CHAPTER 6: INSPECTION, MAINTENANCE, AND MONITORING

6.1 PURPOSE AND USE OF THIS CHAPTER

Best Management Practices (BMPs) are designed to reduce the impacts of stormwater pollutants and increased runoff on Lake Tahoe's famed clarity. Without regular maintenance, BMPs lose their effectiveness, resulting in increased runoff and discharge of pollutants to Lake Tahoe. BMPs must remain functional and effective through regular inspections, maintenance, and monitoring for property owners and land managers to comply with the TRPA Code of Ordinances and for local jurisdictions to meet Lake Tahoe TMDL pollutant load reduction targets.[1]

BMP inspections assess conditions to determine if BMPs need maintenance action to keep them functioning and effective. Inspection protocols include frequency of inspection intervals, conditions to look for which trigger BMP maintenance, and suggested equipment needed to complete the work. Maintenance actions upkeep BMP function and performance, while monitoring evaluates BMP effectiveness and ensures Lake Tahoe's water quality standards are met. Documenting inspection, maintenance, and monitoring activities provides a record of compliance and can serve as a reminder for future maintenance issues.

Owners of developed properties must ensure BMPs remain functional and effective to retain their BMP Certificate and comply with the TRPA Code of Ordinances. Routine maintenance preserves the lifespan of BMPs and minimizes the potential for discharges of stormwater runoff and pollutants to Lake Tahoe. Where BMPs are not functioning effectively due to property owner's failure to inspect, maintain, and monitor them, a BMP Certificate may be revoked by the TRPA.

Specific inspection protocols and maintenance actions accompany most BMPs in Chapter 4, BMP Toolkit. Not all BMPs need the same inspection protocols, maintenance actions, and monitoring requirements. They vary depending on project size, location, and on-site use and conditions. The purpose of this chapter is to provide technical guidance for a range of project scales and complexity.

For ease of use, this chapter organizes inspection, maintenance, and monitoring information into three project scale breakpoints according to project size and type:

- **Section 6.2** describes methods for Projects Less than 1 Acre and all Single Family Residential (SFR).
- **Section 6.3** describes methods for Projects 1 to 5 Acres and all Commercial, Industrial, Communications and Utilities (CICU).
- **Section 6.4** describes methods for Projects Greater than 5 Acres, which includes most jurisdiction scale projects.
- **Section 6.5** concludes with pertinent information on BMP Maintenance Agreements and other BMP related legal documents.

[1] EPA, May 2007, *Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*

6.2 PROJECTS LESS THAN 1 ACRE AND ALL SINGLE FAMILY RESIDENTIAL (SFR)

Inspection, maintenance, and monitoring of small-scale BMPs is fairly simple and can usually be accomplished by the property owner, handyman, or licensed contractor. Regular BMP inspection and maintenance prevents costly repair and/or BMP replacement.

The *Small Residential Property BMP Inspection, Maintenance, and Monitoring Checklist* at the end of this chapter provides inspection protocols, maintenance actions, and monitoring requirements for BMPs most commonly installed on residential properties less than 1 acre in size and all single family residential (SFR) properties.

Contractor showing an inspection port open to visually assess for sediment accumulation in a rock infiltration trench.

6.3 PROJECTS 1 TO 5 ACRES AND ALL COMMERCIAL, INDUSTRIAL, COMMUNICATIONS AND UTILITIES (CICU)

Commercial and large multi-family residential properties typically have higher pollutant and sediment loads because of their size and use. To retain their BMP Certificate, property owners and land managers must inspect and maintain BMPs so they remain functional and effective. They may also be required to monitor BMP performance to comply with the TRPA Code of Ordinances. Staff time and financial resources, including contracting with a BMP professional may be necessary to complete inspections, maintenance, and monitoring.

6.3.1 BMP INSPECTION AND MAINTENANCE LOG

All commercial and large multi-family residential properties must develop a *BMP Inspection and Maintenance Log* that identifies BMP inspection protocols and necessary maintenance actions to document all inspection and maintenance activities. The log should be specific to the property location, BMP types, property management organization, and on-site conditions[2]. TRPA has created an electronic *BMP Inspection and Maintenance Log* template for property owners to complete which incorporates the following sections and an example is at the end of this chapter:

- Site Description: This section should list the occupancy and uses of the site and any other pertinent information such as slope elevations and contours, contributing and receiving drainage areas, and potential pollutants that might be necessary to characterize the site.
- BMP Inventory: List each BMP on-site that correspond to a site plan including non-structural BMPs such as sweeping.
- BMP Inspection Protocols and Maintenance Action: The electronic Maintenance Log template uses the Inspection and Maintenance section for common BMPs listed in Chapter 4, BMP Toolkit to develop specific inspection protocols and maintenance actions. When completing the Maintenance Log, include site-specific triggers that indicate when maintenance of a BMP is necessary and other supporting documentation such as photos and invoices from contractors providing any specialized maintenance services (such as vactoring or filter cartridge replacement), and corrective actions to be taken if there is a recurring maintenance issue.

Training and Education: Property owners and land managers responsible for BMP inspections and maintenance should receive comprehensive training including BMP locations and types, inspection protocols, maintenance actions, spill prevention and cleanup measures, and recordkeeping requirements. At a minimum, training should require reading the *BMP Inspection and Maintenance Log*.

6.3.2 BMP MONITORING PLAN

In certain circumstances a *BMP Monitoring Plan* may be required as a condition of approval for a proposed project. Examples of these conditions include BMPs systems that directly discharge to Lake Tahoe or its tributaries, installation of BMPs without reliable effectiveness data, and sites with high pollutant loading potential.

[2] EPA, May 2007, *Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites*

BMPs are most commonly monitored by analysis of water quality samples and photographic documentation.

Start the *BMP Monitoring Plan* with a site-description that includes uses and conditions on site. Determine what will be monitored and what standards will be used to evaluate the data collected. If monitoring water quality, use the standards outlined in the TRPA Code for comparison. If performing photographic monitoring for a BMP such as revegetation, compare to a reference site or use other success criteria such as percent vegetative cover. Refer to the Revegetation Plan guidance in Chapter 5, Soil and Vegetation Management for more detail.

Next, identify the sampling locations and proposed methods and provide rational for each. Examples include collecting grab samples at the outlet of a cartridge filtration system which discharges directly to Lake Tahoe, or photographic monitoring of a slope which requires successful revegetation to prevent sediment discharge onto an adjacent road. Water quality monitoring and sampling should follow the protocols and guidelines outlined by the Lake Tahoe Interagency Monitoring Program. Larger sites may need to provide photos of sampling locations and have them denoted on a site plan, as specified in permit conditions.

Determine sampling frequency based on establishment of a data set large enough to capture a variety of conditions including summer and winter storms and first flush events. Photographic monitoring of revegetation generally occurs at the beginning and end of each growing season, though winter monitoring may be included to document protection of sensitive areas from snow removal.

Monitoring plans include observations at the time of data collection that assist in the analysis of BMP effectiveness. These observations include intensity of use, weather patterns, the interval between storm events, point in the hydrograph and relative intensity of the storm. This additional information will help property owners and regulators determine if BMPs are performing as designed and may help explain any violations of standards.

Monitoring plans should identify corrective measures to resolve any violations of BMP standards should they occur and be designed to work in conjunction with the BMP Inspection and Maintenance Log to identify actions that will improve BMP performance. A *BMP Monitoring Plan* template is available at the end of this chapter.

Data analysis is documented in the *BMP Monitoring Report* and submitted to TRPA. It is essential to clearly define when this report will be submitted to TRPA and who will be responsible for providing it. A TRPA Monitoring Report template is provided at the end of this chapter.

6.4 PROJECTS GREATER THAN 5 ACRES

Jurisdictions within the Lake Tahoe Region must reduce their pollutant loading to meet targets identified in the Lake Tahoe Total Daily Maximum Load (TMDL). The Lake Tahoe TMDL specifies the maximum amount of fine sediment, nitrogen, and phosphorus that can be discharged to the Lake and still restore Lake Tahoe's clarity.

Vactor equipment removes sediment and other debris out of a drop inlet, preventing re-suspension of materials into the storm drain during the next storm event.

As part of the Lake Tahoe TMDL effort, jurisdictions in partnership with regulatory and funding agencies implement regional water quality improvement projects that treat and infiltrate runoff from the public right of way. Operations and maintenance of municipal water quality infrastructure is very complex and each jurisdiction develops its own operations and maintenance plan. Effectively implementing these plans is essential to maintaining the long term effectiveness of regional BMPs, and to achieving Lake Tahoe TMDL pollutant load reduction targets.

The Lake Tahoe TMDL program includes several tools for the local jurisdictions to assess, quantify, and track pollution reduction targets. The Best Management Practices Rapid Assessment Methodology (BMP RAM) is a tool for gauging and tracking the relative condition of municipal water quality treatment BMPs. The BMP RAM quantifies the BMP performance condition and informs the user of the relative urgency for maintenance.

Inspection protocols, maintenance actions, and monitoring requirements associated with BMPs in Chapter 4, BMP Toolkit follow the BMP RAM protocols as closely as possible for treatment BMPs to establish consistency between the private and public sectors. This BMP Handbook does not duplicate the BMP RAM. However, when inspecting a treatment BMP, a landowner or manager may use both this handbook and the BMP RAM manual where applicable.

6.5 MAINTENANCE AGREEMENTS AND BMP-RELATED LEGAL DOCUMENTS

Inspection of a baffle vault to determine the depth of sediment accumulation and whether oil/grease absorbent pads need replacement.

The property owner is responsible for selection, installation, maintenance, and performance of BMPs on their property. However, it is possible to enter into an agreement with other adjacent property owner to collaborate on the installation and maintenance of BMPs. If such an agreement is formed, it should state which parties are responsible for the maintenance activities and costs associated with the BMPs. Types of agreements that are commonly used in the Lake Tahoe Region include the following:

- Home Owner/Property Owner Associations (HOAs/POAS): HOAs are typically responsible for maintenance of all BMPs within common areas of a residential development. Individual property owners may be assessed for common area maintenance costs.
- Deed restrictions: In cases where BMPs are shared by multiple properties, a deed restriction may be placed on all affected properties to ensure BMPs remain in place. These restrictions remain with the property regardless of changes in ownership.
- Limited Government Responsibility: The local government is responsible for all areas in the city's or county's right-of-way and any other publicly owned land such as local facilities and parks.
- Conditional use permits: In cases where the United States Forest Service allows private use of federal land, responsibility for BMPs inspection and maintenance will be stated in the conditional use permit.
- Stormwater Pollution Prevention Plan: A Stormwater Pollution Prevention Plan (SWPPP) is a maintenance agreement required for Commercial/ Industrial Properties, Marinas, and projects with disturbance greater than 1 acre. Site-specific maintenance requirements are outlined in the SWPPP.

- BMP Real Estate Disclosure: At the time of sale, new deed holders are required to acknowledge BMP compliance status and maintenance requirements using the BMP Real Estate Disclosure Form. Once the property is sold, BMP maintenance becomes the responsibility of the new deed holder. Failure to maintain existing BMPs may result in a noncompliant status and the BMP Certificate being revoked.