

Cove Stormwater Pump Station and Collection System Hydrology and Hydraulic Study

Public Comments and Responses

The Cove Stormwater Pump Station and Collection System Hydrology and Hydraulic Study was a significant effort which aimed to: 1) develop a comprehensive understanding of the current condition and level of service of the pump station; and 2) develop alternative recommendations for upgrading the system.

On May 12, 2016 the Marin County Flood Control & Water Conservation District (District) and consultant Schaaf & Wheeler presented a summary of the Study to the Zone 4 Advisory Board. Following this meeting a draft version of the Study was posted for a public comment period that extended from May 23, 2016 to July 25, 2016 and public comments were received. This document summarizes these comments and provides responses to these, as well as some general questions the District frequently receives concerning flood control and the Flood Control Zone 4 watersheds.

Written reports pertaining to the Cove Stormwater Pump Station and Collection System Hydrology and Hydraulic Study may be viewed online at http://www.marinwatersheds.org/pubs_reports.html#Zone4.

Please contact Scott McMorrow at SMcmorrow@marincounty.org or 415.473.2918 with questions concerning the study, or other questions relating to Flood Control Zone 4.

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. The District 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. The governing board of the District is the County's Board of Supervisors. 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 were formed to fund infrastructure to help to protect the zone from flooding. There are presently eight zones within the County.

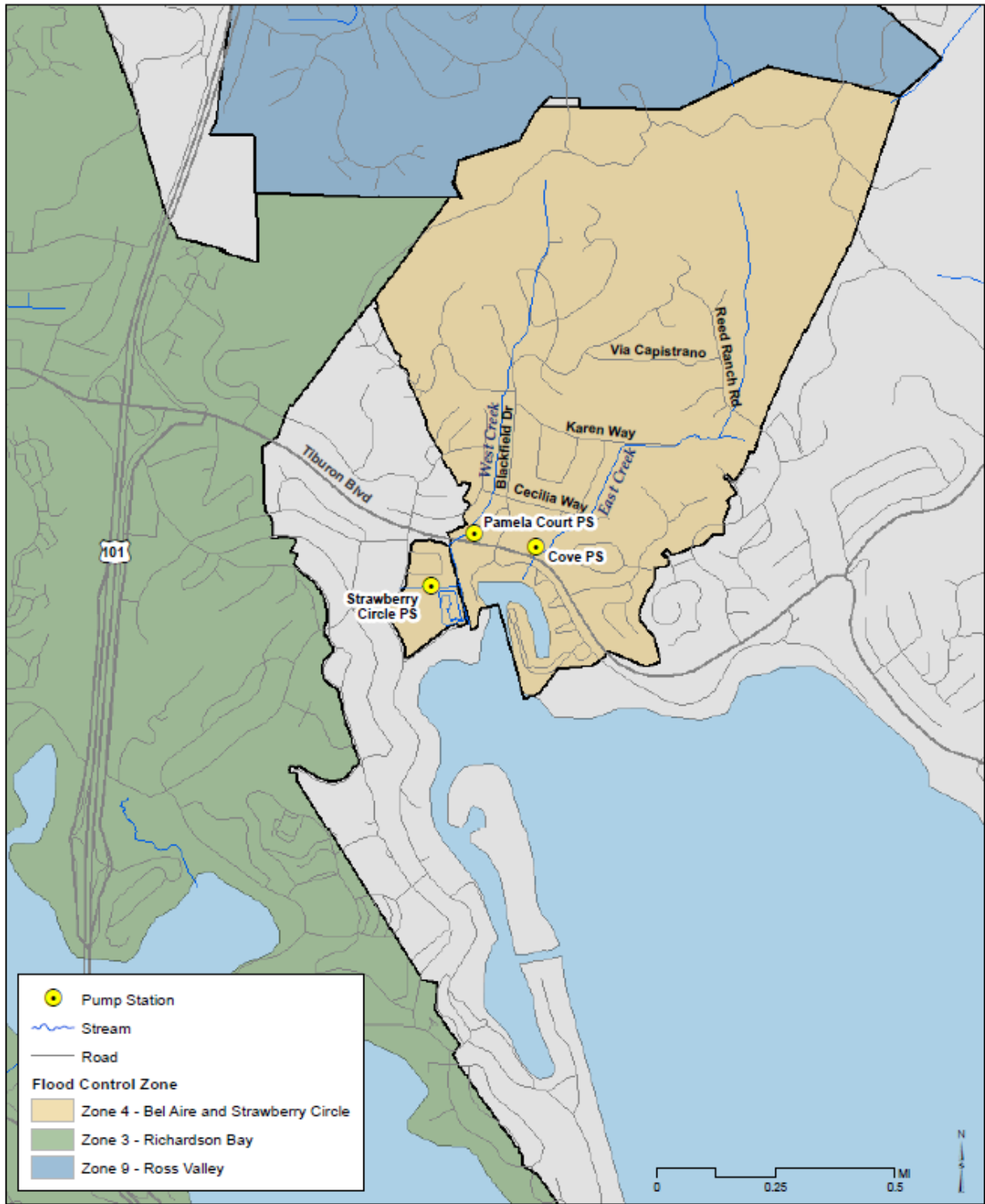
2. What is Zone 4 and how is it funded?

Flood Zone 4 is located on the Tiburon Peninsula encompassing portions of the City of Tiburon, including the community of Bel Aire. Flood Zone 4 was created in May of 1957 to alleviate chronic flooding in what was the Bel Aire subdivision and adjacent undeveloped lands. The boundaries of the zone were later amended to include the residents of Strawberry Circle (Subzone Zone 4A).

The Zone currently maintains existing facilities, including three pump stations, and does an annual cleaning of drainage ways.

Like other zones in the District, Zone 4 is funded via a portion of the regular annual property taxes collected within the zone. Zone 4's annual revenue is approximately \$700,000. The residents of Flood Control Subzone Zone 4A passed a special parcel tax in 2002. This special parcel tax generates approximately \$6,700 annually, which funds the ongoing maintenance of the Strawberry Circle Pump Station.

Below please find a map of Zone 4:



Flood Control Zone 4 - Bel Aire and Strawberry Circle



3. What is the role of the Flood Control Zone 4 Advisory Board?

The Flood Control Zone 4 Advisory Board (AB) serves as a citizens' advisory board that makes recommendations to the Supervisors of the Marin County Flood Control and Water Conservation District (District BOS). The AB responds to matters referred to it by the BOS, via District staff, such as annual zone budget, annual work plan, and capital projects for the zone. The AB consists of five members who are appointed by the BOS. AB members must be residents of Zone 4, and no more than one AB member can be a resident of Subzone 4A. Zone 4 Advisory Board meetings are public meetings that adhere to the public meeting laws of California, including the Brown Act.

4. What facilities are part of the Zone and how are they maintained?

The Zone maintains drainage in East and West Creek through annual removal of vegetation, debris, and sediment as necessary in the channels, at bridges, and trash racks. The zone also maintains pump stations at Cove Shopping Center and between Tiburon Blvd and Pamela Court. Zone 4A maintains an additional pump station serving Strawberry Circle. The District utilizes County maintenance crews for day-to-day operation and maintenance of pump stations. Contractors are hired for clearing the pump station wet wells before the rainy season and also for preventative maintenance on the pumps - with each pump being removed, inspected, and restored on a 6-year cycle. Additionally, the District has two portable pumps stationed in Zone 4. These pumps are available for use District-wide as needed and not just in Zone 4.

Marin County Watershed Program

5. What is the Watershed Program?

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

The Southern Marin Watershed Program is a partnership consisting of the County of Marin, Flood Control Zone 3 (Tam Valley, Marin City, Unincorporated Mill Valley, Ryan Creek, Sutton Manor, Alto) and Flood Control Zone 4/4a (Strawberry, Bel Aire), and the Cities of Mill Valley and Sausalito. The Southern Marin Watershed Program aims to provide a system-wide analysis of flood protection options and to support:

- Arroyo Corte Madera del Presidio Riverine Flood Risk Reduction Alternatives (2012 study complete; additional study required before taking to construction)
- Crest Marin Riverine Flood Risk Reduction Alternatives (partially complete and on hold)
- Coyote Creek Levee Improvements (studies completed)
- Lower Marin City Drainage Improvements (Marin City Drainage Study to begin in the Summer of 2016)

- Richardson Bay Shoreline Protection (study complete, in review phase)
- Ryan Creek Pump Station Improvements (partially complete)
- Sutton Manor Creek Improvements (future study)
- Cove Pump Station Upgrades (study completed and presented to Zone 4 AB in May 2016)
- Karen Way Ditch Improvements (future study)
- Strawberry Levee Improvements (future study)
- West Creek Flood Wall Study (on hold)

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

http://www.marinwatersheds.org/southern_marin.html

Cove Pump Station and Collection System Hydrology and Hydraulic Study

6. What is the difference between a Request for Proposal and a finalized contract?

A Request for Proposal (RFP) is a document prepared by the District and sent to multiple consultants. The RFP describes the general scope of the proposed project being considered. The consultants then respond back to the District with their individual proposals that describe how the consultant will meet the needs of the project. The District reviews the RFPs, and selects the consultant best suited to complete the project. Once selected, the District negotiates a contract with the selected consultant. The tasks defined in the RFP and the scope of work in the final contract may have slight differences due to prioritization of tasks, budget constraints, or other project needs. In the case of the Cove Pump Station Study, Schaaf & Wheeler Consulting Civil Engineers were selected to complete the Study.

7. What was the scope of the Cove Pump Station Study?

Schaaf & Wheeler was hired to analyze the District's Cove Stormwater Pump Station, and the contributing storm drain pipes that feed into the pump station, to determine the current operations and capacity of the system. The analyses performed under this Study gauged the performance of the existing system and identified potential upgrades. Planning level cost estimates were developed for each identified system upgrade. The tasks as part of the scope of work include:

Task 1 - Information Assessment: includes assessing available information and summarizing observations, planning for additional data collection, reviewing applicable engineering and safety standards, and establishing goals for flood risk reduction.

Task 2 - Operations & Maintenance Assessment: includes inspecting the District-owned portions of the system with CCTV, performing an above-ground inspection of the Shopping Center drainage system (privately owned), inspection of the pump station

structure, investigating the feasibility of installing a self-cleaning trash rack, developing pump curves representing current performance and evaluating the wet well configuration, inspecting electrical controls, alarms, and electrical systems, reviewing the capability for pump station remote control and monitoring, and developing recommendations for operations and maintenance.

Task 3 - Hydrologic & Hydraulic Modeling for Existing Conditions: includes development of a model to calculate stormwater flows to the pump station, determining any impacts of groundwater intrusion, determining the capacity of the existing pumps, calibrating the model, identifying the potential water surface profiles, and reviewing the FEMA Floodplain.

Task 4 - Hydrologic & Hydraulic Modeling for Improved Conditions: includes modeling 3 major project alternatives and analyzing pump performance and potential impacts of sedimentation on simulated system upgrades.

Task 5 - Project Management and Administration: includes an evaluation kick-off meeting with District staff, evaluation status reports and meetings for staff, and two public presentations on the evaluation status.

The final report summarizing the evaluation is located on the Southern Marin Watershed Program website:

http://www.marinwatersheds.org/pubs_reports.html#Zone4.

8. How was the scope of the Cove Pump Station study developed?

At the March 12, 2015 Advisory Board meeting, the AB recommended that staff work with a subcommittee made up of two AB members on creating a scope of work for completing an engineering evaluation of the pump station. Nute Engineering of San Rafael, which has extensive experience in pump station design, was asked to assist with creating a technical memorandum containing the scope of work. The scope of work was posted on http://www.marinwatersheds.org/pubs_reports.html#Zone4 and shared with the larger advisory board on July 27, 2015.

9. What was the public outreach concerning the Study?

On March 12, 2015, the Flood Control Zone 4 Advisory Board met and recommended that the Study be undertaken. This public meeting took place at the Strawberry Recreation Center. Additional updates were provided by District staff to the Advisory Board on October 21, 2015, March 10, 2016, and May 12, 2016. Also, the consultant hired to perform the Study gave presentations to the Advisory Board on [March 10, 2016](#) and [May 12, 2016](#). All of the above mentioned meetings were public meetings conducted in accordance with California public meeting laws, including the Brown Act.

A draft version of the Study was released for public comment on May 23, 2016. The draft Study was posted online as noted above, as well as on the main web page of the

[Southern Marin Flood Protection and Watershed Program](#). The initial public comment period was scheduled to close on June 24, 2016. This deadline was extended to July 25, 2016. Pertinent comments received were incorporated into the final version of the Study.

10. What is the current maximum level of flood protection that the Cove Pump Station provides?

The existing Cove Pump Station has capacity to handle 16,000 gallons per minute (gpm) with all three of the pump station's pumps running. This corresponds to a level of protection of greater than a 100-year storm routed through the existing storm drains, however water ponds in streets and lawns higher in the watershed due to limitations in storm drain capacity. In a 100-year storm, the existing storm drain system can directly deliver up to 14,900 gpm to the pump station.

Based on the pump station's original 1974 design study, the station is dependent on one natural-gas driven pump in the event of an electrical failure. At the time of design, the likelihood of power outages was considered infrequent. This gas-driven pump has a capacity of 8,800 gpm. For comparison, the existing storm drain system delivers the following flows to the pump station for various storm intensities: 10,400 gpm (10-year storm); 12,600 gpm (25-year storm); and 13,900 gpm (50-year storm). Potential pump station upgrades could include the installation of a back-up diesel powered generator that would have the ability run all pumps in the station in the event of an electrical power failure.

11. Where is the drainage system for Cove Pump Station, and who owns it?

The District currently owns a small portion of the storm drainage system that feeds into the Cove Pump Station, as is the case throughout Marin County where the District operates pump stations. The privately owned shopping center has a drainage system that feeds into the Cove Pump Station. The Town of Tiburon also owns drainage facilities in the area that drain into the pump station. Following is a map of the drainage system that depicts ownership of the various drainage facilities.

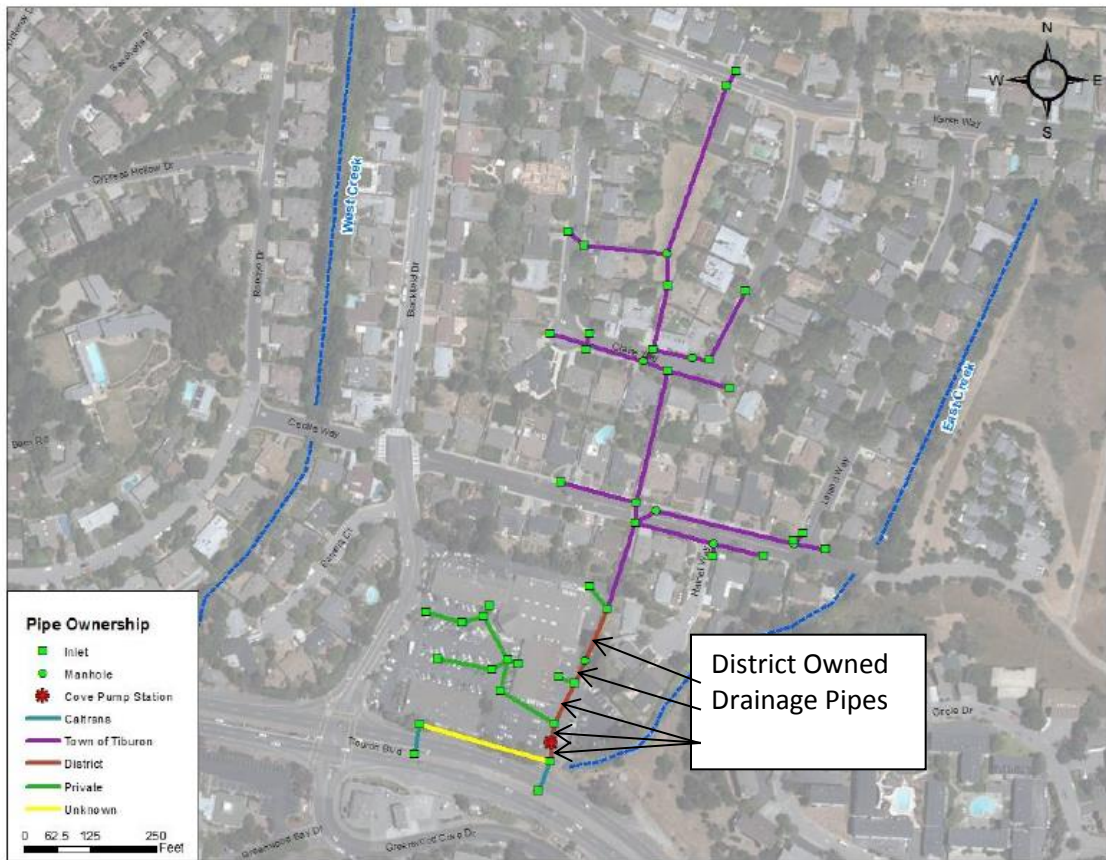


Figure 4-3: Responsible Parties for Cove Drainage System

12. Where does the Pump Station discharge stormwater and how does this outlet affect the capacity of the pump station?

The pump station discharges stormwater to East Creek immediately behind the pump station (see photo of discharge pipes below).



The discharge pipes are located above the modeled water surface elevation in the creek and above the creek bank elevations; therefore, the pumping capacity is not currently affected by the hydraulics of the creek. Future pump station upgrades, sea level rise, and floodwall construction may increase the water surface elevations in the creek; therefore, this should be taken into account with future upgrades.

The current design of the pump station does not specifically account for inflows to the storm drain system due to East Creek overtopping its banks. A separate study to evaluate the creek could be undertaken to determine how to eliminate potential overtopping.

13. Where does East Creek discharge?

East Creek discharges through culverts on the southwest side of Greenwood Cove Drive. The culverts discharge beneath a dock structure that extends into the bay at about 37°53'51.20"N; 122°30'1.41"W

14. Has there been a hydraulic study of East Creek?

The portion of East Creek adjacent to the pump station and under Tiburon Boulevard was evaluated as part of the Cove Pump Station Study. Additional analysis should be performed before implementing any projects to mitigate potential creek overtopping.

15. Did the Study consider a flood wall along East Creek?

East Creek, to which Cove Pump Station pumps, is tidally influenced. The Study considered a floodwall along the western side of East Creek to prevent overtopping into the Cove Shopping Center, and subsequently into the pump station, due to very high tides or moderately high tides combined with very high stormwater flow in the creek. Further analysis of East Creek would be required before implementing a floodwall

project.

16. What are the next steps for Cove Pump Station?

Next steps for this pump station include working with the Flood Zone 4 Advisory Board and the Supervisors of the Marin Flood Control and Water Conservation District to determine when and how to proceed with pump station upgrades. These upgrades would then need to enter a phase of final study, design, and environmental review prior to construction.

17. How was the terrain modeled in the study?

For the purpose of creating the hydraulic and hydrologic model and maps of flooding due to stormwater, the terrain was modeled using the 2010 Golden Gate LiDAR survey. This was a flyover survey using airborne laser scanning of the ground and above-ground objects, and is considered accurate enough for the purposes of this study. This method is standard for these types of models in the Bay Area.

Tidal flooding potential was evaluated using FEMA Flood Insurance Rate Maps which were since updated in March 2016. The updated maps no longer show tidewaters backing up north of Tiburon Boulevard and those homes are being removed from the 100-year floodplain Special Flood Hazard Area. This should result in lower flood insurance premiums in areas removed. Because the actual risk of flooding has not changed, the District recommends that property owners north of the Boulevard continue to purchase flood insurance even if their mortgage lenders do not require it anymore.

18. Where can I get information about the Federal Emergency Management Agency (FEMA) and the National Flood Insurance Program?

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>.

19. Why are some homes that have flooded in the past not shown as flooding in the figures in the study?

There could be a number of reasons for this difference in actual vs. simulated flooding. The accuracy of the terrain model is within +/- 6" due to use of the flyover LiDAR data instead of on-the-ground land surveying and therefore localized areas may have deeper or more shallow flooding than would show up in the model. The accuracy is typically better in un-vegetated areas.

Sometimes flooding occurs because floodwaters bring debris into the storm drain system and cause clogs that limit capacity and this effect is not part of the model.

20. What immediate improvements are being proposed for Cove Pump Station?

The Study identified two District-owned pipes that drain directly into the pump station that should be replaced immediately. The estimated cost for replacing these pipes is \$100,000. If the two pipes proposed for replacement collapsed in a storm, the ability for water to get to the pump station would be significantly compromised. The at-grade inlet at the trash rack would be the only way of getting around those two pipes and the elevation at that point is high relative to the shopping center due to apparent differential settlement. In other words, if those pipes collapse, which could happen at any time given current condition, the pump station won't be able to prevent flooding.

21. What additional upgrades can be made to the Cove Pump Station?

The Cove Pump Station was constructed in 1976, and is nearing the end of its design life. Minimal upgrades that were recommended by Schaaf & Wheeler include replacing the station's Programmable Logic Controller, installing a back-up (float-based) control system, integrating a Supervisory Control and Data Acquisition system for remote monitoring, installing Arc Flash labels, replacing the meter/main breaker, replacing the motor control center and moving it outside the pump station building, repairing corroded bars on trash rack, modifying the wet well pump bays to improve interconnectivity, and modifying the pump set levels.

More extensive upgrades involve installing a backup power generator and automatic transfer switch, replacing some of the electrical equipment, and increasing the size of the pumps, which would also require new electrical service. The consultant also recommended installing wet well access hatches and an automatic-cleaning trash rack in order to facilitate maintenance. As an alternative method to prevent debris from clogging up the pumps, a pump grinder was also considered. This is not feasible because at high flows, this device would impede hydraulic flow entering the wet well, and create smaller pieces of trash that would pass through the pumps and pollute East Creek.

The storm drain system north of the Cove Shopping Center is owned by the Town of Tiburon, and the District anticipates that the Town will eventually upgrade their storm drain system as outlined in the Town of Tiburon's 2008 Storm Drainage Master Plan. The upgraded storm drains could deliver up to 21,100 gpm to the pump station in a 100-year storm, which is nearly 50% more flow than the existing system. Therefore, the District recommends that improvements to the pump station anticipate increased flows that would result from upstream storm drain system upgrades.

22. Are upgrades to the Cove Pump Station consistent with existing and proposed upgrades for pump stations in the other District Flood Zones?

A goal of the final design process for any upgrades to Cove Pump station will be to ensure the pump station follows a District-wide standard for operations and technology. This includes using equipment, procedures, codes, and standards similar to that currently implemented or recommended in other Flood Zones. Example District-wide

projects include improvements to worker safety to follow updated codes, implementation of a remote pump monitoring (SCADA) system, and development of common standards for determination of design capacity and back-up power systems.

23. How much would upgrades cost and how would they be paid for?

The District recommends that the more extensive upgrade plan be implemented. For comparison, the Study outlines three potential levels of upgrades to the pump station (please see question 24 below for more details). The initial estimate for these improvements was identified in the Study to cost \$2,400,000. These improvements could be implemented over a several-year project window and paid for with the existing tax-based funds generated in Zone 4.

The District is always looking for funding opportunities from state and federal agencies (Department of Water Resources, State Water Resource Control Board, FEMA and the U.S. Army Corps of Engineers), but there is nothing available at this time. The District will notify any other agencies in the area (Town of Tiburon, Caltrans) regarding major pump station upgrades and coordinate with the Town of Tiburon and Caltrans regarding study findings associated with facilities in their right-of-way.

Additionally, the District will begin the process of real estate procurement to accommodate the larger pump station footprint. Unfortunately, there is not room in the existing pump station to make upgrades. We recommend putting fencing around the pump station to protect any new outdoor gear from vandalism.

24. If the pump station currently has a 100-year capacity why were larger pumps proposed as part of the study?

District staff recommends that upgrades to the Cove Pump Station be implemented that complement the Town of Tiburon's Master Drainage Plan (MDP). Please see question 10, and 21 above for more details on existing pumping capacity and projected pumping capacity needs.

Tiburon's MDP projects an upgrade to 25-year level-of-service pipe capacity in the underground drainage facilities north of the Cove Shopping Center. This could result in up to 21,100 gpm inflow into the Cove Pump Station. Alternative 3 (please see below) meets this 25-year level-of-service pipe upgrade. Alternative 3 provides a level of protection at only a 33% premium over Alternative 2, which is a much lower level of protection. Expenditures for fiscal year 2016-17 to implement Alternative 3 would include the design of the pump station, preliminary environmental review, and an updated cost estimate for consideration in next year's budget.

Below are the three alternatives presented in the Study for comparison purposes. The District recommends implementing Alternative 3.

Alternative 1 - Table 6-7: Cove PS Short-Term Upgrades: Existing Capacity

Table 6-7: Pump Station Short Term Upgrades Cost Estimate

Item No.	Description	Unit	Quantity	Unit Cost	Total
1	Replace PLC	LS	1	\$25,000	\$ 25,000
2	Install Backup Control System	LS	1	\$15,000	\$ 15,000
3	Integrate SCADA	LS	1	\$15,000	\$ 15,000
4	Install Arc Flash Labels	LS	1	\$2,000	\$ 2,000
5	Replace Meter/Main Breaker	LS	1	\$15,000	\$ 15,000
6	Replace MCC	LS	1	\$150,000	\$ 150,000
7	Remove Pump 4 and Piping	LS	1	\$4,000	\$ 4,000
8	Replace Corroded Trash Rack Bars	LS	1	\$5,000	\$ 5,000
9	Modify Wetwell	LS	1	\$20,000	\$ 20,000
10	Modify Pump Set Levels	LS	1	\$1,000	\$ 1,000
Total w/o Contingency:					\$250,000
Total w/ Contingency and Soft Costs:					\$430,000

Definitions of Acronyms:

PLC - programmable logic controller

MCC - motor control center

SCADA - supervisory control and data acquisition

Alternative 2 - Table 6-8: Cove PS Long-Term Upgrades – Existing Capacity

Table 6-8: Pump Station Long Term Upgrades Cost Estimate, Existing Storm Drain System, Existing Level of Service

Item No.	Description	Unit	Quantity	Unit Cost	Total
1	Mob/Demob	LS	1	\$ 90,000	\$ 90,000
2	New MCC	LS	1	\$ 150,000	\$ 150,000
3	Backup Generator and ATS	LS	1	\$ 110,000	\$ 110,000
4	New Pumps, tubes, discharge	EA	3	\$ 70,000	\$ 210,000
5	New Electrical Service (if required)	LS	1	\$ 30,000	\$ 30,000
6	Misc. Electrical Imp.	LS	1	\$ 50,000	\$ 50,000
7	Modify Pump Bays	LS	1	\$ 40,000	\$ 40,000
8	Add Wetwell Access Hatches	EA	3	\$ 30,000	\$ 90,000
9	Automatic Trash Rack, Fence, Etc.	LS	1	\$ 260,000	\$ 260,000
10	Misc. Site Items	LS	1	\$ 30,000	\$ 30,000
Total w/o Contingency:					\$1,060,000
Total w/ Contingency and Soft Costs:					\$1,800,000

Definitions of Acronyms:

PLC - programmable logic controller

MCC - motor control center

SCADA - supervisory control and data acquisition

Alternative 3 - Table 6-9: Cove PS Long-Term Upgrades: Increased Capacity

Table 6-9: Pump Station Long Term Upgrades, 100-Year Inflow, 25-Year Pipe Projects*, and Modified Wetwell

Item No.	Description	Unit	Quantity	Unit Cost	Total
1	Mob/Demob	LS	1	\$ 130,000	\$ 130,000
2	New MCC	LS	1	\$ 160,000	\$ 160,000
3	Backup Generator and ATS	LS	1	\$ 130,000	\$ 130,000
4	New Pumps, tubes, discharge	EA	3	\$ 80,000	\$ 240,000
5	New Electrical Service (if required)	LS	1	\$ 30,000	\$ 30,000
6	Misc. Electrical Imp.	LS	1	\$ 60,000	\$ 60,000
7	Modify Wetwell	LS	1	\$ 200,000	\$ 200,000
8	Add wetwell access hatches	EA	3	\$ 30,000	\$ 90,000
9	Automatic Trash Rack, Fence, Etc.	LS	1	\$ 280,000	\$ 280,000
10	Misc. Site Items	LS	1	\$ 50,000	\$ 50,000
Total w/o Contingency:					\$1,400,000
Total w/ Contingency and Soft Costs:					\$2,400,000

* Does not include implementation of 25-year level-of-service pipe projects, but increased capacity of pump station allows for future pipe upgrades. See table 6-5 in the Cove Pump Station and Collection System Hydrology & Hydraulic Study for potential future pipe upgrades.

Definitions of Acronyms:
 PLC - programmable logic controller
 MCC - motor control center
 SCADA - supervisory control and data acquisition