

# CHAPTER 11

## Conclusions and Recommendations

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Provided below are the conclusions and recommendations resulting from this study.

### 11.1 CONCLUSIONS

Provided below are the conclusions resulting from this study:

- The existing the Walnut Creek Flood Control Channel System (WCFCCS) has effectively reduced/eliminated the repetitive flooding that occurred prior to the construction of the channel system.
- The rectangular concrete channel conveys the design flow of 18,000 cubic feet per second at a velocity of about 28 feet per second. The flow design is supercritical with a Froude number of 1.36. Even at a depth three feet, the flow would be about 2,900 cfs and the water velocity would be about 12.9 feet per second, or 8.8 miles per hour, which is too fast for a person to stand up or grab onto a fixed object.
- Drop Structure 2 conveys the flow over a 20 foot drop into an 8 foot deep stilling well. This drop structure causes a submerged hydraulic jump (or a hydraulic) that can recirculate a victim trapped in the flow repeatedly through the submerged hydraulic jump.
- The supercritical flow in the WCFCCS limits the extent of potential safety improvements that are feasible. The supercritical flow prevents the effective use of escape ladders, safety racks, safety nets, safety cables, Baffle Chute Drop Structure, Grouted Sloping Boulder Drop Structure, and Multiple Vertical Drop Structure.
- The CCCFPD staff recommended a set of improvements that would help them implement rescue operations in the WCFCCS. The CCCFPD Recommended Improvements would provide the greatest potential increase in safety and have a relatively low cost at \$38,000.
- Public awareness and outreach, fence inspection and repair, and additional signage reduce the likelihood of people entering the channels and there by prevent the need to rescue victims from the channel. Also, the costs of these programs are low compared to the costs of most of the other safety improvements.
- Safety cables (downstream of Drop Structure 2 only), thermal imaging, and tensional diagonals are considerably less promising than the CCCFPD Recommended Improvements. Thermal imaging is not a proven technology for use in a flood control channel.
- Safety nets and the Baffle Chute Drop Structure, each create new, significant safety hazards, and are infeasible because of these new safety hazards.
- The Stream Channel Restoration Project is infeasible because of the high cost (\$1.2 billion) and because of the major community and transportation (streets) impacts it would cause.

- Only improvements that would not adversely affect the function of the floodwater conveyance channel would be recommended by the CCCFCWCD and submitted to the USACE for approval. Up to 2 to 5 years would be required to complete the permit application and approval process for improvements that would not adversely impact the function of the WCFCCS.

## 11.2 RECOMMENDATIONS

Provided below are the recommendations resulting from this study.

- The CCCFPD Recommended Improvements should be further evaluated for implementation.
- The public awareness and outreach, fence inspection and repair, and additional signage programs should be continued.