APPENDIX C: THE COMPLIANCE EVALUATION CHECKLIST

The following lists factors to consider when evaluating the application of treatment alternatives. This checklist is to be completed by the permittee or their engineer, and submitted with permit applications.

The treatment alternatives are as follows: No Action, Vegetation Only, Repair Protection, Vegetate Structure, Remove Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall.

APPLICABILITY

(All Treatments)

• Is this alternative listed as a treatment alternative for this property in the Master Plan maps? If not, is the rationale for its application justified, given changed existing conditions since the preparation of the Master Plan?

Explanation: The proposed treatment should be consistent with the Master Plan.

REGRADING

(Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

• Is the design slope appropriate to the treatment?

Explanation: Treatments should be applied according to the table below:

Design Slope		Appropriate Treatment
(H:V)	Degrees	
= 3.0H:1.0V	= 18	Regrade and Replant, Terrace
3.0H:1.0V < x = 1.5H:1.0V	18 < x = 34	Riprap at Toe or Vegetated Riprap
> 1.5H:1.0V	> 34	Vegetated Wall

If treatments are applied at higher than recommended slopes, they will be prone to failure. For example, rocks places on slopes steeper than 1.5H:1V typically are not effective, because rocks placed at high slopes tend to shift and tumble into the stream during high flows. If a more intensive treatment is applied to a slope less than recommended, then revegetation opportunities will not be realized.

• Has a geotechnical engineer evaluated the local soil characteristics and/or design stability?

Explanation: A geotechnical engineer will provide additional information for the design, such as soil properties and likely failure planes. Based on geotechnical information, a bank stabilization design may need to be adjusted.

POSITION OF TOE OF BANK

(Repair Protection, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

• Is the toe of the altered bank at the same position (or set back farther from the thalweg)?

Explanation: Regrading and the addition of materials should not extend the toe of the bank into flow, since that could alter streamflow patterns and exacerbate erosion elsewhere along the channel.

TERRACE DESIGN

(Terrace Treatment)

• Has the basis/calculation for sizing (width, elevation) of the terrace(s) been stated/shown?

Explanation: The lowermost terraces should be sized to contain the 1.5- to 2.0-year flow. Additional terraces can be designed to hold any design flow event, at the discretion of the design team. Another logical terrace elevation would be at the stage of the 10-year flood, for example. Terrace widths (dimension perpendicular to channel) should generally be at least 10 feet wide to accommodate shrubs and 15 feet wide for trees.

ROCK PLACEMENT AND SIZING

(Riprap Toe, Vegetated Riprap)

• In steep areas (slopes ~1.5H:1V), will rocks be placed, rather than dumped?

Explanation: Rocks that are placed carefully by hand or machinery are more stable than dumped rock. Slopes of 1.5H:1V are possible only if rock is placed meticulously for three-point contact between rocks.

• Has the rationale for rock size been explained with supporting calculations?

Explanation: Rock should be sized to remain stable at a design flow. Neither Santa Clara nor San Mateo currently have guidelines for a design flow event for rock sizing. However, a minimum design flow assumption of at least a 25-year flood should be used. A higher design flow event should be adopted in the event of significant costs or hazards associated with project failure. Design for a higher flow rate, less-frequent flood event, such as a 100-year peak flow, will significantly reduce the likelihood of structural failure over the lifetime of the project. Santa Clara Valley Water District can provide can provide hydraulic data (from FEMA) to estimate flow velocities through a given reach.

• Has the basis for the upper limit of the rock been stated?

Explanation: Rock should extend up to (and preferably at least 1 foot above) the elevation of the design flow event. We recommend that, at minimum, a 25-year design flow be used as a guideline. Hydraulic information for the 25-year design flow is available through SCVWD.

• Has a filter layer been incorporated into the design?

Explanation: A filter layer is a blanketing layer that acts to prevent erosion of finer soil particles from the bank through the interstices of the overlying riprap. A filter layer can consist of smaller sized, graded rock material or a geotextile fabric.

KEYING IN THE STRUCTURE

(Riprap Toe, Vegetated Riprap, Vegetated Wall)

• Has the bottom of the structure been "keyed into" the channel bed? Have scour calculations been provided that support the depth to which the structure extends below the thalweg?

Explanation: Structural elements must extend to some design depth below the streambed. This prevents undermining of the structure from scour. Scour calculations can be done based upon existing hydraulic information available through SCVWD. We recommend that, at minimum, a 25-year design flow be used as the basis for scour calculations.

• Have the upstream and downstream ends of the structure been "keyed into" the channel banks?

Explanation: Structural elements must extend to some design depth

below the streambed. This prevents localized scour alongside the structure. Scour calculations can be done based upon existing hydraulic information available through SCVWD. We recomment that, at minimum, a 25-year design flow event be used as the basis for scour calculations.

GEOMORPHIC

(Repair Protection, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Has the cause of erosion been identified?

Explanation: The Master Plan is conceptually designed so that recommended treatments are appropriate to currently active geomorphic processes. The design consultant(s), however, should reexplore the active geomorphic processes to fine-tune the design. Understanding the local cause for erosion, and predicting future geomorphic processes, can help inform the design and minimize later maintenance requirements.

Despite the emphasis on existing conditions in this Master Plan, it will be important for future stakeholders to consider then-current fluvial processes as projects are proposed on an individual basis. It is therefore recommended that, in addition to other scientific personnel, a geomorphologist participate in the design of all bank stabilization projects. This will help ensure that local fluvial processes are properly considered for a bank stabilization design. To design a site-specific bank stabilization and revegetation technique, the following items be addressed: planform channel pattern, upstream and downstream conditions, conditions on the opposite bank, erosion at the edges of hard structures, bed conditions, and any major hydrologic changes in the watershed since release of the Master Plan.

- What is the likely potential of the design to exacerbate erosion upstream, downstream, or on the opposite bank?

Explanation: Changes to the shape of and materials after implementation of a bank stabilization/revegetation project may alter local flow direction and hydraulics. As a result, a design may affect erosion risks in nearby areas. A design should reduce erosion risks at a location without transferring risks upstream, downstream, or to the opposite bank.

CONSTRUCTION/IMPLEMENTATION CONSIDERATIONS

(Vegetation Only, Repair Protection, Vegetated Structure, Remove Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Has the design considered access for any necessary machinery?

Explanation: Some types of machinery may not be able to access and work within areas necessary for implementation of a bank treatment. Equipment cannot be moved across property if permission has not been granted.

- Has an erosion control plan been submitted with the design?

Explanation: Disturbance to the bank surface during implementation can move soil into the stream and degrade water quality essential to fish and wildlife.

FLOODING

(Vegetation Only, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Given the existing conditions, would the treatment exacerbate flooding upstream?

Explanation: The Master Plan is conceptually designed so that treatments will not exacerbate flooding locally. However, the actual final design of any treatment has the potential to increase flood hazards if this design factor is not explicitly considered. Therefore, each design team should consider the net effect of the proposed design, particularly in those zones of the creek where flooding is already a high risk.

Hydraulic modeling can be used to estimate any local changes in water surface elevations associated with changes in channel geometry and/or roughness. Hydraulic modeling can utilize existing hydraulic models, with changes in appropriate variables to account for changes with the proposed bank treatment. These models (currently in HEC-2 format) are available through FEMA or SCVWD.

CHANNEL IMPROVEMENTS

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Does the bank stabilization design preserve the low-flow channel?

Explanation: a low-flow channel, in which water continues to move as flows diminish, is essential to providing passage for fish, including the migratory steelhead. Design elements, such as wing deflectors, may be required.

- Does the design avoid creating new barriers to the migration of fish?

Explanation: Steelhead spend a portion of their lives in the ocean, and return to streams, including San Francisquito Creek to spawn. As such, they require free-flowing passage to the bay to be able to complete their life cycle.

- Does the design minimize the removal of riparian vegetation?

Explanation: Riparian vegetation provides valuable shaded cover of the creek channel and helps to keep the water temperature low, which is beneficial to steelhead.

- Is construction limited to the period between April and October?

Explanation: Protection of fish and other aquatic organisms benefits from limiting construction to the period with the lowest flows. This limitation is likely to be a condition of applicable state and federal permits for the purpose of protecting critical habitat for steelhead.

- Does the design incorporate Best Management Practices (BMPs) governing erosion and sedimentation control, de-watering, and exclusion fencing?

Explanation: State and federal permitting agencies require BMPs to ensure that projects will have minimal effects on aquatic organisms and their habitat. Of particular importance is the prevention of sediments from fouling the stream, preventing aquatic organisms from passing through de-watering pump systems, limiting work to the minimum area necessary and preventing special status species from entering the work area during construction.

WEED REMOVAL

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Does the plan include provisions to off-haul cut vegetation?

- If herbicide application is proposed, does the Environmental Protection Agency (EPA) approve of the herbicide for use in aquatic settings?

- Does the plan address future weed removal efforts including follow-up treatments?

- Does the plan identify native species to be retained?

PLANT SELECTION

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Are the plants selected contained within Table 5B of the Master Plan?

PLANT PROCUREMENT

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Does the plant material proposed originate from propagules (seeds and cuttings) collected from the San Francisquito Creek project area or within Santa Clara and San Mateo Counties?

- Are the proposed plants of the correct container size as shown in Table 5D of the Master Plan?

SITE PREPARATION

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

- Does the plan include site preparation methods such as soil decompaction and amendments?

PLANT INSTALLATION

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

• Are plants spaced according the on-center spacing recommendations given in Table 5E of the Master Plan?

• Has the need for root protectors been assessed for the plants?

• Does the plan include irrigation basins such as those detailed in Figure 5A of the Master Plan?

• Does the plan include utilizing wood chip mulch to control weeds as shown in Figure 5A of the Master Plan?

• If container plants, cuttings, acorns or buckeye seeds are being used, does the plan follow the planting recommendations of Figure 5A of the Master Plan?

• Does the plan include tree shelters if acorns are installed?

• Does the plan include hydroseeding of native grasses?

MAINTENANCE/MONITORING

(Vegetation Only, Repair Protection, Vegetate Structure, Regrade and Replant, Terrace, Riprap Toe, Vegetated Riprap, Vegetated Wall)

• Has a 3-year (or more) monitoring plan been included?

Explanation: A rigorous monitoring program following project implementation is essential. The early identification of any local problems will permit adjustments in the project implementation that will extend the lifespan of the structure and/or plantings. Monitoring and adaptive management is particularly important when applying any innovative biotechnical treatments within a design. Significant maintenance and even re-construction may be needed in the future.

A monitoring plan should include pre-construction ("as-is") surveys and yearly post-construction surveys for at least 3 years. Items to be monitored should include plant survival, performance of bank stabilization structure, cross-sectional geometry, and photographic documentation, at minimum as applicable.

• Does the plan include a 3-year maintenance plan that includes irriga-

tion, non-native, invasive species control, dead plant replacement, and irrigation basin and foliage protector maintenance?

- Does the project include provisions for biological monitoring of endangered species?

Explanation: Permit conditions likely will require specific measures prior to and during construction of individual projects, to be completed by experienced biologists. Biological monitors are essential to ensuring that endangered species are not present in a work site, that adequate protection measures for the creek will be place, and that the terms and conditions of the applicable permits are being met. This will protect the member agencies and the local sponsor of a Regional General Permit to ensure that individual projects comply with the permit.

- Does the design avoid removal of trees with nesting birds?

Explanation: Nesting birds are protected during the breeding season. A qualified biologist should be consulted to identify the potential for nesting birds. Trees with nests may be removed following breeding season. In such cases where removal is postponed, an experienced biologist should be consulted to ensure that young birds have left the nest.