



## 2015-2016 SANTA CLARA COUNTY CIVIL GRAND JURY REPORT

# 100-YEAR FLOOD PROTECTION FOR PERMANENTE CREEK

### Summary

The 2015-2016 Santa Clara County Civil Grand Jury (Grand Jury) investigated a complaint alleging that the Permanente Creek Flood Protection Project (Project) of the Santa Clara Valley Water District (Water District) is fraudulent and lacking in sound engineering principles. The Grand Jury found that the Project has the potential to prevent flooding of some residential and commercial properties within the cities of Los Altos and Mountain View. After project completion, the flood insurance requirements for some properties in Los Altos and Mountain View may be eliminated if the Federal Emergency Management Agency (FEMA) redefines the boundaries of their flood plain.

### Background

The Permanente Creek watershed has produced floods affecting homes and businesses in Cupertino, Los Altos, and Mountain View in 1911, 1940, 1950, 1952, 1955, 1958, 1963, 1968, 1983, 1995, and 1998. Previous flood mitigation efforts included creation of the Permanente Creek Diversion Channel (Diversion Channel) in 1959 and various channel improvements such as channel widening, steepening, and the construction of sidewalls in some portions of the creek from the foothills of the Santa Cruz Mountains to San Francisco Bay (Bay).

The map (Figure 1) shows in blue the areas of Mountain View and Los Altos that are at risk of flooding during a 100-year flood according to the Water District and FEMA. The darker blue areas are flood plains designated by FEMA, which considers an area to be flooded when the water is one foot deep. The lighter blue areas are flood plains designated by the Water District, which considers an area flooded when there is water on the surface in excess of what is expected from a heavy local rainfall. Twelve percent of the City of Mountain View is located within the flood plain.

These flood plains follow the stream courses of Permanente and Hale Creeks from the Santa Cruz Mountains into the Bay. Hale Creek is also on this map to the west of Permanente Creek. The Permanente Creek watershed is outlined in green.

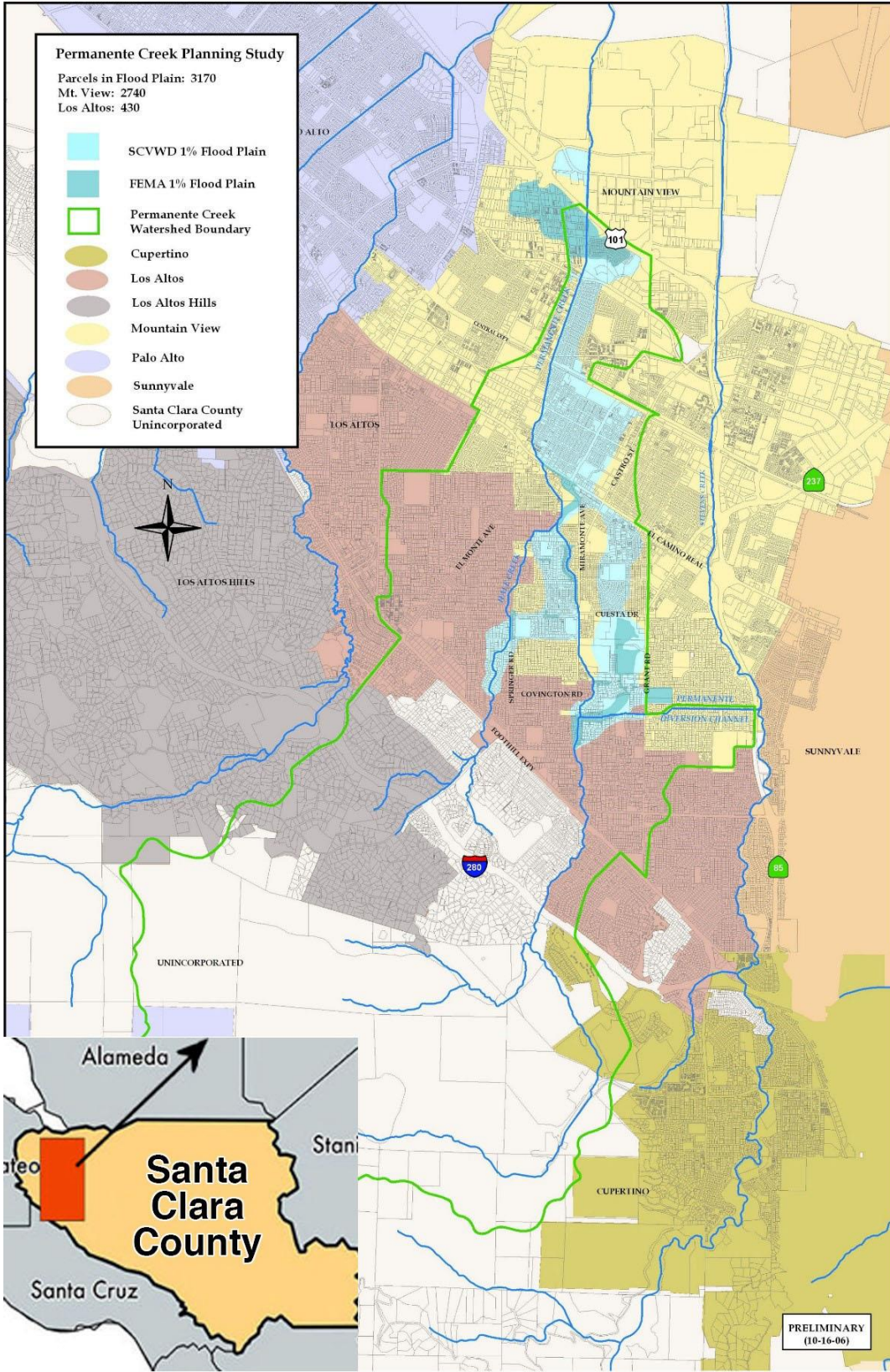


Figure 1. Blue areas indicate 1% flood plain, areas at risk of flooding during a 100-year flood. (Adapted from Water District 2016)

Flood insurance is required for properties in the FEMA flood plain. The Grand Jury was told that property owners pay around \$2,000 annually for this insurance. Flood insurance requirements are summarized in an article entitled “Flood Insurance Requirements and Laws” (Keefer, 2009):

Federally regulated lenders require that a property owner purchase flood insurance coverage for structures located on property designated by FEMA as being in a high-risk flood zone, or Special Flood Hazard Areas, as they are called by the National Flood Insurance Program. Under the National Flood Insurance Reform Act, if a property owner in a flood zone fails to purchase flood insurance, he will not be eligible to receive federal disaster assistance in the form of grants or loans in the event that buildings and personal property are damaged or lost due to a flood disaster. Similarly, renters in flood zones must maintain flood insurance on the contents of their homes in order to qualify for federal aid following a flood that damages the property and its contents.

Permanente Creek is 13.3 miles long. For purposes of discussion, the Grand Jury has divided it into three segments: upper, middle, and lower. Starting from the south, the creek originates in the Santa Cruz Mountains, and the upper segment flows generally north to pass under Foothill Expressway in Los Altos. The middle segment is in the cities of Los Altos and Mountain View from Foothill Expressway north to El Camino Real. The lower segment is in Mountain View north of El Camino Real to where the creek enters the Bay through the Mountain View Slough.

### **The Upper Creek Segment**

The upper segment of Permanente Creek starts in the Santa Cruz Mountains in Santa Clara County. The creek is at its highest elevation here and also has the steepest slope. It flows through the Lehigh Permanente Quarry and Rancho San Antonio County Park, passes under Interstate 280 (I-280), and proceeds further north to Foothill Expressway. The Grand Jury learned that several ponds form in this area during storm season. These ponds serve to increase percolation of water into the ground while reducing otherwise greater runoff from the hillside.

Rancho San Antonio County Park is a popular public recreational area in the foothills of the Santa Cruz Mountains. There are approximately 23 miles of hiking/horse trails, equestrian support, and a model airplane flight venue within the park. School groups and families frequently use the park.

Permanente Creek continues north under I-280 through box culverts and under Foothill Expressway. The Grand Jury observed the creek to be a deep V-shaped watercourse downstream of I-280.

## **The Middle Creek Segment**

Permanente Creek runs north through residential neighborhoods from Foothill Expressway to El Camino Real. The creek is diverted downstream of Portland Avenue into the Diversion Channel. Almost all of the creek flow enters this channel except for seepage through the bottom of the floodgate into the continuation of Permanente Creek. One flood in this section of the creek is described in the Water District Permanente Creek Flood Protection Project, Planning Study Report, 2008, p. 34:

On March 2, 1983, Permanente Diversion overtopped its banks and flooded Blach Jr. High School to a depth of 1/2 foot. Street flooding also occurred, as well as minor mud damage to the garages of three homes on Altamead Drive. The flooding was related to operations conducted at the Kaiser Cement Plant located in the upper Permanente Watershed. Immediately after the flood, Kaiser Staff reported that the outlet to a large water "retention structure" had become plugged. On March 2, the plug burst, which resulted in the release of a large slug of water to Permanente Creek. County Communications reported that a large (about 20-foot deep) "wall" of water was observed traveling down Permanente Creek from Kaiser Cement. (Internal District memo, April 29, 1983) When the slug of water reached the box culvert near Blach Jr. High School, the water overtopped the banks. The capacity of the box culvert was significantly reduced due to sediment which had accumulated within the culvert.

Very little water passes through the bottom screen or over the floodgate at the beginning of the Diversion Channel. Downstream of the Diversion Channel, the creek bed is a shallow V as it passes under streets and past backyards until it approaches Saint Francis High School. From the Diversion Channel to Cuesta Drive, Permanente Creek follows the east side of Miramonte Avenue. Upon reaching Cuesta Drive it flows through a culvert under Miramonte Avenue. From there to El Camino Real, Permanente Creek is in an open concrete channel.

## **The Lower Creek Segment**

In the lower segment, Permanente Creek passes from El Camino Real north through industrial and residential flatlands to the Bay. It passes under Central Expressway, the CalTrain tracks, Middlefield Road, and U.S. Route 101. It carries water that has seeped under the Diversion Channel floodgate, all creek water sourced downstream from the Diversion Channel, and water from Hale Creek. Storm drains also contribute to flow in this section.

Permanente Creek in this area runs in an open concrete channel. Closer to the Bay and the Mountain View Slough the channel is earthen with sloping sides. The

slough and creek channel are subject to tidal action, wave action, storm surge, and sea level rise.

### **Permanente Creek Project History**

The “Clean, Safe Creeks and Natural Flood Protection Plan” approved by Santa Clara County (County) voters in November 2000 provided the funding by means of a parcel tax for the Water District to proceed with flood protection projects on creeks and streams within the County. In November 2012, County voters enacted a successor plan titled “Safe, Clean Water and Natural Flood Protection Program.” This measure reaffirmed the parcel tax. The Water District then developed the Project, which is one of many supported by these taxes.

Planning for the Project began in 2004, and design started in 2009. The Project was conceived to encompass modifications to various portions of Permanente Creek from Foothill Expressway to the Bay. The Project plan includes changes to channel sidewalls, widening of the channel, and other improvements to mitigate the effects of tidal action, storm surge, high water flows, and the shallow slope of the creek. The current Project plan includes construction of two floodwater detention basins, totaling 12 acres, within Rancho San Antonio County Park (Figure 2). Detention basin A is upstream of detention basin B. Another detention basin is to be constructed in Mountain View’s McKelvey Park.

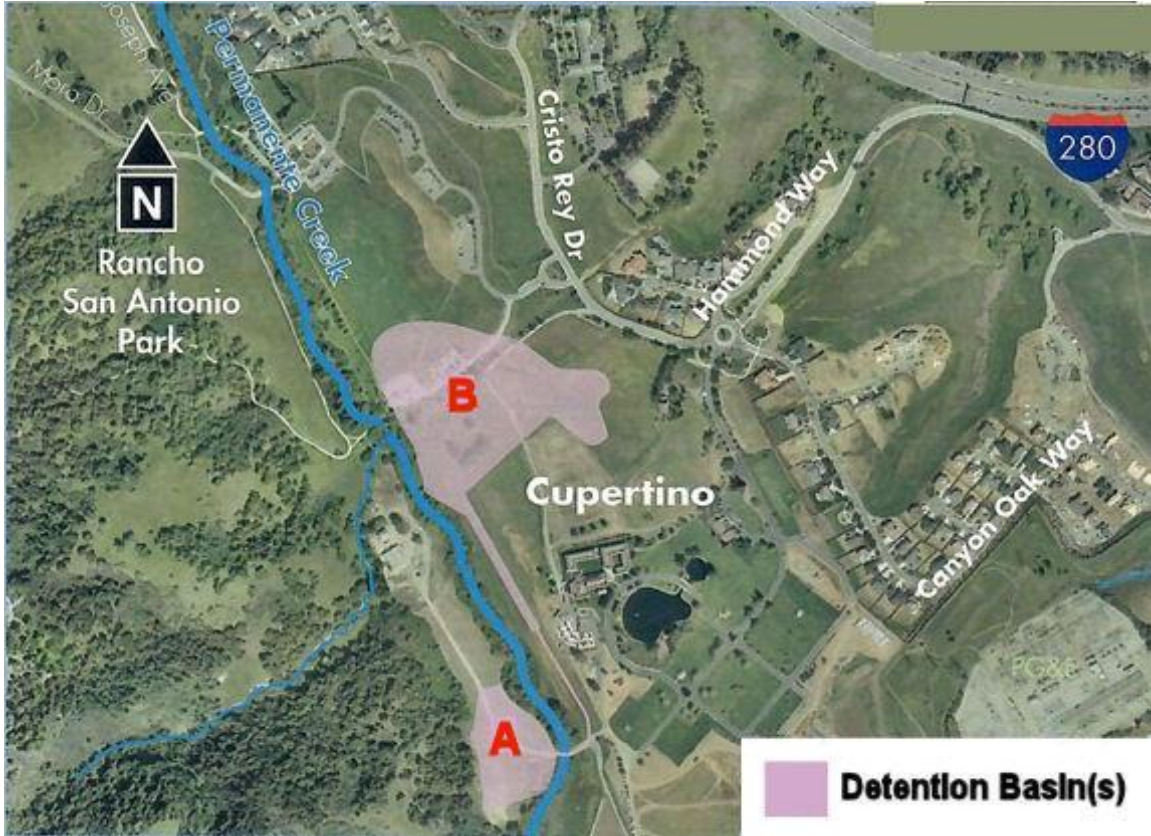


Figure 2. Rancho San Antonio Park detention basin locations (Adapted from Water District 2016)

Figure 3 shows the design of a generic floodwater detention basin, which is designed to accept excess water until the creek level drops. Water from the detention basin then reenters the creek.

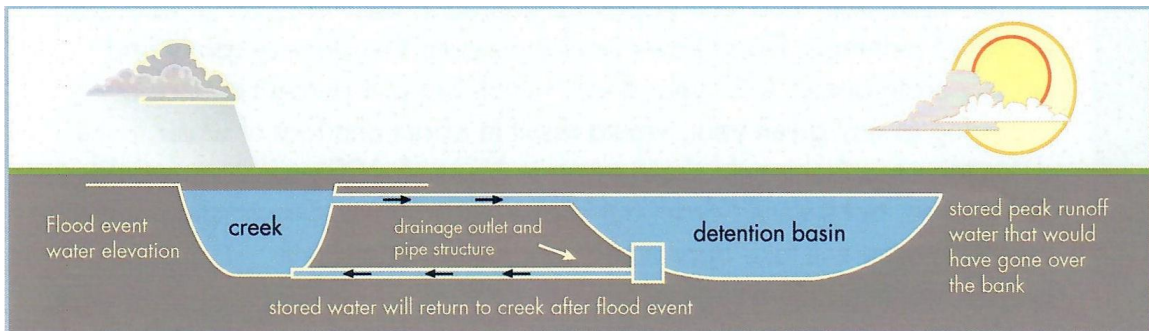


Figure 3. Diagram of the water flow into and out of a generic detention basin (Water District 2016)

The City of Mountain View’s McKelvey Park (Figure 4) is located just upstream of El Camino Real. This is to be the site of a 4.5-acre 18-foot-deep floodwater detention basin. The purpose of this basin is to protect the lower creek from the effects of a 100-year flood. It is designed to contain a flood peak arriving from both Permanente Creek and Hale Creek. The confluence of these two creeks occurs just upstream of the park. As floodwaters recede, the detained water will drain

north into Permanente Creek.



Figure 4. McKelvey Park - aerial view of existing park and conceptual view of redesigned park (Adapted from Water District 2016)

## Discussion

The Grand Jury reviewed materials provided with the complaint as well as project plans, financial documents, other government agency documents, published news articles, and online information regarding the Project.

The Grand Jury also toured Rancho San Antonio County Park, the Permanente Creek Diversion Channel, McKelvey Park in Mountain View, and Permanente Creek at or near the following locations:

- Interstate 280, Los Altos
- Granger Avenue, Los Altos
- Fremont Avenue, Los Altos
- Portland Avenue (Heritage Oaks Park), Los Altos
- Miramonte Avenue, Los Altos and Mountain View
- Eastwood Drive, Los Altos
- Covington Road, Los Altos

- Saint Francis High School parking area, Mountain View
- Valencia Avenue, Mountain View (confluence of Hale Creek and Permanente Creek)
- Montecito Avenue, Mountain View
- Amphitheatre Parkway, Mountain View
- North Shoreline Boulevard, Mountain View

According to the Water District, all necessary approvals for Project startup have been granted. Construction is currently scheduled to start in June 2016 and may take two or more years to complete.

Project plans call for one parking area in Rancho San Antonio County Park to be relocated and improved with restrooms compliant with Americans with Disabilities Act (ADA) standards, to be completed before removing the old area. This should reduce inconvenience for park visitors.

Two detention basins will be constructed within Rancho San Antonio County Park. In the area where the large detention basin (designated B in Figure 2) is planned, some mature trees will be removed. The Grand Jury observed that some of these trees are in poor condition or dead. The trees will be replaced and other flora will be planted using species native to the area.

The Creek exits Rancho San Antonio County Park through a box culvert under I-280. Between I-280 and Foothill Expressway the channel is a deep V where it winds among residential properties to Granger Avenue. The Grand Jury observed overgrowth in the channel in this area (Figure 5) in January 2016, which is typically the rainy season in California.





Figure 5. Permanente Creek upstream of Granger Avenue, Los Altos, facing south. Ellipse indicates location of creek channel. (Grand Jury, January 25, 2016)

In January 2016 the Grand Jury observed the deep V channel of the creek at Fremont Avenue. The shape of the channel changes to a shallow U at Portland Avenue. Downstream from Portland Avenue, the creek bed is concrete lined and clear of obstructions.

### **Permanente Creek Diversion Channel**

The Grand Jury observed the Permanente Creek Diversion Channel at Miramonte Avenue, the bridge at Georgina P. Blach Intermediate School (Blach School), and at each cross street to State Route 85.

The Diversion Channel (horizontal yellow line in Figure 6) was constructed in 1959 with concrete walls throughout its length to direct most of the flow from Permanente Creek east to Stevens Creek. It was assumed Stevens Creek had the capacity to accept the additional flow. In 2016 Water District staff told the Grand Jury that Stevens Creek lacks the capacity to accept the full flow from the Diversion Channel in addition to its normal projected flow.

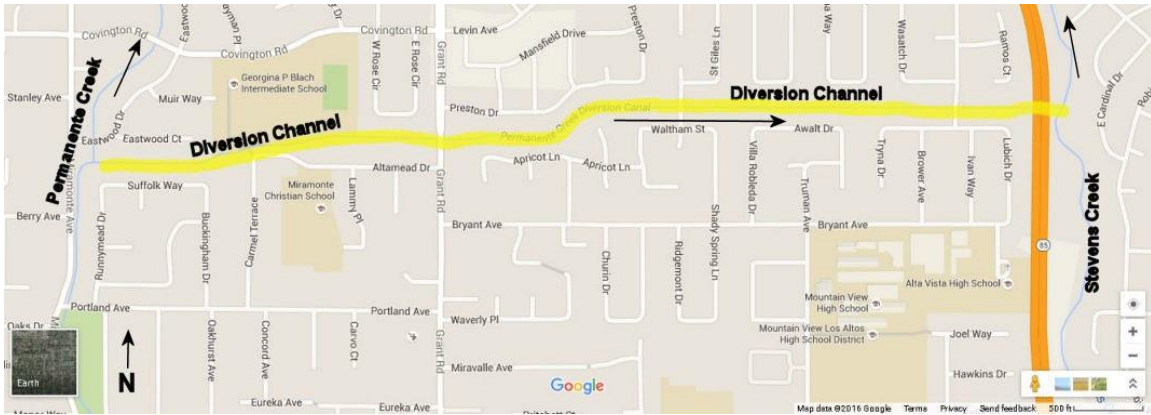


Figure 6. Map of the Permanente Creek Diversion Channel/Canal through Los Altos and Mountain View. Highlight in yellow is not to scale. Black arrows indicate direction of water flow. (Adapted from Google Maps © 2016)

Near the start of the Diversion Channel is a floodgate (Figure 7) that directs almost all of the water in the creek east to Stevens Creek. This floodgate has a screen at the bottom to permit a small amount of water to pass. By design, the top of the gate is lower than the top of the adjacent channel walls so that high water will overflow this gate into the lower creek. Water District staff advised that the gate is opened in May and closed in November and may also be opened to permit a greater flow at other times.



Figure 7. Permanente Creek Diversion Channel floodgate/valve. View is downstream and generally to the northeast. The yellow ellipse contains the floodgate. (Grand Jury, October 28, 2015)

A constriction is present in the Diversion Channel just downstream of Blach School

(Figure 8). The Water District stated that the constriction is designed to limit water flow into Stevens Creek by narrowing the channel from 27 feet to 15 feet.



Figure 8. Permanente Creek Diversion Channel constriction. View is upstream and generally to the west. Blach School is in the background. (Water District, n.d.)

On January 25, 2016 the Grand Jury observed debris on the shoulder of the Diversion Channel upstream of Grant Road. Debris was still present on March 1, 2016 as shown in Figure 9. The Grand Jury is concerned that debris could fall or be washed into the Channel by heavy rain and create obstructions downstream.



Figure 9. Debris on the shoulder of the Diversion Channel upstream of Grant Road, Los Altos, facing west (Grand Jury March 1, 2016)

### **After the Diversion Channel**

The cross-section of Permanente Creek between the Diversion Channel and Saint Francis High School is generally a shallow V. In January 2016 the Grand Jury observed that the creek in that area is overgrown with vegetation, which could restrict the flow of water between Eastwood Drive and Covington Road and cause flooding

At Valencia Avenue in Mountain View, Hale Creek flows into Permanente Creek. In January 2016, the Grand Jury observed water flowing only in Hale Creek at this confluence since much of the water from the upper part of Permanente Creek is directed through the Diversion Channel.

As a part of the Project, a section of the creeks will be converted to a larger U-shape with a natural sediment bottom to allow water to percolate into the ground. This section will start 100 feet upstream on Hale Creek and continue into Permanente Creek to McKelvey Park.

## **Conclusions**

The Permanente Creek Flood Protection Project is intended to avoid flooding along or near Permanente Creek. In investigating the complaint the Grand Jury did not discover credible data to support the allegation of fraud or to invalidate Water District engineering decisions regarding this project.

The two detention basins within Rancho San Antonio County Park and the detention basin in McKelvey Park will store water during heavy rainfall to protect areas downstream.

Observations made by the Grand Jury indicate that water flow in sections of Permanente Creek may be compromised due to the presence of dense vegetation and debris.

## **Findings and Recommendations**

### **Finding 1**

The Santa Clara Valley Water District Permanente Creek Flood Protection Project has the potential to prevent flooding of some residential and commercial properties within the cities of Los Altos and Mountain View.

### **Recommendation 1**

No Recommendation.

### **Finding 2**

Completion of the Permanente Creek Flood Protection Project could result in redefinition of the flood plain by the Santa Clara Valley Water District and the Federal Emergency Management Agency with subsequent removal of the requirement for flood insurance for some properties in the cities of Los Altos and Mountain View.

### **Recommendation 2a**

The Santa Clara Valley Water District should notify the Federal Emergency Management Agency of completion of the Permanente Creek Flood Protection Project so FEMA may reevaluate its 100-year flood plain within the cities of Los Altos and Mountain View. In addition, the Water District should inform the public of that notification.

## **Recommendation 2b**

At project completion, the Santa Clara Valley Water District should reevaluate its 100-year flood plain within the cities of Los Altos and Mountain View.

## Glossary

**100-year flood:** A flood event that has a 1% probability of occurring in any given year. Also referred to as a 1% flood, or base flood.

**ADA:** Americans with Disabilities Act of 1990.

**Box culvert:** A box shaped conduit carrying water under a road or railroad.

**Culvert:** A conduit carrying water under a road or railroad.

**Flood peak:** The highest level of the stage or discharge attained by a flood.

**Flood plain:** An area of low, flat land along a creek, stream, or river that may flood.

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## Interviews

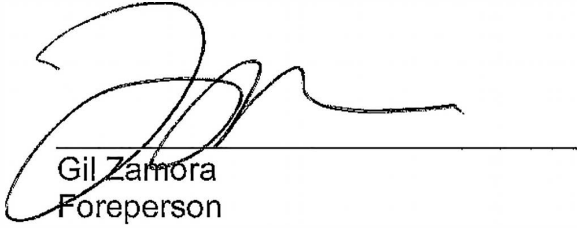
Two interviews were conducted between September 1, 2015 and March 31, 2016.

A presentation was made by Santa Clara Valley Water District personnel on September 21, 2015.

## Tours and Observations

|                    |  |
|--------------------|--|
| September 21, 2015 | Rancho San Antonio County Park, guided by Santa Clara Valley Water District personnel  |
| October 28, 2015   | Permanente Creek between Portland Avenue and Saint Francis High School, and the entire Permanente Creek Diversion Channel  |
| January 25, 2016   | Permanente Creek in Rancho San Antonio County Park, south of I-280, at West Fremont Avenue, at Portland Avenue (Heritage Oaks Park), at Saint Francis High School, at the confluence of Hale and Permanente Creeks (from Valencia Avenue), at McKelvey Park, and at Montecito Avenue |
| February 2, 2016   | Permanente Creek at Shoreline Park (North Shoreline Boulevard) and at Amphitheatre Parkway, and the Permanente Creek Diversion Channel at Grant Road   |

This report was **ADOPTED** by the 2015-2016 Santa Clara County Civil Grand Jury on this day 8<sup>th</sup> of June, 2016.



Gil Zamora  
Foreperson