

## **Las Gallinas Creek Levee Evaluation Public Comments and Responses**

The Las Gallinas Creek Levee Evaluation was a significant multi-year effort which aimed to: 1) better understand the current condition of the levees which help protect the Santa Venetia community from flooding; 2) develop an idea of the cost and feasibility of possible improvement alternatives; and 3) receive an indication of whether or not federal interest may exist for the U.S. Army Corps of Engineers (Corps) to participate in the design and construction of a preferred improvement alternative.

On January 29, 2014 the Marin County Flood Control & Water Conservation District (District) and the Corps held a community meeting to present the results of the evaluation. Staff from the District and Corps received and answered questions from meeting attendees both during and following the meeting. This FAQ document attempts to capture these questions and provide answers to these as well as some general questions the District frequently receives concerning flood control and other matters of interest related to Santa Venetia's watershed.

Written reports pertaining to the evaluation may be viewed online at [marinwatersheds.org](http://marinwatersheds.org). Please contact assistant engineer Dave Nicholson at [dnicholson@marincounty.org](mailto:dnicholson@marincounty.org) or 415.473.6535 with any questions or comments concerning the evaluation, or other questions relating to flood control in Santa Venetia.

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### **Marin County Flood Control & Water Conservation District**

#### **1. What is the District?**

The Marin County Flood Control and Water Conservation District (District) is a political subdivision of the State of California and is a separate and distinct agency from the County of Marin. It was established in 1953 by an act of the state legislature known as the Marin County Flood Control and Water Conservation District Act, which can be found in Chapter 68 of the Appendix to the California Water Code.

The boundaries of the District are the same as the boundaries of the county and the governing board of the District is the County's Board of Supervisors sitting as the Board of Supervisors of the District. Staffing for the District is provided by the Marin County Department of Public Works. Within the boundaries of the District, individual areas known as *zones* may be formed to fund infrastructure which helps protect the zone from flooding. There are presently eight zones within the county.

2. What is Zone 7 and how is it funded?

Flood Control Zone No. 7 (Zone 7) was formed as part of the District in 1962 in order to help protect Santa Venetia from flooding by dedicating local funds for the construction and maintenance of specialized flood control facilities in Santa Venetia. Since Zone 7's creation, five pump stations, three large intercepting drains, a system of levees, and various other flood control facilities have been constructed. In addition, Zone 7 supports an annual maintenance program for these facilities, including vegetation management.

Like other zones in the District, Zone 7 is funded via a portion of the regular annual property taxes which are collected within the zone. Zone 7's annual revenue is approximately \$385,000. Supplemental funding for specific projects may also be raised via the community's passage of a special tax or fee measure. Zone 7 residents have approved several measures over the years to help support its activities. Zone projects and studies have also been awarded state and federal funding grants.

### **Marin County Watershed Program**

3. What is the Watershed Program?

Initiated in 2008 to integrate flood protection and environmental restoration, the Marin County Watershed Program has produced watershed descriptions, existing conditions reports, and a series of maps for the entire county.

The Gallinas Watershed Program is a partnership consisting of the County, Flood Control Zones 6 (Rafael Meadows and Redwood Village) and 7 (Santa Venetia), County Service Area 6 (Gallinas Creek dredging), the Las Gallinas Valley Sanitary District, and the City of San Rafael aiming to provide a system-wide analysis of flood protection options and to develop:

- Hydrology and hydraulic models for Gallinas Creek
- Stormdrain model for Santa Venetia
- Lower Las Gallinas Creek Geomorphic Dredge Channel Study
- McInnis Park feasibility study for marsh restoration and hydraulic function improvement
- Conceptual project descriptions

Details for the Gallinas Watershed Program, including partnerships, work plan, deliverables, budgets, and schedule are available online at:

[http://www.marinwatersheds.org/gallinas\\_creek\\_flood\\_protection.html](http://www.marinwatersheds.org/gallinas_creek_flood_protection.html)

### **General Questions about the Las Gallinas Creek Levee Evaluation**

4. Why was the evaluation performed?

The Las Gallinas Creek Levee Evaluation was a joint multi-year study of the District and the Corps to better understand the current condition and performance of the existing 2 miles of levees and floodwalls which help protect the Santa Venetia Community from flooding. The Evaluation describes a set of possible conceptual alternatives to reduce impacts from flooding, including those which address sea-level rise and provide a Federal Emergency Management Agency (FEMA) accredited level of protection. An additional evaluation goal was to indicate whether or not adequate financial justification existed for the Corps' continued participation in the evaluation via the Section 205 Continuing Authorities Program (CAP).

Reports produced during the evaluation are available for review by visiting the *Library* page at [marinwatersheds.org/library.html](http://marinwatersheds.org/library.html).

5. What does the evaluation tell us and how will the findings be used?

The evaluation's several parts, which included a geotechnical investigation, failure analysis, hydrology and hydraulics analysis, damage assessment, and alternatives assessment, tell us several things about the existing levee, including:

- The Corps determined that continued federal participation on the project was likely unwarranted when considering that the program's 2013 funding cap was \$13,900,000 and the estimated lowest probable construction cost of an alternative is \$17,200,000.
- The greatest probable flood risk stems from high tides coming from the bay and not creek flows generated from watershed runoff.
- Based on current conditions, it is unlikely that seepage of water through the levee or structural instability alone would result in levee failure.
- Variability in the condition of the levee along its entire length, including property owner encroachments, which limit the District's ability to inspect, greatly increases the calculation of probability of failure.
- Improvement alternatives are expensive and are driven by the costs to acquire the right-of-way necessary to construct a project.

The evaluation's tools and reports provide valuable information concerning the creek and levee and will be used as a basis for the District's continuing study of the system. Tools include a hydrologic and hydraulic model of the creek and levees, which can be updated as conditions change and used to consider impacts any levee improvements might have on water surface elevations along the creek. Evaluation findings will also be compiled and considered along with the findings of other ongoing efforts in the watershed in the development of a watershed guide which will help outline possible next steps towards project implementation.

6. How much did the evaluation cost?

As of this writing, final accounting for the project was not complete; however, cost estimates for completing the evaluation are approximately \$1,200,000, of which \$594,585 are local costs and the remaining \$605,415 are federal costs incurred by the U.S. Army Corps of Engineers.

Of the \$595,000 in local costs, \$371,291 (62%) was provided by District 1 Community Services Fund at no cost to Zone 7. The remaining \$223,700 in local costs consists of District staff labor that was paid for by Zone 7.

7. How long did the evaluation take to complete?

The evaluation began with the District's agreement with the Corps to conduct a Section 205 Feasibility Study for the Las Gallinas Creek levees, which was signed in June 2008. Final reports for the last parts of the study were delivered in January 2014.

### **Levee Improvement Alternatives**

8. What alternatives were considered as part of the Las Gallinas Creek Levee Evaluation?

A wide range of alternatives was considered as part of the evaluation, including:

- Earthen levee
- Earthen levee with concrete floodwall
- Single sheet pile (with and without soil buttress)
- Maintaining the existing earthen levee and wooden "redwood box" floodwall

Some, but not all, of the considered alternatives were specified for their ability to address sea-level rise and/or to meet FEMA accreditation requirements. Other alternatives were specified only to provide protection against current sea-levels and did not necessarily meet FEMA accreditation requirements. Highlights for the considered alternatives include:

- The least costly alternative which would substantially improve the level of flood protection against current sea-levels is a \$17,200,000 sheet pile wall; however, this alternative would not meet FEMA accreditation requirements.
- The most costly alternative is a \$105,300,000 earthen levee option which, while meeting FEMA accreditation requirements, calls for the acquisition of substantial portions of creekside property.
- The least costly alternative which would provide protection against sea-rise and meet FEMA accreditation requirements is the \$21,000,000 sheet pile wall alternative.

9. What levee improvements were considered for the Santa Venetia Marsh Levee (Reach 1)?

Improvements considered for the levee at the Santa Venetia Marsh Open Space Preserve (Reach 1) include the same set alternatives considered for the creekside levee (Reach 2), with the exception of maintaining the existing earthen levee.

10. Why did the levee evaluation consider alternatives other than those which would provide a FEMA accredited levee?

Alternatives which meet FEMA accreditation requirements are generally costlier than those alternatives which, while increasing the level of flood protection provided, do not meet accreditation requirements. A primary goal of the levee evaluation was to assess a wide range of improvement alternatives with the idea that the construction of less costly alternatives would still provide a significant benefit to the community, regardless of whether or not they would meet all FEMA accreditation requirements.

11. Why don't any of the levee alternative alignments include fill/construction on the creek side?

For the purposes of the evaluation it was assumed that the cost of further filling and constructing within the wetland would be prohibitively expensive compared to constructing the levee on land. Additionally, it is unlikely that the many state and federal regulatory agencies with jurisdiction over the wetland would permit levee construction which would require the filling or "take" of wetland. If permitted, mitigation costs for wetland fill would likely be prohibitively expensive.

12. What are the elevations used in the levee evaluation relative to? (And how can I relate the elevations used to the elevations shown in a tide book?)

All elevations are provided relative to a plane of reference or "datum." The primary datum for the levee evaluation is the National Geodetic Vertical Datum of 1929, also known as NGVD29. A popular datum for the measurement of tides is mean lower low water (MLLW). Readers of tide books may recognize this datum as it is commonly used to report the daily variations in tide. The datum on FEMA maps is NAVD88. In Santa Venetia, you can roughly convert from NGVD29 to NAVD88 by adding 2.7 ft. So if you have an elevation of 6.0 ft NGVD29, the elevation in NAVD88 would be 8.7 ft.

13. What are possible ways of funding a levee improvement alternative?

Levee improvements of the type and scale considered by the evaluation require a significant amount of dedicated funding to provide for the planning, design, environmental review and permitting, easement and right-of-way acquisition, and eventual construction of the project. While Zone 7 receives funding annually from the collection of property taxes (fiscal

year 2013-2014 estimate is approximately \$385,000), these funds are largely dedicated to funding the operation and maintenance of existing facilities.

Funding levee improvements could be accomplished through the passage of a special tax or fee by Zone 7 voters and state and/or federal grant awards. Programs, such as the Corps' Section 205 Continuing Authorities Program (CAP), can also fund improvements by supplementing local funds with federal dollars. In order to be eligible for this funding, however, a project must demonstrate that it falls within the funding limits for the CAP and has quantifiable benefits which outweigh the project cost. The levee evaluation demonstrated that, in the case of the Gallinas Creek levee, the project costs and benefits do not meet the 2013 CAP criteria.

14. What are the next steps to getting the levee funded? Is there something we can do now?

Any substantial system-wide levee improvement would cost well beyond what Zone 7 could afford given its limited annual income and ongoing operation and maintenance responsibilities. Therefore, other potential funding sources which would need to be considered include targeted special taxes or fees, state or federal grant opportunities, and including levee improvements as part of a multi-benefit project. Multi-benefit projects may, for example, improve flood protection, increase and/or enhance wildlife habitat, improve water quality, conserve water supplies, and accommodate navigation. Multi-benefit projects often have advantages when attempting to meet regulatory requirements and may be more competitive candidates for receiving grant funding. A local match will most likely be required.

Without requisite funding, Zone 7 will continue to budget for the maintenance of the existing levee, which should allow for the regular inspection and repair of the segments of the system most in need.

15. How much higher will the levee in my backyard be than the levee today?

Existing levee heights vary depending on the exact location along the levee and construction of a new levee would increase levee heights between 2 to 3 feet.

**Real Estate**

16. Who owns the levees and why does there appear to be uncertainty concerning property ownership near the levees?

In general, the levees along Gallinas Creek (i.e., Reach 2) have been built on private land owned by individual property owners and without right-of-way provided to the District for operation and maintenance. Without right-of-way, the District must gain permission from each individual property owner each time it wants to inspect or improve the levee. There has been uncertainty concerning where historical creek boundaries lie relative to current

parcel boundaries. These discrepancies may be attributed, in part, to both natural and manmade changes in creek alignment.

17. Who built the levees?

Levees were originally constructed in the early part of the twentieth century by private developers as part of the Santa Venetia residential development. In addition to building the levees, the developers filled in marshland with soil to allow for future development of the land. These levees included sections of concrete floodwall, pieces of which are still visible today. Several decades later a new set of developers built and rebuilt levees as lots were subdivided and readied for construction during the mid-century housing boom. As the land, including the levees, began to naturally subside due to the weight of development and dewatering, the issue of tidal flooding became very apparent. Zone 7 of the Marin County Flood Control and Water Conservation District was created in 1962 to help address the issue of flooding in Santa Venetia and soon thereafter began funding the raising, improving, and maintenance of the levees. Redwood floodwalls were added to the existing earthen levees in 1982-1983 in response to exceptionally high tides which had led to widespread flooding in Santa Venetia.

18. Who maintains the levees and who pays for damages if they fail?

When granted permission, the District inspects and maintains levees to help maintain a level of protection upon which the Santa Venetia community has become reliant. Regular maintenance includes the replacement of deteriorated components of the redwood floodwall and filling seep holes or burrows within the levee. In the event of a levee breach, multiple parties may be involved and any compensation for damages would likely be determined through litigation. In a major event, state and federal assistance may be available.

19. How would the cost of levee improvements change if project right-of-way was donated? And how might this affect the project's eligibility for federal funding?

Real estate adds considerable cost to the construction of improvement alternatives whether bought in cash by the District or borne in-kind by property owners. Real Estate costs make up between 36% and 77% of total project costs depending on the alternative. Sheet pile walls require less right-of-way for construction, operation, and maintenance and are, therefore, less costly. Earthen levees require more right-of-way and are, therefore, more costly.

20. Why doesn't the District just buy the required right-of-way for the levee?

Real estate costs for the considered alternatives are between \$8,712,000 and \$81,102,000 and are far greater than the amount of money the zone has on hand. The end of fiscal year 2014-2015 fund contingency is currently projected to be less than \$50K.

## U.S. Army Corps of Engineers

### 21. Why wouldn't Las Gallinas Creek levee improvements qualify for Section 205 Funding?

The Corps offers the sponsors of qualifying projects matching funding for the construction and/or improvement of flood control facilities through their Section 205 Continuing Authorities Program (CAP). As of 2013, the program stipulated that the federal contribution to the total cost for completing a project not be more than \$7,000,000 and also required 35% and 50% of the total project cost be provided by the sponsor. In the case of the Gallinas Creek levees, the maximum total project cost eligible for funding under this program would be \$13.9M. (Total project cost includes planning, real estate, design, environmental review, and construction.)

The lowest cost alternative specified as part of the levee evaluation is a \$17.2M sheet pile wall improvement. Comparing these costs, it is clear that even the lowest level of improvement would not qualify for CAP funding. Additionally, the local sponsor is not allowed to "buy up" the difference between the \$13.9 CAP funding limit and the lowest estimated project cost of \$17.2M.

In addition to merely qualifying for funding, projects must also be considered based on their relative competitiveness compared to the large backlog in projects which have been identified as meeting minimum requirements. One significant measure of competitiveness is the project's cost-to-benefit ratio (CBR). The CBR is a comparison of a projects cost to the value of the benefits that project provides. While a minimum CBR of 1-to-1 is required, projects are more regularly held to a 1-to-2.5 ratio or higher before they are considered competitive for receiving funding.

### 22. Could a project be constructed under another Corps program?

The Corps does offer funding via programs outside of the Section 205 Continuing Authorities Program (CAP). One such common program is known as a General Investigation (GI). GI's require specific authorization by Congress and dedicated funding which is also appropriated by Congress. Receiving authorization and appropriations under a GI represents a significant and very uncertain effort. Furthermore, a project must still have a competitive cost-to-benefit ratio (CBR) in order to have a realistic chance of receiving funding. Like the CAP, a substantial amount of local funding must also be provided as part of the project. (Local matches vary between 0%-50%, depending on project phase. Matches between 25% and 50% are required for the construction phase.)

### 23. Would participation in the Corps' Section 205 Continuing Authorities Program require construction of a FEMA accredited levee?

Participation in the Corps' Section 205 Continuing Authorities Program would not require construction of a FEMA accredited levee. For the sheet pile alternative, the difference in



cost for constructing a FEMA accredited levee compared to a non-accredited levee is 16%. In this case, this difference is attributed to the cost of acquiring additional right-of-way required for accreditation.

## **Federal Emergency Management Agency (FEMA) and Flood Insurance**

### 24. What does it mean to have a FEMA accredited levee?

A FEMA accredited levee must meet several FEMA requirements including providing flood protection (with specified freeboard – i.e. distance between water surface and top of levee) for at least the 1 percent annual chance flood (so called “100-year flood”) and that the levee be built properly according to sound engineering practices which generally refers to geotechnical requirements. There are also specific requirements for levee inspection and maintenance.

Levees that meet these requirements can go through a certification process. FEMA can then acknowledge the certification through an official levee accreditation. A FEMA accredited levee is the first step towards protecting the community from flooding and removing the protected areas behind the credited levee from the mandatory flood insurance purchase requirement.

However, there are additional FEMA requirements in order to finally remove areas behind accredited levees from the Special Flood Hazard Area (SFHA) designation on FEMA’s Flood Insurance Rate Map (FIRM) and thus eliminate the mandatory flood insurance purchase requirements for homes financed by federally regulated or insured lenders. One of these requirements is that areas behind the levees also have a FEMA accredited interior drainage system (i.e. pumps, drainage pipes, ponds etc.) that meet FEMA requirements to prevent flooding of structures behind the levees. In addition, a Flood Insurance Rate Map Revision or Amendment has a formal process that must be followed.

### 25. What is the range in cost for providing Santa Venetia with a FEMA accredited levee?

Given current sea-levels, costs range from \$20.5M for a sheet pile wall to \$105.3M for an earthen levee. While sheet piles require less right-of-way (a major portion of levee cost), they are also less conforming to the natural environment.

### 26. Can a levee achieve FEMA accreditation if it is not built and/or funded by the Army Corps of Engineers?

FEMA accreditation does not require that a levee be built and/or funded by the Army Corps of Engineers.

27. What right-of-way is necessary along the levee in order to meet requirements for FEMA accreditation?

FEMA accreditation requires that right-of-way be provided along the entire length of the levee for purposes of access, operation, and maintenance. U.S. Army Corps of Engineer's guidelines specify that right-of-way include a minimum of 10 feet from the levee.

28. What is the County doing to help the community with increasing flood insurance costs?

One way the County is aiming to help the community minimize costs for acquiring flood insurance is through participation in FEMA's Community Rating System (CRS). CRS is a FEMA program that provides incentives in the form of discounts on insurance premiums directly to property owners for communities who go beyond minimum floodplain management requirements and develop extra flood protection measures. Recognized measures include public information, mapping and regulations, flood damage reduction, and flood preparedness. CRS is a County-wide program and will be developed and applied across all of unincorporated Marin County.

The discount amount varies depending on the number of measures taken. The County anticipates entering the program at a Class 9 or 8 which would provide a 5% to 10% reduction in insurance premiums to homeowners. In order to receive the discount, all measures taken by a community must first be documented, submitted to, and certified by FEMA on an ongoing basis. The County is currently preparing its CRS application and hopes to be accepted into the program in 2015.

29. How might current federal legislation affect flood insurance rates in Santa Venetia?

Questions concerning flood insurance, including rates and possible legislation, may be directed to FEMA. Contact information for FEMA may be found on their website at: <http://www.fema.gov/national-flood-insurance-program>.

**Current Condition and Maintenance of the Existing Levees**

30. What will be done for the levees in the near term (i.e., next 1 to 5 years)?

Per the recommendation of the Zone 7 Advisory Board, the levees and redwood floodwall will continue to be maintained to their current design specification. With permission, regular inspections will be conducted in an attempt to identify those levee sections in the most need of repair. Repairs will then be made based on need and available funding.

31. What will be done for the levees in the long term (i.e., next 5-20 years)?

Long term potential levee improvements have been identified through completion of the levee evaluation and include addressing the following: sea level rise, encroachments,

deterioration of the redwood floodwall and rodent infestation. At this time, funding for improvements has not been identified. Potential funding sources may include a combination of special taxes, grants, and other funding programs. A levee improvement project may also be combined with other local projects such as wetland restoration and channel dredging to help achieve multiple-benefits and increase the possibility of regulatory approval and attractiveness to possible funding opportunities.

### **Gallinas Creek Dredging**

32. How does sediment accumulation in Gallinas Creek affect Santa Venetia's flood risk?

The hydrology and hydraulic analysis conducted as part of the evaluation determined that Santa Venetia's greatest flood risk stems from high tides and not riverine flow through the creek channel. Tide levels are not directly impacted by the level of sediment in the creek. Therefore, the effect sediment accumulation has on Santa Venetia's flood risk can be considered negligible.

33. What is the County doing concerning the dredging of Gallinas Creek?

County Service Area No. 6 (CSA 6) was established in the 1960s for the purpose of dredging Gallinas Creek. A study completed in 2012 by consultants Winzler & Kelly estimated the cost for constructing a dredging project at over \$3,000,000. As of 2014, CSA 6 has accumulated approximately \$2,000,000 in funds and continues to seek ways of funding a dredging project.

CSA 6 is currently considering a range of potentially more sustainable dredging project alternatives, preliminarily estimated to cost between \$1,200,000 and \$4,100,000 to construct. These alternatives are being developed through the Gallinas Watershed Program's Lower Las Gallinas Creek Geomorphic Dredge Channel Study. The study seeks to define a more sustainable dredge channel template based on available tidal prism. In contrast with previous dredges following a trapezoidal template, a geomorphic dredge may be more sustainable, less costly, and easier to permit.

Preliminary findings were presented to the CSA6 Advisory Board in May, and results of the geomorphic dredge assessment were presented to the CSA6 Advisory Board on July 29<sup>th</sup>. The final report is scheduled for completion this summer/fall and will be available on [http://marinwatersheds.org/gallinas\\_creek\\_flood\\_protection.html](http://marinwatersheds.org/gallinas_creek_flood_protection.html).

### **Stormwater Drainage in Santa Venetia**

34. What is the County doing concerning Santa Venetia's storm drains to help address issues like ponding and street flooding?

The Gallinas Watershed Program commissioned a study in 2013 for performing a detailed assessment of Santa Venetia's storm drain system. Details of that study are expected to be available in the summer of 2014 at [http://marinwatersheds.org/gallinas\\_creek\\_flood\\_protection.html](http://marinwatersheds.org/gallinas_creek_flood_protection.html) and will provide recommendations for system improvements, including improvements to the community's five pump stations. A summary of the existing conditions study results and preliminary alternatives will be presented at a Zone 7 Advisory Board meeting on September 3, 2014.

35. How would Santa Venetia's stormwater pump stations respond to a loss in power?

Each of Santa Venetia's five pump stations is equipped with backup power to allow for continued operation in the event of a power failure. System components are designed to continue operation under loss of power.