Arroyo Avichi - Baccaglio Basin -Scottsdale Marsh and Pond -Lynwood Basin (ABSL) Complex and Nave Gardens Flood Drainage Improvements Feasibility Study

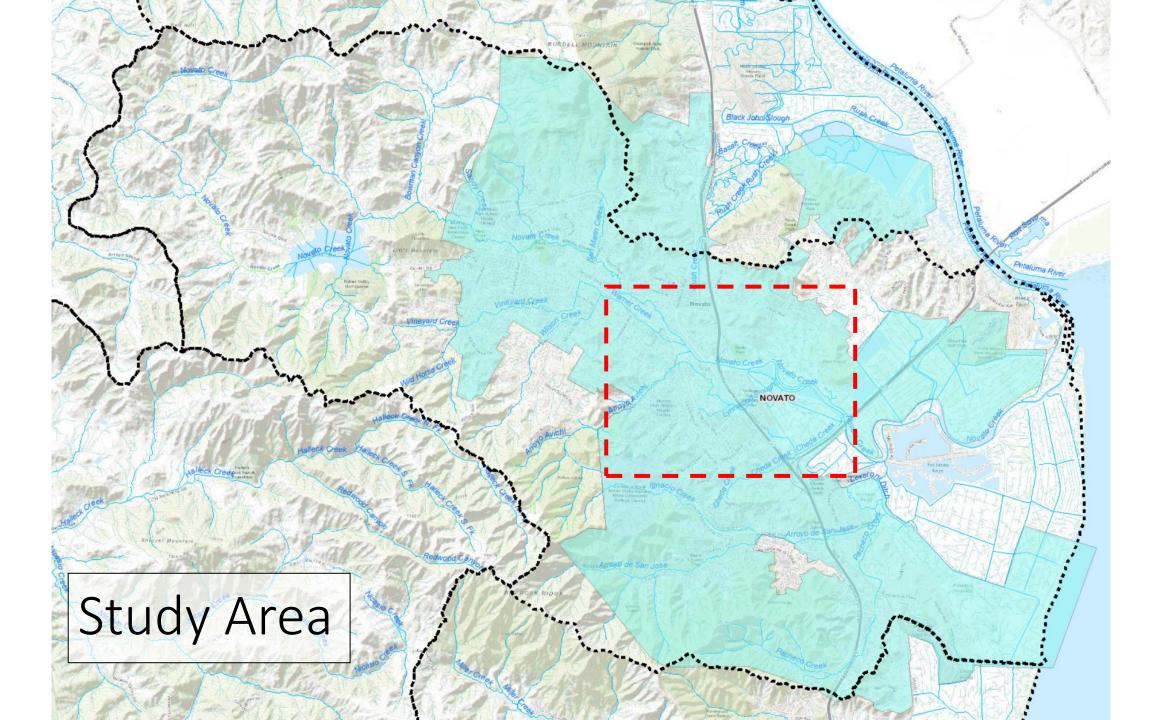
Marin County Flood Control District Zone 1 Meeting ABSL Complex Study Update February 23, 2023

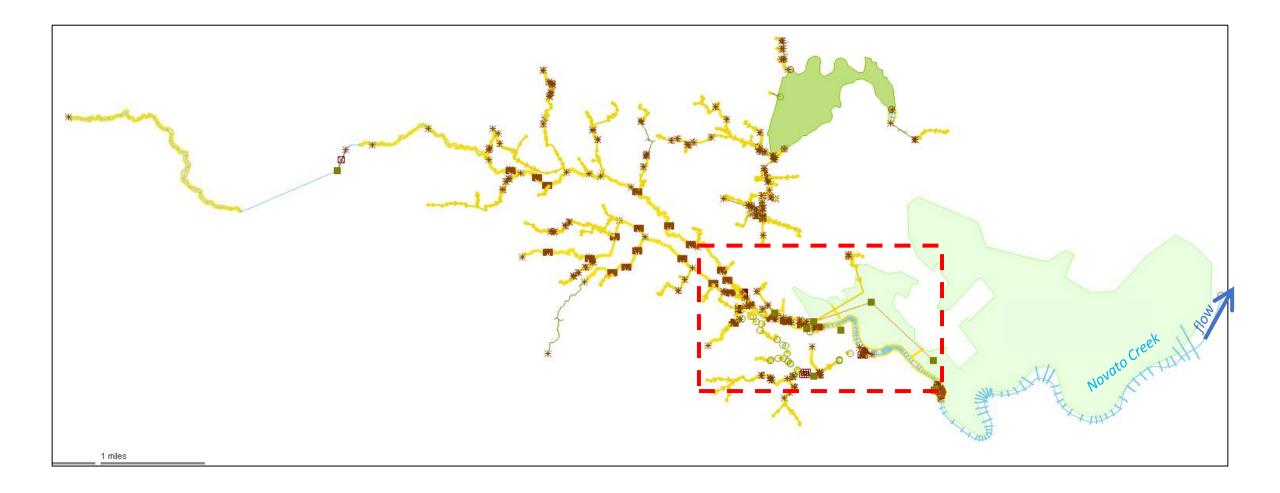




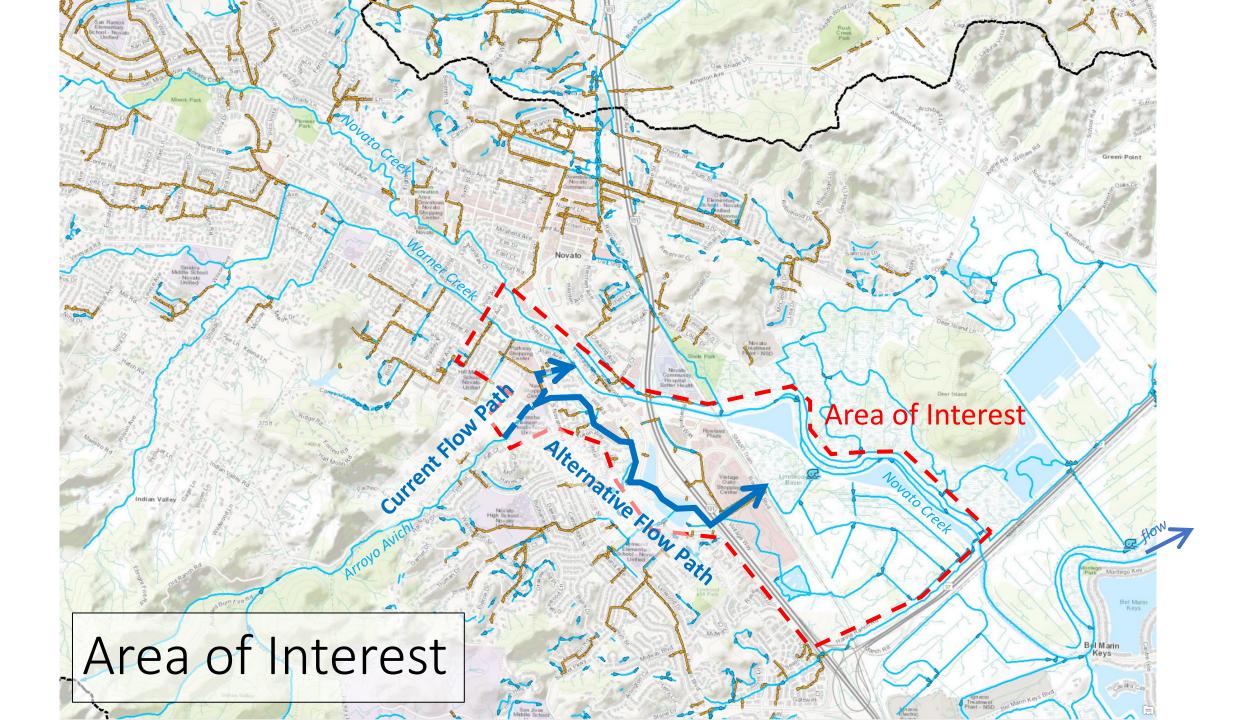
Evaluate the most feasible improvements to the ABSL complex of open spaces to assist with flood control in downtown Novato and the surrounding low elevation neighborhoods (e.g., Nave Gardens).











Scope of Work

- Background Review
- Existing Condition Characterization
- Hydrologic/Hydraulic Modeling
- Alternatives Analysis

complete nearly complete (May 2023) in progress (June 2023) future (December 2023)



Background Review complete

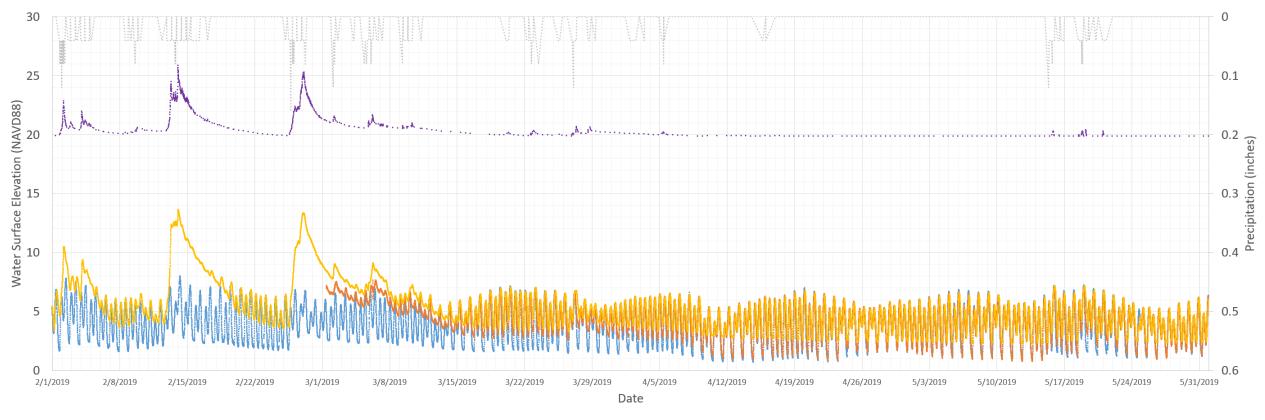
- 93 documents related to:
 - Hydrology and Hydraulics
 - Observed Flooding
 - Infrastructure Condition, Maintenance Activities, Operations
 - GIS databases
 - Utilities, Right-of-Way, Topographic Surveys
- Identify Data Gaps
- Scope Investigations to Fill Data Gaps

Novato Creek Hydraulic Study: Alternatives Development and Hydraulic Analysis Final Report: June, 2016

Table ES-1: Novato Watershed Project: SHORT Term Alternative Summary

Version 2010 Restore to expand Canyon to floodplain Lower Warner Creek Da S-2 Install St to reduce S-2 S-2 S-3 S-3 S-3 S-4 Increase to decrease to decrease to improvise control BN S-4 S-5 Novato Creek Channel: Novato Creek Channel: Novato Creek Channel: S-6 S-7 Remove to increase channel con to passive Novato Baylance: Novato Baylance: S-7 Divide Ly Novato Baylance:			Preliminary Cost	
S-1 Restore to expand Canyon to floodplain Lower Warner Creek Drives S-2 Install St to reduce S-2 Install St to reduce S-3 Novato Brives S-4 Increase to improviscotts Soutsdale Novato Creek Dredge Re S-5 Redesign to reduce Novato Creek Channel: Novato Creek Channel: S-6 Spillway to increase culverts to itides. S-7 Remove to jassive Novato Baylance: Lynwe to increase channel co to passive Novato Baylance: Divide Lynwe storage ar	Novato Creek (Upstream of Hwy 101)		estimate	
S-1 to expand Canyon to floodplain Lower Warrer Creek Dr S-2 Install St to reduce to decreas by modify Novato Bi Scottsdale Marrer S-3 Increase to improv Scottsdale Marrer Novato Creek Dredge Ru S-5 Redesign to increase to improv Scottsdale Novato Creek Channel: S-5 Spillway S-6 Spillway to increas culverts to tides. S-7 Remove to increase culverts to to increase channel C Divide Ly To increase corage and Divide Ly	Creek Storage and Floodplain Improvements			
5-2 Install SI to reduce to reduce S-3 Increase to decrease by modify Novato Bir S-4 Increase to decrease by modify Novato Bir Scottsdale Narsh Convertion to improving Scottsdale Increase to improving Scottsdale S-4 Increase to improving Scottsdale Novato Creek Novato I Novato Creek Channel: Novato Creek Spillway to increase culverts to itdes. S-6 Remove scottsdale S-7 Remove scottsdale Novato Baylannel cr to passive Novato Baylannel cr to passive Novato Baylander S: Lynwy S-8	Restore Floodplain Upstream of Bowman Canyon (Leveroni Creek) to expand existing channel cross section on public parcels upstream and downstream of Bowman Canyon to increase the active flow area. Modify tributary outfalls to discharge across available floodplain. Protect/expand riparian corridor via floodplain excavation and grading.	\$	1,500,000	
5-2 to reduce S-3 Increase to decrease to decrease by modify Novato Bit Scottsdale Marsh Converted Increase S-4 Increase S-4 Increase Novato Bit to improve S-4 Increase Novato Creek Novato Bit Novato Creek Channel: Novato Creek Spillway S-6 Spillway S-7 Remove Novato Baylannel cr to increase channel cr to passive Novato Baylander Storage ar	r Creek Drainage Improvements			
S-3 to decrease by modify Novato Bills Scottsdale Market Conversion of the improve Scottsdale S-4 Increase to improve Scottsdale Novato Creek Dedesign to reduce Novato Creek Channel: S-5 Redesign to increase culverts to ides. S-6 Remove to increase channel cu to passive Novato Baytantes: Lynwy S-8 Divide Ly To increase storage ar	nstall Storm Drain Flap Gates: Nave Gardens and Center Rd to reduce backflow from creeks to streets.	\$	150,000	
S-4 Increase to improv Scottsdale Novato Creek Dredge Rd S-5 Redesign to reduce Novato Creek Channel: S-6 Spillway to increas culverts to tides. S-7 Remove to increas channel or to passive Novato Baylands: Lynwd	Increase Arroyo Avichi Diversions to Lynwood Basin to decrease volume of water and sediment being directed into the aggrading Novato Creek confluence by modifying the diversions structure, removing coarse sediment and increasing culvert capacity at So. Novato Blvd.	\$	1,500,000	
S-4 to improv Scottsdale Novato Creek Unedge Rd S-5 Redesign to reduce Novato Creek Channel: S-6 Spillway S-6 Spillway S-7 Remove to increas culverts to tides. S-7 to increas channel cr to passive Novato Baylands: Lynwe S-8 Divide Ly	rsh Conveyance/Storage Improvements			
Novato Creek Dredge Ro S-5 Redesign to reduce Novato Creek Channel: S-6 Spillway to increas culverts to tides. Remove S-7 Remove s-7 coincreas channel cr to passive Novato Baylands: Lynwi S-8 Divide Ly	ncrease Scottsdale Marsh Conveyance to improve drainage from low lying portions of So. Novato Blvd. and Center Rd. install a pump in Scottsdale Pond to maintain discharges duing large storm events.	\$	4,000,000	
S-5 Redesign to reduce Novato Creek Channel: Spillway 5-6 Spillway to increas culverts to tides. S-7 Remove to increas channel cr to passive Novato Baylands: Lynw S-8 To increas storage ar	Novato Baylands (Downstream of Hwy 101)			
S-6 to reduce Novato Creek Channel: Spillway S-6 S-7 Remove to increas channel cr to passive Novato Baylands: Lynwy S-8 Divide Ly To increas storage ar	Dredge Reach:			
S-6 S-7 S-8 Spillway to increas culverts to tides. S-7 Remove to increas channel co to passive Novato Baylands: Lynw S-8 Divide Ly To increas storage ar	Redesign Dredge Reach /Reduce Coarse Sediment Loading to reduce the excavation extent, volume and frequency while maintaining flood conveyance.	\$	2,800,000	
S-6 to increase culverts to tides. Remove to increase channel co to passive Novato Baylands: Lynw S-8 Divide Ly To increase storage ar	Channel: Upper Bayland			
S-7 to increase channel or to passive Novato Baylands: Lynwr S-8 Divide Ly To increas storage ar	Spillway and Storm Water Basin for high flow bypass to No. DIB to increase floodplain conveyance, attenuate peak flood WSEs and protect the NWPRR Bridge. Install culverts to provide gravity drainage of floodwaters from No. DIB back to Novato Creek during low tides.	\$	2,270,000	
S-8 S-8 Storage ar	Remove Novato Creek South Levee (@Duckbill Pond and Heron's Beak Pond) to increase the available flow area in an undredged reach. Removing the levees increases the available channel cross section by over 200%, improving flood and sediment conveyance and adding tidal prism to passively maintain a larger channel cross section.	\$	3,240,000	
S-8 To increas storage ar	rds: Lynwood Basin			
permit gra	Divide Lynwood Basin (70% storm water/30% tidal) To increases operational value, open a portion of the basin to tidal exchange, providing a sediment storage area and increasing tidal prism and downstream channel geometry. Add gated culverts to permit gravity drainage from the storm water basin during favorable tides.	\$	5,400,000	
Novato Baylands: West	ids: West Basin			
s-9 to expan the asso	Restore Tidal Floodplain to West Basin Oxbow to expand the available channel cross section, and increase bayland tidal exchange and the associated stable channel dimensions (reduces downstream dredging requirements).	\$	3,900,000	
	Preliminary Cost Total:	ć	24.800.000	

Background Review



· @ San Pablo Bay · @ Hwy 37 · @ Rowland · @ 7th Street ······ Precip

Existing Condition Characterization

- Water Level Monitoring
- Condition Assessment Field Inspection
- Topographic and Bathymetric Survey
- Utility and Base Map
- Existing Conditions Technical Memorandum

in progress (May 2023) complete complete in progress (March 2023) in progress (April 2023)



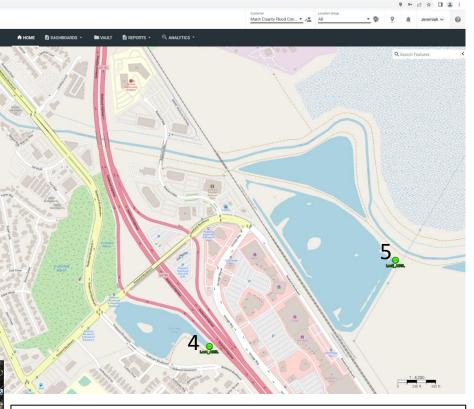
Water Level Monitoring

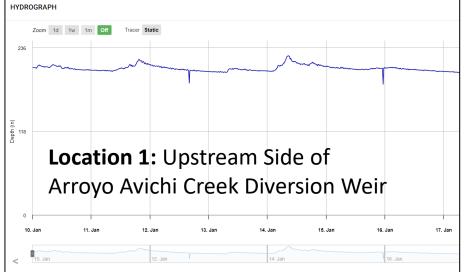


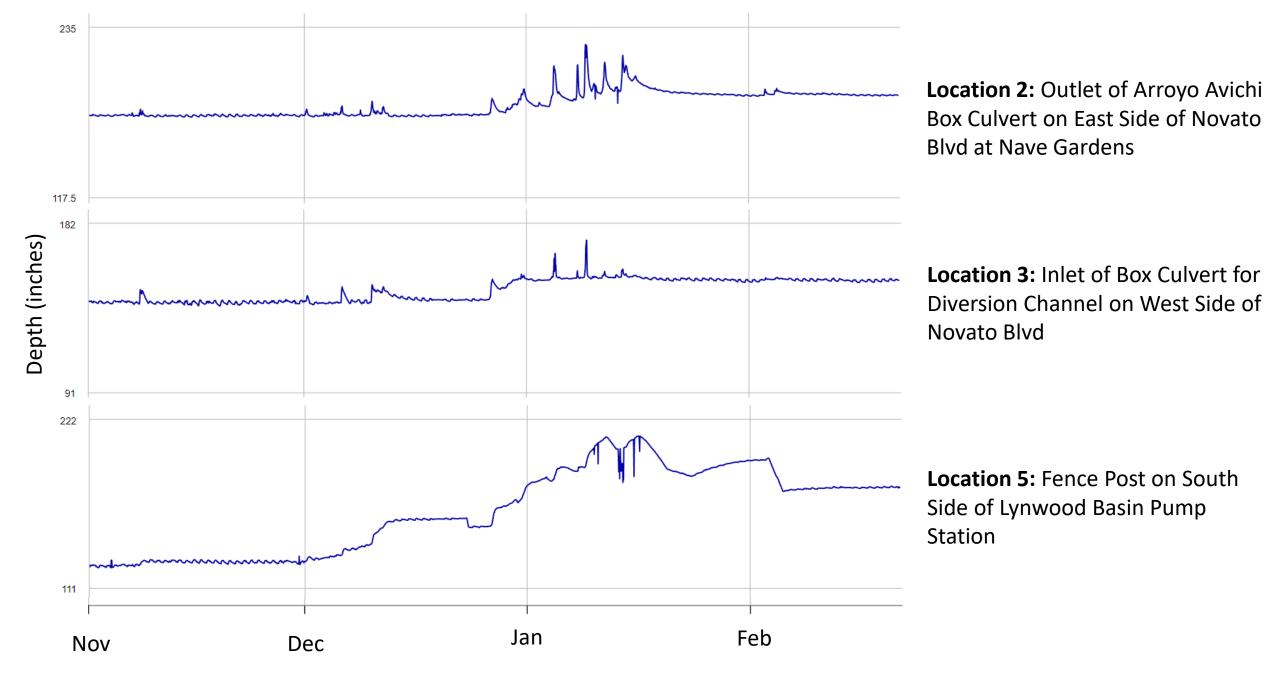
ADD PR SM

2











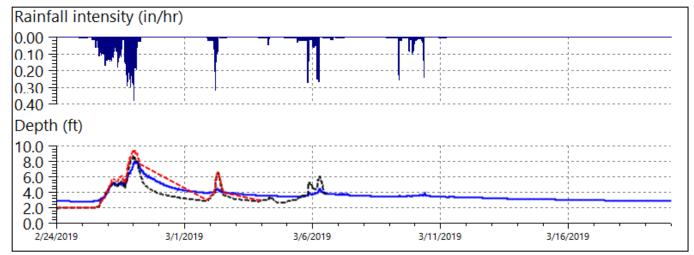
Hydrologic and Hydraulic Modeling

- Refine Model
- Perform Calibration/Validation
- Evaluate 2-, 10-, and 50-Year Event Flooding future (June 2023)
- Nave Gardens Evaluation
- H&H Technical Memorandum

nearly complete (March 2023) in progress (May 2023)

future (June 2023)





Alternatives Analysis

- Develop Preliminary Alternatives
- Model and Prioritize Preliminary Alternatives
- Nave Gardens Preliminary Alternatives
- Evaluate Flood Risk (HAZUS) & Life Cycle Cost
- Evaluate Habitat Impact & Benefit
- Alternatives Analysis Report

(July 2023) (August 2023) (September 2023) (October 2023) (October 2023)

future

Preliminary Alternatives

- Move pump from Lynwood to Scottsdale Pond. Send to Lynwood Pond.
- Increase hydraulic connection between Lynwood and Cheta pumps.
- Daylight Balderama Channel between Baccaglio and Scottsdale Marsh
- Add pipes into Scottsdale pond
- Add tide gates on Nave Garden outfalls w pumps.
- Add tide gate on Arroyo Avichi with pump
- Add diversion with lane lowering on Novato Blvd and Center Ave of Warner Creek overflow
- Add diversion with lane lowering on Novato Blvd and Center Ave of Novato Creek overflow
- Increase Baccaglio Storage
- Add diversion of Novato Creek high flows into Baccaglio