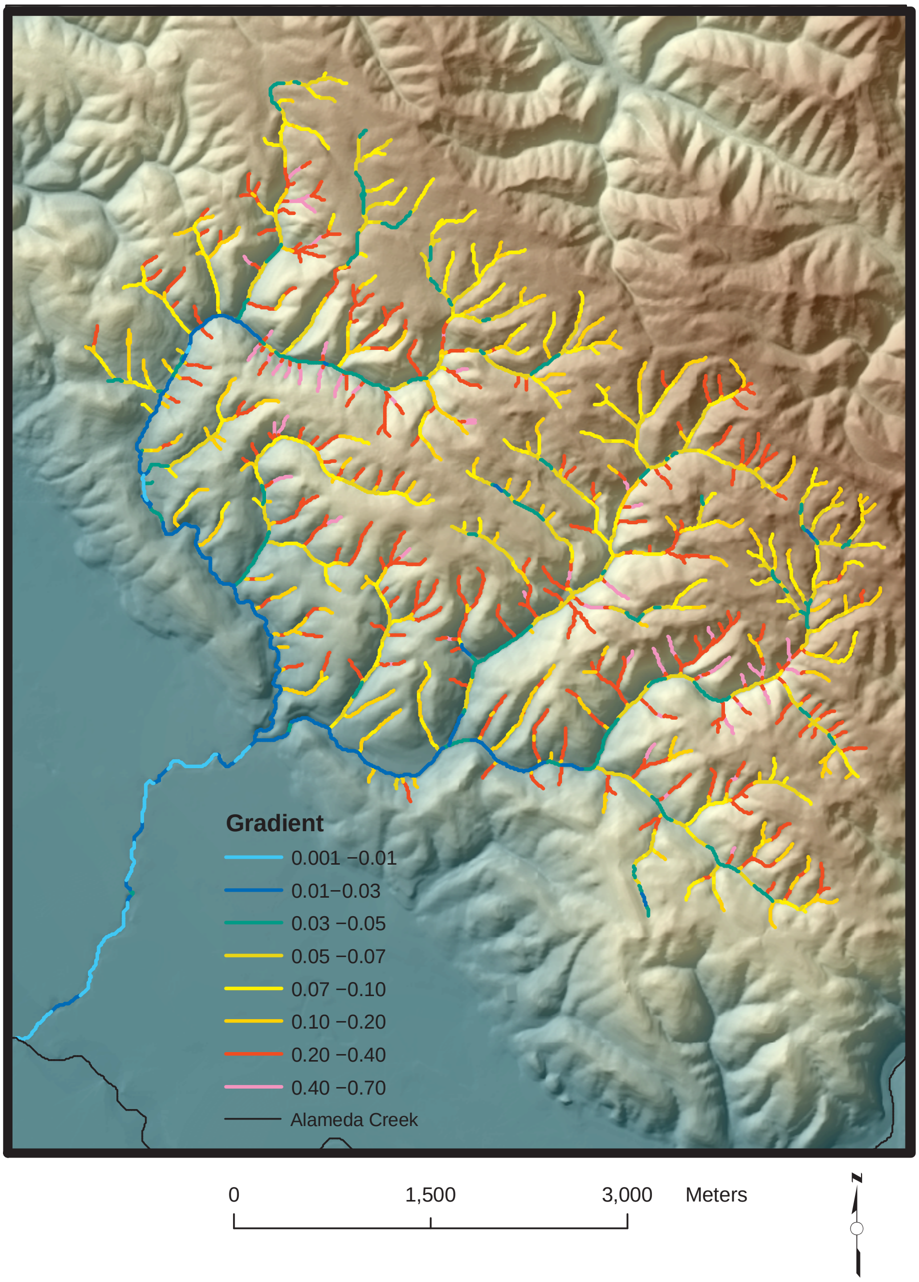
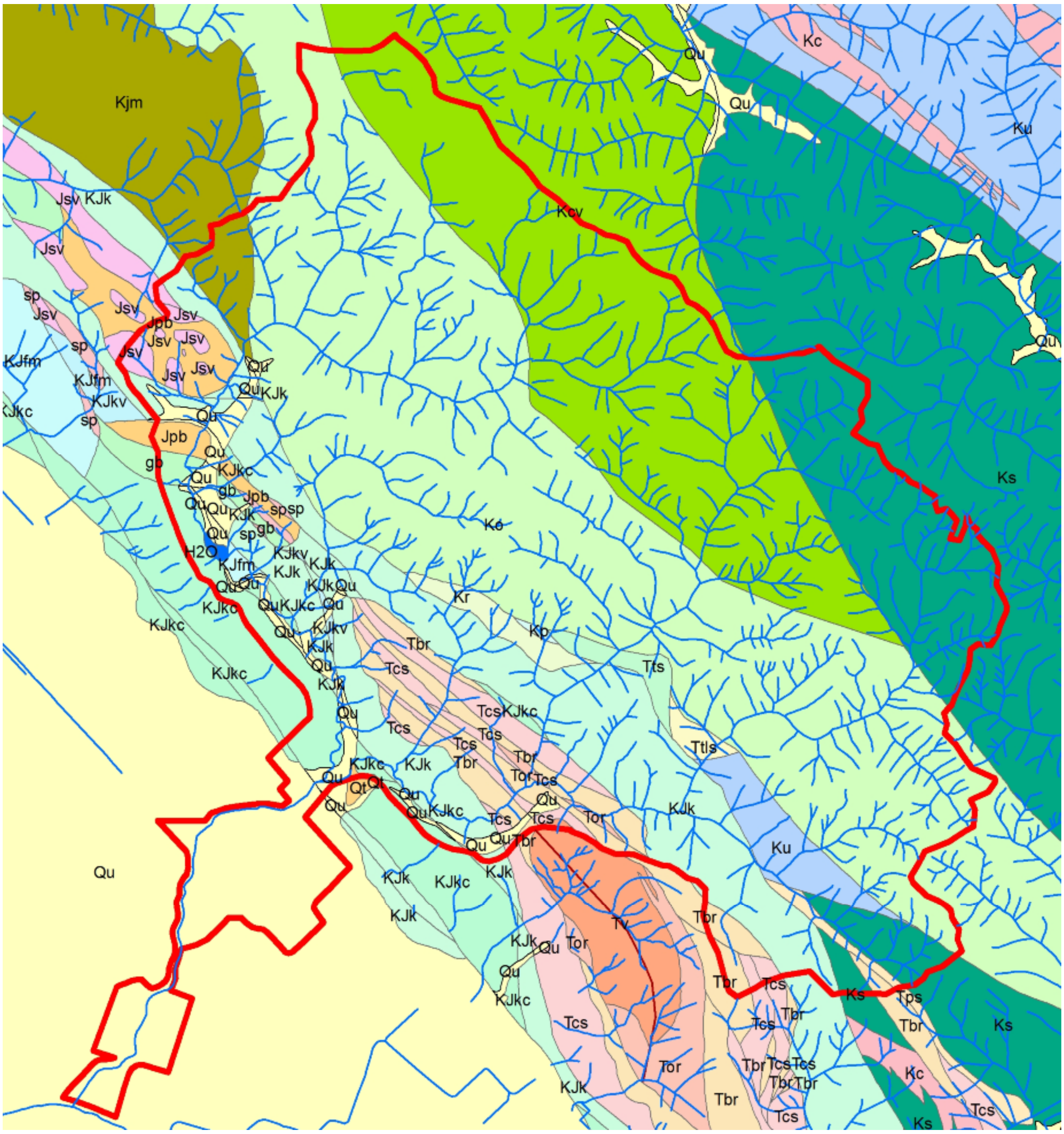
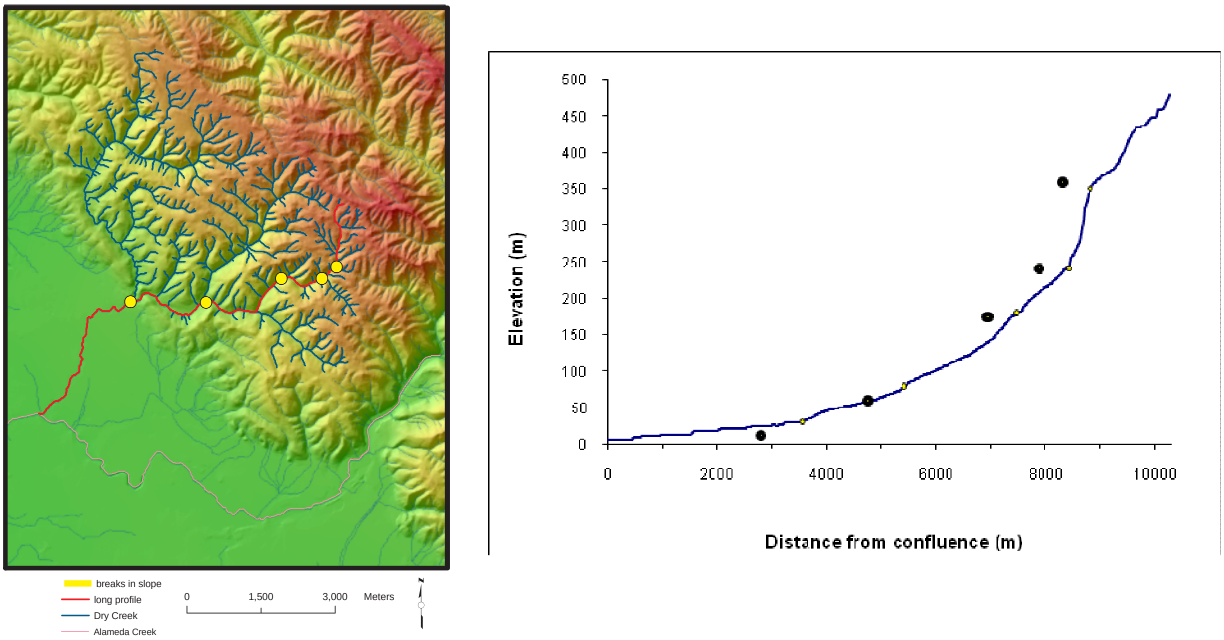
APPENDIX
Dry Creek Reconnaissance Sediment Study
Technical Memo



Appendix Figure 1. Channel gradient map for Dry Creek.



Appendix Figure 2. Bedrock geology underlying the Dry Creek watershed (Graymer et al, 1996). Major units include: Ko (Oakland sandstone), Kcv (Unnamed sandstone, conglomerate, and shale of the Castro Valley area, Ks (Unnamed sandstone and shale), Kjk (Knoxville Formation silt or clay shale with thin sandstone beds), Qu (surficial deposits, undivided), Tbr (Briones Formation, sandstone, siltstone, conglomerate), Tcs (Claremont Shale), Jsv (Keratophyre and quartz keratophyre), Kjm (Joaquin Miller Formation thinly bedded shale), Jpb (pillow basalt), Jb (massive basalt), Jgb (gabbro), and sp (serpentinite).



Appendix Figure 3. Longitudinal profile of Dry Creek. Left: map showing the selected branch in red, and major breaks in slope in yellow dots. Right: Longitudinal profile, with corresponding yellow dots showing the major breaks in slope.

Appendix Figure 4. Photographs of the USGS gage station (11180500 Dry C at Union City CA) located downstream of Mission Boulevard. Left: looking at the right bank at the gage house. Right: looking downstream at the weir and gage house.

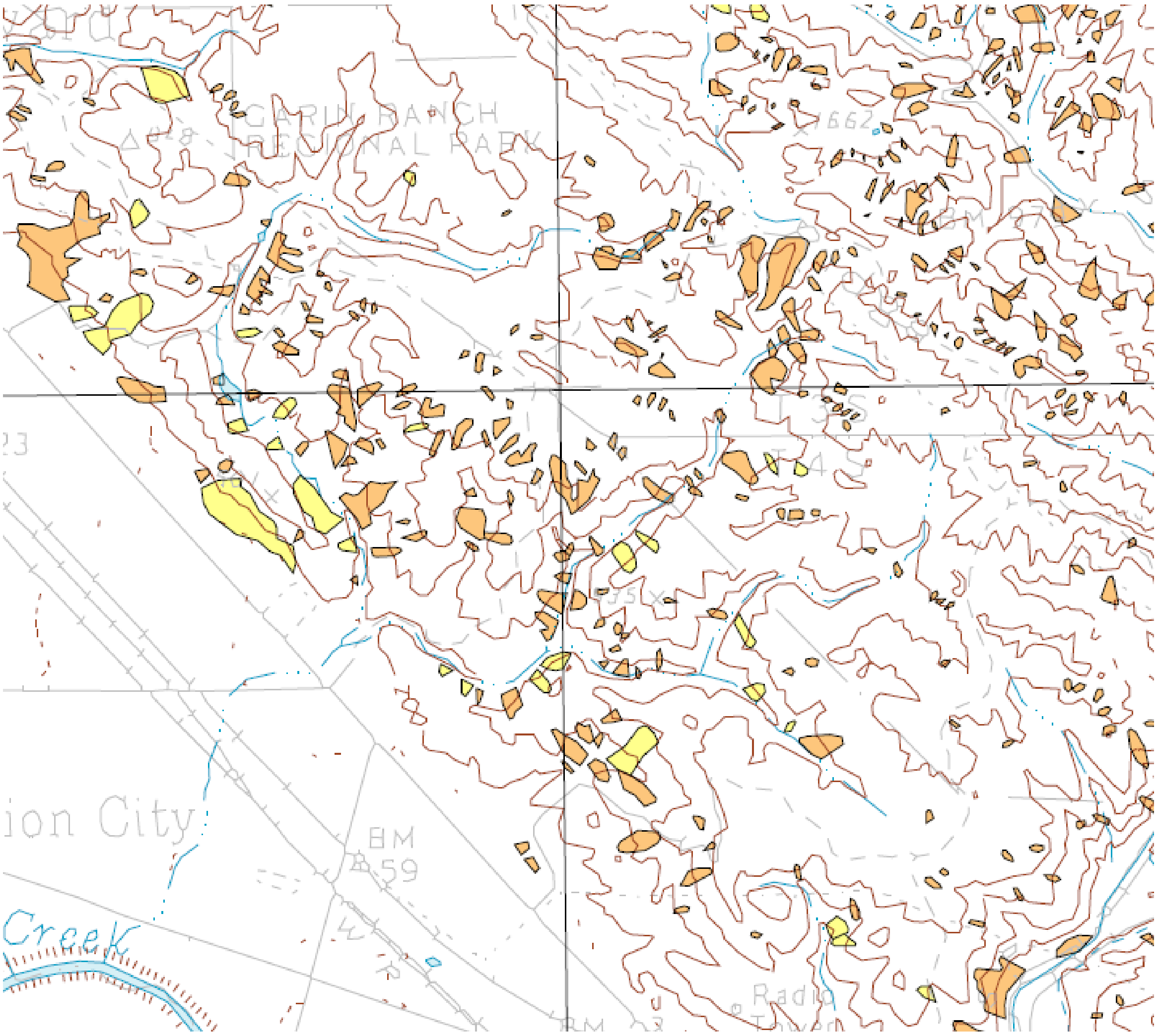
Appendix Figure 5. Photographs showing examples of channel incision (top), and erosion of coarse older valley alluvium (bottom).

Appendix Figure 6. Left: looking up the channel at the spillway for Jordan Pond. Right: exposure of bedrock in the channel bed and base of the channel bank.

Appendix Figure 7. Example of bank erosion exposing tree roots along a stretch of the North Fork. Flow is from right to left.

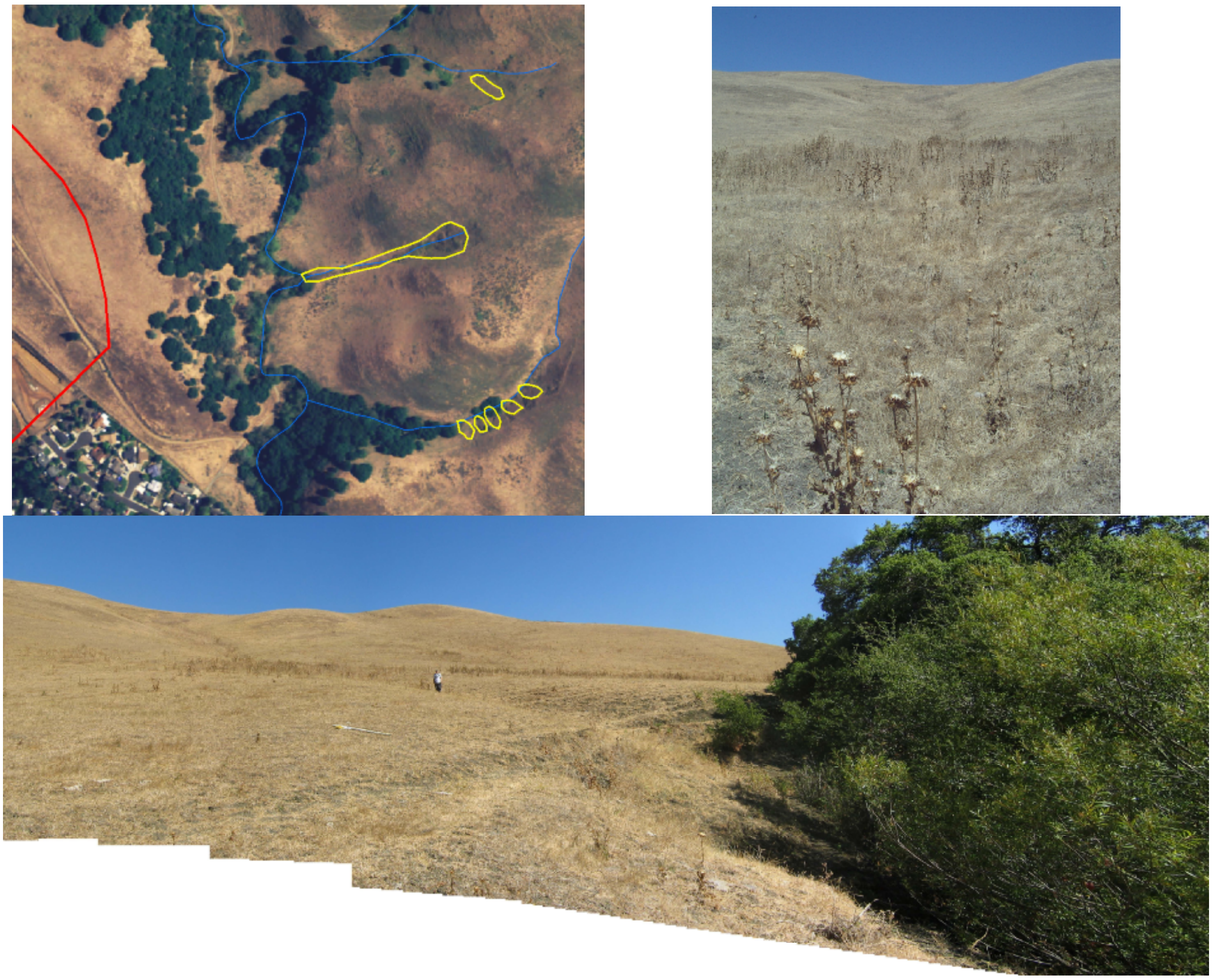
Appendix Figure 8. Two examples of streamside slides occurring on 3rd and 4th order channel segments. Right: slide occurring on a terrace. Left: slide occurring on a hillslope.



Appendix Figure 9. Landslide mapping in the Dry Creek watershed (Roberts et al, 1999). Map is centered on Dry Creek; confluence with the Alameda Creek flood control channel is located in the lower left corner. Orange polygons are landslide deposits larger than 200 ft, yellow polygons are landslide deposits larger than 200 ft (identification uncertain).

Appendix Figure 10. Examples of slope failures in the Dry Creek watershed. Left: deep-seated landslide. Right: numerous shallow soil slips and debris flows (now healed and covered in grasses).

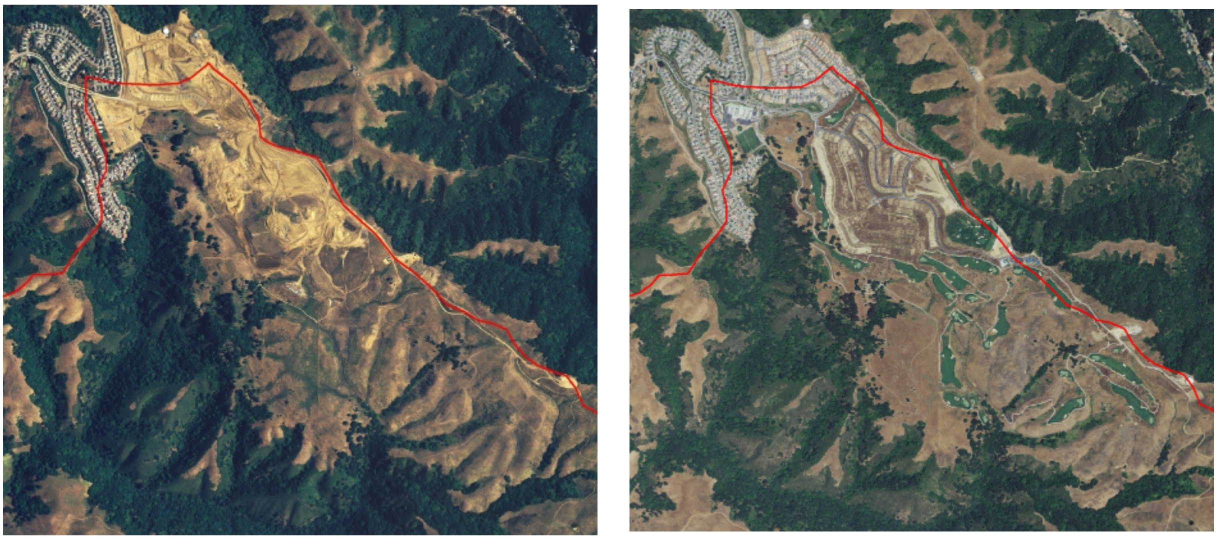
Appendix Figure 11. Photograph illustrating 1998 debris flows on Walpert Ridge (from Coe and Godt, 2002).



Appendix Figure 12. Example location of a landslide with direct connection to the channel. Upper left: USGS mapping of landslide location in 1998. Upper right: Field photograph standing in the landslide looking upslope. Lower: Panorama looking south at landslide connection to channel. Sarah is standing in the landslide location; the North Fork of Dry Creek is at the base of the slope in the willows.

Appendix Figure 13. Left: example location of grazing pressure on a North Fork tributary. Right: example of terracettes.

Appendix Figure 14. Photograph looking uphill at a road segment contributing to erosion; runoff exits the road to the left (middle of the photograph), and has contributed to the destabilization of the hillslope.



Appendix Figure 15. Left: Aerial photograph showing the 2005 construction of a residential area and golf course in the northern portion of the watershed. Right: The same area shown in 2009, note the extent of the golf course and the areas not yet built out.

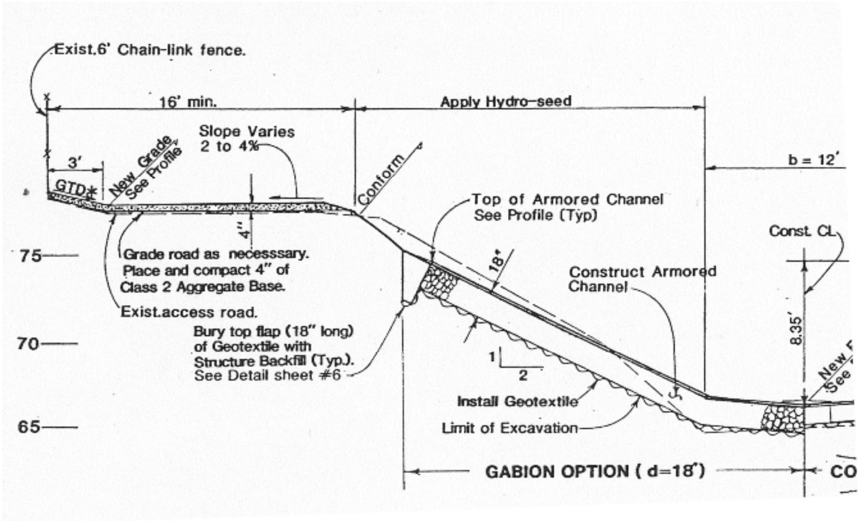
Appendix Figure 16. Aerial photograph showing a portion of the lower urbanized watershed.

Appendix Figure 17. Left: Aerial photograph showing an example of mapped landslides that occur high upon the hillslope and do not have a connection with a channel. Right: Field photo illustrating hillslope storage of landslide deposits.

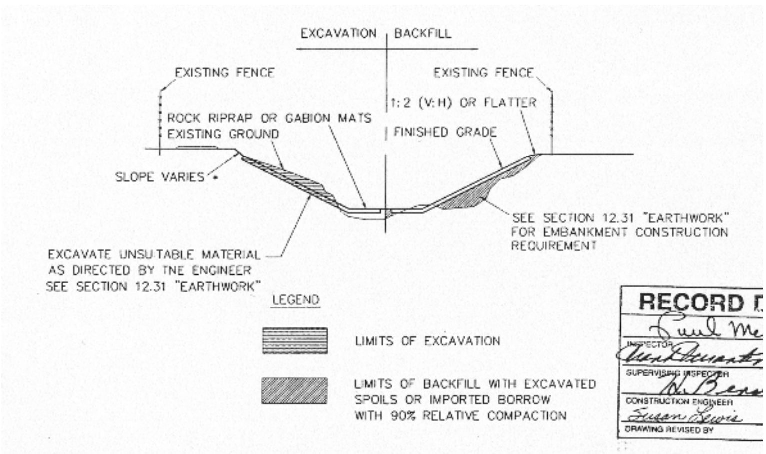
Appendix Figure 18. Example of a small stock pond (dry) observed in the watershed.

Appendix Figure 19. Left: Floodplain surface upstream of Mission Blvd. Right: coarse surface hypothesized to have been deposited during the 1950s events.

Appendix Figure 20. Left: Photograph showing a package of sediment deposited within the flood control channel. Right: a close-up of the heterogeneous nature of the deposit.



Appendix Figure 21. Example from 1988 as-built construction plans of typical armored channel bed and bank gabion installation in the channel.

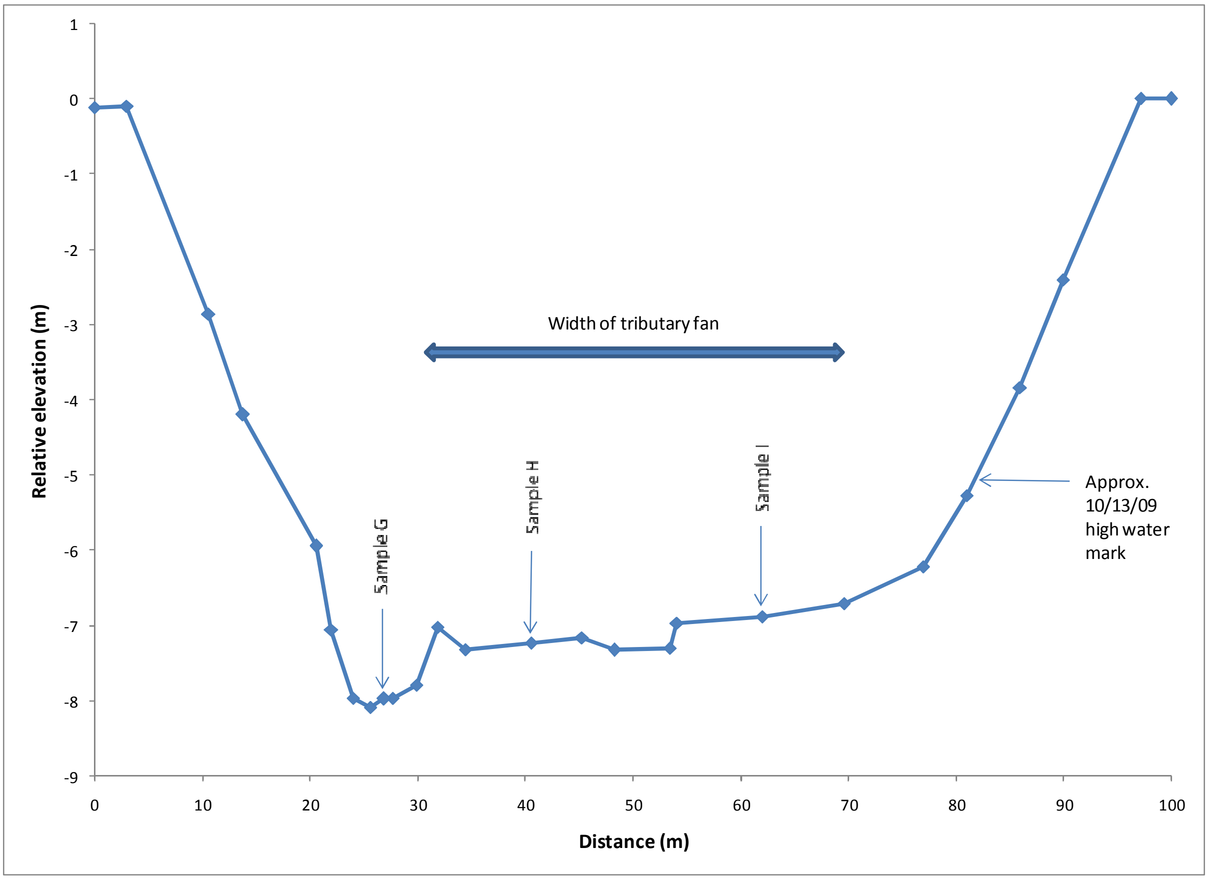


Appendix Figure 22. Example from 1996 as-built construction plans of typical excavation, backfill, and gabion mat installation in the channel.

Appendix Figure 23. Photographs of gabions armoring the Dry Creek flood control channel. Upper left: photo showing exposed bank gabion. Upper right: photograph showing gabions on the bed surface. Lower left: exposed erosion control fabric. Lower right: exposed bed gabion.

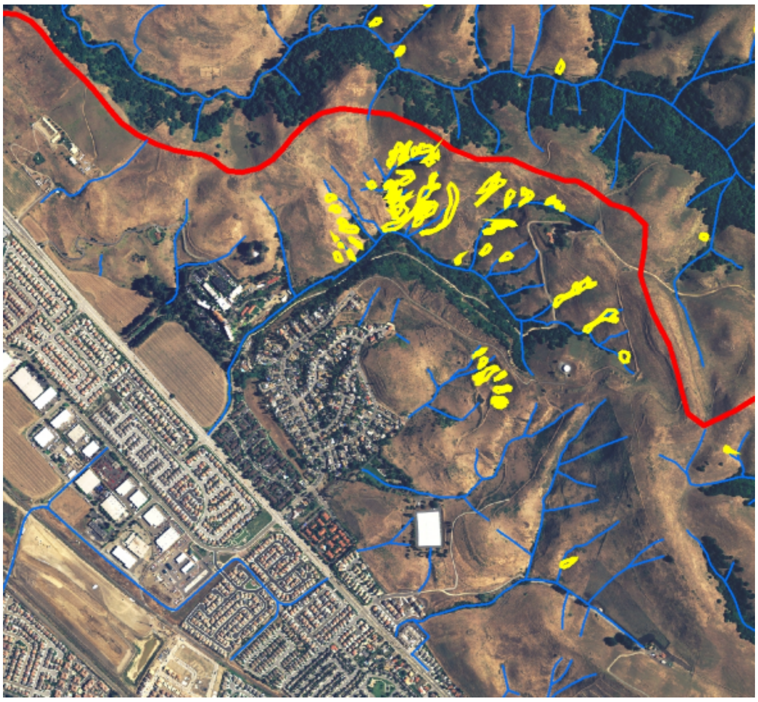
Appendix Figure 24. Left: Efficient channel reach downstream of Mission Blvd. Right: Typical bed grain size distribution.

Appendix Figure 25. Left: example of the coarser grain sizes observed on the fan surface. Right: example of the finer grain sizes observed on the fan surface.

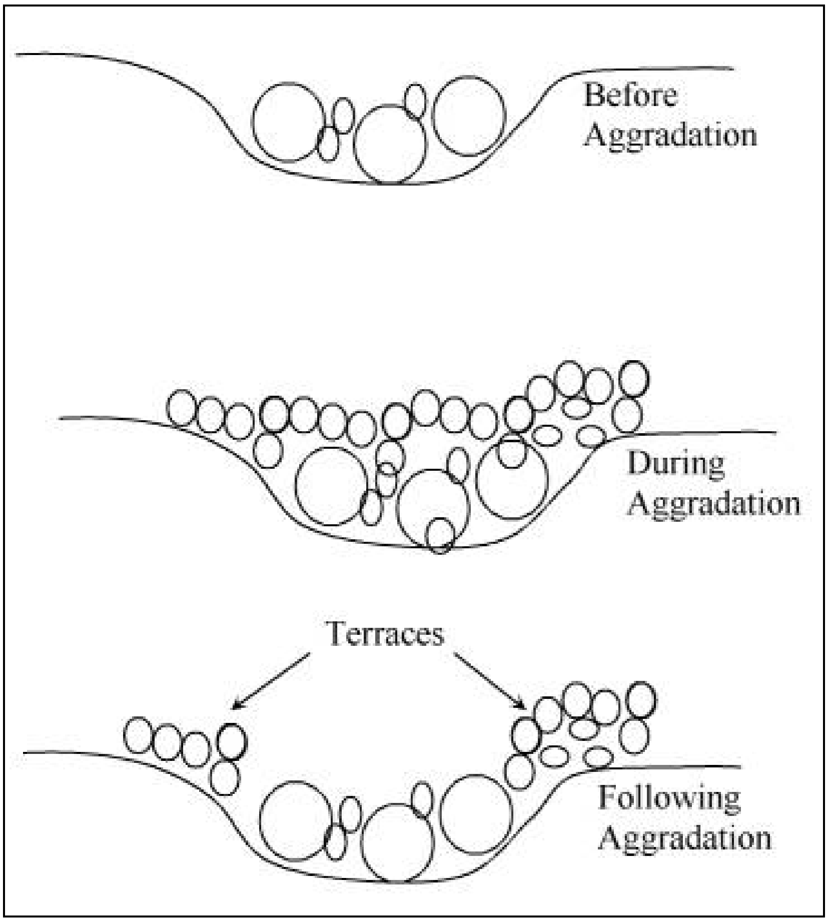


Appendix Figure 26. Cross section approximately in the middle of the fan, looking downstream. Locations of bulk sediment samples are noted.

Appendix Figure 27. Comparison of riffles located upstream of the tributary fan (left) and adjacent to the fan (right). Notice the decreased channel width, increased grain size, and increased gradient of the riffle on the right.



Appendix Figure 28. Upper: photograph of the hillslopes of the Masonic Home watershed showing the multiple debris flow scars. Lower: USGS mapping showing the density of debris flows occurring in the 1998 El Nino event. Note, the Dry Creek watershed is in the upper portion, and the Masonic Home watershed (not delineated) flows to the lower left of the figure.



Appendix Figure 29. (Modified from Benda and Bigelow 2002) Cross sections showing the idealized channel response to cycles of aggradation during periods of high sediment supply such as the 1950s floods and other large events (El Nino 1998, see Coe and Godt 2002) and subsequent channel degradation or incision through filled channels in subsequent years. These cycles can create cut and fill terraces (Miller and Benda 2000), which we occasionally observed in the Dry Creek watershed.