

**ROSS VALLEY FIRE DEPARTMENT
STAFF REPORT**

For the meeting of: February 11, 2017

To: Board of Directors

From: Mark Mills, Fire Chief

Prepared by: Mark Mills, JoAnne Lewis, Todd Lando, Brian Costello

Subject: Weather Stations/Creek Monitoring Gauges – IT recommendations

RECOMMENDATION:

For the Board to receive the report, discuss and provide direction to staff.

BACKGROUND:

Prior to the floods of 1982, San Anselmo Fire Department maintained a creek level alarm at the Butterfield Fire Station. This was a local alarm that would sound inside the fire station when water reached a critical height. It was estimated that once the alarm sounded, and if it continued to rain, the creek in downtown San Anselmo would overflow its bank within 30 minutes. Since it was a local alarm, if the firefighters were out of the station on calls, and the alarm sounded, there would be no way to know it had activated. Following the 1982 flood, a second alarm was installed across the street from Station 19 on San Anselmo Ave. This was also a local alarm that was set to activate at just below the level where the creek would overflow, which was just below the bottom of the building. In Fairfax, the firefighters or town staff would keep watch on the creek behind the station and would sound an alarm if the water hit a level just below the town hall building. In Ross, there has been a creek/sediment gauge at Station 18 since the early 1970's. It has been updated, maintained and changed over the years. The Marin County Flood Control maintains the gauge and data.

In the years following the 2005 flood, the Ross Valley Fire Department (RVFD) in conjunction with the Towns of Fairfax and San Anselmo replaced the local alarms with two stream gauges. One is located across from Station 19 (attached to the building across the street from the station), and the other is just west of Station 21 on the Town Hall building complex. In 2016 a gauge was added at Station 20. Predetermined alert levels are set and automated notifications are sent to key personnel via text message and email. In addition, webcams have been installed at the three locations. An outside contractor, a firm called Eyasco, annually services the gauges and updates the servers.

There have been local weather stations at each of the locations for many years. Station 19 and Station 21 hosted a rainfall gauge maintained by the Marin County Flood Control up through the late 1990's. After their removal, weather stations were installed at Station 19 and Station 21. After the 2005 flood, updated equipment was installed with

AGENDA ITEM # 8
Date 2/11/17

real-time rainfall and other weather data, which is now available on the Department website. Department staff, up until recently, maintained and serviced the equipment and worked with the contract firm on the gauges.

Department staff utilizes these gauges and weather stations as one of the many aspects to our storm preparedness work.

DISCUSSION:

At the meeting of January 11, 2017, the Board requested a report on the status of the creek gauges and weather stations, and recommendations on modernizing the gauges and the weather stations.

Since that meeting, staff has met with the Department's IT staff to discuss what options are available regarding the gauges and weather stations and what the costs would be.

At the preliminary meetings, we discussed where our technology is currently, what would need to be upgraded, replaced, purchased new. It was determined that the computers that currently have the creek gauges running on them are at least 10 years old, so new stand-alone computers would need to be purchased.

The weather stations were also purchased in 2006 and would need replacing. The weather station at Station 21 is broken and needs to be replaced.

Our Hazard Mitigation Consultant, Todd Lando, provided an After Action Report after the storm events of January 2017. The activities on the website were impressive during the storms. The statistics are as follows: the majority of "hits" to our website were from mobile devices to our creek gauge and weather pages. Since December 1, there the visitors used mobile devices 45.5%, 12.1% tablet and 42.4% desktop to access our website. There were 136,441 individual visitors to the site, which translates to 3,653,790 hits during that period. Todd has made changes to the website to better accommodate mobile devices and will continue to do so.

In order to improve our system and prevent future failures and outages, his recommendations are as follows:

- Review threshold, warning, critical and flood levels for all gauges with Dick Stutsman and the County Flood Control and update as needed.
- Add dedicated internet service to 800 San Anselmo Ave to provide a more reliable connection for camera.
- Verify levels and configure notifications for the Station 20 gauge
- Update all images, layouts, and web design elements to better accommodate mobile devices

- Upgrade the UPS (Uninterruptible Power Source) for weather and creek servers at the stations.
- Ensure UPS for network infrastructure is adequate to prevent restart if generator transfer is delayed during power failure.

- Replace dedicated creek servers at each station with updated computers as the current machines are at least 12 years old, are unsecured and cannot be updated with current software. Currently, Station 21's server is exhibiting signs of imminent hardware failure.

The creek computer at Station 21 began having serious issues during the storm. It continues to show signs of instability, including shutting down randomly as recently as Feb 1. During the storm, Todd found it in a "frozen" state, with the fans running and the keyboard and mouse unresponsive. This was following a number of power failures, power surges, brownouts, and other storm related issues affecting the downtown Fairfax area, so it's possible that the computer issues are related to damage caused during the storm.

It is also very important to note that preparations completed in 2015 and early 2016 upgraded the website (and web server) to be able to withstand extremely high loads. In prior years, high server loads were found to slow down or "crash" the website. At the peak of the storm January 10, the web server had "scaled up" to 64 CPUs (from the normal 4), and was running quite "calmly" at less than 5-10% of capacity. Website responses for site visitors were faster during the storm than during non-events!

The offsite website server could have quite easily handled 10 to 20 times the load without slowing down, and additional "scaling" was available to handle even more traffic if needed. The web server is deliberately "geographically co-located" in St. Louis (with a mirror in Dallas) to separate it from natural disasters that might affect the Bay Area.

Updating the servers and Uninterruptable Power Supplies will help to eliminate the potential website and creek gauge issues related to frequent power outages during the storms.

Staff is also looking into other options for hosting the creek gauges with more robust servers, access and updates. We will be contacting the Marin County Flood Control District to discuss the possibility of working with them to provide improved information, reports, and updates.

Additionally, there has been discussion of adding a creek gauge along the Cascade drainage in Fairfax. If that is determined to be necessary, then the cost estimates will be increased to add the additional gauge.

FISCAL IMPACTS:

We have obtained cost estimates for implementing these changes and it would be roughly \$25,000. Of that, to replace the servers and UPS would be approximately \$6,500. The new weather stations approximately \$5,000. IT and Hazard Mitigation costs will add another \$13,500.

These are estimates at this time. After further discussion and direction, staff will bring an updated report to the board for further discussion.