SAN FRANCISQUITO CREEK
JOINT POWERS AUTHORITY
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PROJECT DESCRIPTION

San Francisquito Creek Flood Reduction, Ecosystem Restoration and Recreation Project Upstream of Highway 101

Prepared for:
City of Palo Alto
City of Menlo Park
City of East Palo Alto

This project description summarizes the San Francisquito Creek Joint Powers Authority's Reach 2 Upstream Project proposal, and follows the format required for Palo Alto Architectural Review Board (ARB) outlined below:
___ Scope of work
___ Existing and proposed uses
___ Explanation of the design concept
___ Relationship to existing conditions on site
___ Materials, colors, and construction methods to be used

Discussions with Menlo Park and East Palo Alto staff confirmed that this format is acceptable for their review.

BACKGROUND

The San Francisquito Creek Joint Powers Authority (SFCJPA) is a regional governmental agency created in 1999 after the 1998 flood-of-record that resulted in the inundation of approximately 1,700 properties and more than $28 million in estimated damages. The SFCJPA is comprised of and funded by the Cities of Palo Alto, East Palo Alto and Menlo Park, Santa Clara Valley Water District and the San Mateo County Flood and Sea Level Rise Resiliency District.

San Francisquito Creek has been divided into three reaches: Reach 1 - from San Francisco Bay to Highway 101, Reach 2 - from Highway 101 to the Pope Chaucer Bridge, and Reach 3 - the upper San Francisquito Creek watershed.

The SFCJPA completed construction of a multi-benefit project in the creek in Reach 1 in 2019 and is now focused on this project in Reach 2.

The objectives of the San Francisquito Creek Flood Reduction, Ecosystem Restoration and Recreation Project, Upstream of Highway 101 Project (Upstream Project) within Reach 2 are:

- Protect life, property, and infrastructure from floodwaters exiting the creek during flows up to 7,500 cubic feet per second (cfs), while minimizing impacts of the project on adjacent communities and the environment,
- Enhance habitat within the project area, particularly interconnected habitat for threatened and endangered species,
- Create new recreational opportunities and connect to existing bike and pedestrian corridors,
- Minimize operational and maintenance requirements; and
- Not preclude future actions to bring cumulative flood protection up to a 100-year flow event.

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SCOPE OF WORK

The Reach 2 Upstream Project is located along the creek from Highway 101 to just upstream of the Pope Chaucer Bridge. Components will be constructed in Palo Alto, Menlo Park and East Palo Alto, since the San Francisquito Creek is the boundary between these cities, as well as the boundary of Santa Clara and San Mateo Counties.

The Reach 2 Upstream Project scope and locations are summarized below, and shown in Figure 1:

1. Replace the Pope-Chaucer bridge, which is jointly owned and maintained by the Cities of Menlo Park and Palo Alto.

2. Widen the creek channel at four locations on the Palo Alto side of San Francisquito Creek where the bank is covered by sacked concrete that was installed in the 1960's. After widening, the new creek banks will be stabilized using sheet pile or soil nail walls and armored at the base with rock to prevent scour.

3. In the back of two Palo Alto properties, add between 1 and 4 feet of creek bank elevation to 225 linear feet of creek bank through sacked concrete atop the existing sacked concrete wall (125 feet) and through a concrete retaining wall that largely replaces an existing wooden retaining wall (100 feet);

4. Remove a concrete structure on the East Palo Alto side of the creek and replace it with a more natural creek bank with native habitat area and a small creek-side park.

5. Replace a temporary wooden parapet extension of the University Avenue bridge that runs along Woodland Avenue in East Palo Alto with a permanent structure composed of reinforced concrete.

Items 1-3 above are located fully or partially in the Palo Alto city limits. Item 1 is partially located in Menlo Park. Items 4 and 5 are in East Palo Alto.

The Upstream Project will provide protection from a flood event similar to the 1998 event, which is considered a 70-year flood. This is the largest recorded flood since the US Geological Survey began measurements in the 1930's.

The Upstream Project will not protect the area around the San Francisquito Creek from a 100-year flood event (which has a 1% chance of happening in any given year). A project protecting people and infrastructure to this level was proposed in 2013 and rejected by residents. The SFCJPA included alternatives that could supplement this project to increase protection to the 100-year level, including upstream detention, on a programmatic level it its Final Environmental Impact Report (EIR). Future 100-year flood protection is envisioned as an additive project in the future. Just as this project cannot provide 100-year protection by itself, the topography of the upper watershed does not allow for upstream detention at the scale needed to provide 100-year protection on its own. Only a combination of the current project's channel conveyance improvements, coupled with upstream detention or other similar flow reduction features can achieve 100-year protection for San Francisquito Creek.

The Upstream Project benefited from an independently facilitated stakeholder and community engagement process in 2018- 2019 that included six public meetings, two workshops, and a site tour.

We also partnered with the Army Corps of Engineers (ACOE) for the Upstream Project and held joint public meetings for their parallel feasibility study and environmental impact statement. The ACOE's

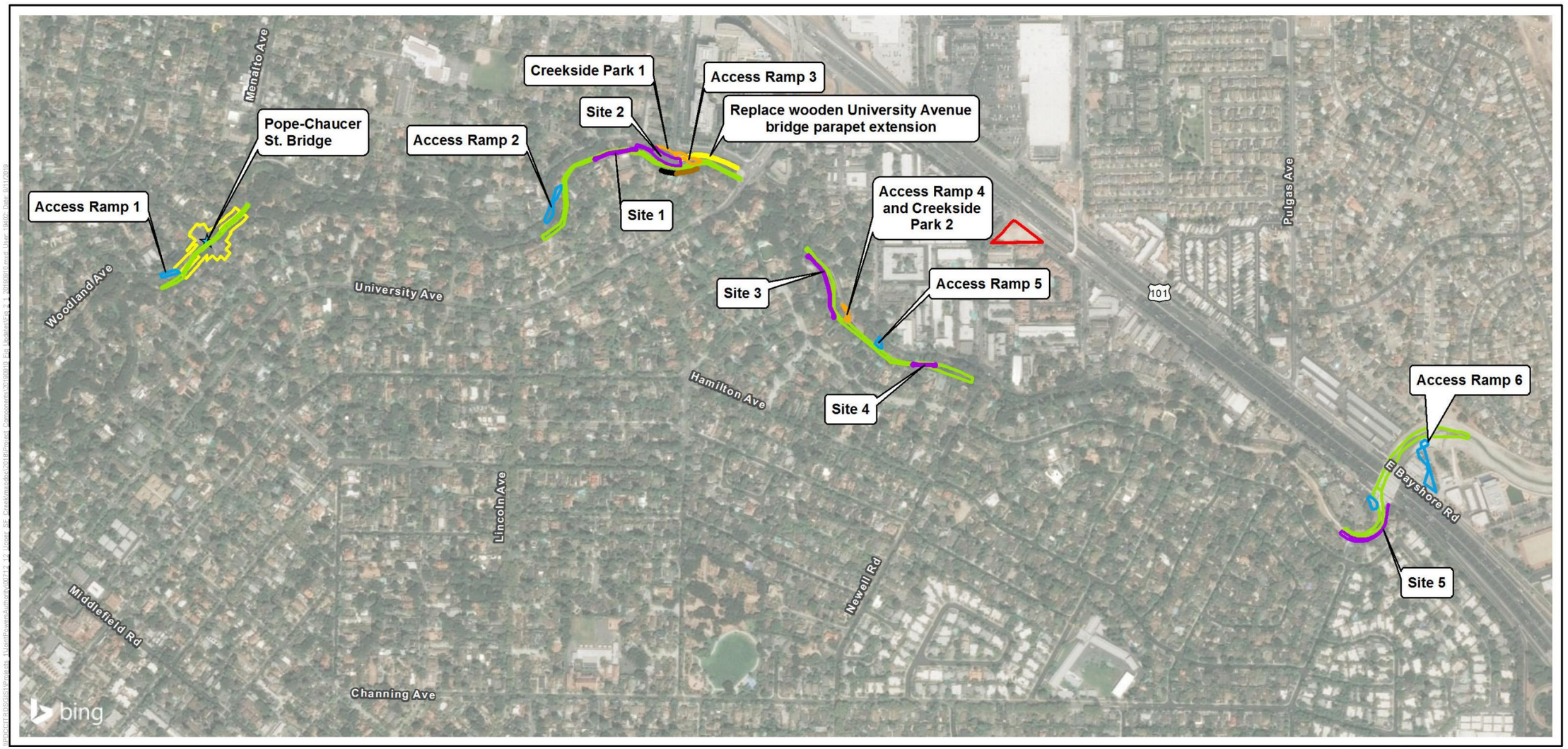

Figure 1. Location of Upstream Project Elements

Tentatively Selected Plan in October 2018 was the same alternative selected by the CEQA process in the Upstream Project's EIR. This independent evaluation by the ACOE corroborated the selection of the Upstream Project alternative, which is supported by most of the community. The SFCJPA Board unanimously certified the EIR on September 26, 2019.

A resident adjacent to the Pope Chaucer Bridge has initiated a suit against the project under the California Environmental Quality Act (CEQA); the SFCJPA is pursuing settlement discussions with the petitioner. The suit did not affect the June 2020 award of $2,964,479 for project construction from the California Department of Water Resources.

Preliminary design has been completed for each of the project elements.

EXISTING AND PROPOSED USES

The project will not change existing zoning or land use. Existing zoning in Palo Alto consists of residential in the areas of creek widening, and public facility for the Pope-Chaucer Bridge. Existing zoning in Menlo Park is residential. Existing zoning in East Palo Alto is residential and adjoining commercial.

DESIGN CONCEPT EXPLANATION

The design concept for each of the five project elements is described below:

1. Pope-Chaucer Bridge Replacement

The existing Pope-Chaucer bridge is a large concrete culvert built in the 1940's, with a maximum flow capacity of approximately 5,800 cubic feet per second (cfs). Sediment is accumulating on the concrete culvert bottom, and the culvert is a target for graffiti, as well as homeless living inside.

The new bridge will have a flow capacity of approximately 7,500 cfs. The design concept for the new Pope-Chaucer bridge is an environmentally friendly design with a natural creek bed that will be as open as possible given the existing homes in the area that formed significant constraints on the bridge design. The SFCJPA listened to residents for a bridge design that passes the required flow, while minimizing the impacts to local roads / intersections / and resident's front yards. Therefore, while there will be short term effects during construction, creek flooding has been addressed without requiring changes at local residences or the adjoining intersections at Pope and Chaucer Streets.

The regulatory community would have preferred a single span bridge; however, this would have resulted in a much larger construction footprint and would be more invasive for the nearby residences. A single span bridge would have required a thicker structure depth, meaning it would have also needed to be raised higher to not impede any creek flows; additionally, this higher profile bridge would have required raising nearby roadways and intersections to match the single span bridge elevation. Therefore, the designer selected a three-span bridge, supported by two piers alongside features that support fish migration (fishpools, rootwad structures, etc.). The three span bridge results in a much thinner structure, allowing a lower roadway profile, that reduces changes to the adjacent intersections.

The new Pope Chaucer Bridge does not require raising existing streets or adding retaining walls. The intersections on both the Palo Alto and Menlo Park sides will be matched to the existing elevation. In addition, roadway width on the bridge will match the Pope and Chaucer Street widths, to not create a choke point and increase risks to motorists, bicyclists, and pedestrians. Both sides of the bridge will have

sidewalks with two outlooks and two streetlamps. Traffic calming measures are integrated into the bridge design, including 4-way stop and no dedicated right turn lane.

In 1991, the right turn lane on the Pope-Chaucer bridge onto Woodland Avenue was removed by covering the concrete culvert in this area with soil and planting trees. This triangle park-like feature with the planted trees will be lost when the new bridge is constructed. The City of Menlo Park is evaluating how to move and replant some of these trees, since their roots may be confined above the concrete culvert.

A goal of this project is to minimize tree removals, and we have worked with arborists to assess trees within the project footprint to help the SFCJPA determine how the actual footprint may be modified to be made smaller to preserve the maximum number of healthiest and largest trees. For example, there is a large Eucalyptus tree near the construction access ramp for bridge replacement, and we are committed to adjusting the access ramp within the project footprint to better protect that tree.

The bridge design incorporated the residents' desire not to have a right turn lane, because having one encourages speeding and cut-through traffic to bypass University Avenue. Additionally, to reduce speeds in the neighborhood and deter cut-through traffic, a stop sign will be added to Chaucer Street at Palo Alto Avenue, to make both intersections on either end of the new bridge a four-way stop.

The replacement of the existing Pope-Chaucer bridge will require roadway closure for approximately nine months; traffic on Woodland Avenue and Palo Alto Avenue will be temporarily restricted as one-way at times during the day, and traffic will not be able to cross over the creek in this area during construction.

Construction within the creek will need to follow a limited work window to protect fish, typically June 15-October 15. Approximately 1,000 cubic yards (CY) of material will be removed below the ordinary high-water mark, and approximately 5,000 CY will be removed between the ordinary high-water mark and the top of the bank. Streambed vegetation from about 200 feet downstream of the bridge to 700 feet upstream will be removed as needed to accommodate construction equipment. The creek streambed, banks, and slopes will be restored and revegetated upon completion of the bridge construction.

2. Creek Channel Widening

San Francisquito Creek must be widened at specific locations where additional hydraulic capacity is needed. As shown on Figure 1, the widening sites in Palo Alto are Sites 1, 3, 4 and 5. Site 2 will be widened in East Palo Alto.

We chose to widen mainly on the Palo Alto side of the creek because at the locations that need widening, the Palo Alto side of San Francisquito Creek is already armored with concrete. Therefore, excavation and engineering work on these banks will not change the already armored character of that portion of the creek. The East Palo Alto side of the creek is largely natural. The exception is Site 2, in East Palo Alto, where there is a large concrete terrace structure that we will remove and restore to a more natural creek bank and create a small creek-side park. We have been in discussions with the Palo Alto homeowners, and to date, no one has objected to the planned changes. We had an arborist evaluate the trees in the Palo Alto back yards and how best to protect them (This report is provided in Appendix B of the EIR). However, if the SFCJPA is not able obtain the needed easements to widen on the Palo Alto side of the creek, we will widen the creek on the East Palo Alto side, since the necessary easements are available from the City. If this alternative becomes necessary it will require additional mitigation, as it will result in the removal of riparian habitat.

Of the four widening sites on the Palo Alto side of the creek, we plan to widen at Site 5 first, but the contractor will establish the actual schedule. The rationale for widening this site first is twofold: it links the Downstream and Caltrans widening to the Reach 2 Upstream project, and it has the most difficult access considerations compared to the other sites. This area is just upstream of the West Bayshore Road (frontage road) bridge and forms a "C" shaped creek constriction that was man-made in the early 1900's.

Caltrans constructed the new larger capacity multi-span bridge at this location in 2017, but one of the four spans is currently blocked off until the creek can be widened. A new floodwall will be constructed at this location to widen the creek to the full width of the new bridge, approximately 30 feet wider than existing conditions. The existing floodwall, footing, and sacked concrete slope protection will be removed, and the underlying bank soils excavated to the designed channel width and geometry. The new floodwall will be constructed along the top of bank from the frontage road extending approximately 350 feet upstream to meet the existing floodwall and sacked concrete bank. The current capacity in this area is greater than 8,000 cfs, and the post-project capacity in this location will be 9,400 cfs.

Upstream of this site, on the Palo Alto bank at Sites 1, 3 and 4 (see Figure 1), the concrete banks will be cut back and braced with a reinforced concrete soil nail wall or sheet pile wall to widen the constriction points in the creek. The replacement of sacked concrete with concrete soil nail walls or sheet pile walls will occur in three locations: two between the Newell Road bridge and the University Avenue bridge (Site 3 and 4), and one upstream of the University Avenue bridge (Site 1). The creek reach with the lowest capacity and in need of widening is Site 1. This section of creek overtopped in 1955, 1983, 1998, 2004 and 2012, causing road closures and property damage in East Palo Alto.

The widened channel bottom at all sites will consist of native soils and will be seeded with a mix of appropriate native low marsh riparian plants species, resulting in improved habitat for special status species. The widened creek channel and new habitat features will be regularly inspected and maintained.

3. Top of Bank Improvements

Behind two Palo Alto properties, just upstream of University Avenue, the existing concrete top of bank will be elevated between 1 to 4 feet utilizing additional concrete, for a combined length of 225 feet along the top of bank.

4. Concrete Terrace Removal and Riparian Restoration

At Site 2 (Figure 1) in East Palo Alto, a 273-foot-long concrete terrace forms an in-channel structure and wall that will be removed. In its place, the bank will be regraded to a stable slope and planted to restore riparian habitat, with a small creek-side park established between the top of bank and Woodland Avenue. With the removal of the large concrete terrace structure, regrading of the slope at its location, and installation of native vegetation to prevent erosion of slope, the stream function, habitat and channel capacity would be improved. The City of East Palo Alto and the landowner support the project and have contributed funding or other resources towards project planning.

5. Replacement of Temporary Wooden Parapet

In 2015, the City of East Palo Alto constructed a temporary a one- to three-foot tall wooden wall directly upstream of University Avenue along Woodland Avenue due to overtopping of the East Palo Alto banks at this location. This was constructed as temporary solution in anticipation of an El Nino flooding, and in 2017 successfully kept floodwaters inside the creek. However, the temporary wooden structure cannot be certified by FEMA, and requires replacement.

The Upstream project will replace this temporary wooden wall with a reinforced concrete wall, and it will tie into the existing University Avenue bridge parapet. This new parapet extension will be of similar length and height as the top of the existing wood wall. A visual of the current conditions is provided in Figure 2.

Figure 2. Temporary Wooden Wall, University and Woodland Avenues, East Palo Alto

RELATIONSHIP TO EXISTING CONDITIONS ON SITE

The new Pope-Chaucer bridge was designed to have minimal impacts to the surrounding area. The existing adjacent road grades will not be significantly altered, with the new bridge in the same approximate footprint, but arched higher than the current bridge. This arched design removes the need for floodwalls to pass target flows. The creek widening areas already have concrete armoring, which will be replaced with either a concrete soil nail wall or a sheet pile wall as such the changes will not significantly alter the character of the creek. The creek widening areas will include habitat features along the toe of bank, to improve stream function and fish passage. It should be noted that the creek widening areas are not readily visible to the general public- one would need to be in the creek bed in order to see them.

The project has been carefully designed to retain the natural features of San Francisquito Creek and enhance the riparian corridor. Creek habitat in the area will be improved though the removal of creation of low-velocity refuge habitat for migrating steelhead, pools and habitat structures to be added to the channel at some of the creek widening sites as well as the Pope-Chaucer bridge site. Riparian habitat will be improved via appropriate bank planting and invasive species removal.

Property rights have been acquired for the construction of the floodwall at Site 5 at Bayshore road, as well as a five-foot wide maintenance trail. The new maintenance trail will follow the wall and align with the existing five-foot trail approximately 100-feet upstream from West Bayshore Road. For the other sites, underground easements and Temporary Construction Easements are being discussed with property owners.

This project is not yet fully funded, and we are actively looking for additional funding so construction can commence as planned in 2021 or 2022.

MATERIALS, COLORS, AND CONSTRUCTION METHODS TO BE USED

The Pope-Chaucer bridge, including the foundations, piers, abutments, and wingwalls will be formed with reinforced concrete. The bridge piles will consist of steel pipe piles that would be spun into the ground instead of hammer-driven to minimize noise and vibrations that will disturb nearby residents during construction. Concrete for the various bridge components will be poured directly into watertight forms to minimize the potential for concrete entering the channel. Once the concrete is cured, the falsework and forms will be removed. The intersections on both ends of the bridge will be resurfaced to conform with the new bridge elevation. All construction materials and equipment will be removed from the creek at the end of the project, and the creek will be restored to its final condition as noted in the contract documents and in compliance with permit requirements.

The current bridge design has four curved outlooks for pedestrians to view the creek, two on the upstream side and two on the downstream side. Adjacent to each outlook, there will be a total of four lamp lights installed, with low lumens bulbs to provide nighttime visibility and ambiance without impacting nearby residents. Lamps will be installed to illuminate the bridge deck and minimize light pollution to nearby residences or the stream surface.

Bridge renderings 1 to 2 years after construction are provided in Figures 3 and 4.

Figure 3 Pope Chaucer Bridge Rendering Aerial View one to two years after construction.

Figure 4 Pope Chaucer Bridge Rendering one to two years after construction

At creek widening locations with sheet pile walls, the sheet piles will be installed in the same manner as our project from San Francisco Bay to Highway 101 that was completed in June 2019. Installation of the sheet piles will be achieved with as little impact to neighboring residents as possible. Where feasible, silent piling techniques will be used to press in the sheets in lieu of vibratory or hammer driven sheets, which create significantly more noise and vibrations. The steel sheet piles will be sized appropriately to account for a sacrificial corrosion layer beyond the required thickness to ensure structural stability; they are not currently planned to be painted.

Figure 5 Example of sheet pile installed downstream

Sheet piles must be used for the replacement floodwall upstream of the West Bayshore Road bridge (Site 5 on Figure 1) due to the limited access at West Bayshore Road and to minimize soil disturbance.

For the widening areas # 1, 3 and 4 shown on Figure 1, sheet piles or reinforced concrete soil nail walls could be used depending on design, constructability, and various site-specific issues such as impacts to existing trees. If reinforced concrete soil nail walls are installed, architectural treatment could be considered to enhance the appearance of the concrete face. The design team is in the process of finalizing the wall type. A minimal amount of scour protection consisting of appropriately sized rock that mimics natural streambed material will be placed at the toe of the walls.

The University Avenue bridge parapet extension along Woodland Avenue as well as the retaining wall across the creek on the Palo Alto bank will be made of reinforced concrete.

Landscaping after the project is complete will consist of appropriate native plantings as well as invasive species removal. Bioretention basins will be planted in the area by Pope Chaucer Bridge. These will retain and treat stormwater flows per the two-year design criteria. An example bioretention basin installed by the City of Palo Alto is provided below in Figure 6.

Figure 6. Bioretention Basin Example, Southgate Neighborhood, Palo Alto

REFERENCES

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