

**TASSAJARA CREEK:
Monitoring confirms vegetated floodplain conveys design flow**

ALAMEDA COUNTY, CALIFORNIA



Figure source: Mark Tompkins 2006

What was done and why?

Tassajara Creek flows from the southeastern slopes of Mount Diablo and drains approximately 23 mi² at the compound channel project reach in northern Alameda County, just east of downtown Dublin, CA. The project reach is in a moderately high energy transport zone, although local areas of deposition along the creek are not uncommon. Historical maps and aerial photography indicate that the project reach of Tassajara Creek has remained in essentially the same location and planform orientation

for at least the past 150 years.

The Tassajara Creek project included two distinct compound channel design approaches. In Reach 1 (from Highway 580 north to Dublin Boulevard), the entire channel was reconstructed with a low flow channel designed to convey the 2-year flow (500 – 650 cfs) before overtopping onto the floodplain surface set within a levee flood corridor designed to convey the 100-year flow (5,200 cfs) with 1 foot of freeboard. In Reach 2 (from Dublin Boulevard north to Gleason Road), the existing low flow channel was left mostly intact (except where it was relocated to protect mature oak trees) and the floodplain surface was excavated to the 5-year flow (1,200 cfs) water surface elevation in the low flow channel. Reach 2 was also designed to convey the 100-year flow through the broader flood corridor. The project also included five gradient control structures across the low flow channel and extensive plantings of native riparian vegetation on the floodplain surfaces and slopes.

Who was involved?

The Alameda County Surplus Property Authority received the property from the US Navy (it was a former naval hospital) and planned a transit-oriented residential area, for which the restored creek would be a key amenity. The project was designed by Graham Matthews and Matt Kondolf, with hydraulic modeling and construction documents prepared by BKF engineering.

Where can I see the project?

The project is located in northern Alameda County, just east of downtown Dublin, CA, near Dublin Boulevard and Gleason Roads (-37.7063N, -121.8786W).

Why was this a model project?

The Tassajara Creek compound channel project has achieved most of its goals and objectives. Riparian vegetation survival and natural recruitment has been high along restored reaches of Tassajara Creek, with emergent cattail (*Typha sp.*) and bulrush (*Scirpus sp.*) interspersed with willow (*Salix sp.*). Aquatic habitat varies vertically between shallow riffles and deeper runs and pools, most with significant adjacent vegetative cover. Channel incision appears stabilized, and the low flow channel is dynamic and hydrologically connected to the floodplain in most reaches. This project has been successful with respect to conveyance as well, providing 100- year flow capacity even with densely vegetated floodplain areas. Compound channels have become a popular approach to meet flood conveyance requirements whilst improving ecological conditions. However, in modeling flow through vegetated floodplains, the roughness coefficient must be estimated. Normally, the project designers have long moved on to other projects by the time a large enough flood occurs to “test” the project, so the estimates of roughness values are essentially never tested/verified. However, during a class field trip to Tassajara Creek shortly after the January 2006 high flow (return interval about 5 years), investigators noticed a clear high water mark in a smooth, concrete

trapezoidal channel downstream---an ideal location to accurately calculate peak discharge. Using their measurement of discharge, they back-calculated roughness values in the vegetated floodplains, confirming the designers' original estimates were reasonable for the design of future such projects. With respect to pre-project conditions, the compound channel reach of Tassajara Creek appears significantly improved. The created floodplain areas provide completely new habitat that is hydrologically connected to the low flow channel. In general, the system appears much closer to a new equilibrium than it was prior to the project.

For more information, please contact:

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