulates against the curb, in the area where bicyclists are riding.



Street sweeping is a relatively simple but important part of making roadways more bicycle-friendly

Pedestrians have little or no protection from the elements and their feet are in direct contact with the ground. While walking, a person will typically be looking ahead and around, and not notice cracks and bumps in the sidewalk. A smooth, level surface is especially critical for the disabled, the young and the elderly. Many snow removal efforts may make conditions worse for the pedestrian, especially where there is no buffer. Pedestrians are very dependent on motorists respecting traffic signs and signals; these must be properly maintained for pedestrian safety."

Taking these factors into consideration, the most important maintenance tasks for on-road facilities include:

- ▶ sweeping after major winter storms
- ▶ sweeping in autumn for leaves and in spring for sand
- ▶ keeping drains in operating condition
- ▶ cutting back vegetation to provide adequate clearances and sight distances
- ▶ cutting back intrusive tree roots
- ▶ replacing and repairing signs
- ▶ inspecting and replacing roadway striping and graphics
- ▶ filling potholes and pavement cracks
- ▶ inspecting pavement patches after underground utility work and other excavation activities that disrupt road and sidewalk surfaces
- ▶ modifying or replacing non-standard drainage grates with bicycle-safe grates

### Conditions for bicyclists can be improved through routine roadway maintenance

Over a ten to twenty year period, almost every street in an urban area is subject to some form of restriping, resurfacing, and/or reconstruction (National Bicycling and Walking Study Case Study, No. 21). This provides an excellent opportunity to make each of these streets friendlier for bicyclists and pedestrians.

In its *Guide for the Development of Bicycle Facilities*, the American Association of State and Highway Officials suggests, "when lane markings for four or six lane streets are restriped, consideration can be given to adjusting the lane widths and providing a wide curb lane for bicycles. Addition of edge lines can better delineate a shoulder, especially at night. When shoulders are re-surfaced, a smooth surface suitable for bicycle riding should be considered." Pavement overlays can be extended over the entire surface of the roadway (to avoid leaving an abrupt edge), road shoulders can be widened, and grates can be replaced with bicycle-safe models.

The City of Palo Alto, California, requires utility companies to patch their roadway excavation to a very high standard. Any large gaps or ridges are unacceptable. And, if the patch fails within one year the company must re-do the job free of charge (Case Study No. 21).

## Design and Maintenance

Prior to the construction of a facility, a comprehensive budget and management plan that includes maintenance costs should be developed. When maintenance costs are being considered, the following dictum applies, "If you install it, you must maintain it". For instance, if informational and directional signs are built, a certain number of them will have to be replaced every year.

If the width of a foot path is 2.44m (eight feet) instead of 3.05 m (ten feet), the weight of maintenance vehicles will cause its edges to crumble more rapidly. If trash cans are placed along a bikeway every 3.33 km (two miles), they must be emptied regularly. The design of the trail must, therefore, reflect the amount of money available for maintenance.

Funds for the planning and development of a facility are much easier to obtain than maintenance funds.

Government agencies and individuals are more likely to donate money before a trail is constructed, rather than after. Therefore, the best way to save money on maintenance is to spend money on designing a facility that needs the least amount of maintenance.

For example, "the single biggest cause of maintenance-related safety problems is water drainage, and fixing damage caused by storms and flooding is often the biggest line item in a maintenance budget. The solution is to solve drainage problems before a trail is built by including adequate and well engineered drainage facilities in the trail's design." (*Trails for the Twenty-First Century*). For instance, if an asphalt-surfaced facility is designed with an uphill ditch to prevent surface runoff, the freezing and thawing process is prevented and there will be less of a need for major surface repairs.

### Developing a maintenance budget

Developing an accurate maintenance budget is not as easy as plugging numbers into a mathematical formula. Differences in bookkeeping methods, wages, trail design, topography, availability of maintenance equipment, community expectations, and many other variables make it impossible to know what the exact maintenance costs per kilometer (mile) per year will be. Two identical facilities in different communities may have different figures for their maintenance costs per kilometer (mile). Even so, it is possible to come up with a good estimate of the costs for a particular facility.

- ▶ Obtain the current per-kilometer (per-mile) cost for maintaining a similar existing trail in a similar community.
- ▶ Find out how the managing agency assigns charges to various maintenance activities.
- ▶ Make a prioritized checklist of all possible maintenance activities and their frequency, cost per application and annual cost.
- ▶ Develop a tracking system that ensures the timely and systematic completion of all maintenance activities.

While there are no hard-and-fast rules for calculating costs of trail components, some guidelines follow:

- ▶ Asphalt needs resurfacing every seven to fifteen years, depending on site conditions and construction quality. In 1992 dollars it cost a minimum of \$32.80 per meter (\$10 per linear foot) to remove and replace asphalt. It is possible to overlay the old asphalt with a 38.1 mm (1.5-inch) top coating, costing approximately \$16.40 per meter (\$5 per linear foot).
- ▶ Concrete lasts approximately 25 or more years; replacement costs approximately \$82 per meter (\$25 per linear foot) in 1992 dollars.
- ▶ Crushed stone should last 7 to 10 years, although it does require frequent patching and spot repairs; replacement costs approximately 16.40 per meter (\$5 per linear foot).

Note: Estimate annual costs by dividing each item's construction cost by its anticipated lifespan. Bridges, tunnels, and other structures can last more than 50 years, although they will need painting and other repairs, including the replacement of decking.

### For More Information:

The Rails-to-Trails Conservancy has a variety of resources regarding trail planning and development, including *Trails for the Twenty-First Century, a Planning, Design, and Management Manual for Multi-Use Trails* (1993). Write: RTC, 1400 16th Street, NW, Washington, DC 20036, or call (202) 797-5400.

The National Bicycle and Pedestrian Clearinghouse distributes the 24 case studies (including Case Study No. 21, *Bicycle and Pedestrian Considerations in State and Local Transportation Planning*) and the *Final Report of the National Bicycling and Walking Study* (1994), along with other bicycle, pedestrian, and trail-oriented documents. Write: NBPC, 1506 21st Street, NW, Washington, DC 20036, or call (800) 760-6272.

The American Association of State Highway and Transportation Officials offers the *AASHTO Guide for the Development of Bicycle Facilities* (1991). Write: AASHTO, 444 N. Capitol Street, NW, Suite 225, Washington, DC 20001, or call 202-624-5800.

