Appendix D

Conservancy Program Objectives And Preferred Design Approach

The Conservancy's goal under the Soil Erosion Control Program is the funding and implementation of projects that meet the following three objectives.

1. Address high priority soil erosion control and water quality improvement needs. This grants program is intended to fund and implement projects in areas with critical problems and to design projects which maximize, to the extent feasible, water quality benefits. Projects, under this program, will focus on preventing the mobilization of fine sediment and nutrients by erosion (source control), reducing surface water volumes (hydrologic design considerations), and removing fine sediment and nutrients from stormwater (treatment). This design objective can be met using the Preferred Design Approach as a guiding principle, or by the use of other approaches which have been shown, by either qualitative or quantitative analysis, to have significant water quality benefit. This Preferred Design Approach is described in detail below.

2. Address soil erosion control needs effectively. This is achieved through the implementation of thorough, comprehensive projects at the lowest necessary cost.

3. Fund projects that can be readily implemented (i.e., so that on-the-ground site improvements may be completed as quickly as possible).

In addition to these primary objectives, projects must be monitored to assess their effectiveness and maintenance needs, and to improve the design of future projects.

Other Resource Objectives

In addition to meeting water quality objectives, applicants are requested to design projects that are compatible with other Conservancy resource objectives and Tahoe Regional Planning Agency (TRPA) environmental thresholds. Therefore, grantees are encouraged, when feasible, to develop project designs which also preserve or enhance wildlife habitat, forest and riparian habitat, public access, recreation, defensible space, and private property Best Management Practices interface opportunities.

Preferred Design Approach

This section presents a guiding principle to consider when designing projects. It is intended to apply not only to grant submittal preparation, but also to the more detailed planning and design work that occurs after a grant is awarded.

The PDA reflects the current assessment of state-of-the-art technology and experience in implementing erosion control projects at Lake Tahoe. The Preferred Design Approach emphasizes project elements that prevent the mobilization of fine sediment and nutrients by erosion (source control), and that reduce the volume of runoff reaching natural surface waters (hydrologic design considerations). Source control measures and hydrologic design considerations, primarily infiltration, are the most cost-effective and efficient means to improve water quality. These two elements should be considered together, not separately, when looking for opportunities. Water quality treatment measures to remove pollutants from runoff are to be considered only after source control and hydrologic design.

In cases where applicants find it difficult to apply a specific portion of the PDA to a project or element of a project, the applicant should consult with Conservancy and other agency staff on specific barriers to implementation of the PDA. If project designs are not based on the PDA, grantees will be required to explain the specific barriers to the application of the PDA and provide documentation to support how the proposed alternative approach meets program objectives (e.g., maximizes water quality benefit).

The Conservancy recognizes that this approach must be applied within the context of professional engineering practices to avoid impacts on public health and safety and damage to public and private property. It also recognizes that there are legal and regulatory limitations to the application of these principles, such as applicable drainage law.

Specific elements of the Preferred Design Approach are:

Source Control

1. Place higher priority on source controls than on treatment. Source controls are measures that prevent erosion. Treatment facilities remove pollutants from runoff.
2. Emphasize reduction in bare, erodible surfaces (e.g., steep cut slopes, dirt roads) and impervious area.
3. Emphasize stabilization of gullies, unstable channels, and other sources that contribute especially high sediment loads.

4. Maximize self-sustaining source control methods, such as revegetation with native plants, pine needle mulching, and adding soil amendments such as mycorrhizal inoculum to soils when appropriate.

Hydrologic Design

5. Maintain or create distributed flow patterns (e.g., flows which discharge from the right-of-way frequently, or from shoulders by unconcentrated "sheet flow") and avoid concentration or increases of flows where feasible.
6. Maximize infiltration of runoff from impervious surfaces. In some cases this can be accomplished by techniques described in number 5 above or also by the construction of leach fields, dry wells, or detention basins, for example.
7. Keep runoff from non-urban areas separate from urban runoff until urban runoff is treated. Treatment efficiency is much greater when flow volumes are smaller.
8. Keep treated urban runoff separate from untreated urban runoff to avoid resuspension of sediments and decreased treatment efficiency in downstream facilities.
9. Apply geomorphologic principles to natural channel design and mimic natural processes when stabilizing, restoring, or recreating natural drainage channels. For example, channels with floodplains tend to be more stable than those without. Channels with steps and pools are a frequent natural stream form and have better habitat values than those with continuous slopes. Avoid adding to or decreasing natural stream flows or changing watershed boundaries.

Treatment

10. Emphasize removal of fine sediments and phosphorous. For the purposes of the PDA, fine sediment is considered to be those particles that pass the number 200 sieve (less than 75 microns). Examples of improvements that are likely to achieve this objective are properly-sized, flat or gently-sloping, well-vegetated, detention areas (meadow-like areas).
11. Use natural treatment systems, such as meadows, where feasible. Because of the critical importance of wetland plants in removing pollutants from runoff, projects located in Stream Environment Zones (SEZ) should generally preserve the existing vegetation and function of the SEZs to the maximum extent practicable.

The Basin 208 Plan calls for the restoration of 1,100 acres of disturbed SEZs in the Basin. The program objectives continue to place a priority on SEZ restoration work to support attainment of this threshold. Such restoration work is cost-effective and beneficial for

removing nutrients and fine sediment from runoff. Preference will be given to qualified projects that provide for infiltration of runoff and absorption of nutrients by plants and soil. This concept will continue to be promoted throughout the project design and plan review process.

Grantees are encouraged to collaborate and cooperate with the Tahoe Resource Conservation District (TRCD) at the beginning of a project to determine methods of collecting and sharing information between them that can assist in promoting private property compliance with the TRPA's BMP Retrofit Ordinance within project areas. The goal of these efforts is to reduce pollutant loads entering public rights-of-way, ground water, and surface waters to improve the effectiveness of County and City erosion control projects as well as assist TRCD in obtaining information that would assist them in providing more efficient BMP designs. When funding submittals are evaluated, preference will be given to qualified projects that include this component.

Coordination with Storm Water Master and Management Planning Efforts

Where feasible and appropriate, grantees shall incorporate jurisdictional storm water master plan drainage efforts and storm water management activities with Conservancy project design objectives. Development of regional treatment systems, where appropriate, should be considered to address water quality treatment. While regional treatment systems may also address the potential for flooding, its primary objective must be water quality improvement to be eligible under the soil erosion control grant program.

Storm Water Quality Improvement Committee (SWQIC) Procedures

The California Tahoe Conservancy board and the Lake Tahoe Basin Executives have endorsed the concepts and principles described in the documents developed by the **Storm Water Quality Improvement Committee (SWQIC)**. The SWQIC documents describe a process to provide a consensus-based approach to project review, development, and implementation. It is hoped that this approach will lead to project designs that have the support of all agencies and meet the objectives of the PDA.

When implementing erosion control projects, the procedures described in the SWQIC documents should be followed to the extent practical and feasible. A complete set of these documents can be downloaded by clicking on the "Stormwater Planning" link on the TRPA website (http://www.trpa.org/).

Pursuant to the Formulating and Evaluating Alternatives portion of the SWQIC process, applicants are requested to develop and analyze a variety of design alternatives to determine the best elements to include in a particular project. Consistent with the PDA, the alternatives should first consider source control measures and hydrologic design measures, and, finally, treatment systems.

Conservancy Monitoring Objectives and Requirements

Pursuant to the intent of the budgetary requirements, all projects must be monitored to document their effectiveness at reducing discharge of sediment and other pollutants to the waters of the Lake Tahoe region. Prior to initiating a monitoring program, the questions that will be answered or addressed through monitoring should be defined and agreed upon in a monitoring plan approved by the Conservancy.

More intensive water quality monitoring is encouraged only on projects that provide the best opportunities to more comprehensively address the Conservancy's monitoring program objectives. These objectives are to improve the effectiveness of future projects and document the water quality benefits of constructed BMPs and projects. Since funding for this task tends to be limited, applicants must work closely with Conservancy staff in the early planning phases of project development to determine the level of monitoring for each project.

Minimum Monitoring Requirements

Photographs and visual observations are required for all projects. These must be recorded at each site during the year preceding construction and for at least two years following construction. Semi-annual reporting and annual reports documenting photo monitoring and visual observation must be prepared and submitted to the Conservancy.

1. Photo points - On a map of the site, show the locations where the camera will be positioned, and the direction(s) it will be pointing. Photographs should be taken from the same locations each time and pointing in the same directions. The photographs should contain landmarks or reference points so that the viewer can discern that the before and after pictures were taken from the same location. Note the frequency and dates when photographs will be taken. Digital photographs must be taken at all sites, at various times of the year both before improvements are installed, and after the project is constructed. Photos must be taken twice a year, once during spring melt and once in the fall prior to snowfall, so that a sequence of photos can be prepared and evaluated for

seasonal variability. Photos should always be taken at the same time of day (i.e., morning, afternoon, etc.).

In addition to seasonal photos taken each year, pictures should be taken during and/or after major storm events (i.e., large runoff events) and after structural changes such as bank failure or gullying have occurred. These event-based photos may be taken at a different location than the established photo points if that is necessary to capture the impacts of the event. Under these circumstances, the locations for the new photo points and the reasons for selecting these new locations should be explained in annotations corresponding to each photo.

2. Field observations - Field observations should address the monitoring goals and should attempt to answer the questions defined for the photo monitoring. In addition to the existing conditions mentioned below, photo annotations should discuss antecedent conditions, such as the weather and soil moisture conditions, and/or the size and type (i.e., rain, snow, hail, etc.) of storm that is being observed.

Conditions that are required to be observed in the field, and must be addressed with photo annotations are:

- location, date and time;
- precipitation (estimate where rain gauge data is not available);
- temperature of the ambient air, and water if present;
- depth, velocity, and cross-sectional area of flow (only where channels are impacted by project);
- color and turbidity of water, if present (turbidity shall be determined by field analysis of a grab sample or submittal of a sample to a laboratory qualified to perform turbidity analysis in accordance with accepted protocol);
- depth and area of accumulated sediment in channels, basins, or traps;
- depth, length and width of rills or gullies on slopes; and
- percent plant cover (if using a transect evaluation method), or label discrete areas with one of the following categories: bare, sparsely vegetated, moderately vegetated, densely vegetated.

Field observations must be recorded whenever photographs are taken.

3. Semi-annual reporting – The grantee should report to the Conservancy staff semi-annually with a brief letter or verbal communication, and provide digital photos on a disk or email attachment, in order to allow Conservancy staff to comment prior to the completion of each year of monitoring. If problems are encountered with the

monitoring, a brief summary of the problems should be provided to the Conservancy during this communication.

4. Annual reports - The first annual report must include annotated photographs of the site before construction. Each subsequent annual report shall include a sequence of annotated photographs from each photo point showing the site, at least twice a year, once during spring snowmelt and once in the fall prior to snowmelt, before construction, one year after construction, and two years after construction. As noted above, the photographs should contain landmarks or reference points so that the viewer can discern that the before and after pictures were taken from the same location. The annotations should include the photo point location, a description of what each photograph shows, and the field observations detailed above. The report should include a project map or maps showing the locations of the photo points.

Annual reports must present the water quality data collected during the past year (if any), and an analysis of the data's significance in regard to the effectiveness of the control measures at improving water quality. Variations in the data, if any, and possible reasons for them should also be discussed. Annual reports should also identify the conclusions that can be drawn from monitoring, and should answer questions like – What did we learn about these designs regarding their effectiveness, limitations associated with them, problems that may have occurred, any suggested solutions/modifications to the designs, any recommendations regarding effectiveness of monitoring techniques?

More Intensive Monitoring

The following guidance should be followed for projects approved for more intensive monitoring, including water quality sampling.

1. Monitoring Proposal Review -

The LTIMP group, a water quality working group, continues to meet monthly. This working group includes representatives from various Federal, regional, State, and local agencies, plus university staff, consultants, and private individuals with monitoring expertise. One function of the working group is to provide an informal review of monitoring proposals and sampling and analysis plans. This review process does not apply to basic monitoring programs involving only photographs and visual observations, and should primarily be utilized for complex monitoring projects, that incorporate new technology or include treatment BMPs that pose problems for monitoring efforts. Applicants are encouraged to present their monitoring proposals for

intensive monitoring projects to the LTIMP working group for review when complex designs are proposed or there is a lack of convenient sampling locations. However, this procedure is optional and at the discretion of the grantee. The recommended process for this informal review is a short presentation by the monitoring project proponent to the LTIMP group, followed by a session of feedback and questions. The purpose of the presentation and feedback session is to coordinate efforts, prevent duplications, and strengthen the monitoring proposal's methods. To schedule a presentation, applicants should contact the current LTIMP chair.

2. Locations of water quality sampling points - At least one sampling point should be immediately above and below the proposed improvements. The station above the project should be designed to provide data on background pollutant levels. If a sampling point immediately above the project is not feasible, a control station as close as possible to the site should be selected. The watershed above the control station must be similar to the project site and there should be no land use changes in this watershed during the period of monitoring. The sampling point below the proposed improvements should be designed to measure the effectiveness of the improvements. If possible, water quality sampling points should be chosen that would allow for flow measurements (or estimates) to be taken (i.e., a location with well defined, concentrated flow).

3. Constituents to be analyzed - The constituents analyzed for in each project should be mutually agreed upon between Conservancy staff and grantees prior to the onset of intensive monitoring efforts. The units of measurement must be the same as those used by the Lahontan Regional Water Quality Control Board. Laboratory methods approved by the US Environmental Protection Agency must also be used.

Where feasible, flow measurements should be taken at each water quality sampling point, during each sampling event, in order to more accurately estimate pollutant loading associated with the project components.

4. Frequency of sampling - Frequency of sampling will vary depending on the question that is being answered through the monitoring. However, at a minimum, samples should be collected at the beginning, peak, and end of each storm that is sampled. At least three storm events and one snowmelt runoff event should be sampled each year for one year preceding construction and at least two years following construction. Consensus on statistical methods and sampling frequency should be reached before data collection begins.