



**WATER  
AGENCY**

# Arroyo Mocho Stanley Reach Stabilization Project – Construction Progress Report

November 8, 2021 – BAFPAA Monthly Meeting

Jeff Tang, Project Engineer

# Project Overview

## Project Objectives

- Repair and restore four (4) sites, destabilized by the 2017 heavy winter storms
- Assist City of Livermore with completion of Iron Horse Trail (IHT) Improvements

## Cost

- Approximately \$5.91 million for construction
- Total project cost estimated at \$6.49 million

## Funding Sources

- Funded by Fund 200 – Flood Protection Operations
- City of Livermore will fund IHT Improvements through a Task Order of the Tri-Valley Intergovernmental Reciprocal Services Agreement

## Construction Schedule

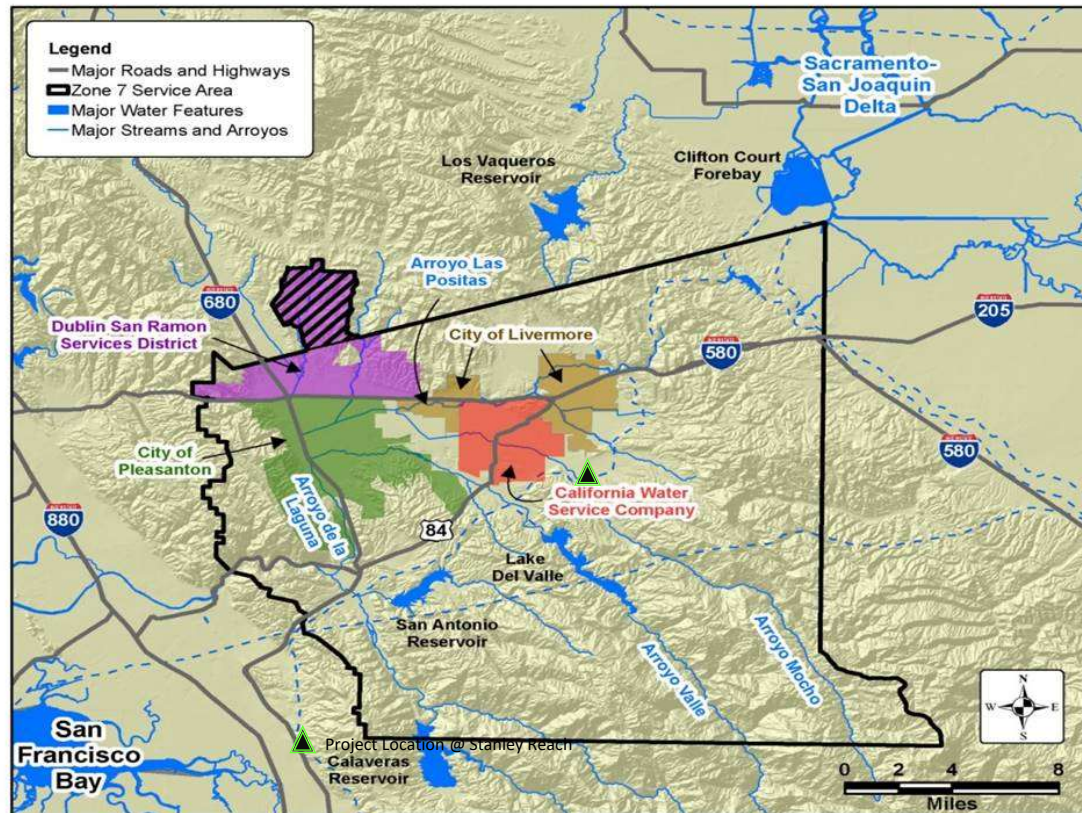
- Began construction mobilization on May 19, 2021
- Originally, scheduled to be completed by Dec 2022
- Channel improvements completed by Oct 2021
- Willow pole plantings and road improvements to be completed Nov 2021



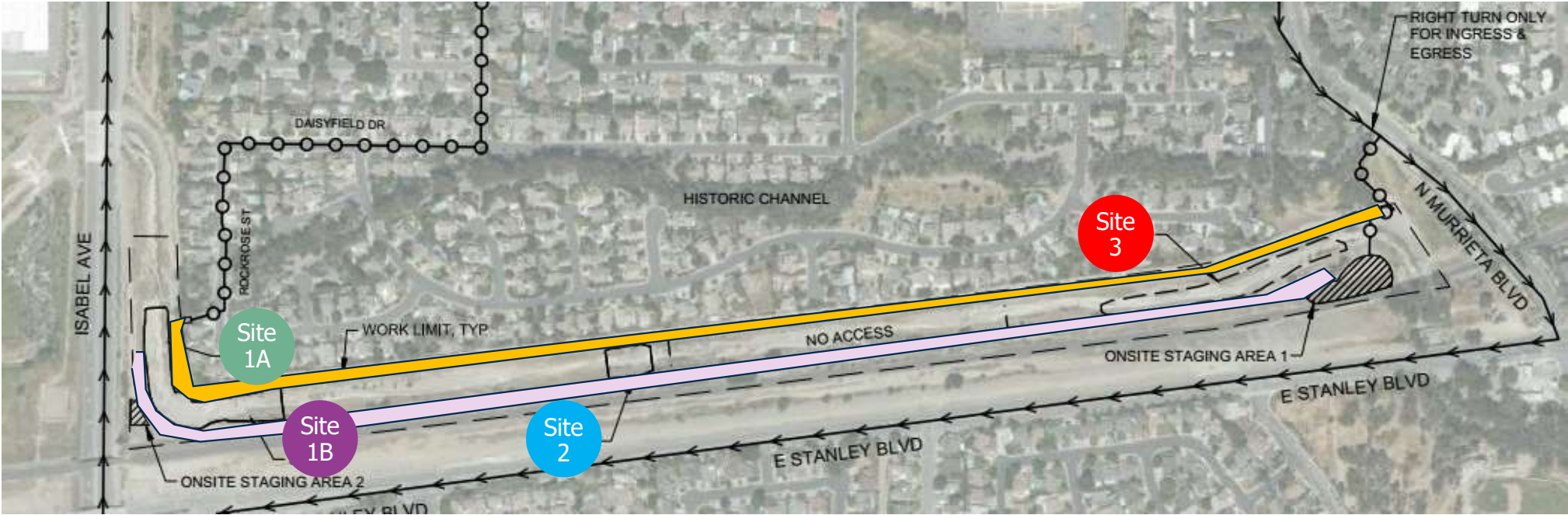
**Flood Protection**

# Project Location

Zone 7 owns and maintains approximately 37 miles (i.e., about one third) of improved and unimproved channels in the Livermore-Amador Valley for regional flood protection in eastern Alameda County.



# PROJECT SITES



 Iron Horse Trail Improvements  Access Road Repairs



# Arroyo Mocho Stanley Reach Background

- Originally constructed as a high-flow conveyance bypass reach in the 1980's
  - Trapezoidal channel with concrete drop structures, including “dragon’s teeth” structure, to slow down streamflow velocities
  - Devoid of any tree plantings
  - Not open to the public
- Low-flow water continues to be conveyed through original natural channel, surrounded by local residential neighborhood and adjacent trails.

## Arroyo Mocho Stanley Reach Background (cont.)

- In 2013, a pilot project was undertaken to demonstrate that we can improve water quality, habitat conditions, and attract funding sources, while maintaining critical flood protection functions:
  - Enhance habitat by removing fish barriers (drop structures) for potential fish passageway;
  - Reduce velocities with more natural structures (roughen channel and plantings), instead of drop structures;
  - Create riparian habitat by planting tree canopy to reduce temperatures in stream; and
  - Create recreation and mitigation opportunities.

# Arroyo Mocho Stanley Reach Background (cont.)

## Getting from here...

BEFORE



DRA GON'S TEETH CREATE A PHYSICAL AND VELOCITY BARRIER TO MIGRATING FISH

DEMOLISH DRA GON'S TEETH AND REPLACE WITH ROUGHENED CHANNEL

WILLOW BAFFLES INSTALLED TO INCREASE ROUGHNESS, PREVENT SCOUR, AND INTRODUCE TOPOGRAPHIC VARIABILITY

WILLOW CLUSTERS

LITTLE TO NO CANOPY COVER TO SHADE STREAM LEADING TO ELEVATED STREAM TEMPERATURES

NEARLY 7,000 TREES PLANTED TO PROVIDE MULTIPLE GEOMORPHIC, HABITAT, AND AESTHETIC BENEFITS

NO CURRENT PUBLIC ACCESS AND LITTLE AESTHETIC VALUE FOR RECREATION OR COMMUNITY AMENITIES

GRADE CONTROL STRUCTURES CREATE A PARTIAL PHYSICAL AND VELOCITY BARRIER TO FISH

REMOVE CONTROL STRUCTURES, ELIMINATE CHANNEL CONSTRUCTIONS, AND REGRADE CHANNEL

## ...to here

AFTER



# Arroyo Mocho Stanley Reach Background (cont.)



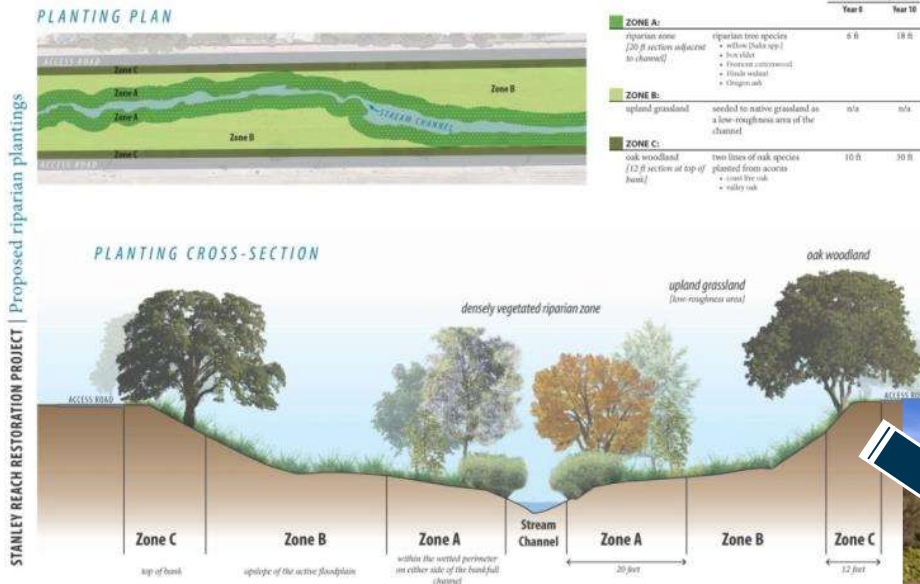
Stanley Reach Restoration Project: Proposed Fish Barrier Removal Strategies



Fish Passage Design at GCS#2



# Arroyo Mocho Stanley Reach Background (cont.)



12 acres riparian habitat installed in 2013-2014

- 1700 oak cages
- 3000 riparian trees



## Arroyo Mocho Stanley Reach Background (cont.)

- The Pilot Project created 12 acres of mitigation “credits” that could be used by Zone 7, or other Agencies, to off-set mitigation impacts from other off-site projects.
  - Zone 7 used 1.2 acres for in-house mitigation
  - Other parties have purchased about 4.82 acres of mitigation “credits” for their off-site projects, totaling about \$858K of funding towards reimbursement of capital and maintenance costs
  - Approximately 6 acres available for future use

## Arroyo Mocho Stanley Reach Background (cont.)

- From 2013 to 2016, the site saw drought conditions, which didn't help the vegetation that had been planted, and the majority struggled to survive or just didn't make it.
- In 2017, the January and February storms proved that Mother Nature didn't quite approve of the design
  - Channel toes throughout the reach had eroded away;
  - The two roughened channel structures that had been constructed to reduce velocities in place of the removed drop structures, destabilized and lost some of its rip-rap structure;
  - Sedimentation and rip-rap had piled up downstream resulted in channel bank flanking; and
  - Vegetation that had been planted originally, failed to provide the necessary protection envisioned.

# Arroyo Mocho Stanley Reach Background (cont.)



**SITE 2**  
Roughened Channel #2

**SITE 3**  
Upstream bank retreat



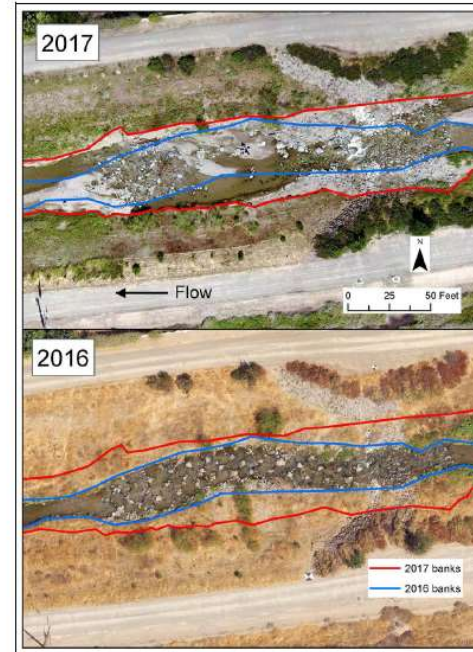
# Arroyo Mocho Stanley Reach Background (cont.)

**SITE 1**  
Roughened  
Channel #1  
(downstream)



Stanley Reach Monitoring & Assessment - D160463.10  
SOURCE:ESA 2017  
**Figure 5**  
Comparison between ground conditions in 2016 and 2017  
Downstream Roughened Channel (Sta 25+15 to 28+15)

**SITE 2**  
Roughened  
Channel #2  
(upstream)



Stanley Reach Monitoring & Assessment - D160463.10  
SOURCE:ESA 2017  
**Figure 4**  
Comparison between ground conditions in 2016 and 2017  
Upstream Roughened Channel (Sta 37+90 to 41+30)

# Arroyo Mocho Stanley Reach Background (cont.)

**SITE 3**  
Upstream  
bank  
retreat



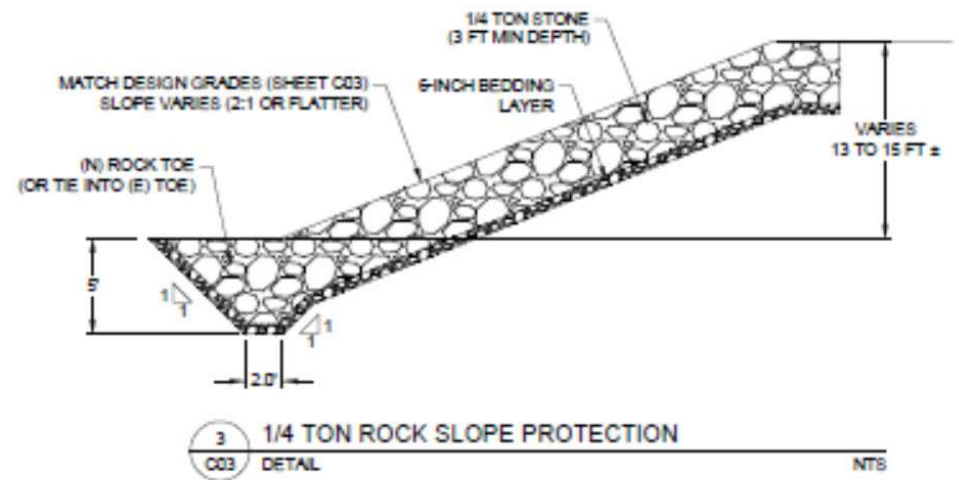
SOURCE: ESA, 2017.

Stanley Reach Monitoring & Assessment . D160463.10  
**Figure 3**  
Comparison between ground conditions in 2016 and 2017  
Upstream Reach (Station 56+00 to 66+00)

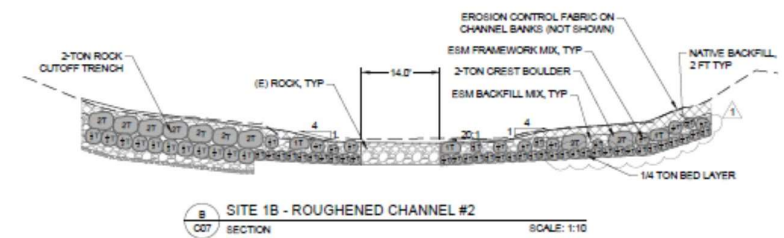
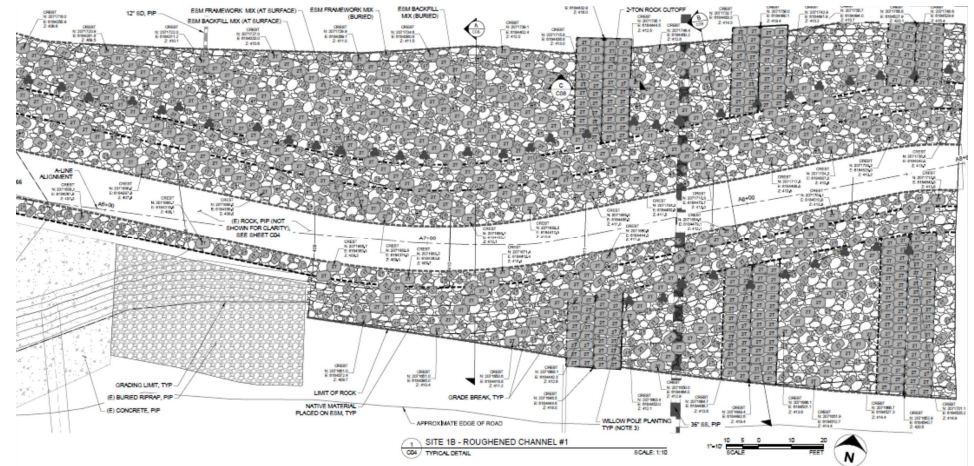
## Arroyo Mocho Stanley Reach Background (cont.)

- In 2021, Zone 7's Board of Directors authorized rehabilitating and restabilizing the Stanley Reach by:
  - Using improved biotechnical channel bank solutions;
  - Using improved roughened channel structures;
  - Planting a higher concentration of willow toe plantings to help protect from erosion;
  - Removing sedimentation that had accumulated over time; and
  - Partner with the City of Livermore to complete the Iron Horse Trail Improvements and make it available for trail use.

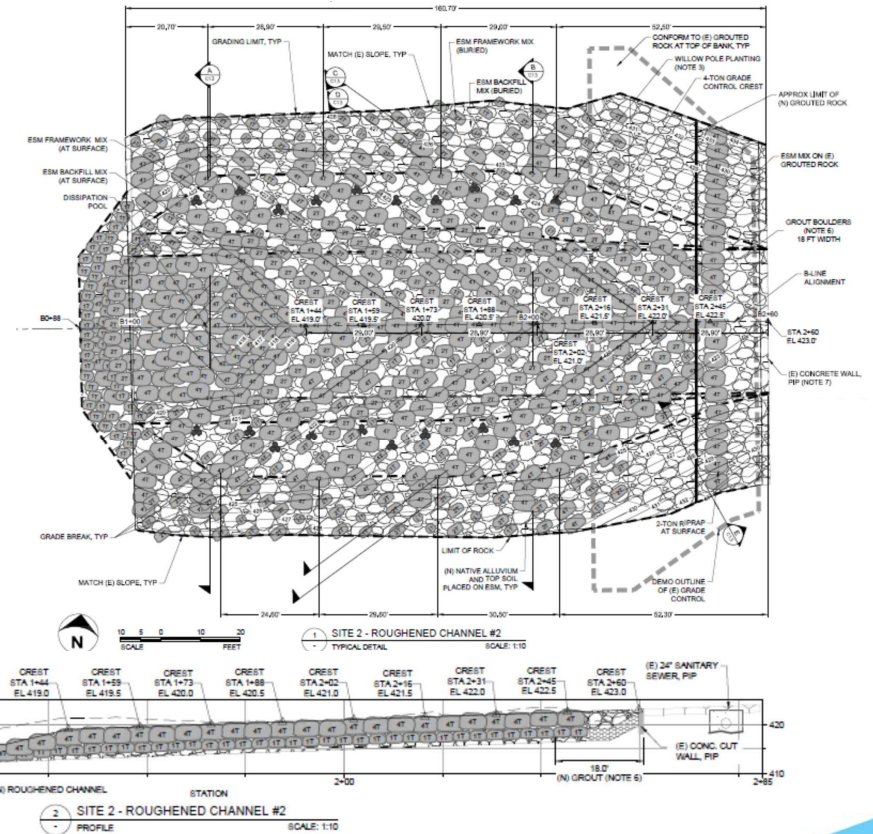
# Proposed Rock Slope Protection (RSP) at Site 1A



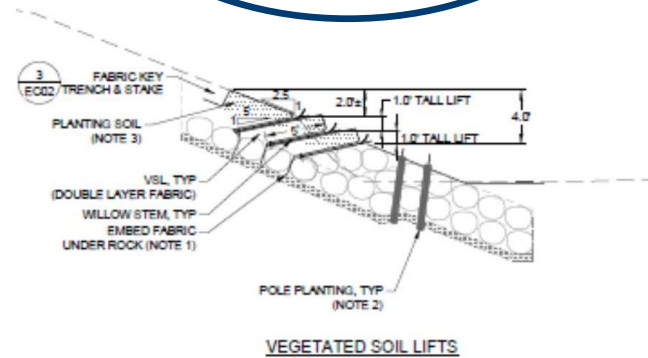
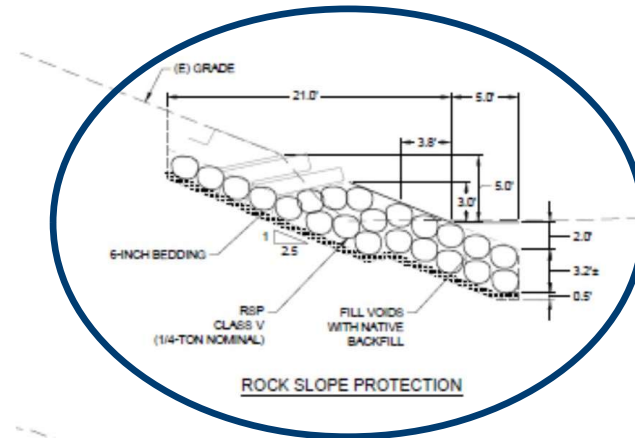
# Proposed Roughened Channel #1 at Site 1B



# Proposed Roughened Channel #2 at Site 2

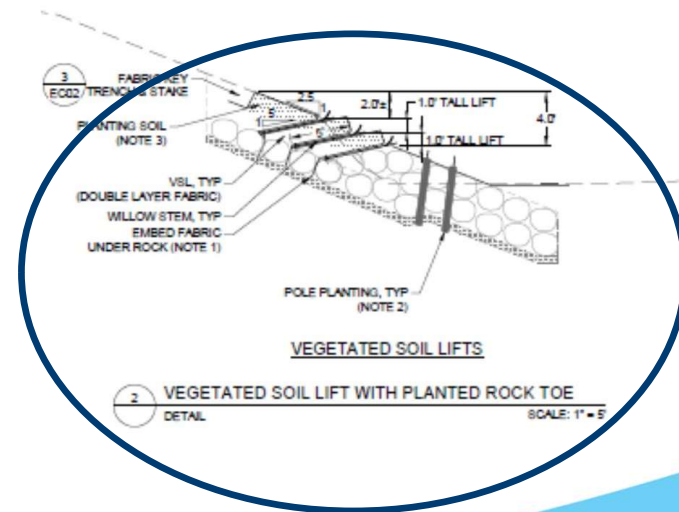
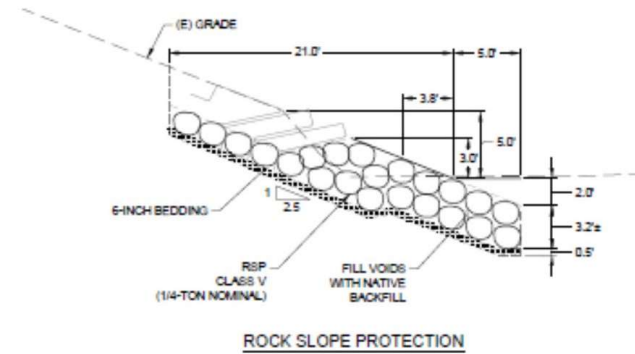


# Proposed RSP below planned Vegetated Soil Lifts at Site 3



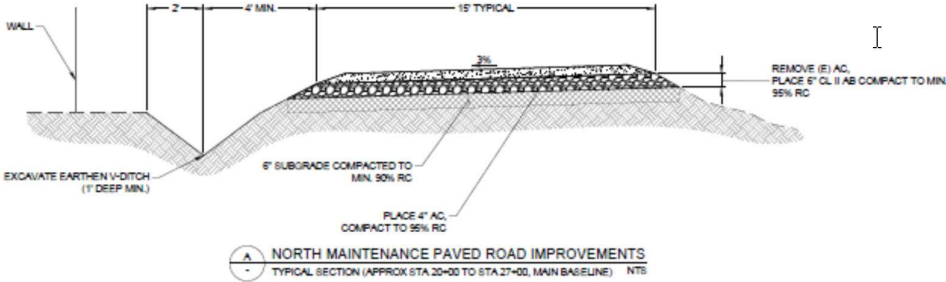
2 VEGETATED SOIL LIFT WITH PLANTED ROCK TOE  
DETAIL SCALE: 1" = 5'

# Proposed Vegetated Soil Lifts at Site 3

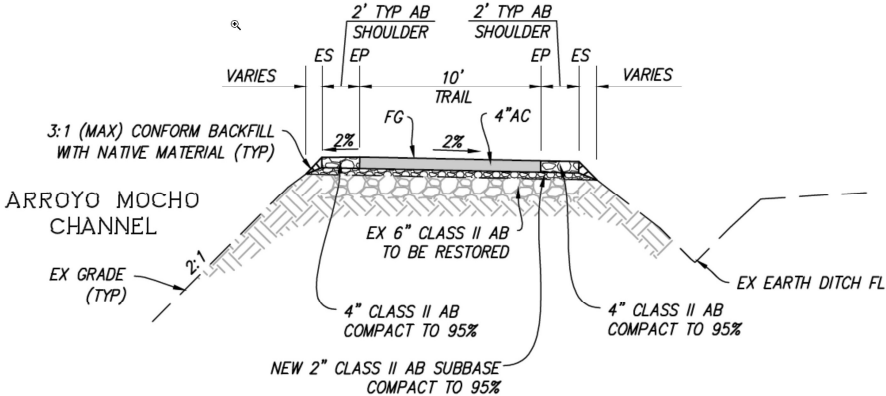


# Proposed Access Road and Iron Horse Trail Improvements

North Bank Access

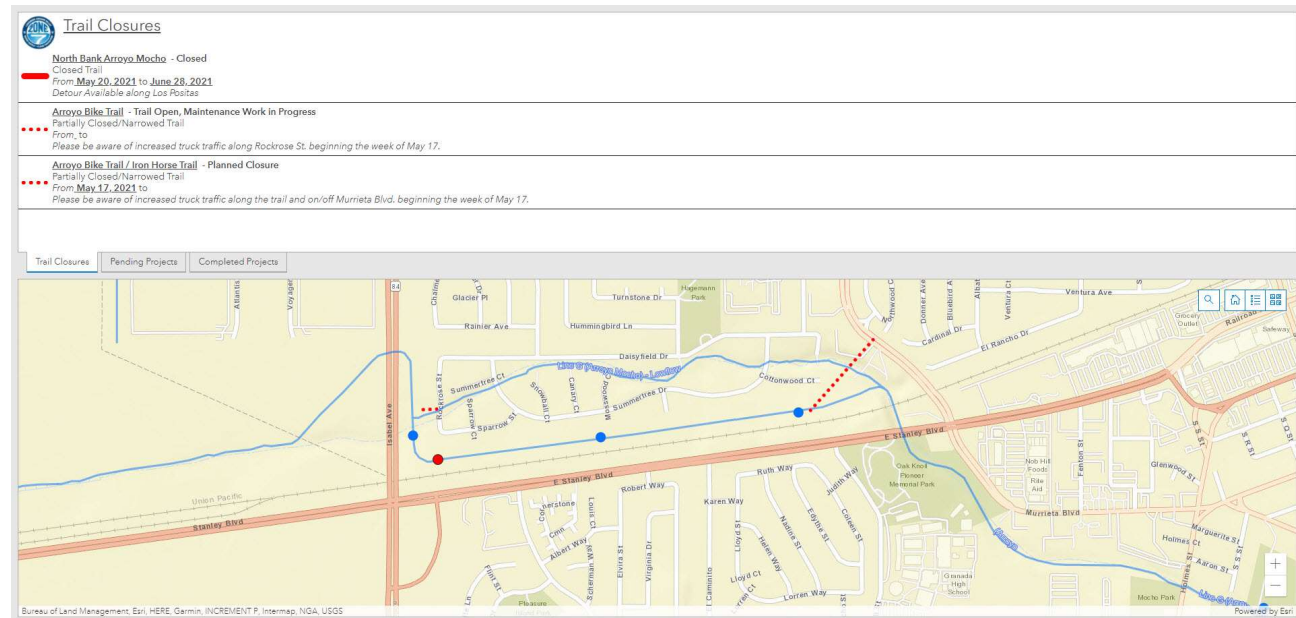


South Bank Access



# Public Outreach Progress

- Neighborhood originally notified of project environmental documents to be adopted in Nov 2020.
- Neighborhood sent a project notification letter ~ 2 weeks prior to project mobilization.
- 2021 Maintenance Projects Map publicly available on the Zone 7 website and updated weekly.
- Zone 7 worked with Livermore to notify public through social media outlets.



# Site 1A – Scope and Progress

- Remove sediment
- Restore channel bank with rock slope protection
- 100% completion



Pre-Construction



May 28

# Site 1A – Scope and Progress



# Site 1A – Scope and Progress



June 22



June 24

# Site 1A – Scope and Progress



October 21



October 27

# Site 1B – Scope and Progress

- Remove sediment and loose boulders
- Demo and reconstruct Roughened Channel #1 with rock slope protection
- 100% completion



# Site 1B – Scope and Progress



June 16



July 6

# Site 1B – Scope and Progress



July 14



August 2

# Site 1B – Scope and Progress



October 15



October 27

# Site 2 – Scope and Progress

- Demo and reconstruct Roughened Channel #2
- 100% completion



Pre-Construction



June 9

# Site 2 – Scope and Progress



June 17



June 28

# Site 2 – Scope and Progress



June 30



Aug 2

# Site 2 – Scope and Progress



September 3



October 27

# Site 3 – Scope and Progress

- Grade channel toe
- Install planted rock toe
- Install vegetated soil lifts and pole plantings
- 100% completion



Pre-Construction



June 8

# Site 3 – Scope and Progress



June 14



June 18

# Site 3 – Scope and Progress



June 23



July 9

# Site 3 – Scope and Progress



October 13



October 25



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# Flood Protection

Questions?

