



# City of Palo Alto

## City Council Staff Report

(ID # 7209)

---

**Report Type: Action Items**

**Meeting Date: 11/7/2016**

**Summary Title: Review Adobe Creek/Highway 101 Pedestrian Overcrossing Project Design Concept Approval**

**Title: Review and Potential Direction to Add Optional Enhancements and Associated Costs for the Adobe Creek/Highway 101 Pedestrian Overcrossing Project, Capital Improvements Program Project PE-11011**

**From: City Manager**

**Lead Department: Public Works**

### **Recommendation**

Staff recommends that Council:

- 1) Review the 15% design and estimated costs of optional enhancements for the Adobe Creek/Highway 101 Pedestrian Overcrossing Project; and
- 2) Determine whether any optional enhancements should be added to the project, and accordingly direct staff to amend the contract with Biggs Cardosa Associates, Inc. and increase the budget for the Adobe Creek/Highway 101 Pedestrian Overcrossing Project, Capital Improvements Program (CIP) Project PE-11011.

### **Executive Summary**

This report provides an update on the design of the baseline bridge with core additional elements, and a review of the potential optional enhancements to the project and their associated costs. The design team, Biggs Cardosa Associates, (BCA) has developed a 15% design for a 12-foot wide baseline bridge, which consists of: a bowstring steel truss principal span, concrete approaches, an eastern approach overlook platform, western approach alternative access (originally anticipated to be a stairway), enhanced lighting, Adobe Creek Reach

Trail head improvements, and educational signage. The baseline bridge is expected to meet the project's \$13 million budget. The optional enhancements that could be added to the project by Council include an eastern approach ramp plaza, enhanced railings and fencing, enhanced amenities, modification of principal span and approach structures to provide a 16-foot clear width, and five alternative principal span steel truss structure types. Staff will return to Council with a design services contract amendment and budget adjustment in December should optional enhancements be selected. The anticipated Google contribution of \$1 million is not yet included in the \$13 million budget and could be used to fund optional enhancements, or act as a contingency to offset any increased project costs (such as higher than anticipated construction cost escalation), or reduce the City's general fund contribution of \$4.65 million to the project. If County of Santa Clara Board of Supervisors is amenable, the \$4.5 million funds in County Trail Funds relinquished by Stanford University may be an additional source of project funding.

## **Background**

Council approved the design contract with Biggs Cardosa Associates, Inc. (BCA) on May 23, 2016 (Staff Report ID# 6578). The contract includes Phase 1, 65% design development services for a bird-friendly, 12-foot wide, prefabricated bowstring, standard steel truss bridge that spans Highway 101 with concrete approaches and meets the \$13 million total project budget. The design intent is to combine a basic bridge with core additional elements (western stair, signage, Adobe Creek Reach Trail, enhanced lighting and overlook), with the potential to add optional enhancements identified during the design competition that would increase the bridge cost beyond the \$13 million budget. Council directed staff to return at the 15% design level, prior to commencing the environmental assessment, to review the design concepts, graphics and estimated costs for optional enhancements.

Staff received positive feedback in August and September on the 15% design bridge alignment, access and maintenance from Pedestrian and Bicycle Advisory Committee (PABAC) and Santa Clara Valley Water District (SCVWD) representatives.

## **Discussion**

### Baseline and Core Additional Project Elements

The baseline bridge is a 12-foot clear width (14 feet total width), bowstring steel truss principal span, with additional steel truss spans over East and West Bayshore Roads, and concrete approach ramp structures. The core additional elements include an eastern approach overlook platform, western approach alternative access (originally anticipated to be a stairway), enhanced lighting, Adobe Creek Reach Trail head improvements, and educational signage. The baseline and core additional project elements are configured to meet the \$10 million construction budget and \$13 million total project budget. Attachment A provides the 15% concept plans and design renderings. The core additional elements are also described in Attachment A, and are briefly summarized below.

#### *Eastern Approach Overlook Platform*

The eastern approach overlook offers sweeping views of the Baylands and Adobe Creek setting. The overlook provides an opportunity for additional amenities.

#### *West Bayshore Road Improvements and new Adobe Creek Reach Trail*

The bridge geometry and sidewalk bike path and roadway interface is an opportunity to improve access for pedestrians and cyclists. Integrating the existing sidewalk into the bridge approach ramp removes the need for a stairway and provides cyclists with a dedicated bike lane over Adobe Creek Bridge on West Bayshore Road.

Best practices in bikeway design support a one-way separated bikeway on each side of West Bayshore Road. The new Adobe Creek Reach Trail will connect West Bayshore Road to East Meadow Drive with a new west plaza and trailheads. The new trailheads, sidewalk and bike lane details will be further developed and presented to the community.

#### *Enhanced Lighting*

Ground-mounted and handrail lighting provides low-impact direct pathway lighting and reduces light spilling beyond the bridge and pathways. Lighting poles along the western approach will limit light pollution by incorporating shields to push light away from the Barron/Adobe confluence. Interactive lighting offers an artistic element and will be explored further. Lighting levels will dim using an

astronomical clock to reduce light output while meeting photometric requirements.

### Optional Enhancements

Optional enhancements to the project include a plaza at the eastern approach ramp entrance, enhanced railings and fence mesh, enhanced amenities, a 16-foot (rather than 12-foot) span and approach width, and five alternative principal span steel truss types. Some of the principal span truss alternatives utilize the same truss types, with a distinction of whether the structure clear-spans only Highway 101 and uses additional spans to clear East and West Bayshore Roads, or clear-spans Highway 101 and one or both of the frontage roads. Attachment B provides the 15% concept plans and design renderings for the optional enhancements. The optional enhancements are described in Attachment B, and are briefly summarized below.

#### *Plaza at Eastern Approach Ramp*

Walkway and cyclist access to the San Francisco Bay Trail and proposed bridge is an opportunity to create a trailhead and improved interface with the current roadway, and bike and pedestrian paths.

#### *Enhanced Railings and Fence Mesh*

Railings integral with fencing and fence density, and patterns of mesh can avoid impacts to wildlife while providing an aesthetic alternative.

#### *Enhanced Amenities*

Benches, interpretive signage and drinking fountains will improve user comfort and education opportunities. Salvaged wood from the Baylands boardwalk decking could be repurposed for benches, deck elements and informational signage.

#### *Structure Width Increase to 16 feet*

12 feet of continuous clear width is consistent with the design guidelines in the City of Palo Alto Bicycle + Pedestrian Transportation Plan for shared-use paths and is greater than the minimum standard. California Department of Transportation (Caltrans) minimum guidelines use an 8-foot minimum width including shoulders. However, a 16-foot deck width would allow for separation of bicyclists and pedestrians. A structure width of 16 feet is expected to be feasible



only for the baseline bowstring truss structure type and the three other principal span steel truss alternatives (as described below) that utilize three spans rather than a single, longer span. For reference, the existing Highway 101 crossing at Palo Alto's Embarcadero pedestrian/bike bridge is 6.5 feet wide, while the Highway 101 Mountain View bike bridge is 10 feet wide.

### *Principal Span Steel Truss Alternatives*

Bridge spans vary in span length, width, aesthetic treatments, cost and complexity. A three-span bridge consists of one 165-foot long prefabricated steel structure spanning Highway 101 with two concrete or steel structure spans at East and West Bayshore Road. A single span bridge consists of one 200-foot to 240-foot long prefabricated steel structure spanning Highway 101 and East and/or West Bayshore Roads.

### Costs of Optional Enhancements

Table 1 provides the estimated additional cost for each optional enhancement. If Council determines that any optional enhancements should be included in the project, the contract with BCA will require an amendment to cover the additional design work and increase the CIP project budget. As noted in the Public and Private Funding Possibilities section below, the anticipated Google contribution of \$1 million could be used to fund optional enhancements, act as contingency to offset any increased project costs (such as higher than anticipated construction cost escalation) or reduce the City's general fund contribution to the project. A portion of the County of Santa Clara \$4.5 million recreation grant may be a possible funding source.

Table 1: Summary of Optional Enhancements and Additional Costs

<b>Optional Enhancements</b>	<b>Additional Cost*</b>
Plaza at eastern approach ramp	\$0.42 million
Enhanced railings and fence mesh	\$0.47 million
Enhanced amenities	\$0.13 million
Increase span and approach widths to 16 feet	\$2.4-3.5 million
Truss type alternative 1: Bowstring (1 span, self-weathering)	\$2.12 million
Truss type alternative 2: Closed (3 spans, self-weathering)	\$2.9 million
Truss type alternative 3: Closed (1 span, painted)	\$1.93 million
Truss type alternative 4: Sloped Open (3 spans, self-weathering)	\$0.71 million
Truss type alternative 5: Inclined U-frame (3 spans, painted)	\$2.25 million

\*These figures represent the total of planning-level construction estimates and design fees, 3 years at 3% per year inflation to mid-point of construction, 10% mobilization and a 20% contingency.

### Maintenance Considerations

#### *Painting or Galvanizing Steel*

A painted or galvanized steel bridge can have a life over 50 years, but regular and proper maintenance can typically extend the life to 75 to 100 years. Painted and galvanized structures require periodic inspection, repair, repainting over the life of the structure and sometimes blasting and re-coating.

#### *Self-Weathering Steel*

Self-weathering steel can have a life over 50 to 75 years. The chemical composition of the steel eliminates the need for painting as the steel forms a protective layer on its surface under the influence of the weather. However, the regular and prolonged exposure to moist environments, such as regular coastal fogs and wetlands can negatively affect the life as the protective layer may not stabilize but instead continue to corrode. The bridge span over Highway 101 combined with wind is in a relatively dry environment and is not a significant concern.

### Project Coordination

The City's Public Art Program is currently compiling a pool of prequalified artists with previous experience working on similar transportation projects. After completing a selection process and early in the bridge design phase, the City plans to have the artist join the design team to identify opportunities to incorporate artwork in the design. Due to the limited budget, the design team will work with the artist to leverage existing budgeted bridge design elements to maximize the impact of the artwork.

Coordination with Pacific Gas and Electric (PG&E) and with SCVWD will ensure the approach structures do not compromise existing utility and creek access. The touchdown on the west side of the Adobe/Barron Creek channel and the new Adobe Creek Reach Trail requires coordination and approval from SCVWD. A Joint Use Agreement with SCVWD will be negotiated before final design begins and finalized before the undercrossing closes permanently when construction begins.

Caltrans coordination is underway with a November project team meeting to share the 15% design and geotechnical soil boring program information. A Cooperative Agreement with Caltrans will be required before construction begins.

Staff will return to the community, boards, commissions, PABAC, SCVWD, Caltrans and private/public utilities during the design phase once Council directs staff on the optional enhancements.

### Public and Private Funding Possibilities

#### *County/Stanford Trails Funds*

Stanford University and the City submitted a joint \$8.5 million grant application in 2012 and Stanford was awarded \$4.5 million from the Santa Clara County Recreation Fund established by the County/Stanford Trails Agreement. Since that time Stanford University has relinquished the \$4.5 million grant funding and built the Stanford Perimeter Trail with its own funds. If the county is amenable, the relinquished \$4.5 million in grant funds could be allocated to the project. Currently, County of Santa Clara staff asked City staff to refrain from making a formal request while internal discussions are occurring. Any use of the funds is subject to the approval of the Santa Clara County Board of Supervisors.

### *Google Contribution*

A contribution of \$1 million from Google is planned to supplement the current \$13 million project budget or to offset the City's current funding allocation. If the Google contribution is used to supplement the current \$13 million budget, it could be used to fund optional enhancements at Council's direction, or could be maintained as a contingency fund to offset any increases in project costs.

### *OBAG Cycle 2 Funds*

Staff anticipates approval of the request for \$4.35 million in OBAG Cycle 2 construction funds pending Santa Clara Valley Transportation Authority's selection process this fall. The OBAG funds could not be coupled with BEP funds for Category 1 projects described below.

### *Bicycle Expenditure Program (BEP) and Future County Sales Tax Funds*

The 2040 Valley Transportation Plan (VTP) and the Santa Clara Valley Transportation Authority Bicycle Expenditure Plan identify the \$9.5 million overcrossing project for Category 1, BEP funds. The project also appears in the draft list of bicycle and pedestrian projects that may be eligible for future county sales tax funding. The unpredictability in sales tax revenue makes planning for long-term future funds uncertain.

### **Resource Impact**

Funding for this project is included in Capital Improvement Program (CIP) project (PE-11011) - Highway 101 Pedestrian/Bicycle Overpass Project. If Council directs staff to add any optional enhancements, the project budget will need to be increased.

The current project funding is as follows:

<b>Funding Source</b>	<b>Funding Amount</b>
Santa Clara County Recreation Fund	\$4.0 million
OBAG Cycle 2*	\$4.35 million
General Fund	\$4.65 million
Sum:	\$13.0 million

\*Approval of the OBAG Cycle 2 funds, which replace Surface Transportation Improvement Program (STIP) funds deleted by the California Transportation Commission due to a funding shortfall, is expected in fall 2016.

### **Policy Implications**

The project is consistent with the Comprehensive Plan goals, policies and programs.

Goal T-3: Facilities, services and programs that encourage and promote walking and bicycling.

Goal T-14: Improve pedestrian and bicycle access to and between local destinations, including public facilities, schools, parks, open space, employment districts, shopping centers, and multi-model transit stations.

Policy T-25: When constructing or modifying roadways, plan for usage of the roadway space by all users, including motor vehicles, transit vehicles, bicyclists, and pedestrians.

### **Timeline**

Schedule and milestones:

Phase 1:

- Begin environmental assessment and 35% design – November 2016
- Potential BCA contract amendment for optional enhancements based on Council direction – December 2016
- Complete 35% design and public review meeting – Fall 2017
- Complete environmental assessment – Winter 2017
- Complete 65% design – Winter 2017

Phase 2:

- Authorize Phase 2 and Phase 3 services – Fall 2017
- OBAG Cycle 2 access to funding – October 2018

Phase 3:

- Begin construction, construction administration – early 2019
- Complete construction – early spring 2020

## **Environmental Review**

Selection of the optional enhancements does not constitute approval of the project. Pursuant to the California Environmental Quality Act (CEQA), a draft Mitigated Negative Declaration analyzing the proposed project, including the selected optional enhancements, will be prepared for public review and for consideration by advisory and decision-making bodies prior to project approval. Because the project may include federal funding, the City will file for a categorical exclusion under the National Environmental Policy Act (NEPA).

### **Attachments:**

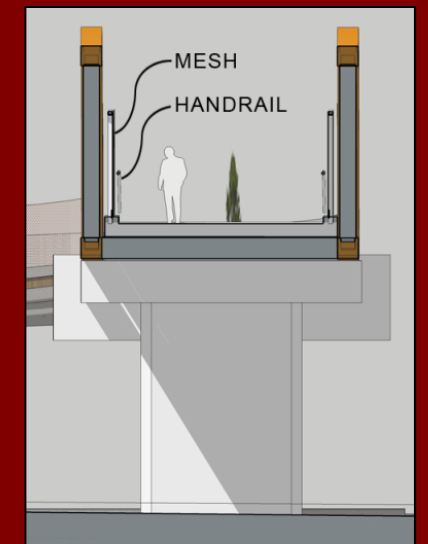
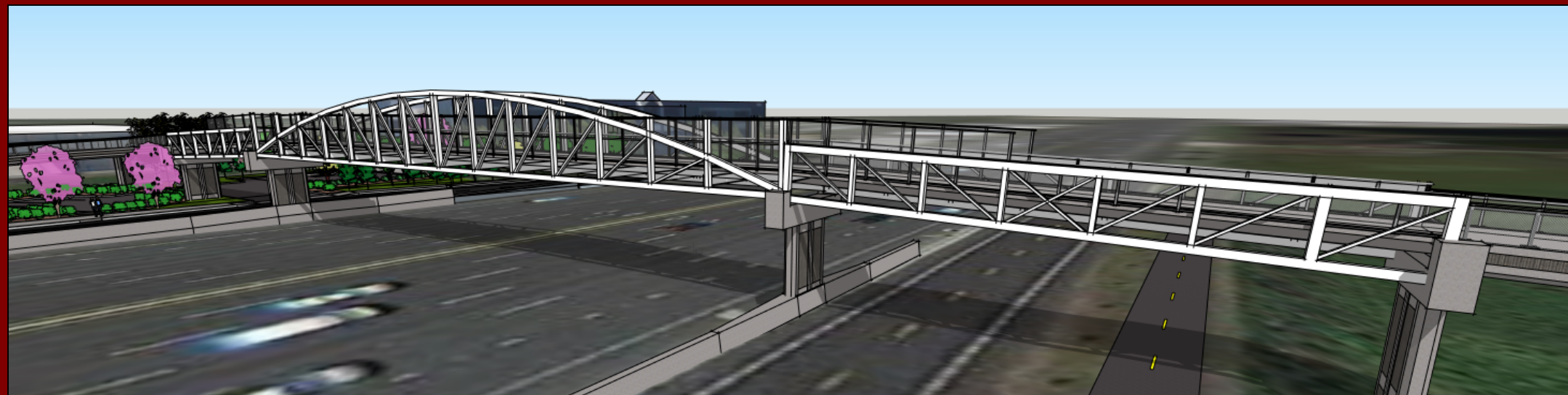
- Attachment A: 15% Project Concept Plan and Graphics (PDF)
- Attachment B: Optional Enhancements Conceptual Renderings (PDF)

# ATTACHMENT A

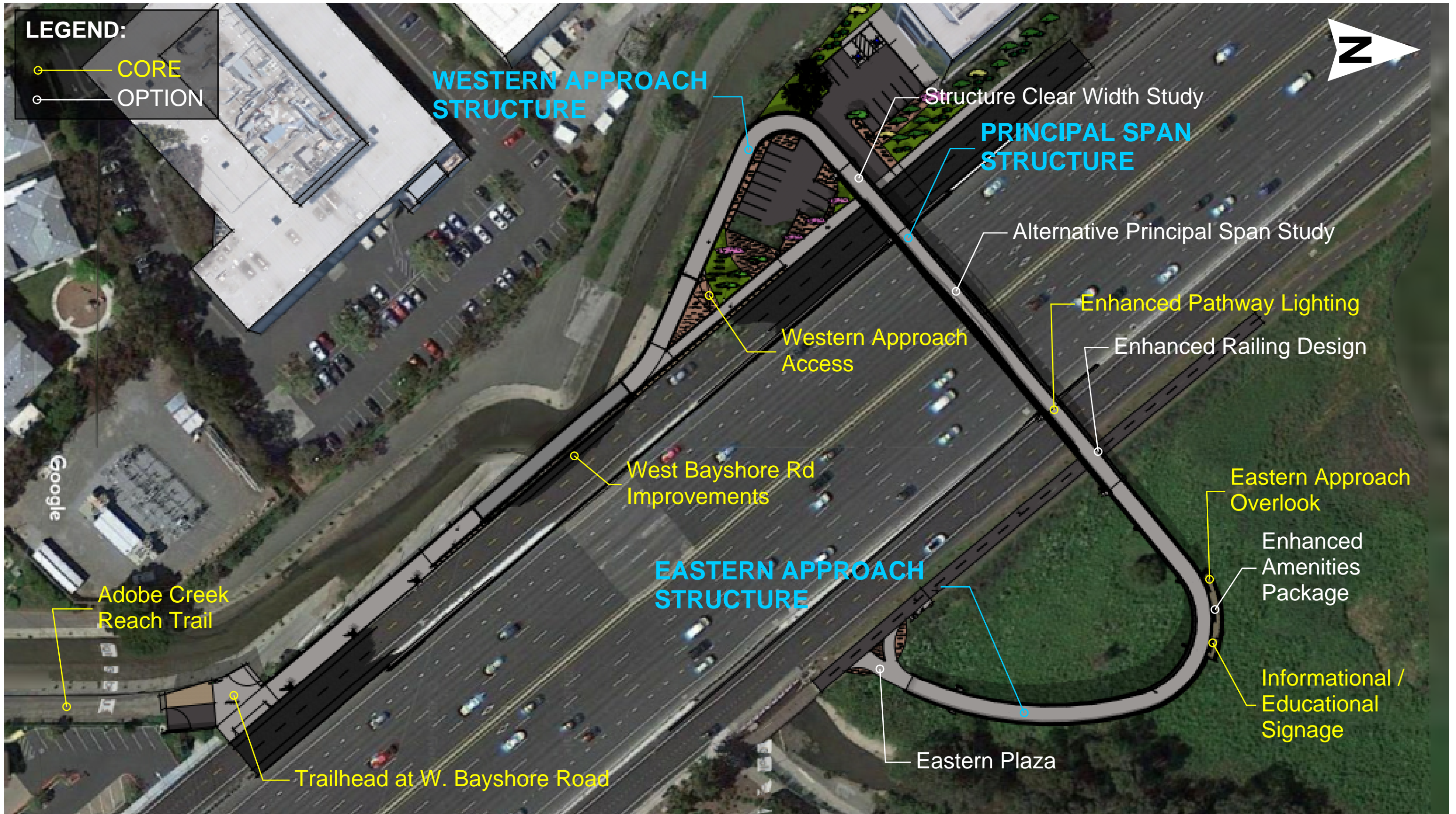
**BIGGS CARDOSA  
ASSOCIATES INC**  
STRUCTURAL ENGINEERS

# HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK

City of Palo Alto  
**15% PS&E Concept Plan and Graphics**  
Baseline + Core Additional Elements





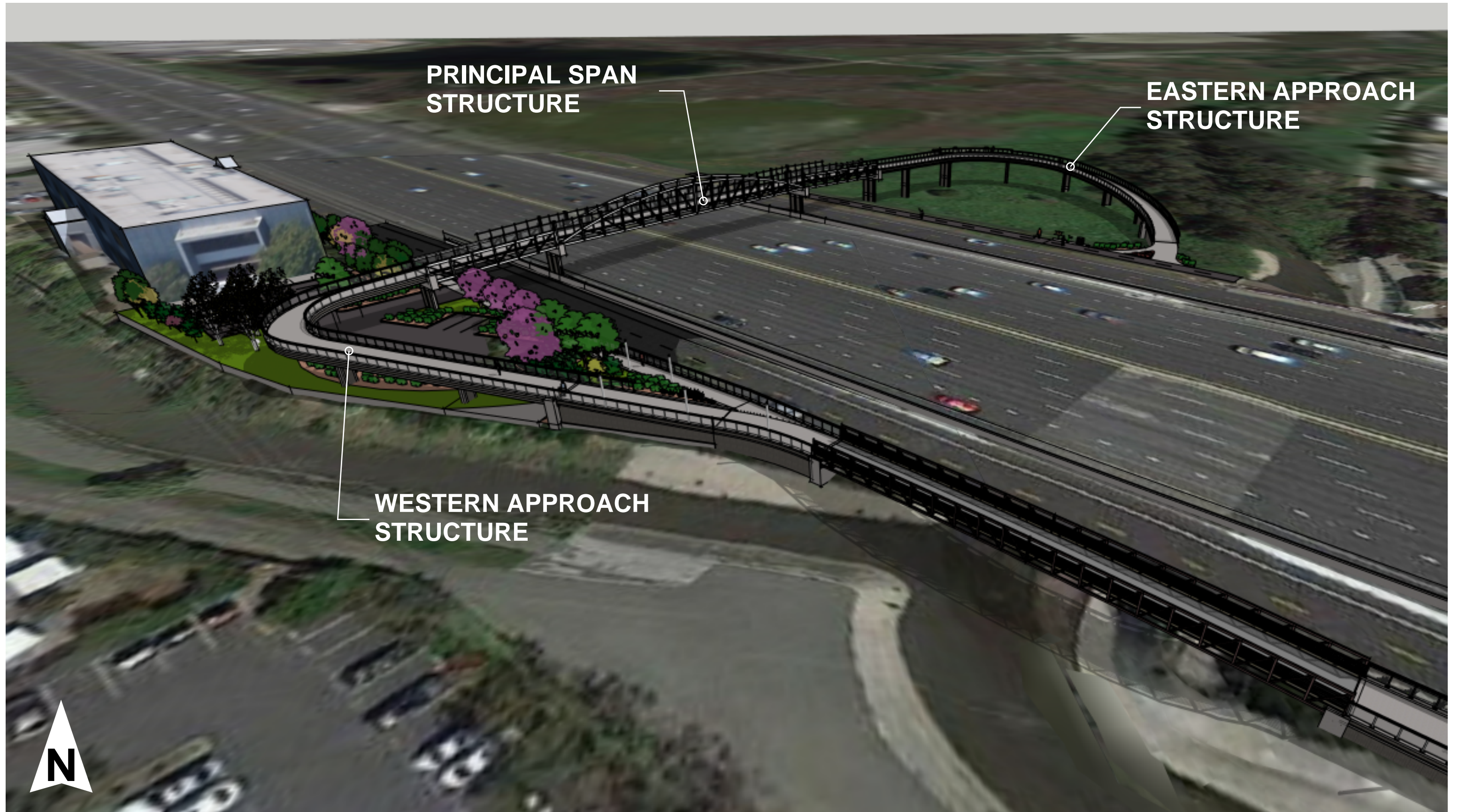


# PROJECT PLAN VIEW

BASELINE + CORE + OPTIONAL ENHANCEMENTS







PRINCIPAL SPAN  
STRUCTURE

EASTERN APPROACH  
STRUCTURE

WESTERN APPROACH  
STRUCTURE



## PROJECT OVERVIEW

LOOKING NORTH





## EASTERN APPROACH OVERLOOK

This overlook will provide users the opportunity to pause, rest, view and appreciate the adjacent Baylands Nature Preserve. The architecture of the overlook will compliment the main bridge structure elements, including railings and concrete facing textures and colors.

The overlook will be decked with a wood finish to make the area more distinguishable from the main pathway and to give it some warmth in texture and color. The decking and the bench elements could be constructed from recycled and repurposed existing timber decking from the adjacent Baylands Boardwalk Project.

Amenities such as benches and informational/educational signage will also be located on the overlook to further enhance the experience for the users.



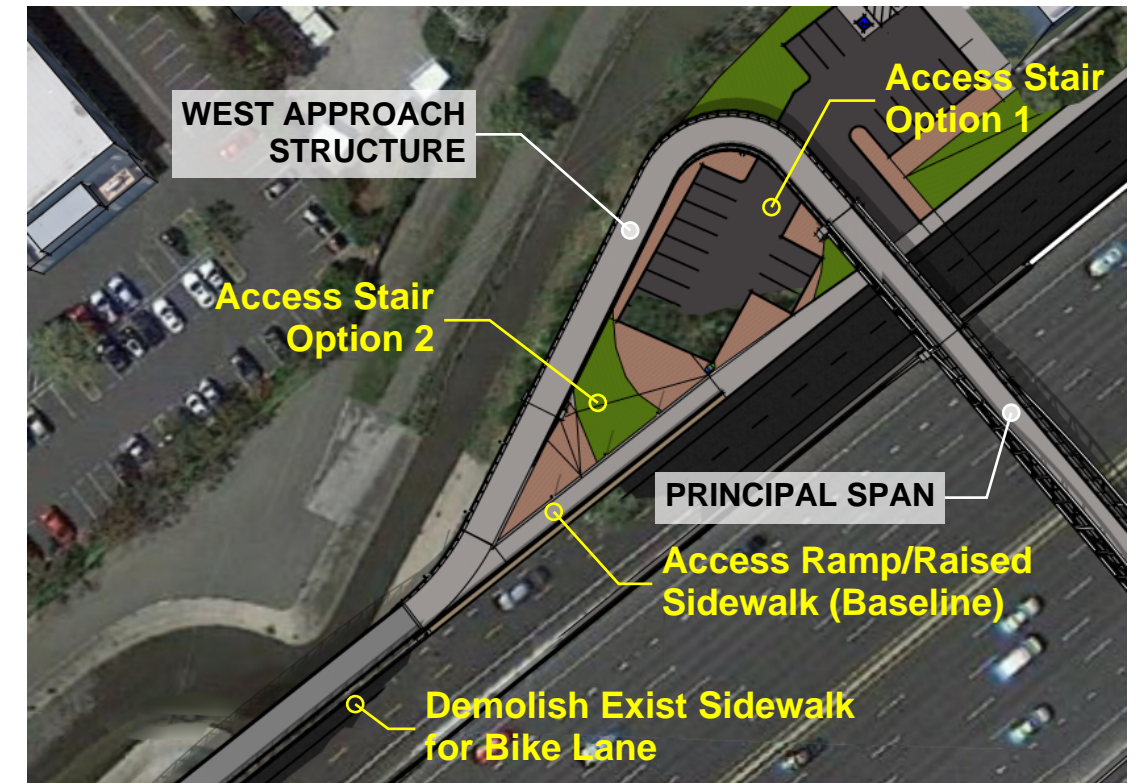


## WESTERN APPROACH ACCESS

An access structure will be incorporated into the baseline Western Approach Structure. For northbound pedestrians along West Bayshore Road, the access structure can reduce the length of travel by roughly 500 feet.

Three initial alternatives were considered: 1) Access Stair Option 1: Located near the interface of the Principal Span and Western Approach Structure; 2) Access Stair Option 2: Located lower along the path where the overcrossing structure becomes supported on fill; and 3) Access Ramp/Raised Sidewalk: Located between the existing parking lot and the Adobe Creek Bridge.

The access ramp/raised sidewalk alternative is preferable since it creates equal access to mobility impaired trail users and it provides a pedestrian bypass allowing the existing bike lane along West Bayshore Road to be made continuous across the existing Adobe Creek Bridge. It also provides a functional ADA compliant alternative access which can be used as primary ingress/egress if and when the SCVWD closes the trail access area for their channel sedimentation maintenance.



## WEST BAYSHORE ROAD IMPROVEMENTS

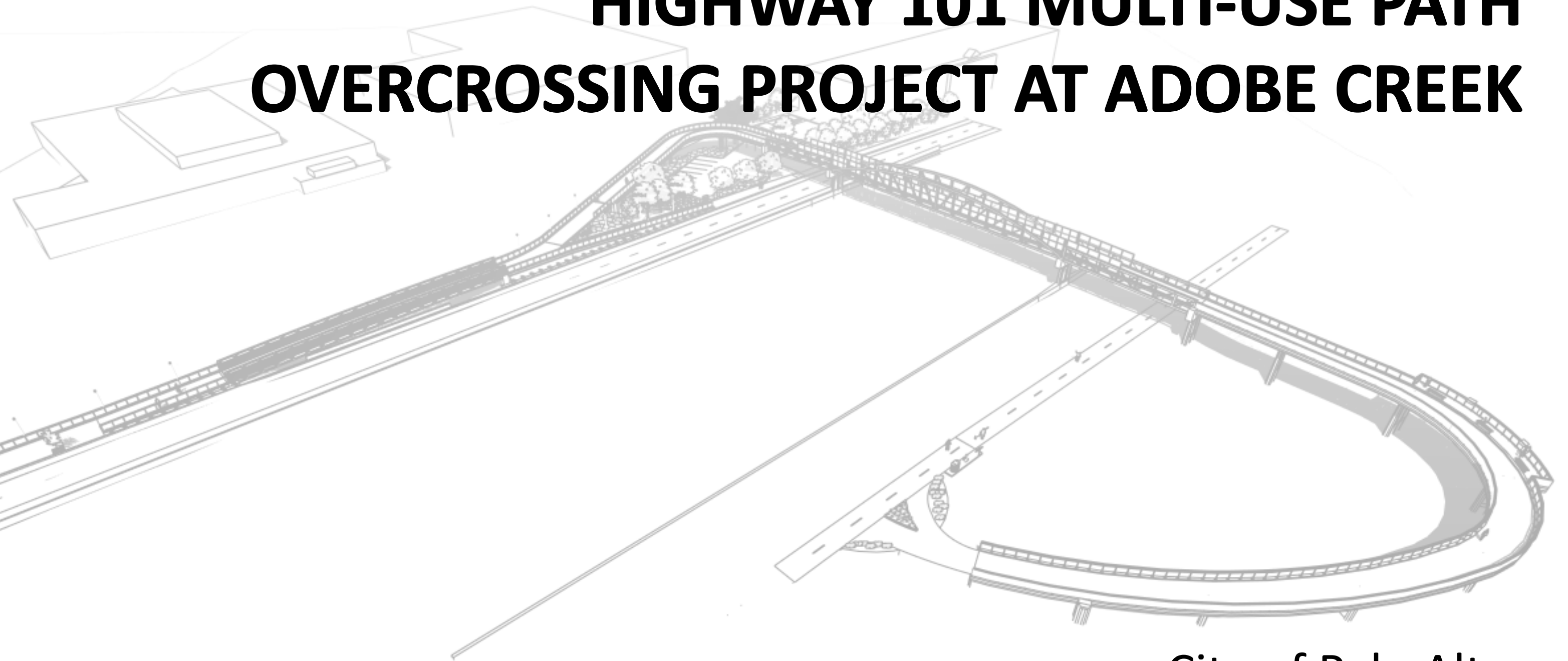
Currently the existing bicycle lane drops off at the Adobe Creek Bridge at West Bayshore Road and the bike lane and sidewalk merge into an approximately 5-foot wide single raised shared sidewalk. A feasible and economical means to accommodate a separate bicycle and pedestrian facility at West Bayshore Road at Adobe Creek was investigated.

We reviewed widening the existing roadway structure to accommodate the bicyclists and pedestrians but the multiple utilities carried by the existing structure are problematic and would require considerable retrofit of the existing structure. Based on conversations with the SCVWD, it was preferable to limit the amount of intrusion into the creek from both the bridge structure and its associated retaining structures. The access ramp/raised sidewalk alternative allowed us the opportunity to essentially accomplish the desired goal with one element.



Access Ramp/Raised Sidewalk  
(Looking SE)

# **HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK**



City of Palo Alto  
Enhanced Lighting



## LIGHTING DESIGN CONCEPT

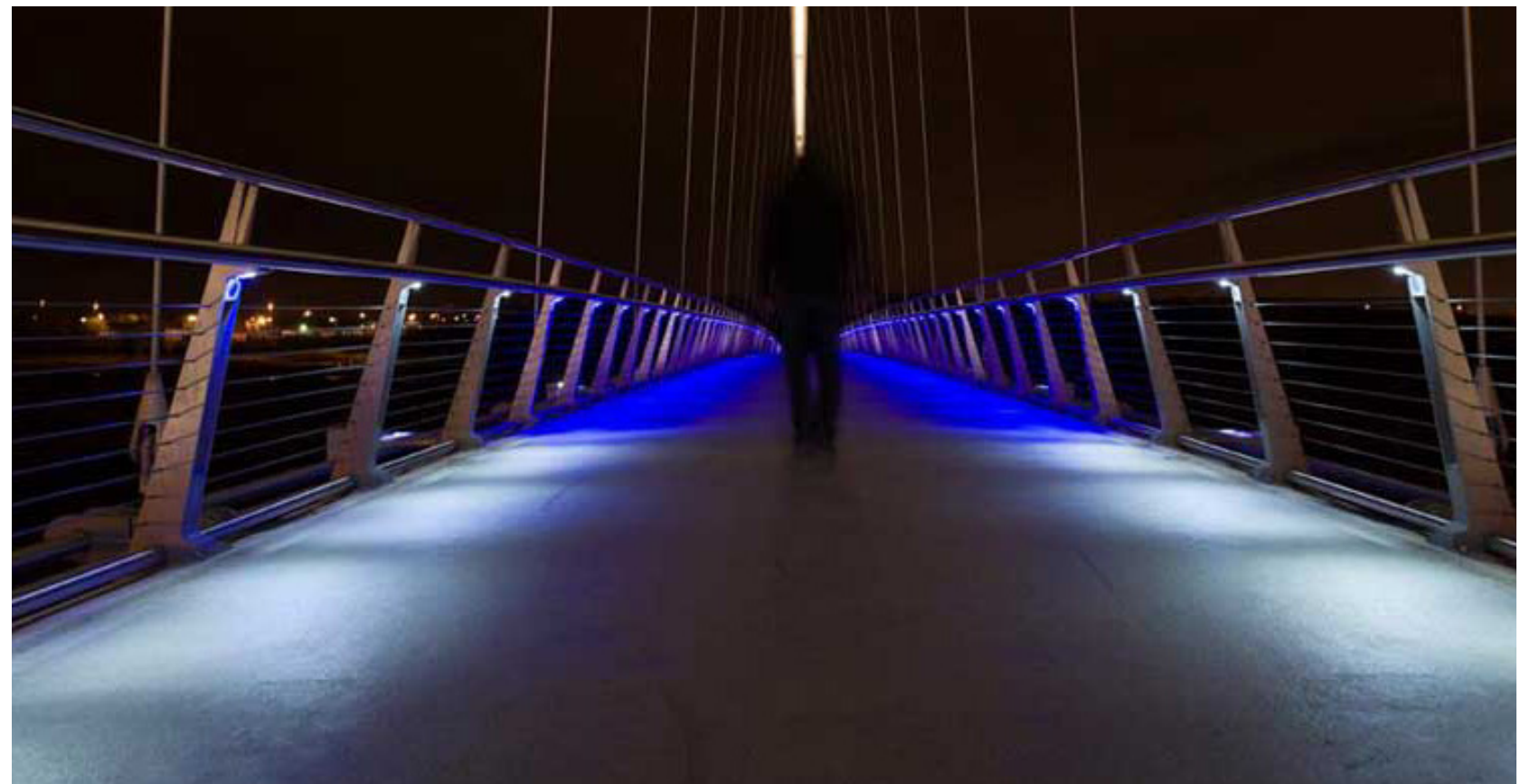
Lighting design will be provided for the pedestrian overcrossing at Adobe Creek that contributes to the project goals of providing connectivity while addressing environmental concerns. Paths are to be illuminated during night hours to support pedestrian and bicycling activities, with lighting levels reflecting the transition from higher illuminated urban areas on the western side to the lower lighting of the Baylands to the east.

The Western Approach will require higher lighting levels for better uniformity ratios to the surrounding environment. Pole mounted luminaires provide uniform illumination along the pathway and at landscaping leading to the Overcrossing. Lighting poles with full cutoff above the 90° plane and no back lighting will be used in order to limiting light pollution as well as light trespass along adjacent river.

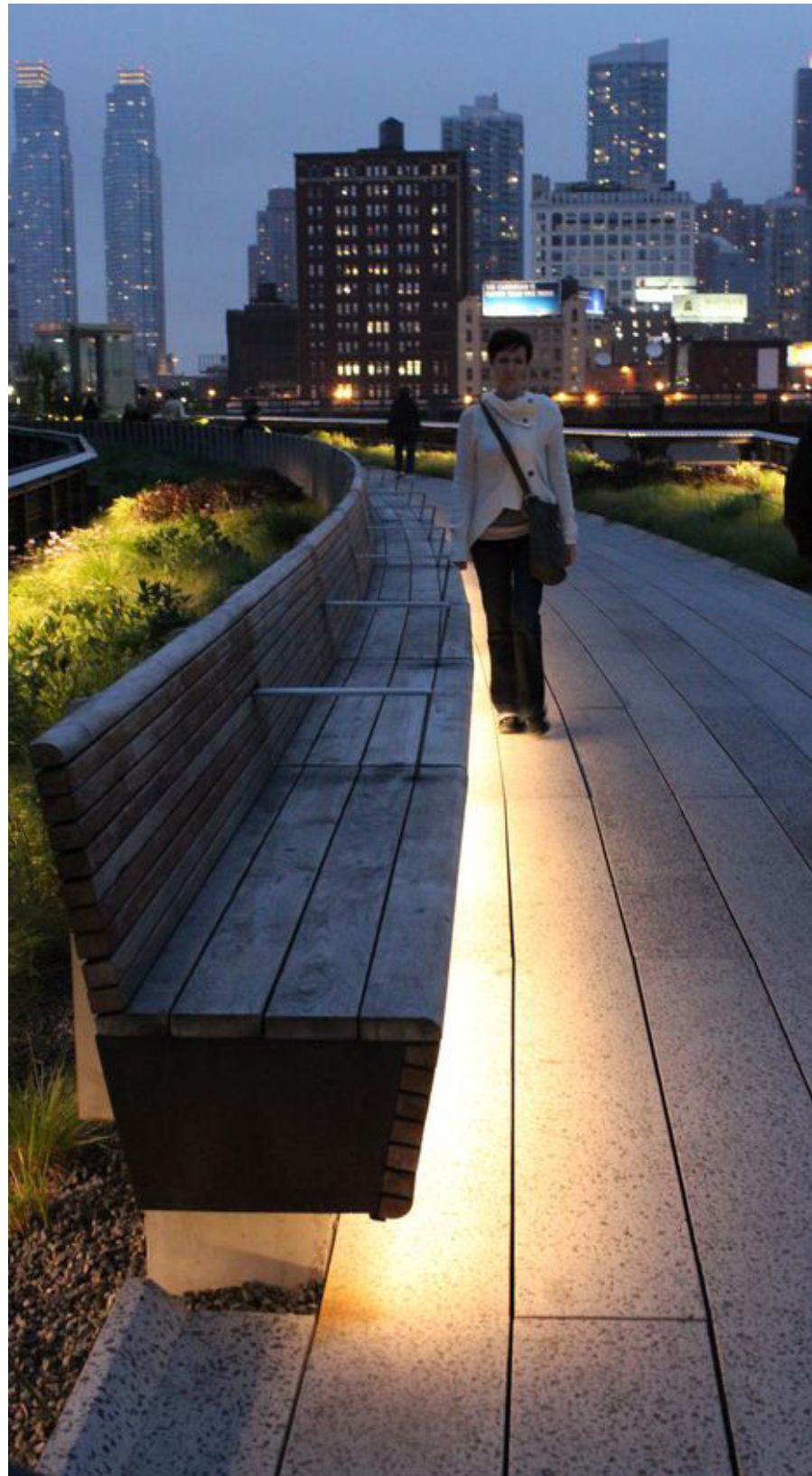
As the pathway approaches the Principal Span, lighting is to be integrated into the railing where possible to create a consistently illuminated pathway. Vertical placement will allow for more forward throw, pushing the lighting further towards the center of the pathway. Direct view of any light source is to be shielded from adjacent vehicular vantage points to reduce glare and distraction for drivers.

This type of installation would be located at key points at the Overcrossing focusing on the user experience from the pathway in order to minimize visibility from vehicular and the Baylands.

White luminaires, along with additional levels of lighting controls, allow the lighting color and output to transform in response to environmental changes or pedestrian and bicycle activity creating a reactive or interactive public art experience.







## LIGHTING DESIGN CONCEPT

Lighting at the Eastern Approach and overlook is to be integrated into urban infrastructure such as railings and benches. Illumination levels should be minimal in order to reduce environmental impact on the Baylands Nature Preserve. Lighting elements will be lowered in elevation and light output.

Steplights will be integrated into railings where possible, providing low levels of functional lighting along the pathway to meet photometric requirements while minimizing environmental impact. Ground mounted marker lights will also be used to define the edge of the overlook curb while providing additional lighting at the pathway. Warm color temperatures will be used to reduce impact to migratory birds and other wildlife.

Lighting controls will be utilized to reduce light output during hours with limited activity. Light levels dim down on a set time schedule synced with the astronomical clock. As people approach, sensors detect their presence, allowing the lighting to change in response to pedestrian and bicycle activity.





WESTERN APPROACH



DAYTIME VIEW



NIGHTTIME VIEW



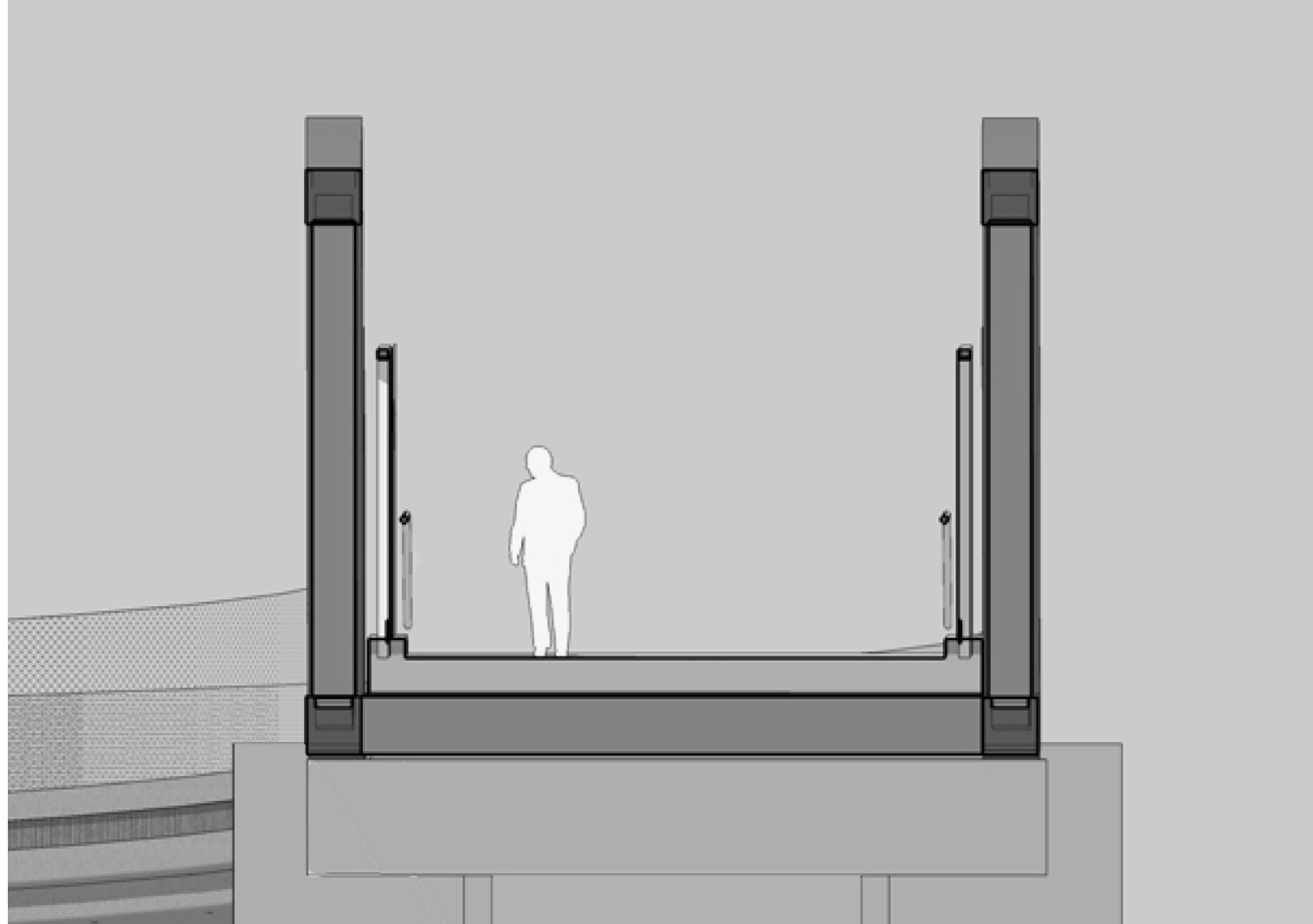
NTS

WESTERN APPROACH

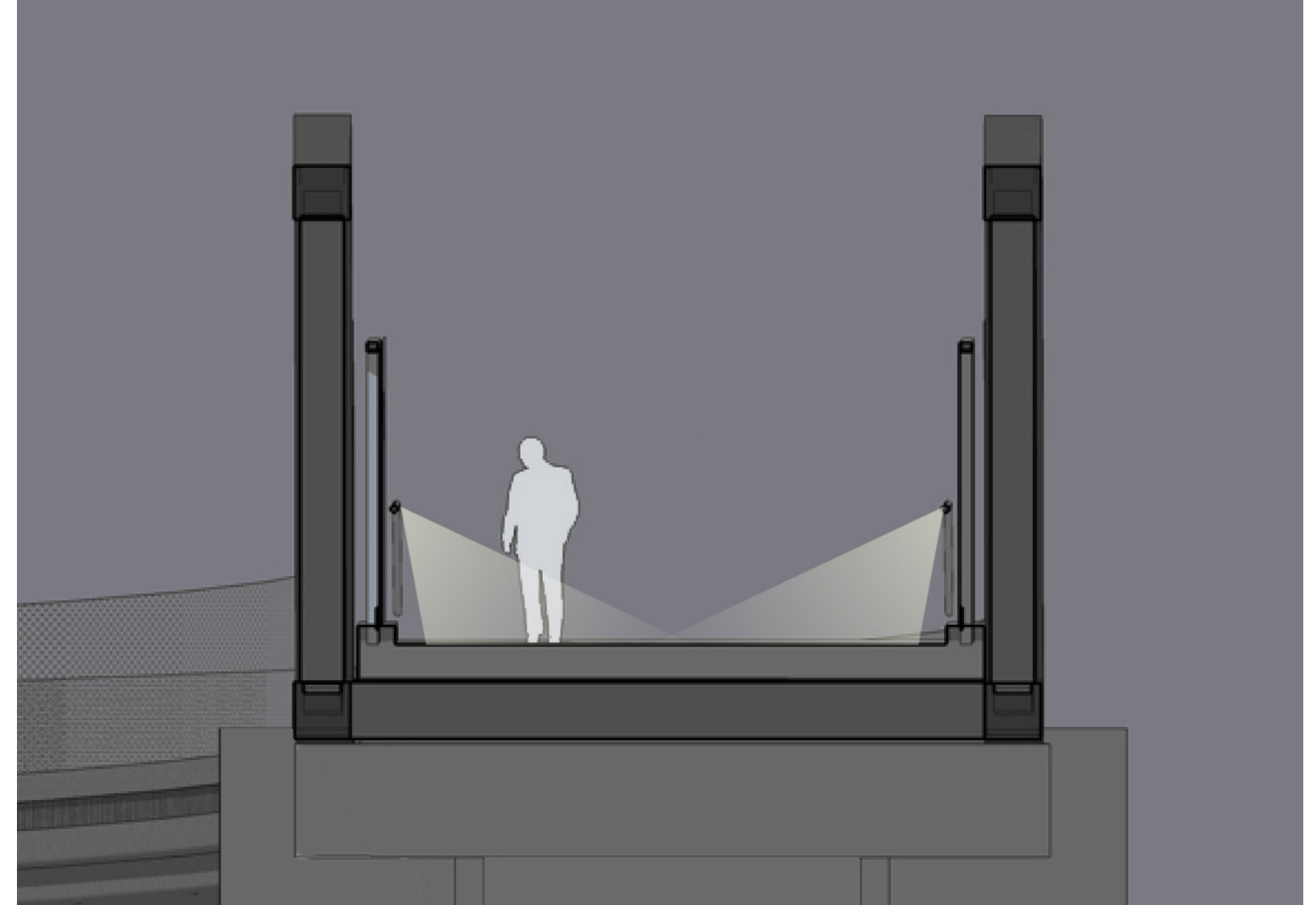




DAYTIME VIEW



NIGHTTIME VIEW



NTS

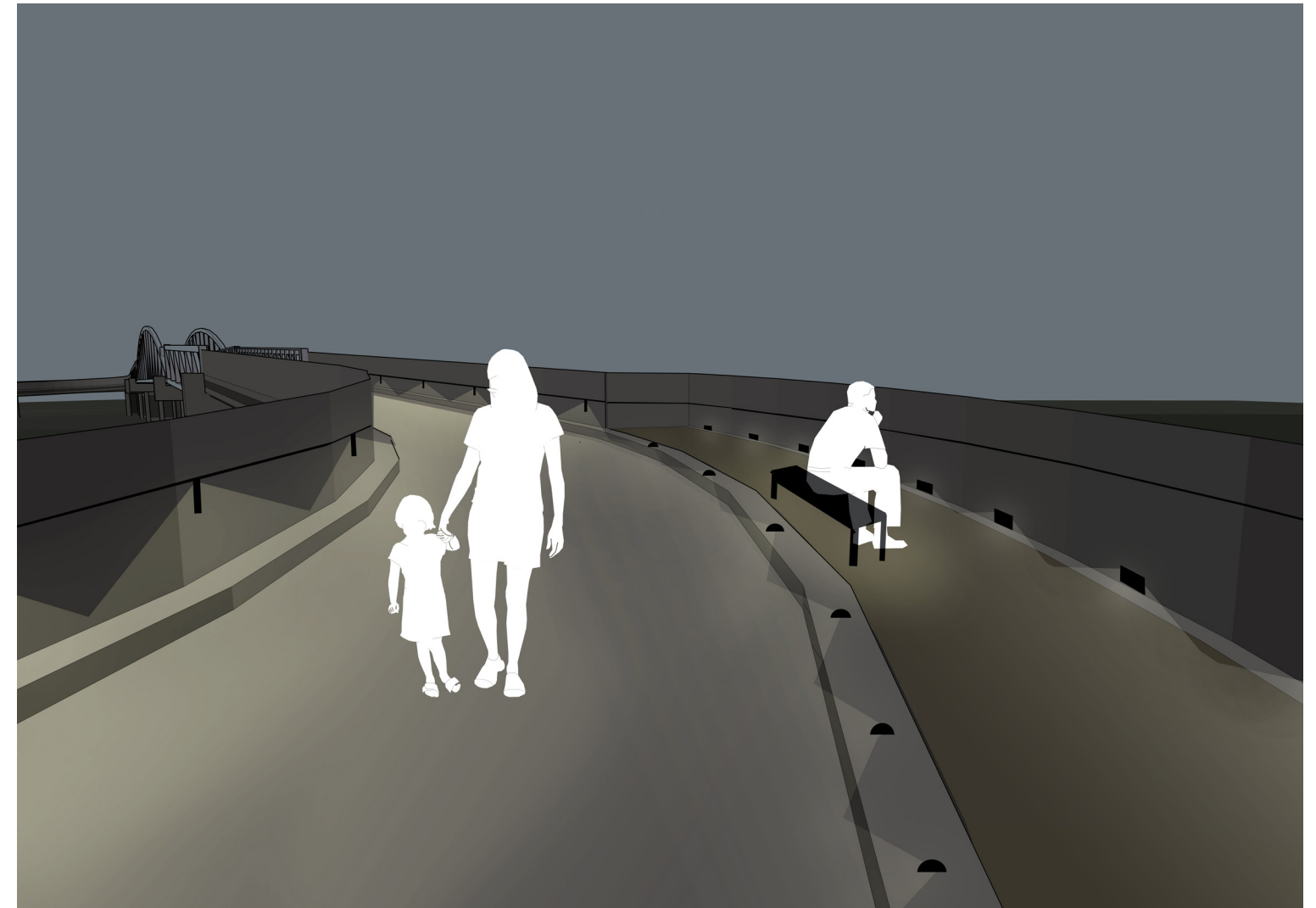
PRINCIPAL SPAN



DAYTIME VIEW



NIGHTTIME VIEW

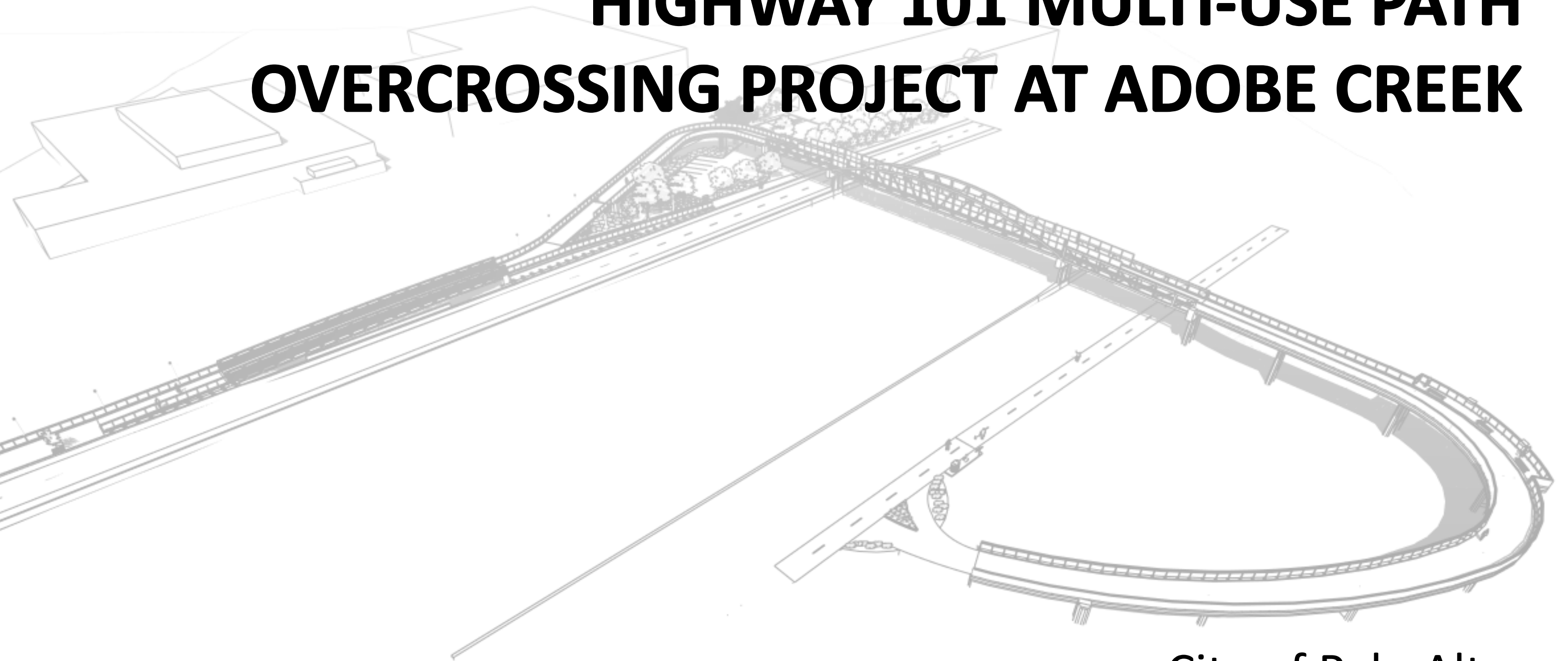


NTS

EASTERN APPROACH

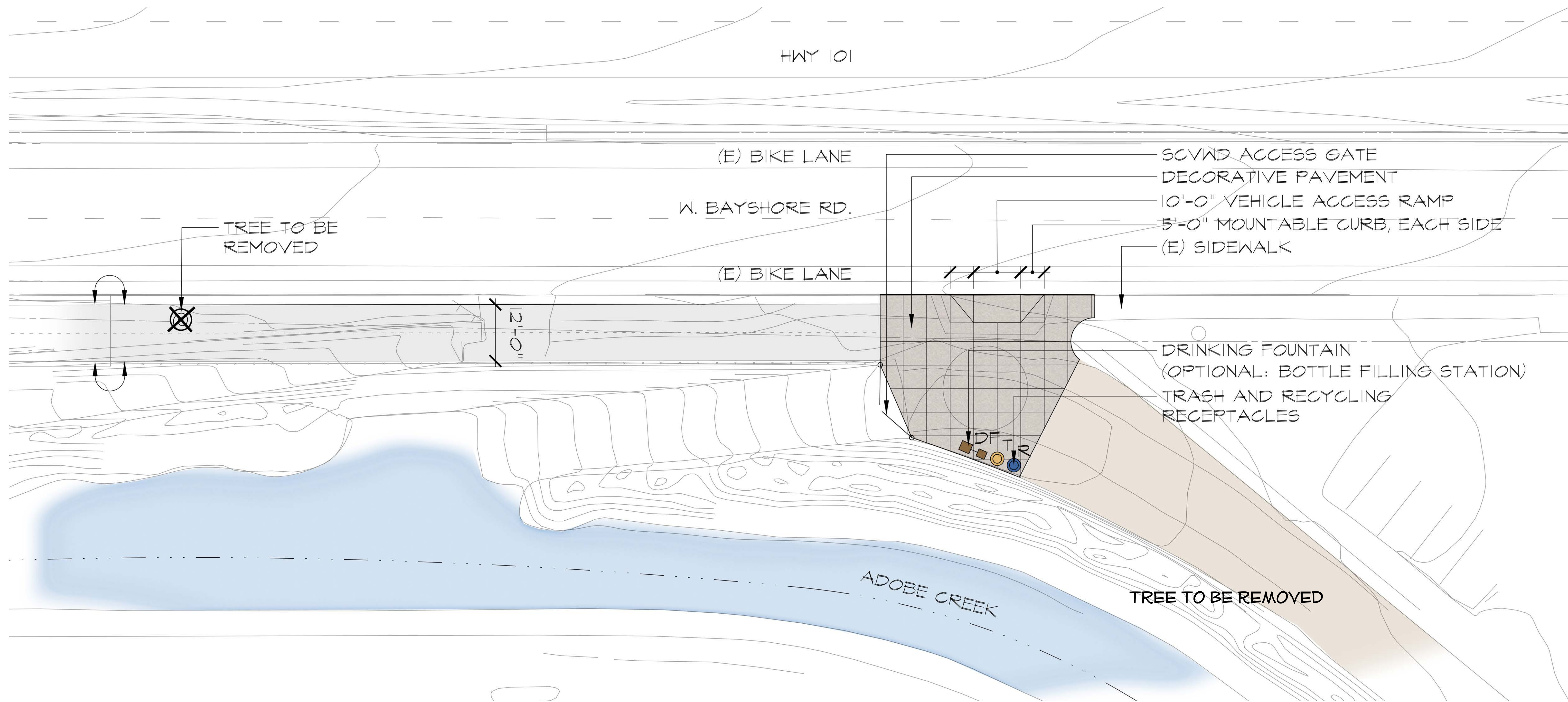


# **HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK**



City of Palo Alto  
**Adobe Creek Reach Trail**

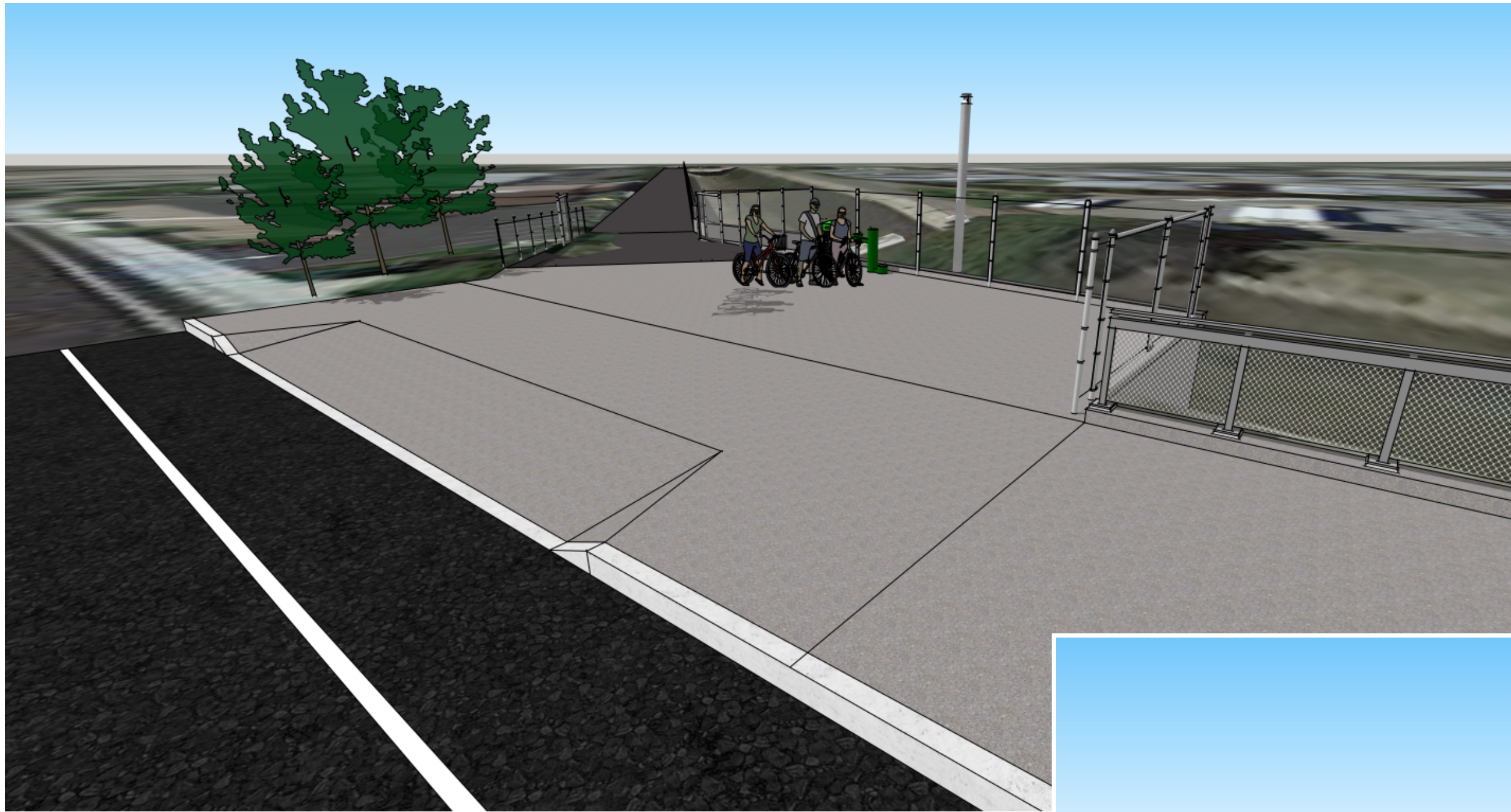




# WEST PLAZA

Highway 101 Multi-Use Path Overcrossing  
Palo Alto, California





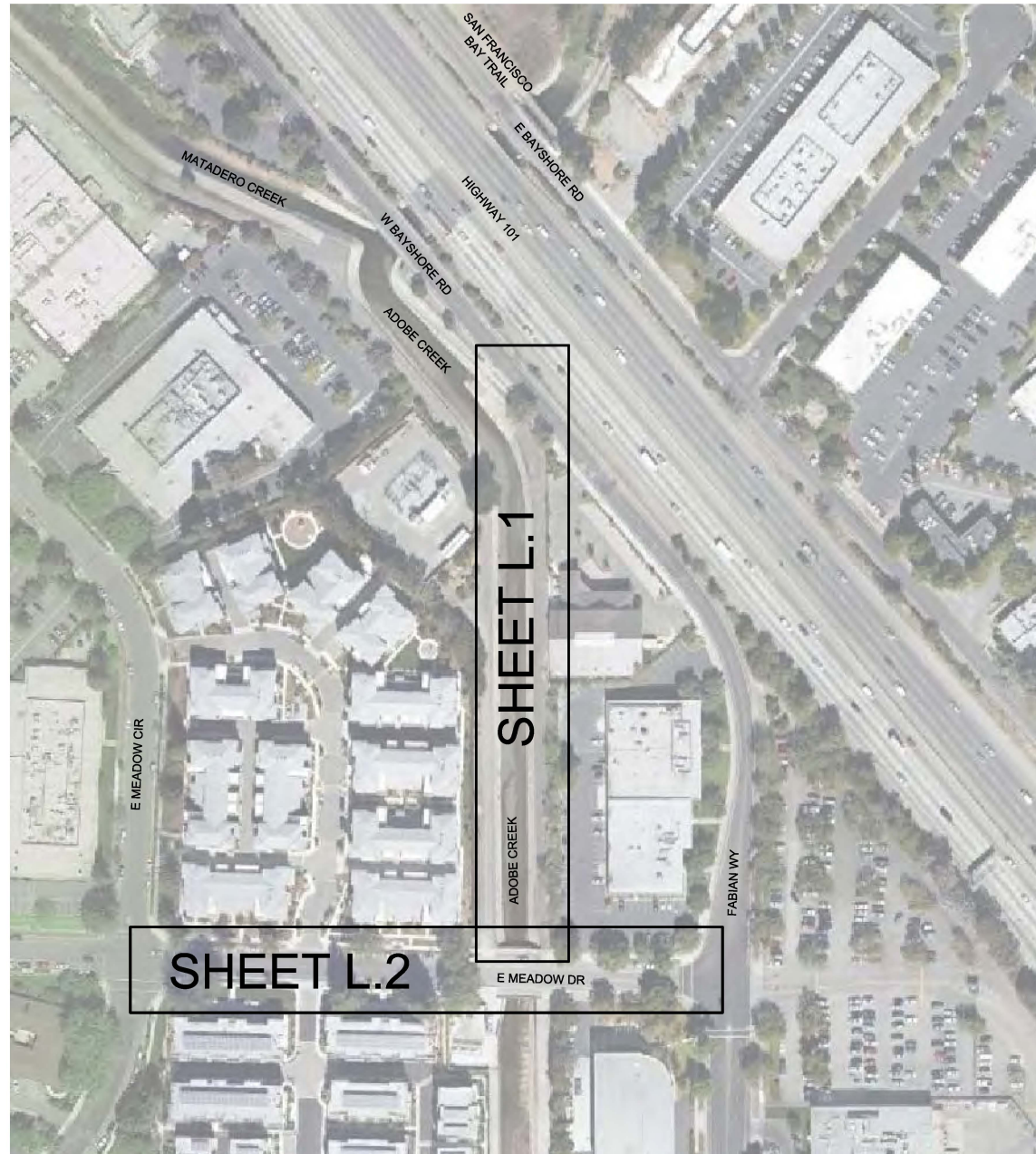
TRAILHEAD LOOKING SOUTH



ADOBE CREEK REACH TRAIL LOOKING NORTH



# ADOBE CREEK REACH TRAIL PALO ALTO, CA



## INDEX OF DRAWINGS

DRAWING NO.	SHEET	DESCRIPTION
1	TS.1	TITLE SHEET
2-3	L.1, L.2	LAYOUT PLAN

### REVISIONS

NO	DATE	ITEM

### REGISTRATION:

DESIGNED: KM

REVIEWED: RA

DRAWN: KM

12-131 12/19/14  
PROJECT NO. DATE

**Adobe Creek  
Reach Trail**

**15% Design**

TITLE SHEET

**TS.1**

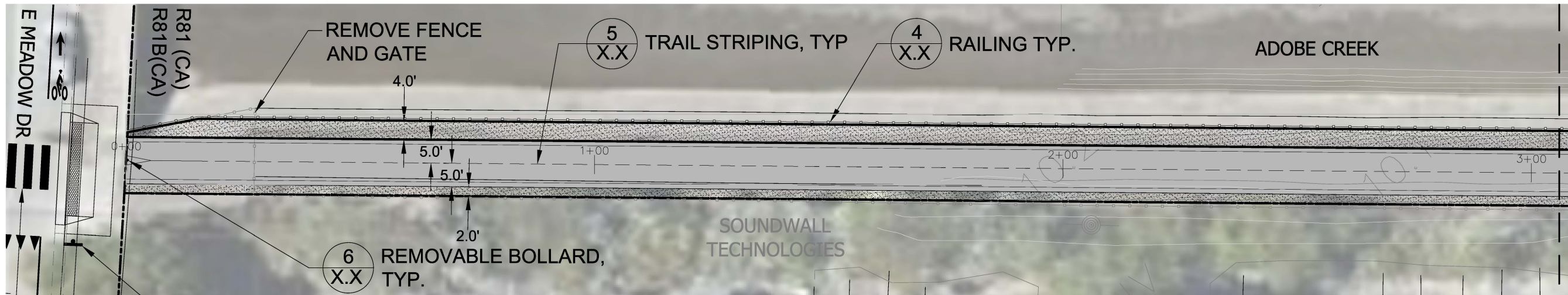
SHEET NO.



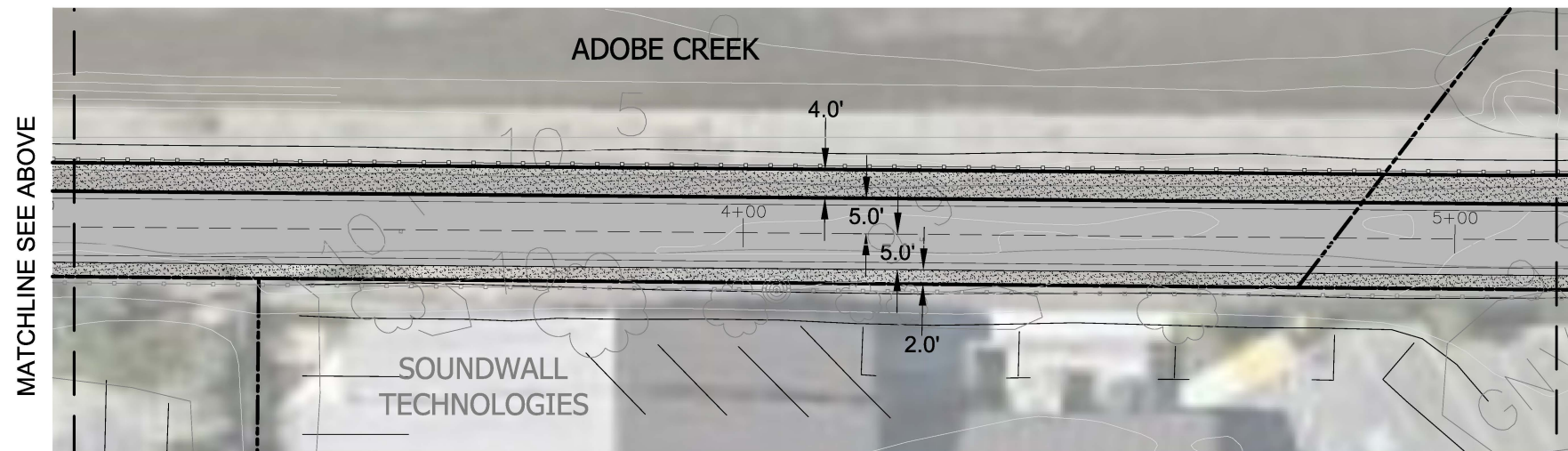
LOCATION MAP

NO SCALE



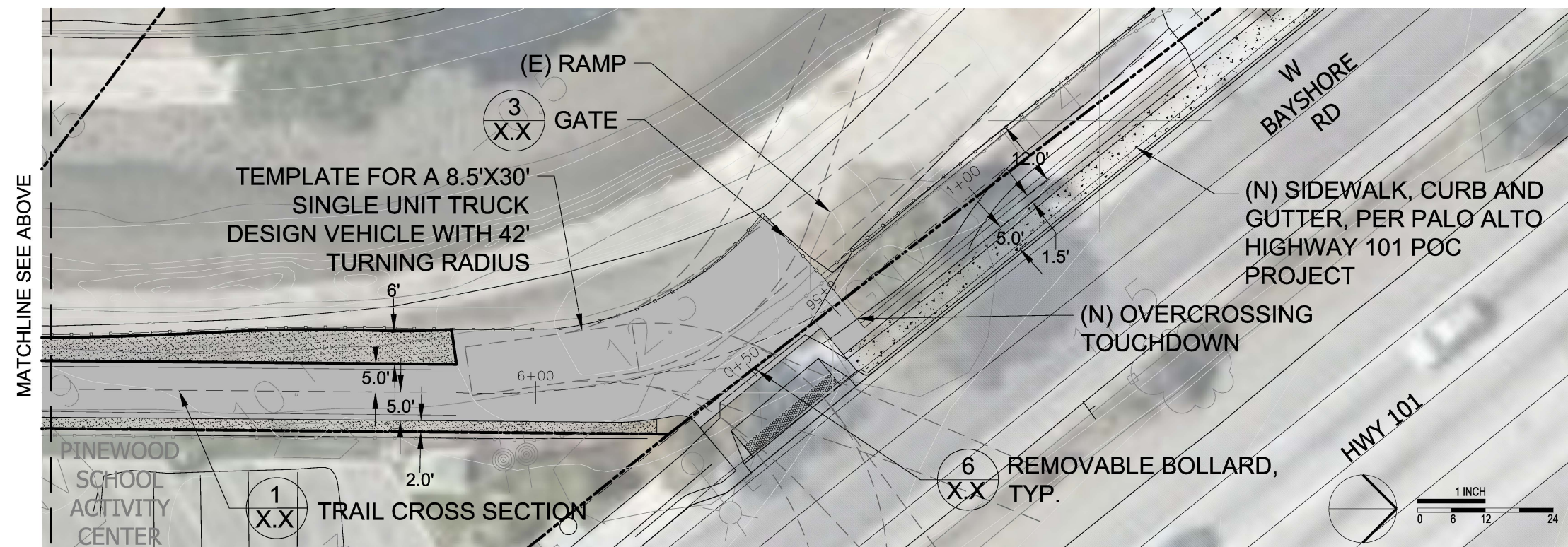


MATCHLINE SEE BELOW



MATCHLINE SEE ABOVE

MATCHLINE SEE BELOW



MATCHLINE SEE ABOVE

**LEGEND** ALL DISTANCES AND DIMENSIONS ARE SHOWN IN FEET AND DECIMALS THEREOF.

**PROPOSED**

- AC PAVEMENT
- DECOMPOSED GRANITE PAVEMENT, SEE CIVIL PLANS
- CONCRETE
- SIGN
- REMOVABLE / LOCKABLE BOLLARD
- CHAINLINK FENCE
- TRUNCATED DOMES

**EXISTING**

- PARCEL LINE
- FENCE LINE AS NOTED

**NOTE: DETAILS TO BE DEVELOPED**

REVISIONS

NO	DATE	ITEM

REGISTRATION:

DESIGNED:	KM
REVIEWED:	RA
DRAWN:	KM
12-131 PROJECT NO.	12/19/14 DATE

**Adobe Creek Reach Trail**

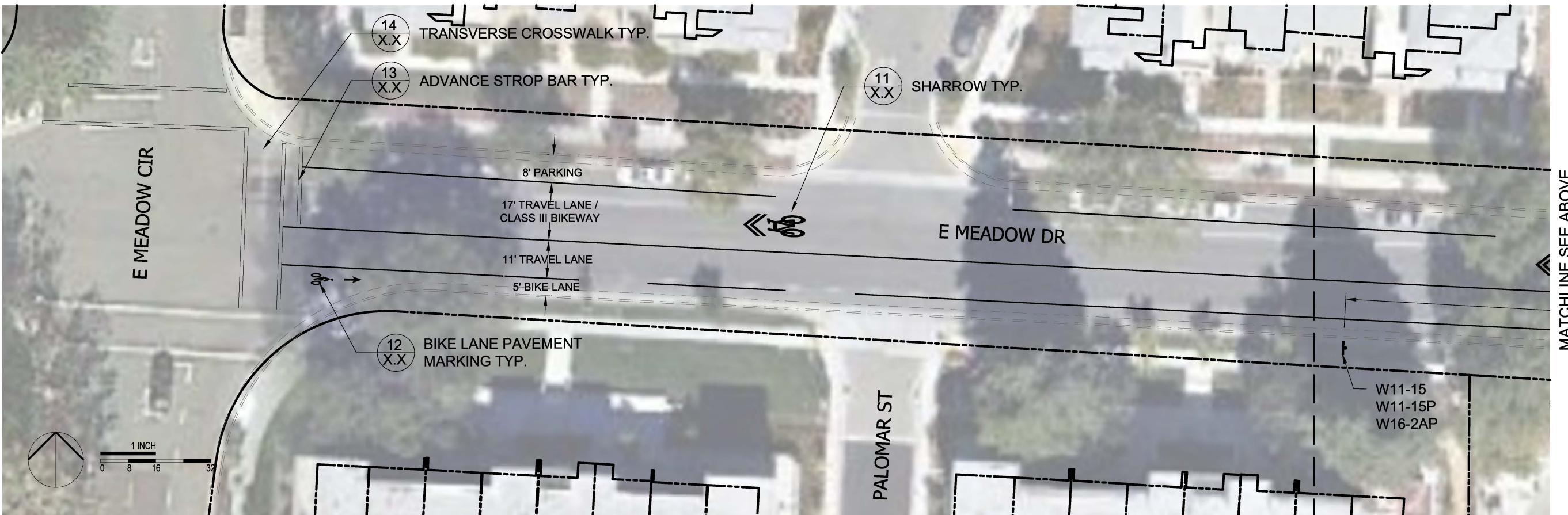
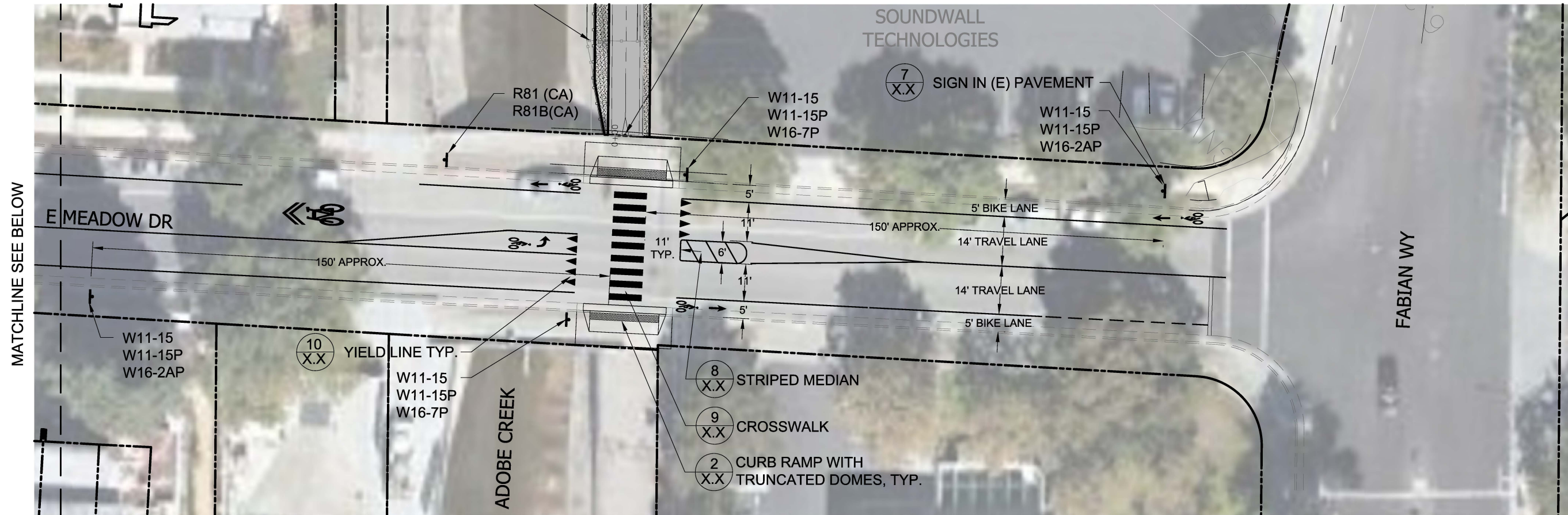
**15% Design**

Layout Plan

**L.1**

SHEET NO.





REVISIONS

NO	DATE	ITEM

REGISTRATION:

DESIGNED:	KM
REVIEWED:	RA
DRAWN:	KM
12-131 PROJECT NO.	12/19/14 DATE

**Adobe Creek Reach Trail**  
 15% Design

Layout Plan  
**L.2**

SHEET NO.

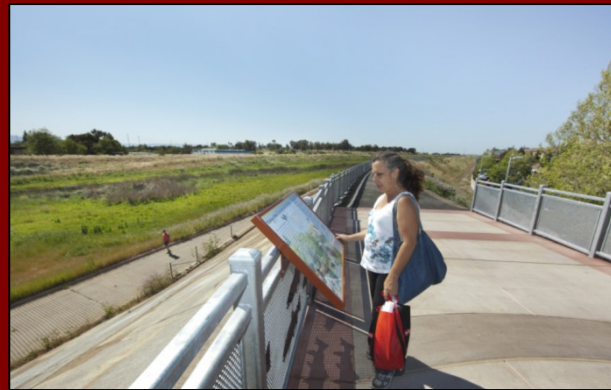


**BIGGS CARDOSA  
ASSOCIATES INC**  
STRUCTURAL ENGINEERS

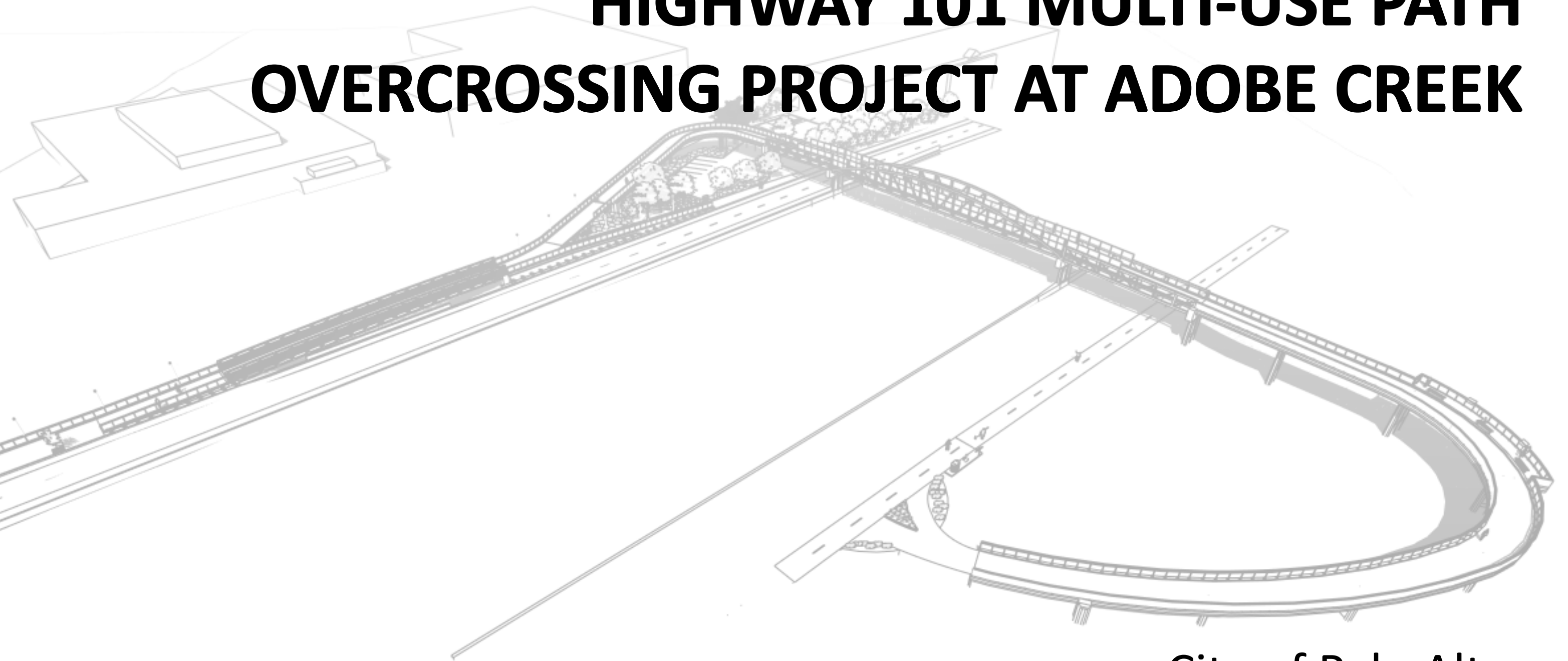
# ATTACHMENT B

# HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK

City of Palo Alto  
**Optional Enhancements**



# **HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK**



City of Palo Alto  
**Alternative Principal Span Study**

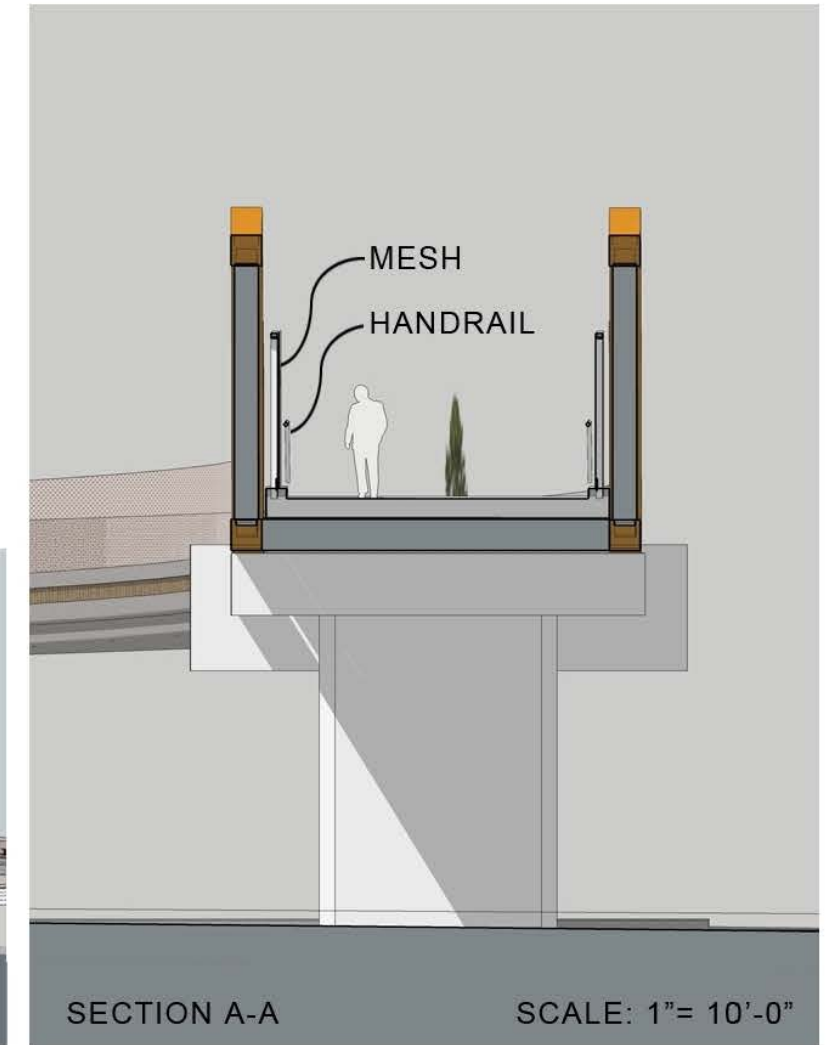
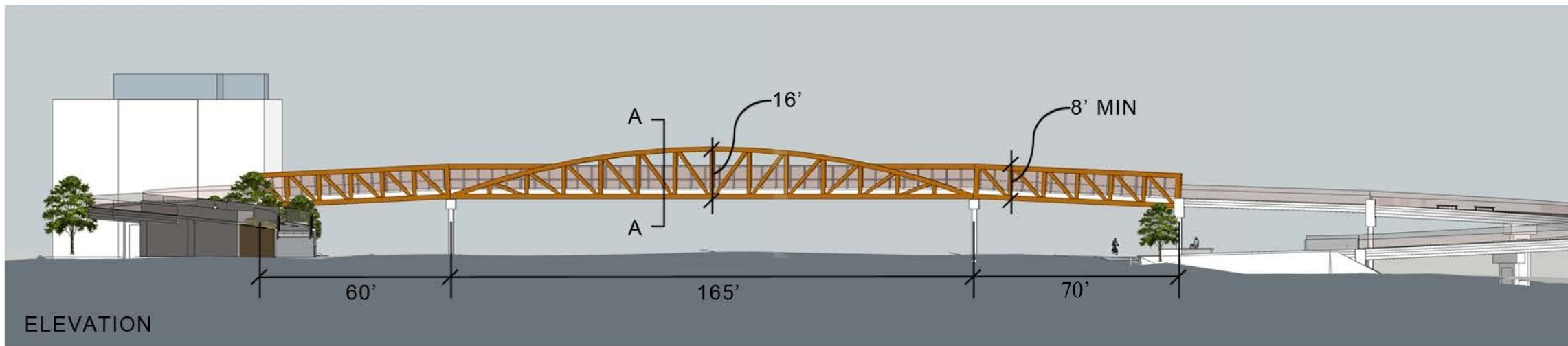
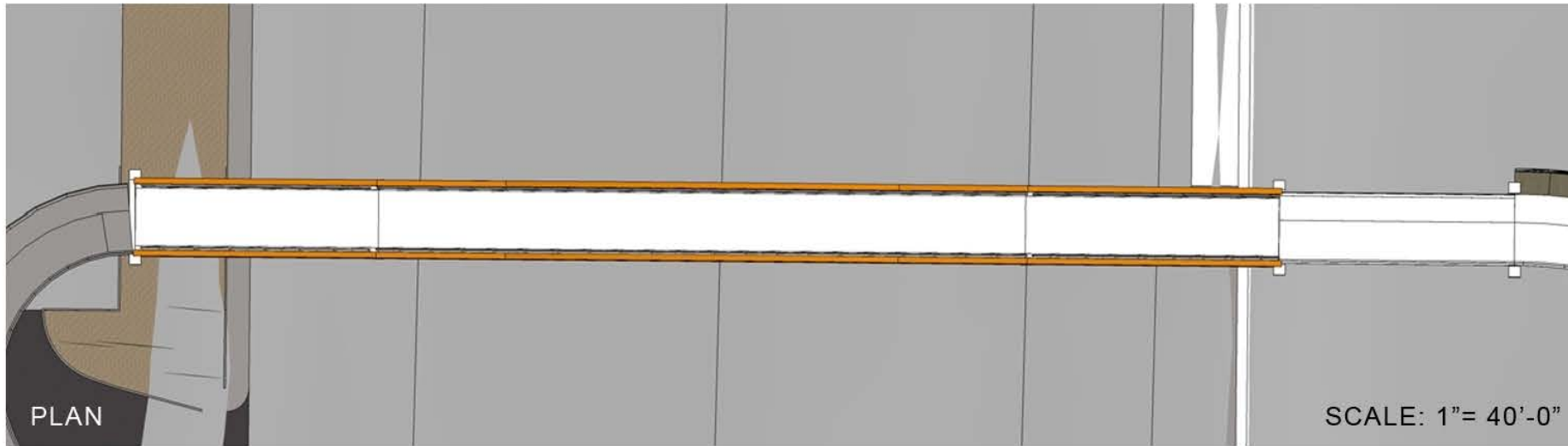
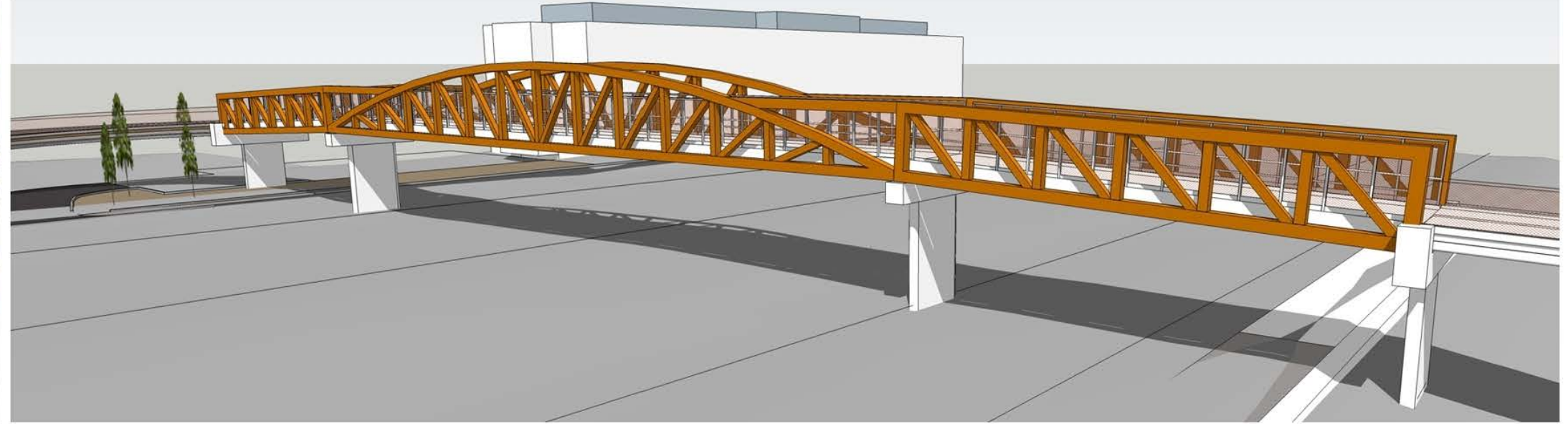
## ALTERNATIVE PRINCIPAL SPAN STUDY

### STRUCTURE FEATURES AND ADVANTAGES / DISADVANTAGES COMPARISON

Description	Baseline	Option 1	Option 2	Option 3	Option 4	Option 5
<b>Principal Span Type</b>						
Prefabricated Steel Bowstring Pratt Truss	X	X				
Prefabricated Steel Closed Box Truss			X	X		
Prefabricated Steel Open Warren Truss					X	
Prefabricated Steel Inclined Warren Truss						X
<b>Principal Span Length</b>						
3 Span (60' / 165' / 70')	X		X		X	X
1 Span (240')		X		X		
<b>Principal Span Width</b>						
12' Clear	X	X	X	X		
Varies (12' Min / 14' Max)					X	X
<b>Principal Span Finish</b>						
Self Weathering Steel		X			X	
Painted Steel	X		X	X		X
Cast-in-Place Concrete Side Spans					X	
<b>Principal Span Advantages / Disadvantages</b>						
Low Profile Structure (Top of Deck to Soffit) Which Keeps Approach Structure Length to a Minimum	X	X	X	X	X	X
Open Structure Type Provides High Visibility to Trail Users Contributing to Public Safety and Discourages Graffiti	X	X	X	X	X	X
Prefabricated Superstructure Eliminates the Need for Falsework over Highway 101	X	X	X	X	X	X
Prefabricated Superstructure Eliminates the Need for Falsework over Bayshore Rd	X	X	X	X		X
Structure Clear Spans Highway 101 (No Foundation Work Required in Hwy 101 Median)	X		X		X	X
Structure Clear Spans Highway 101 and East and West Bayshore Road (No Foundation Work Required in Hwy 101 or Hwy 101/Bayshore Rd Medians)		X		X		
Structural Form Provides a Unique Aesthetic to the Bay Area and Provides Visual Interest to both the Trail Users and Traveling Public			X		X	X
Top of Principal Span Structure is Located Below the Top of Tree Canopy Height (Roughly 35 feet or Less Above Highway 101)	X			X	X	X
Structural System can Support Widening the Pathway to 16 foot Clear Width (16' Clear Width Allows Separation of Bicyclists and Pedestrians)	X		X		X	X
Truss Elements are Inclined Away from the Pathway Providing Architectural Interest and a Wider Functional Pathway for Trail Users						X
Fabrication Facilities are Readily Available to Prefabricate the Principal Span Elements (Several Prefabricators can Product this Structure Type and Span Length)	X				X	
Span Length or Superstructure Complexity will Likely Require Fabrication at a Specialty Fabrication Facility		X	X	X		X
Significant and/or Complicated Field Splicing will be Required to Transport due to the Height, Width or Complexity of the Main Span Structure		X	X			X

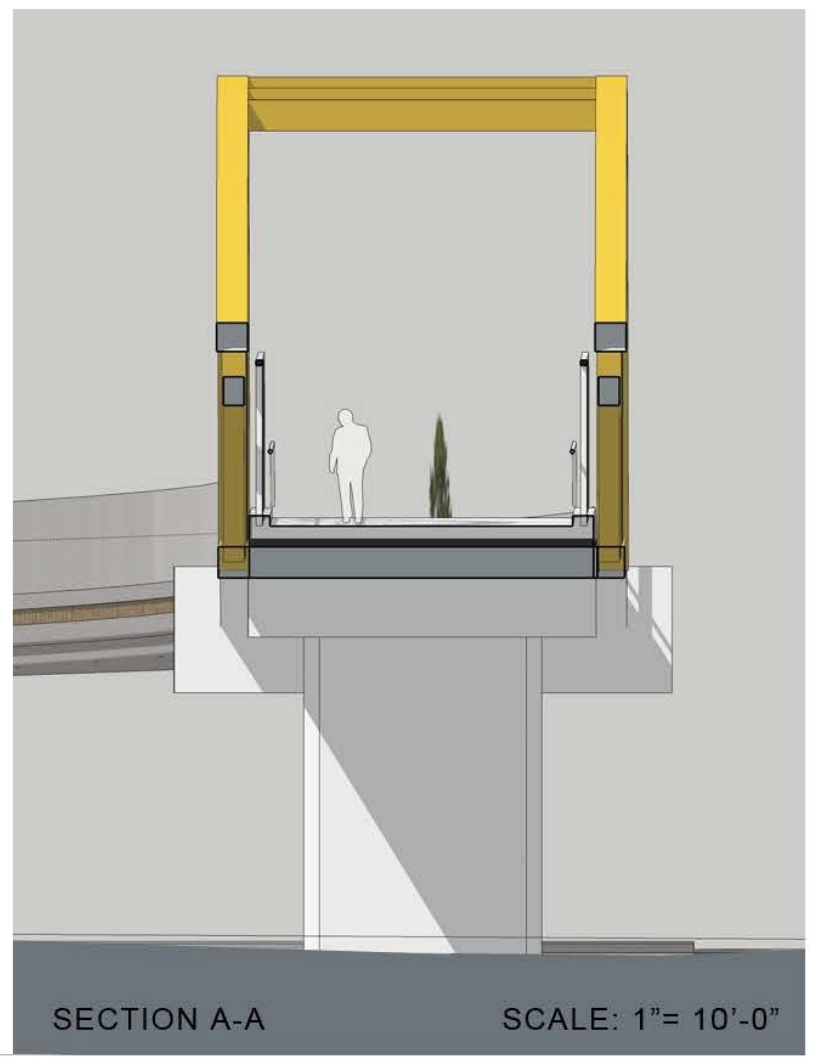
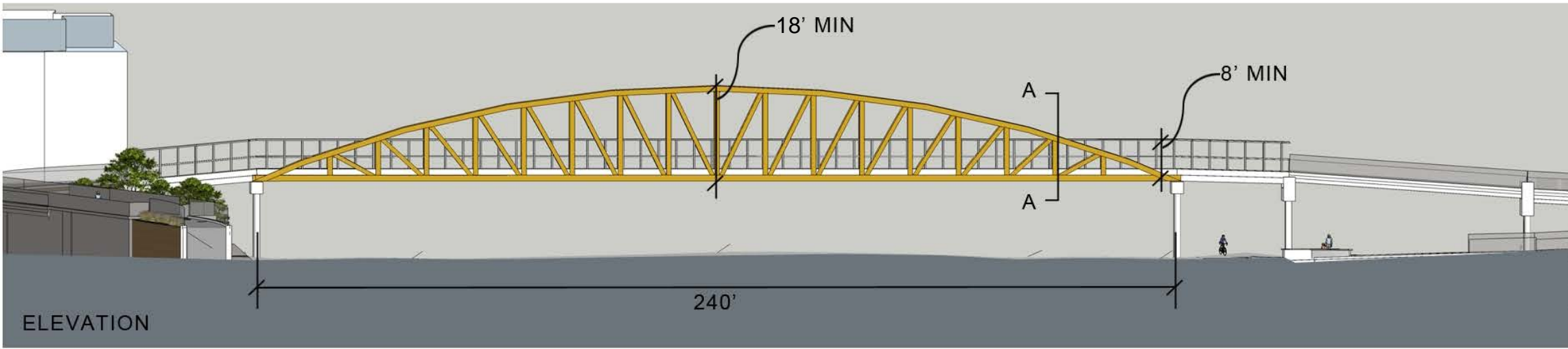
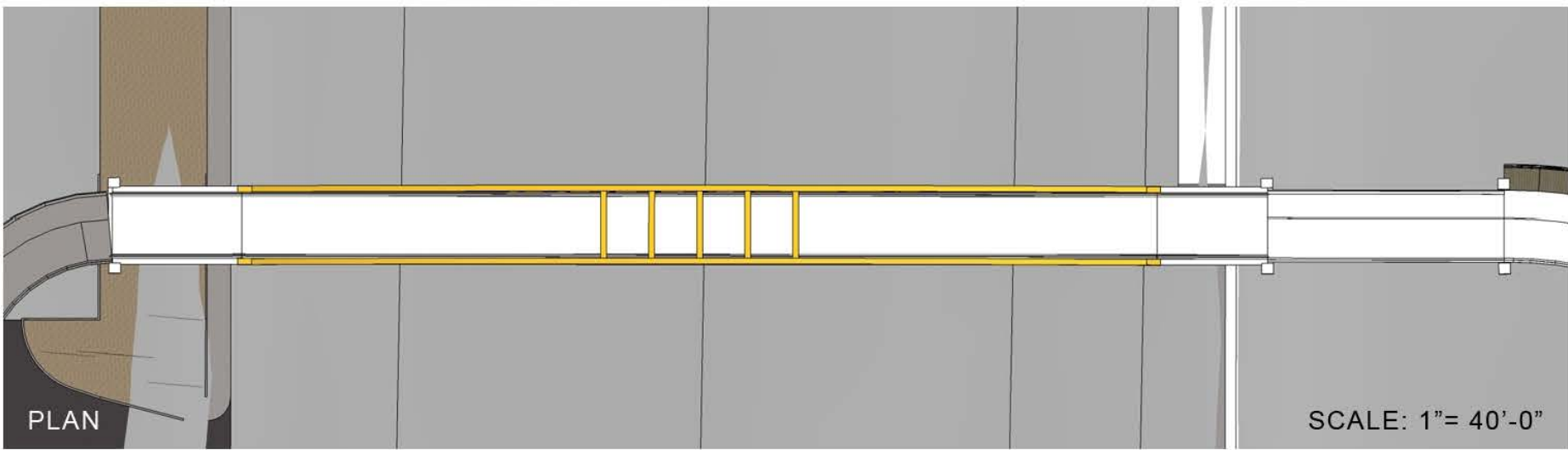
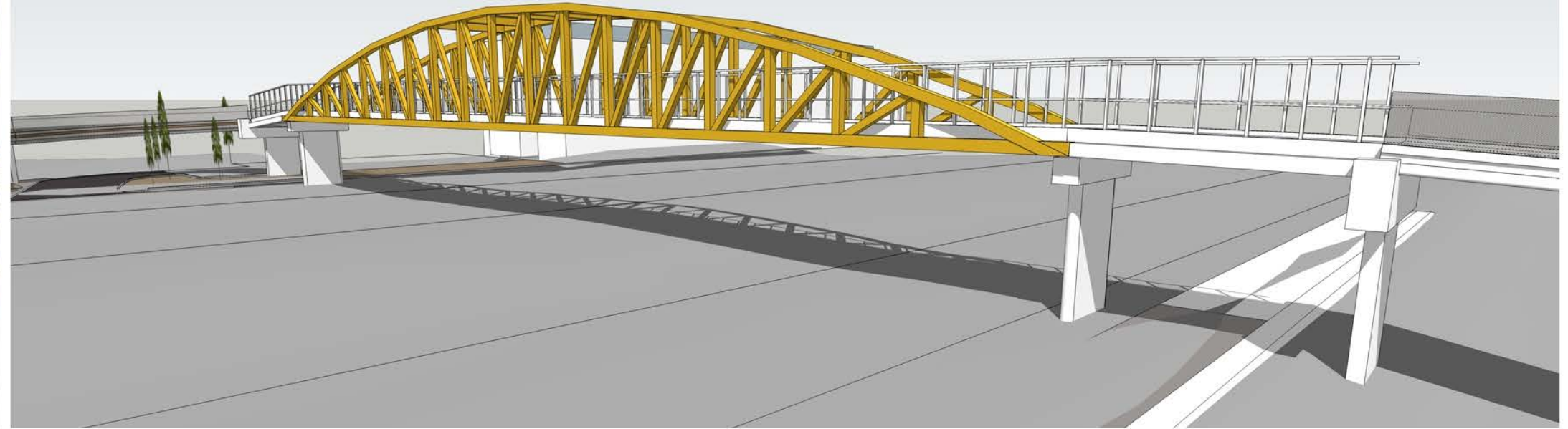


# BASELINE: PREFAB BOWSTRING TRUSS (THREE SPAN) BASELINE



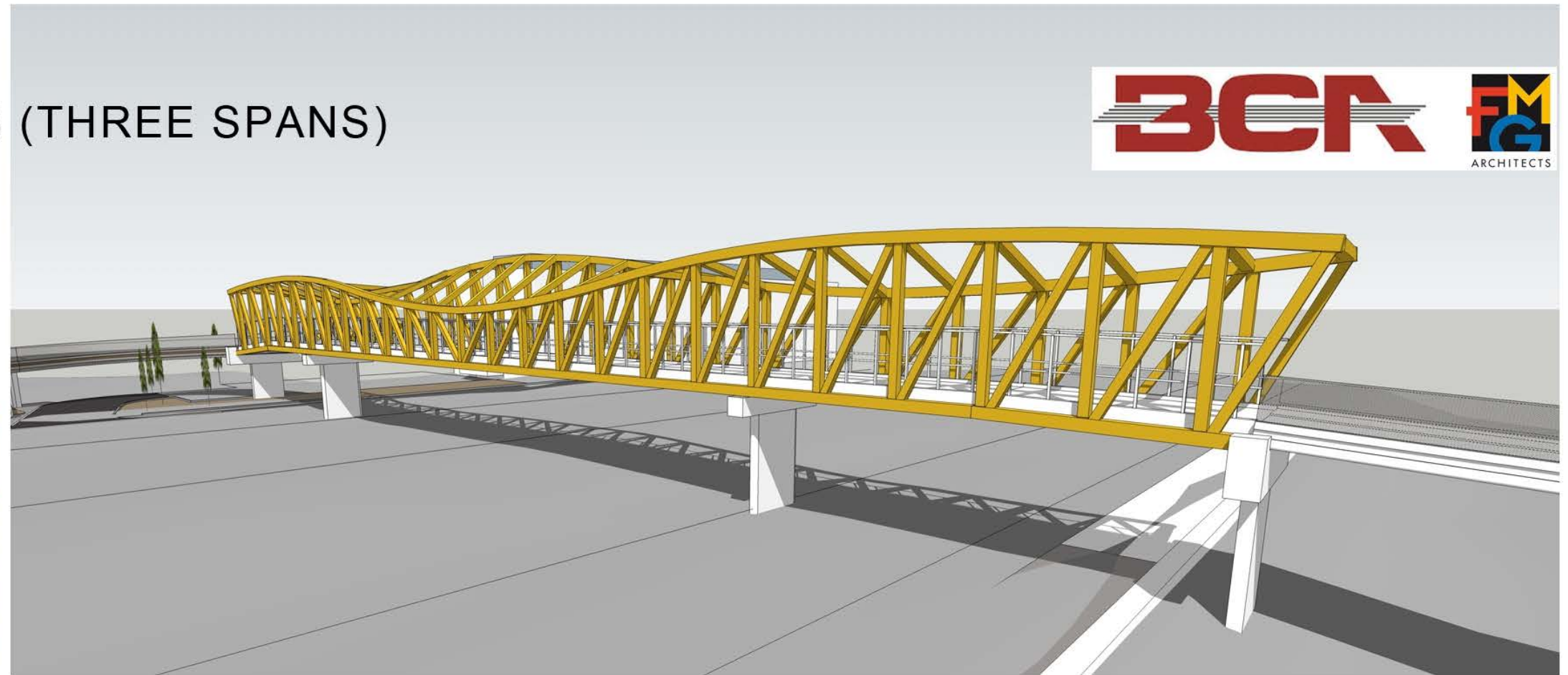


# 1. PREFAB BOWSTRING TRUSS (ONE SPAN)

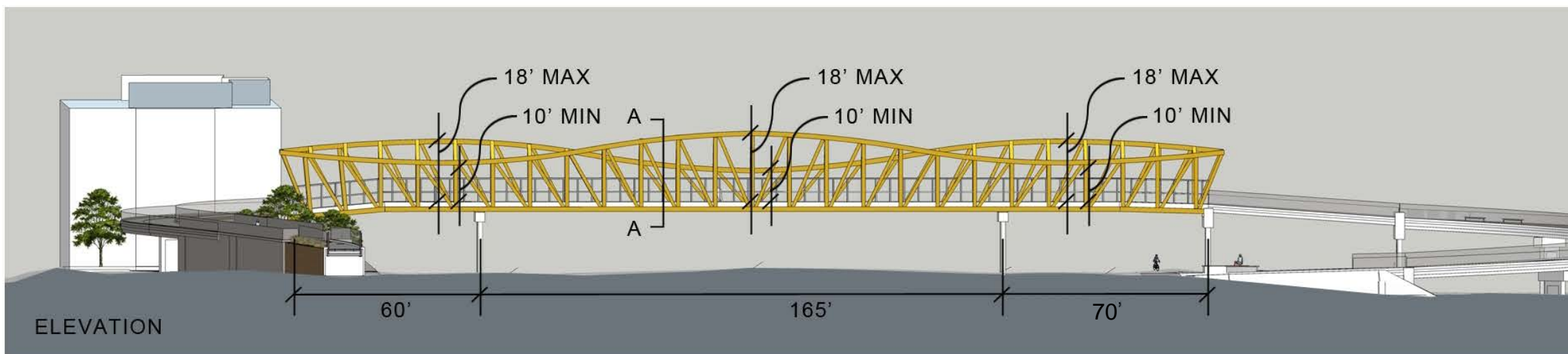
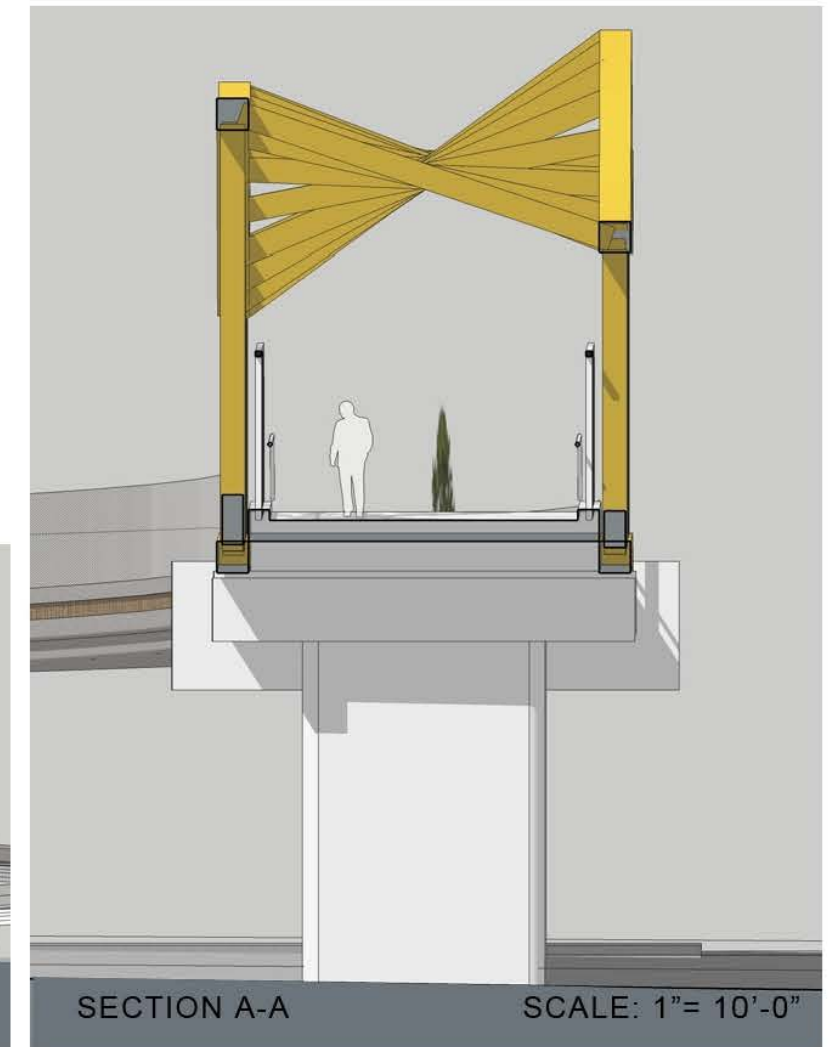
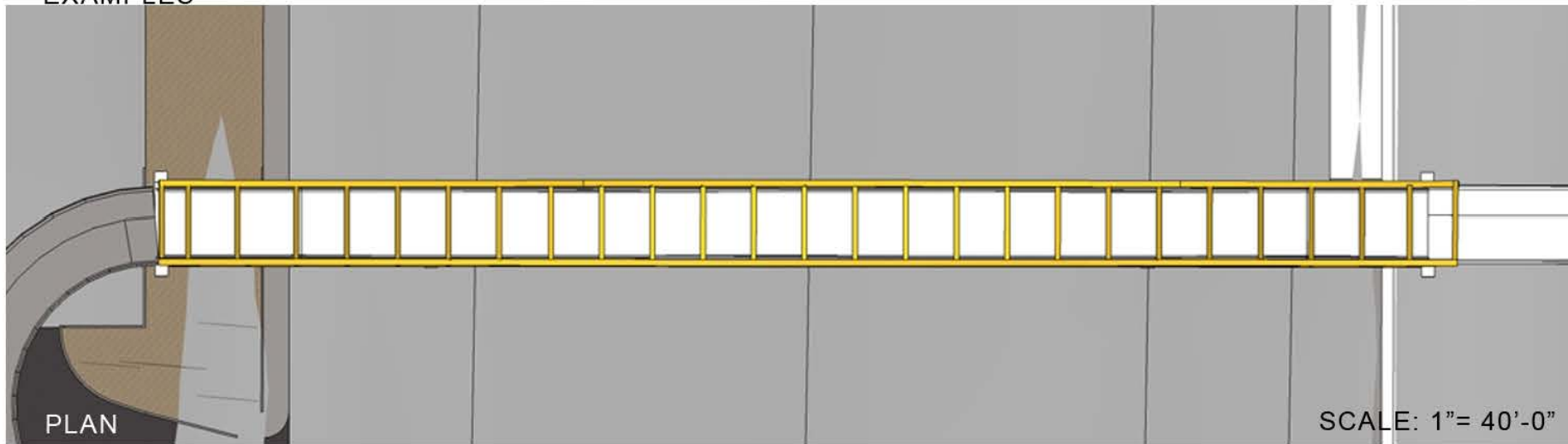




## 2. STEEL CLOSED TRUSS (THREE SPANS)



EXAMPLES

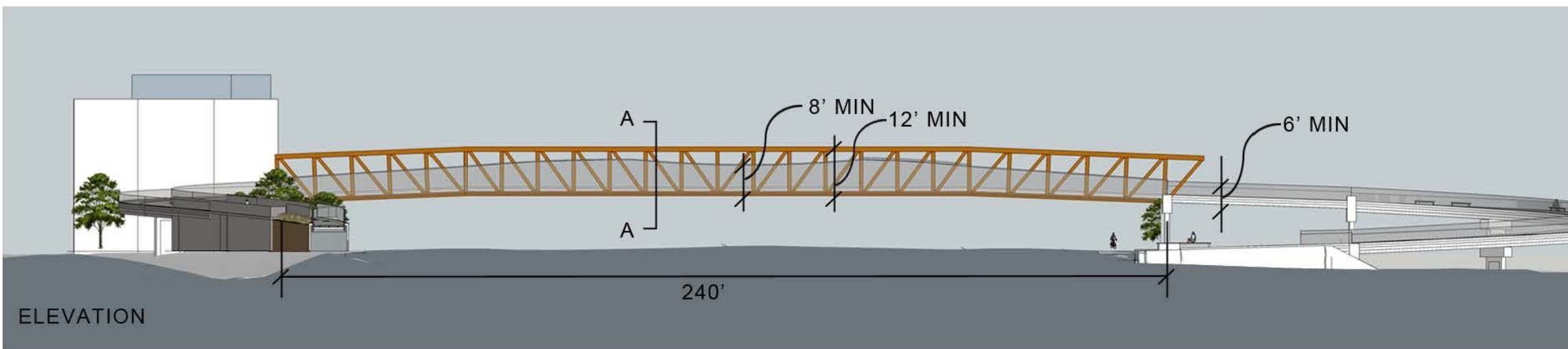
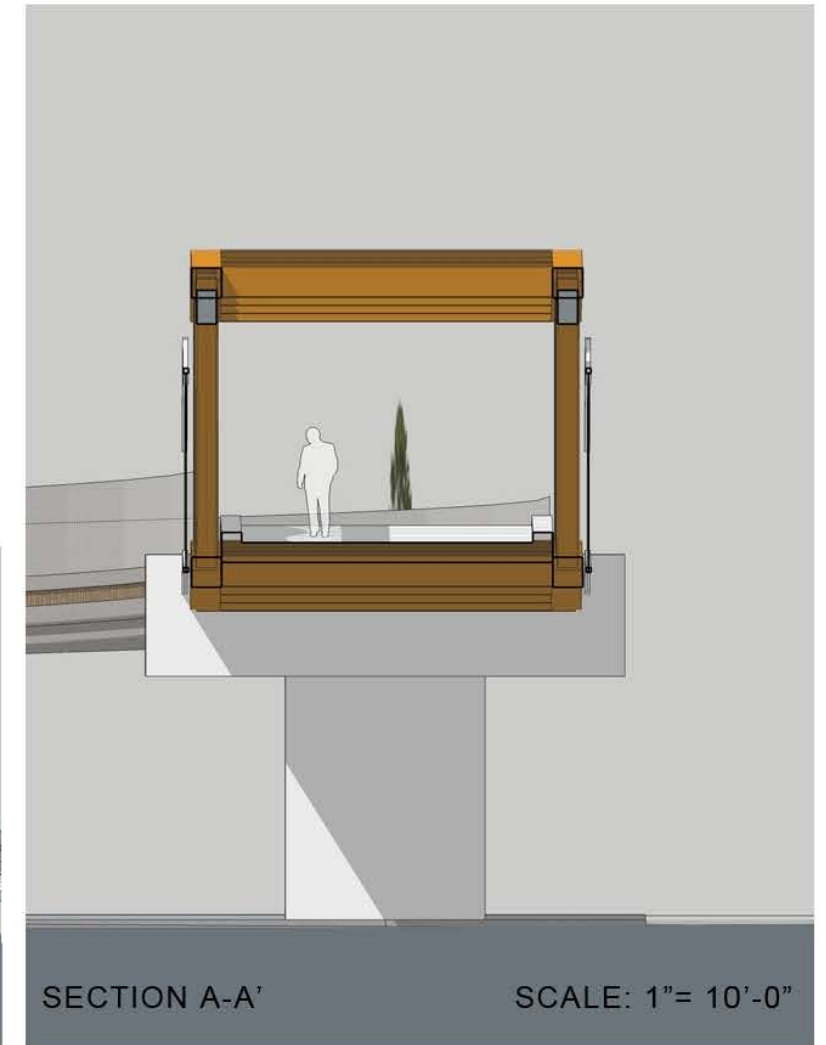
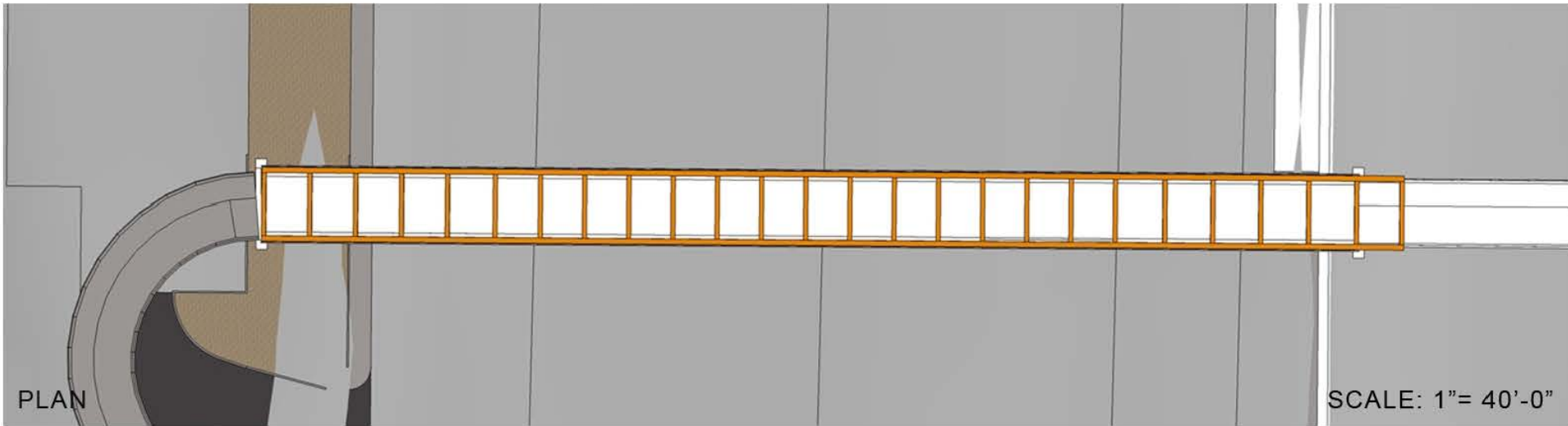




### 3. STEEL CLOSED TRUSS (ONE SPAN)

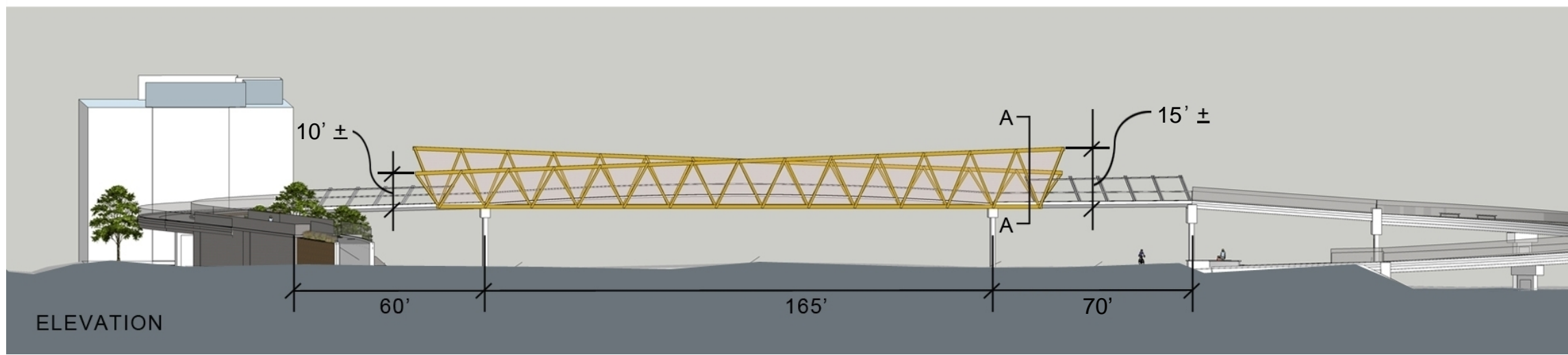
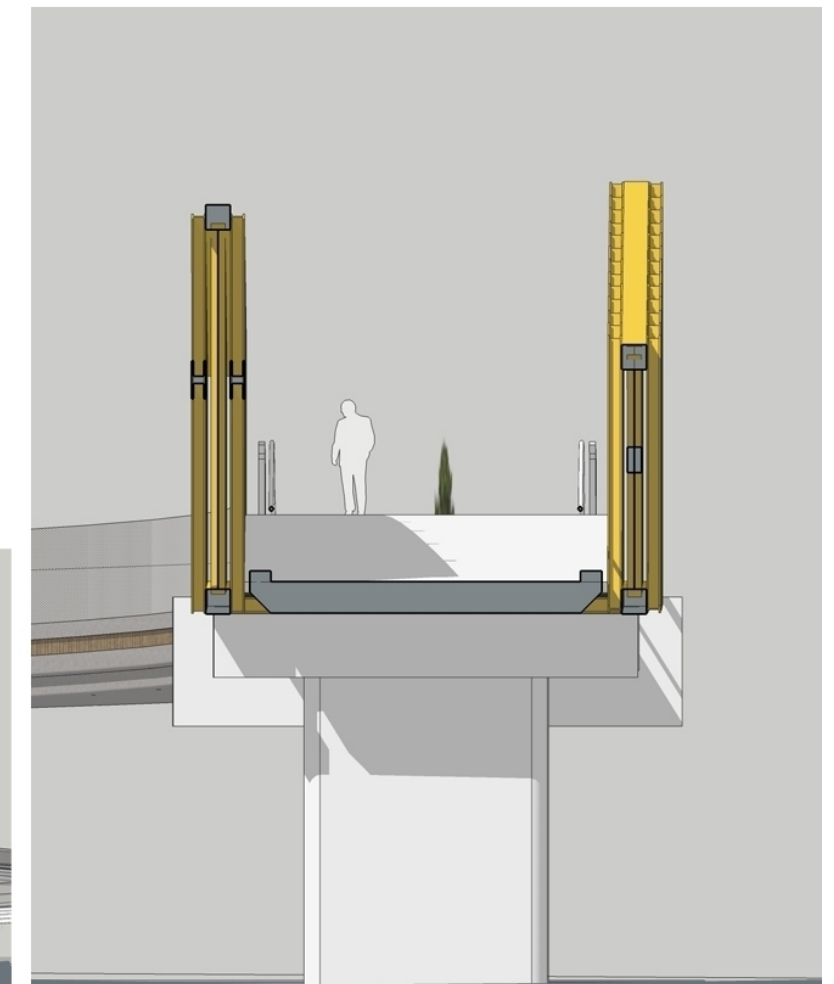
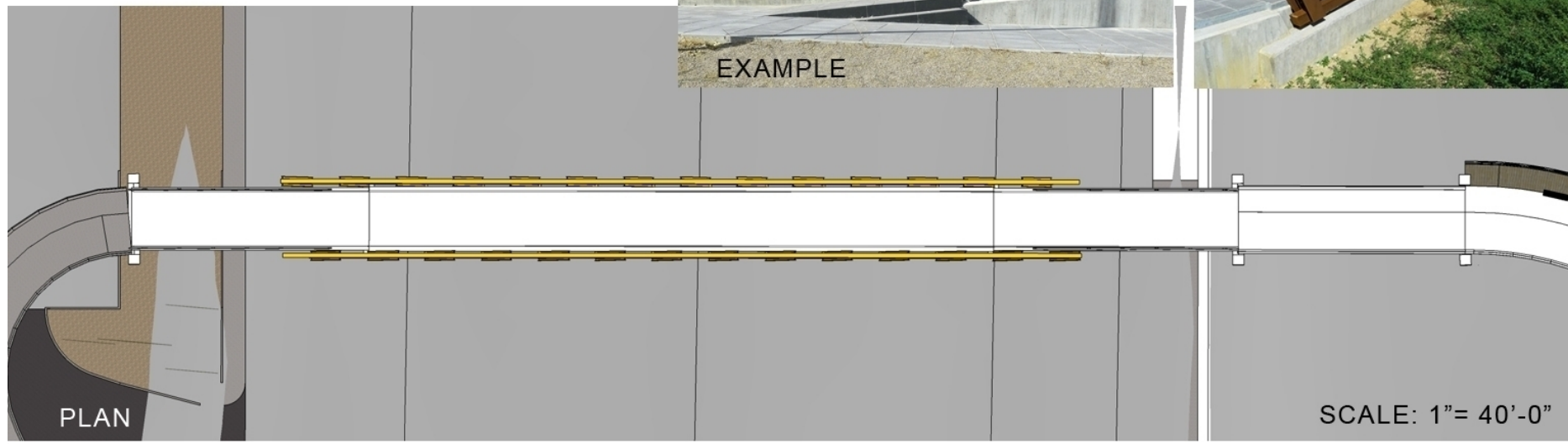


EXAMPLES



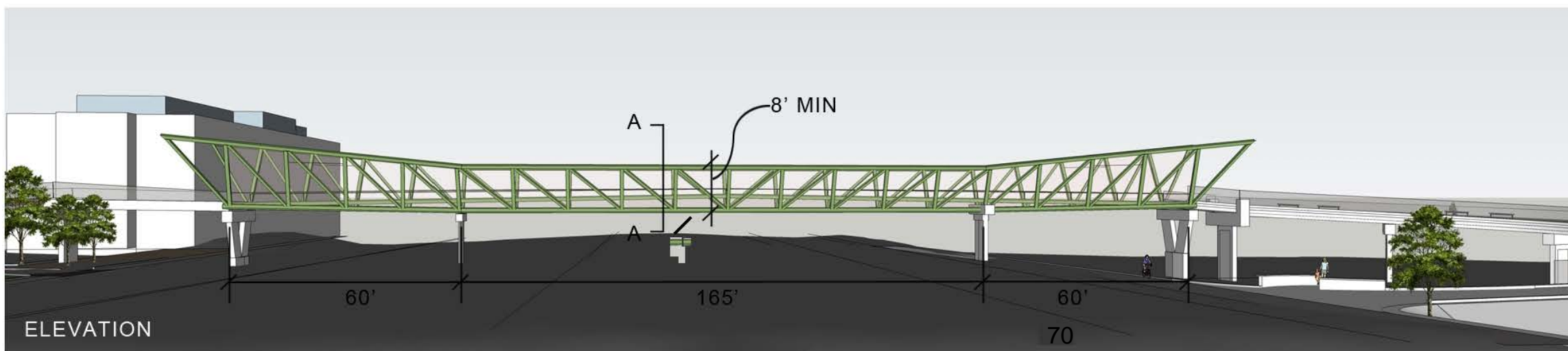
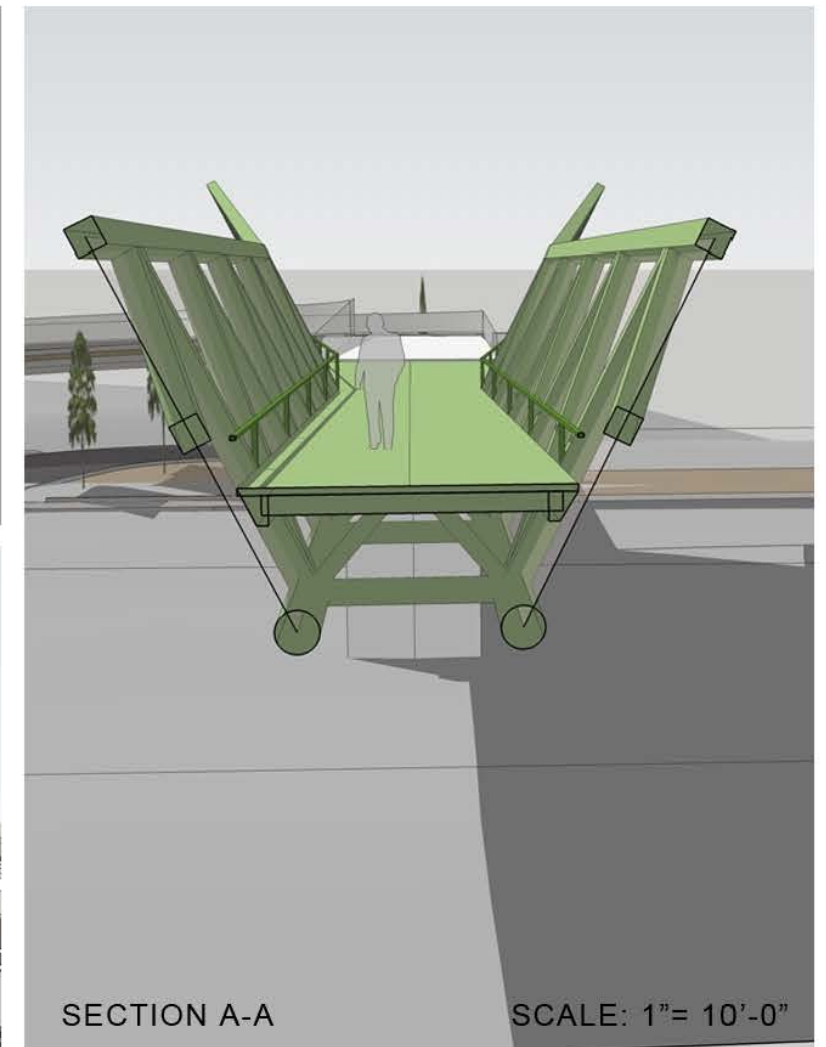
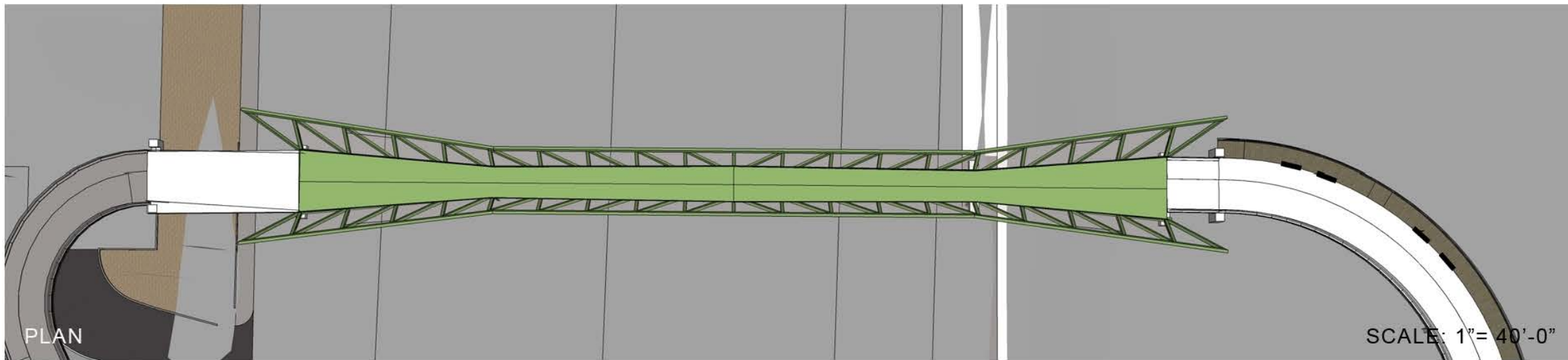
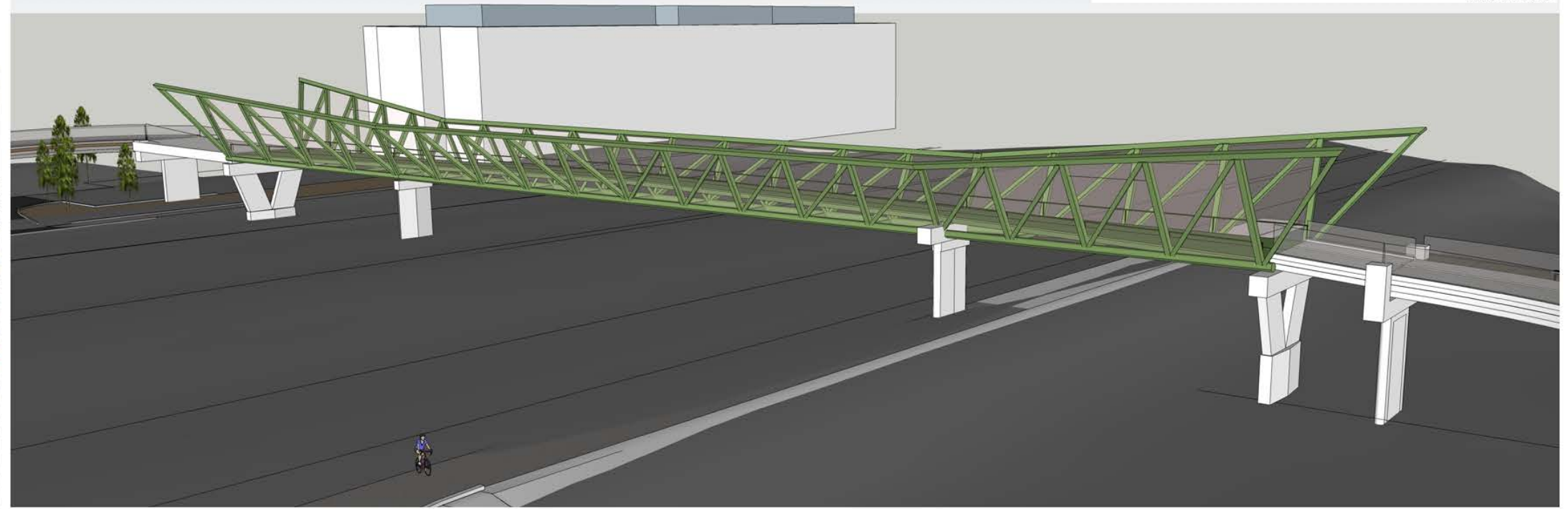


# 4. SLOPED OPEN TRUSS (THREE SPANS)

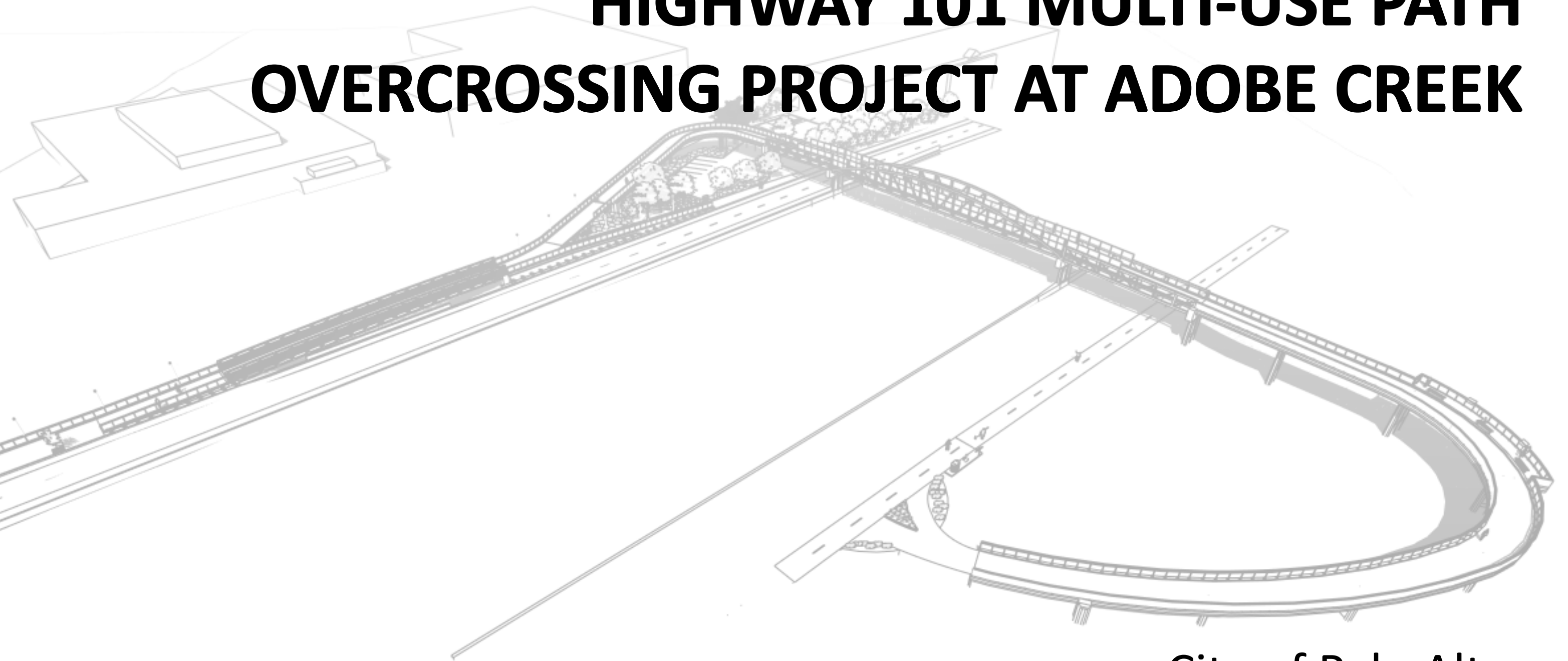




# 5. INCLINED U-FRAMED TRUSS (THREE SPANS)



# **HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK**



City of Palo Alto  
**Structure Clear Width Study**

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SCI	101			

REGISTERED CIVIL ENGINEER \_\_\_\_\_ DATE \_\_\_\_\_

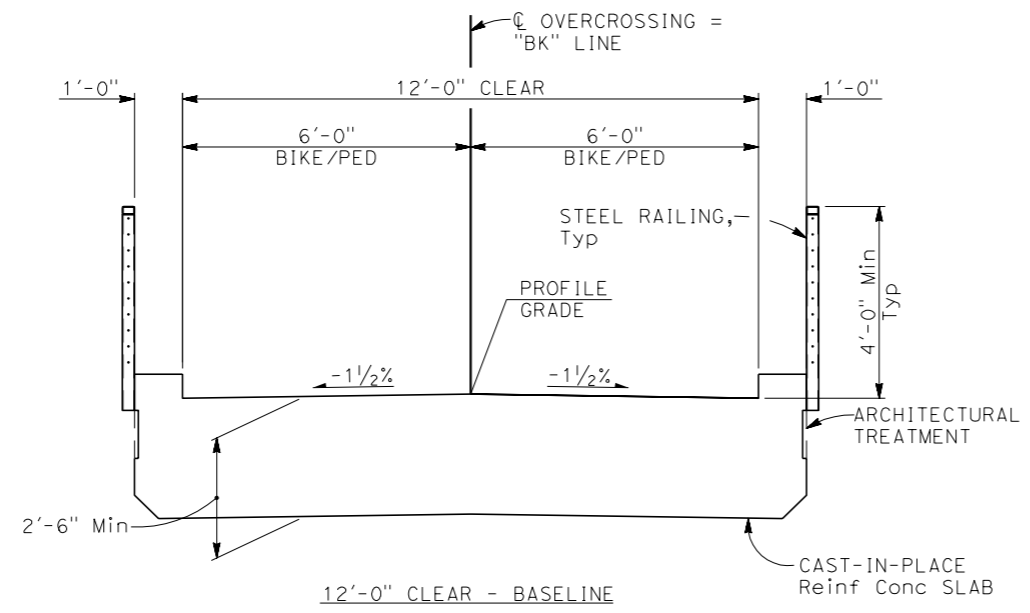
PLANS APPROVAL DATE \_\_\_\_\_

*The State of California or its officers or agents shall not be responsible for the accuracy or completeness of scanned copies of this plan sheet.*

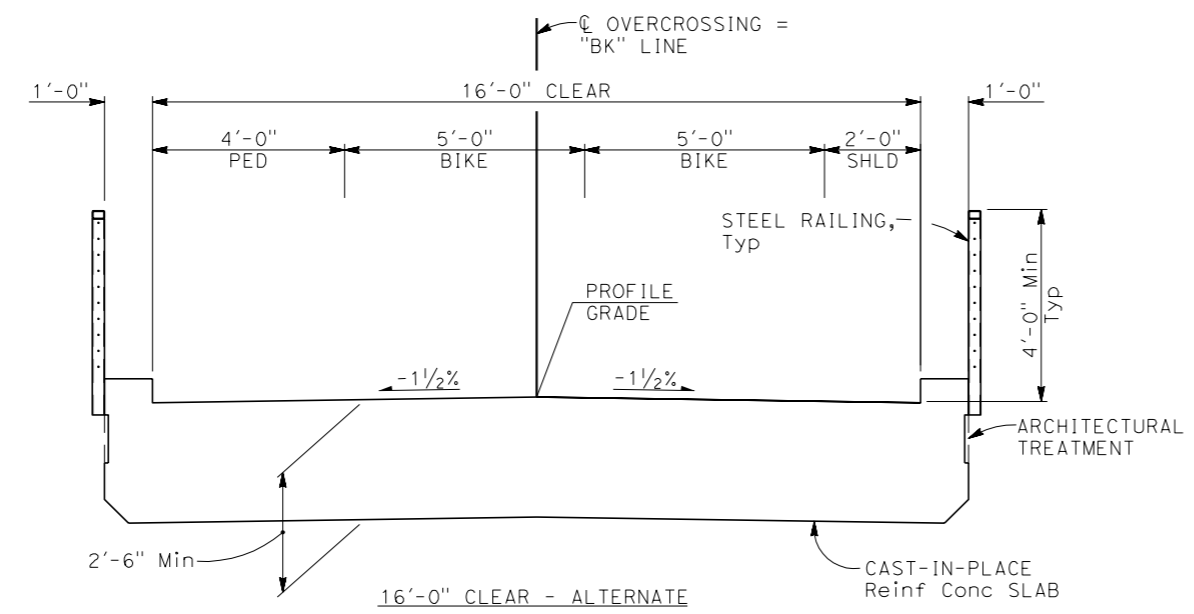


CITY OF PALO ALTO  
250 HAMILTON AVENUE  
PALO ALTO, CA 94301

BIGGS CARDOSA ASSOCIATES INC.  
865 THE ALAMEDA  
SAN JOSE, CALIFORNIA 95126



**TYPICAL SECTION A-A**  
1/2" = 1'-0"



**TYPICAL SECTION B-B**  
1/2" = 1'-0"

**NOTES:**

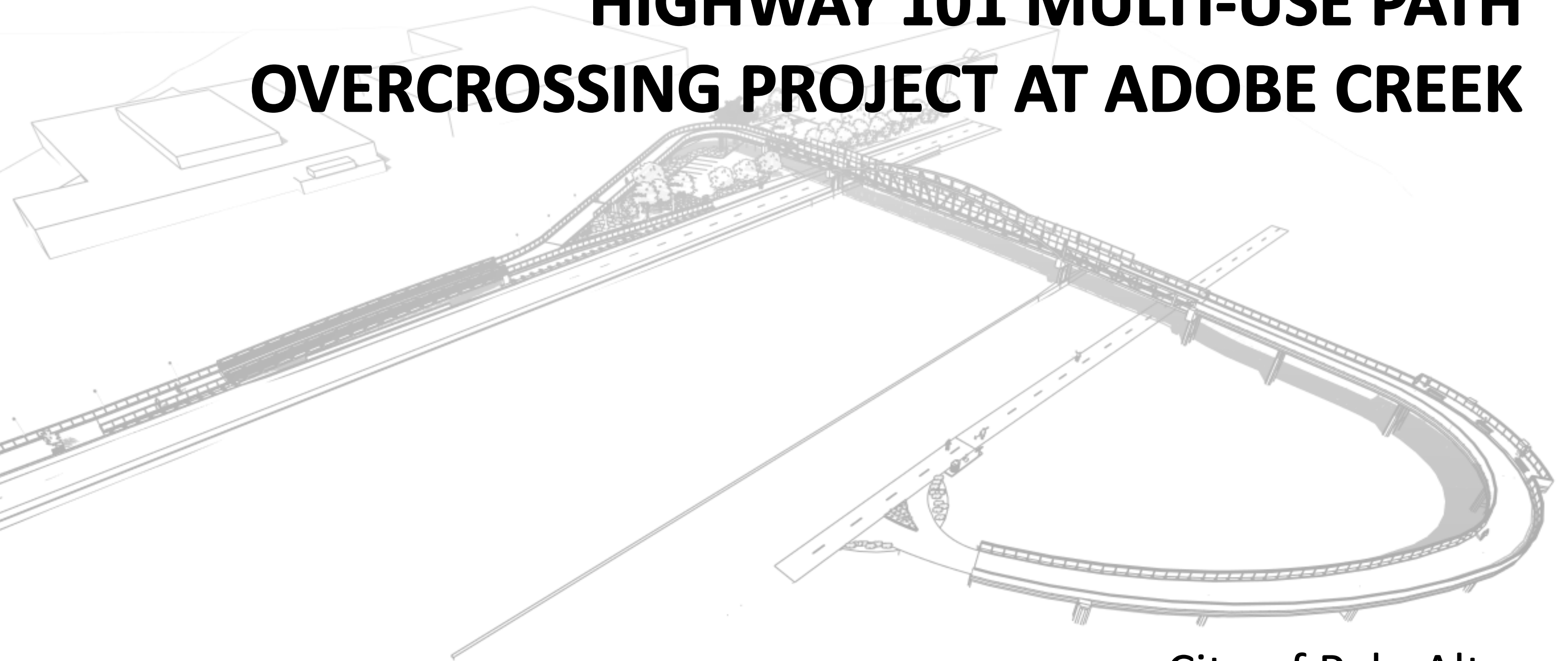
1. Typical baseline ramp structure shown.
2. Widened cross section not suitable for all principal span study options based on difficulties associated with transportation and on-site fabrication.
3. Widened cross section will impact SCVWD maintenance and debris removal operations at Adobe/Barron Creeks.
4. West approach structure cross section must be tapered to 12' max clear at trailhead to avoid impacts to the existing SCVWD maintenance ramp.
5. The widening of the path may not be able to be accommodated through the entire length for certain options. The cost impacts for this alternative will vary from approximately \$2,000,000 to \$3,000,000.

PLAN CHECK SET/NOT FOR CONSTRUCTION (9/28/16)

DESIGN OVERSIGHT SIGN OFF DATE	DESIGN BY D. ROSELLINI CHECKED	PREPARED FOR THE <b>STATE OF CALIFORNIA</b> DEPARTMENT OF TRANSPORTATION	BRIDGE NO.	<b>HWY 101 MULTI-USE PATH OVERCROSSING STRUCTURE CLEAR WIDTH STUDY</b>
	DETAILS BY D. ROSELLINI CHECKED		POST MILES	
	QUANTITIES BY D. ROSELLINI CHECKED			

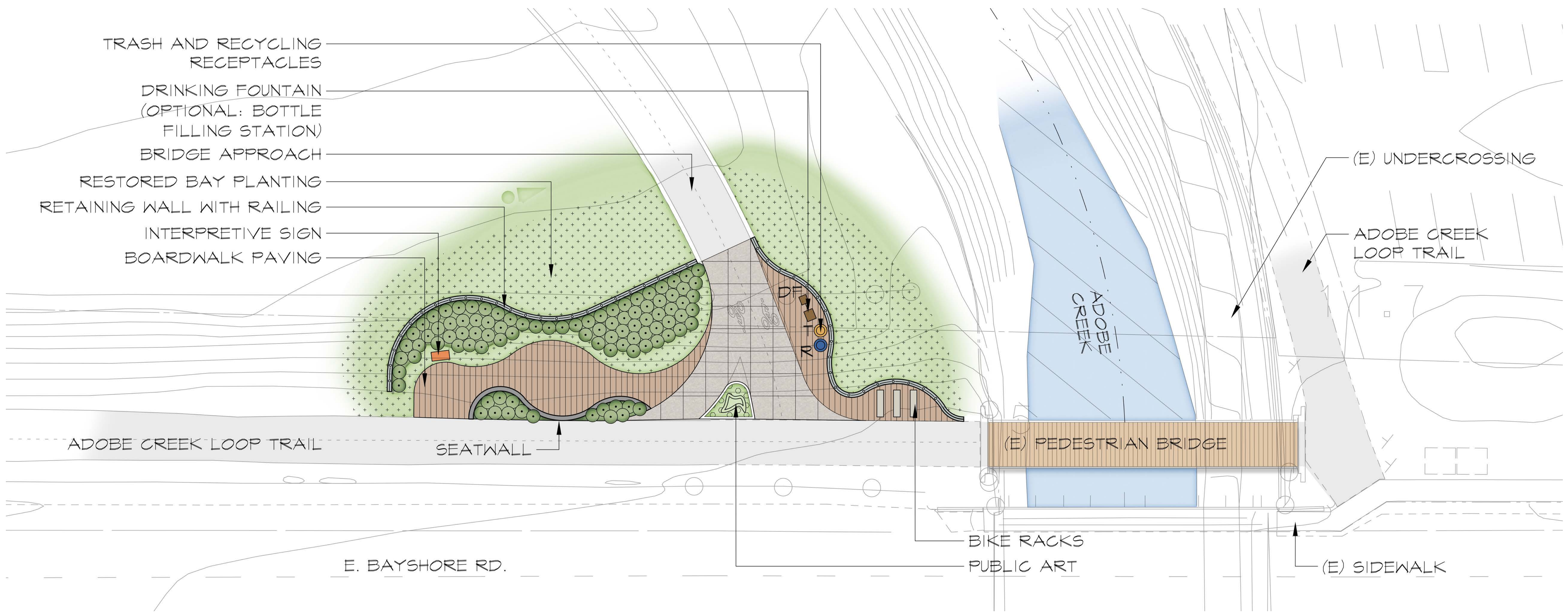


# **HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK**



City of Palo Alto  
Eastern Plaza





# EAST PLAZA

Highway 101 Multi-Use Path Overcrossing  
Palo Alto, California





**Decorative Concrete**



**Boardwalk Pavement**



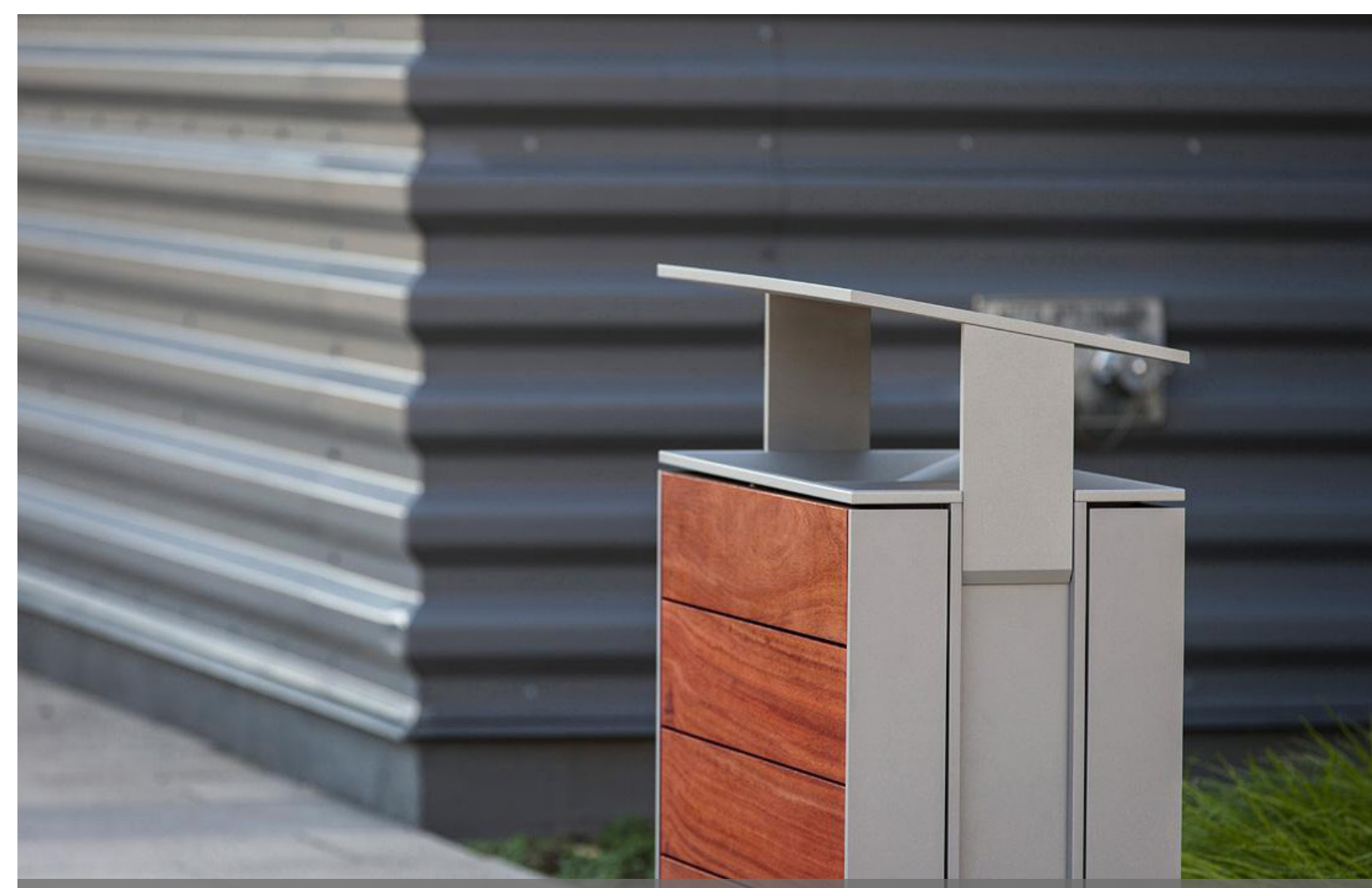
**Planting Bands**



**Bay Restoration Planting**



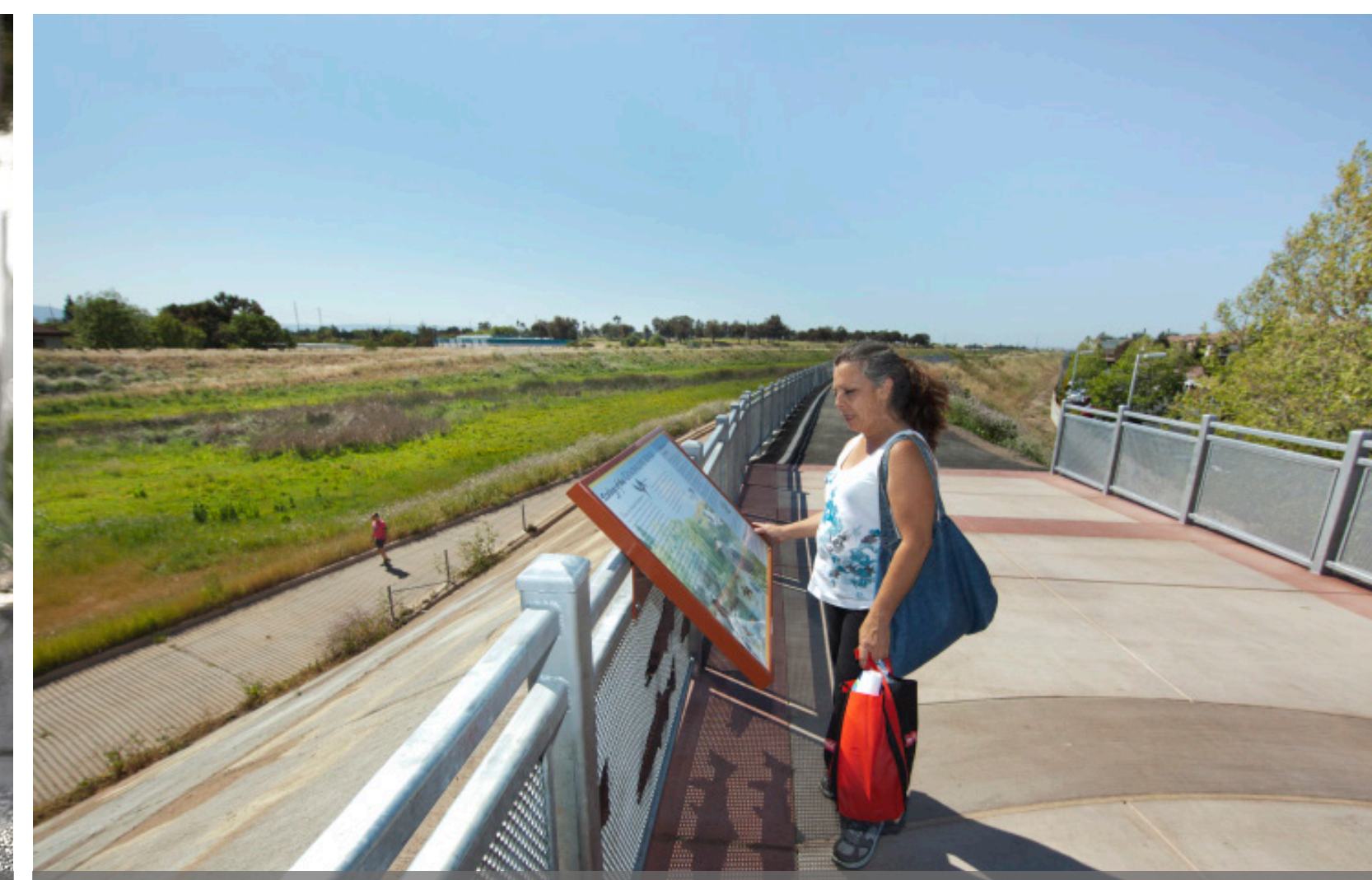
**Drinking Fountain/Bottle Filler**



**Trash/Recycling Receptacles**



**Bike Racks**



**Interpretive Signage**



**Public Art at Trailhead**



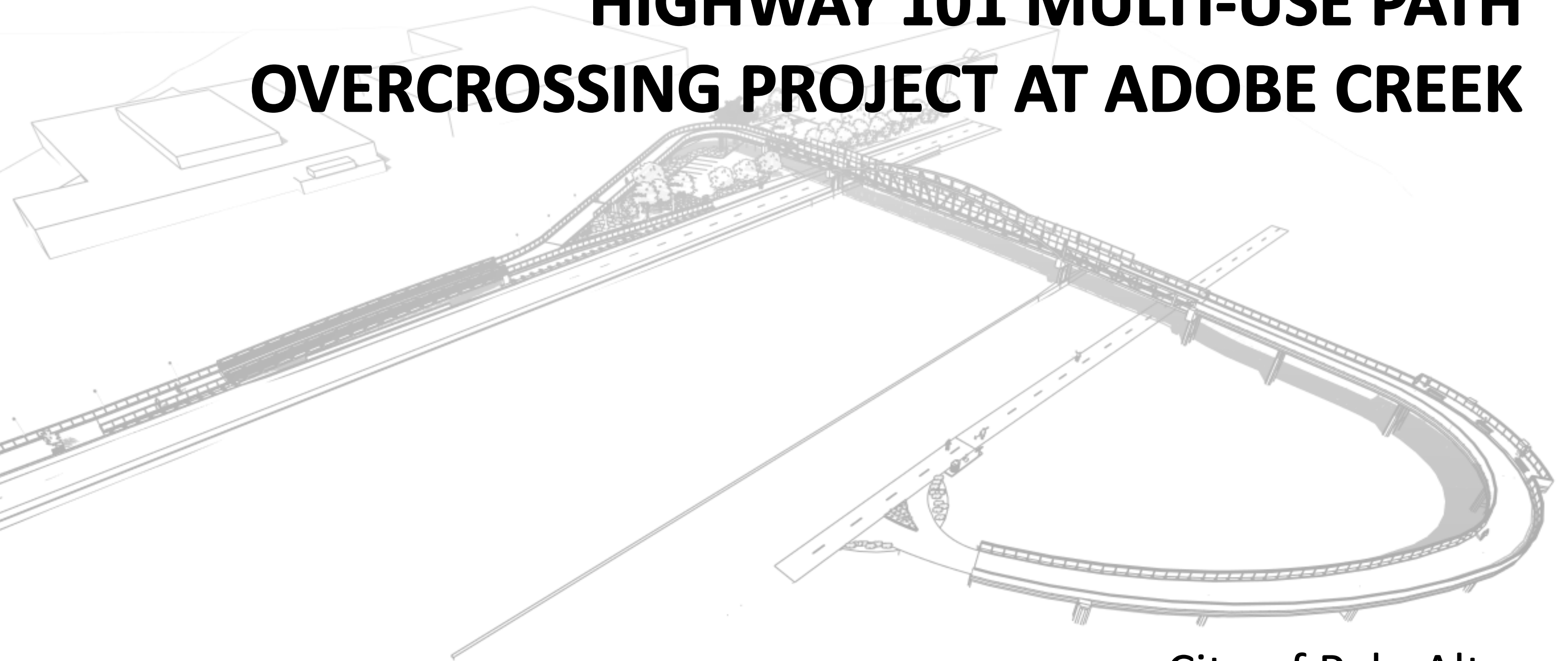
**Concrete Seatwall and Railing**

## CHARACTER IMAGES

Highway 101 Multi-Use Path Overcrossing  
Palo Alto, California



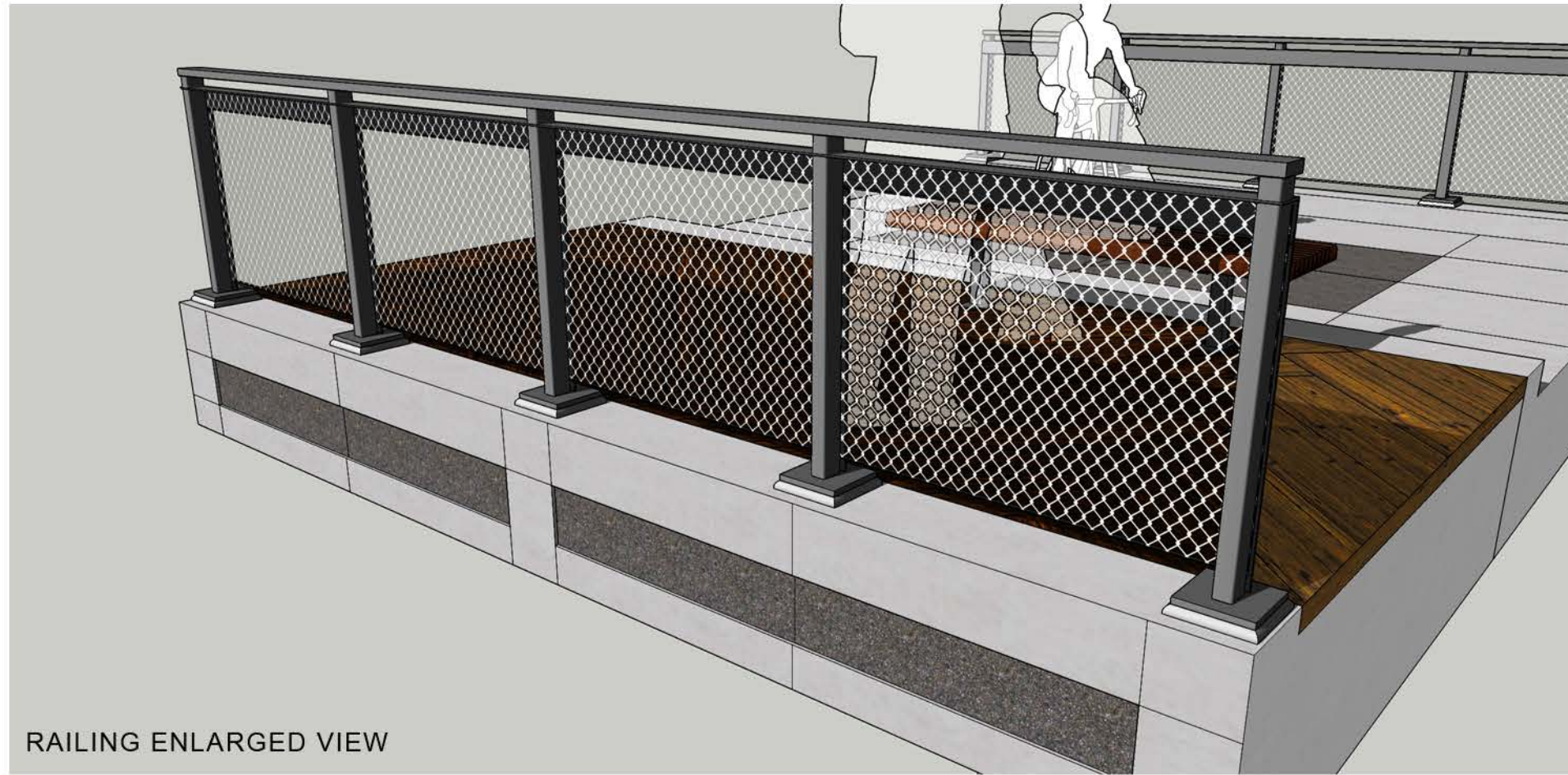
# **HIGHWAY 101 MULTI-USE PATH OVERCROSSING PROJECT AT ADOBE CREEK**



City of Palo Alto  
**Enhanced Railing Design**



# BASELINE: TOP MOUNTED GALVANIZED POST WITH METAL CHAIN LINK



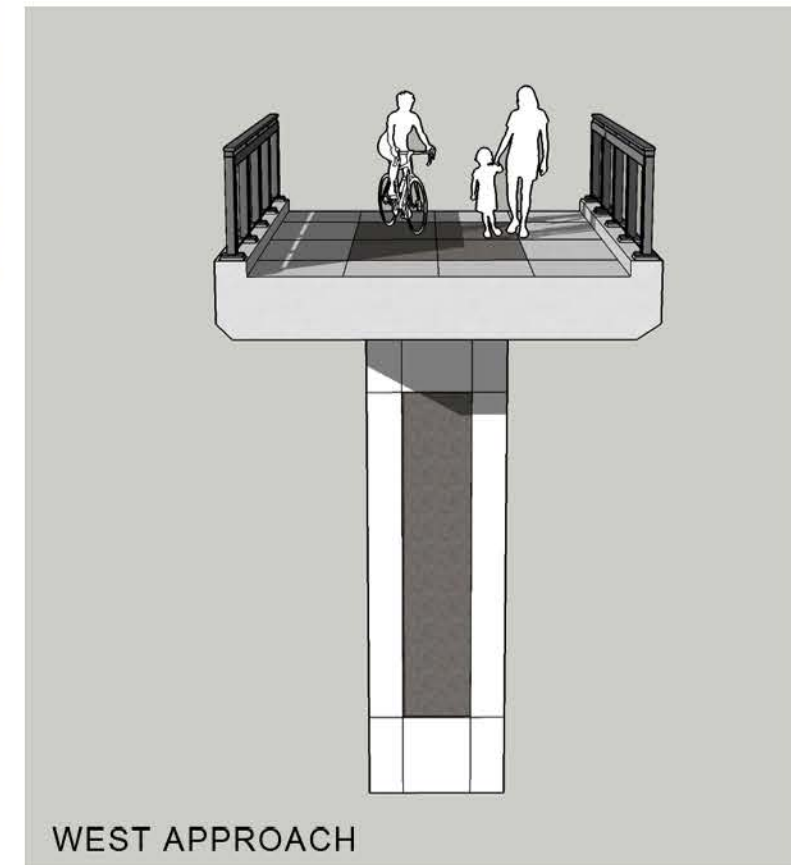
RAILING ENLARGED VIEW



EAST APPROACH



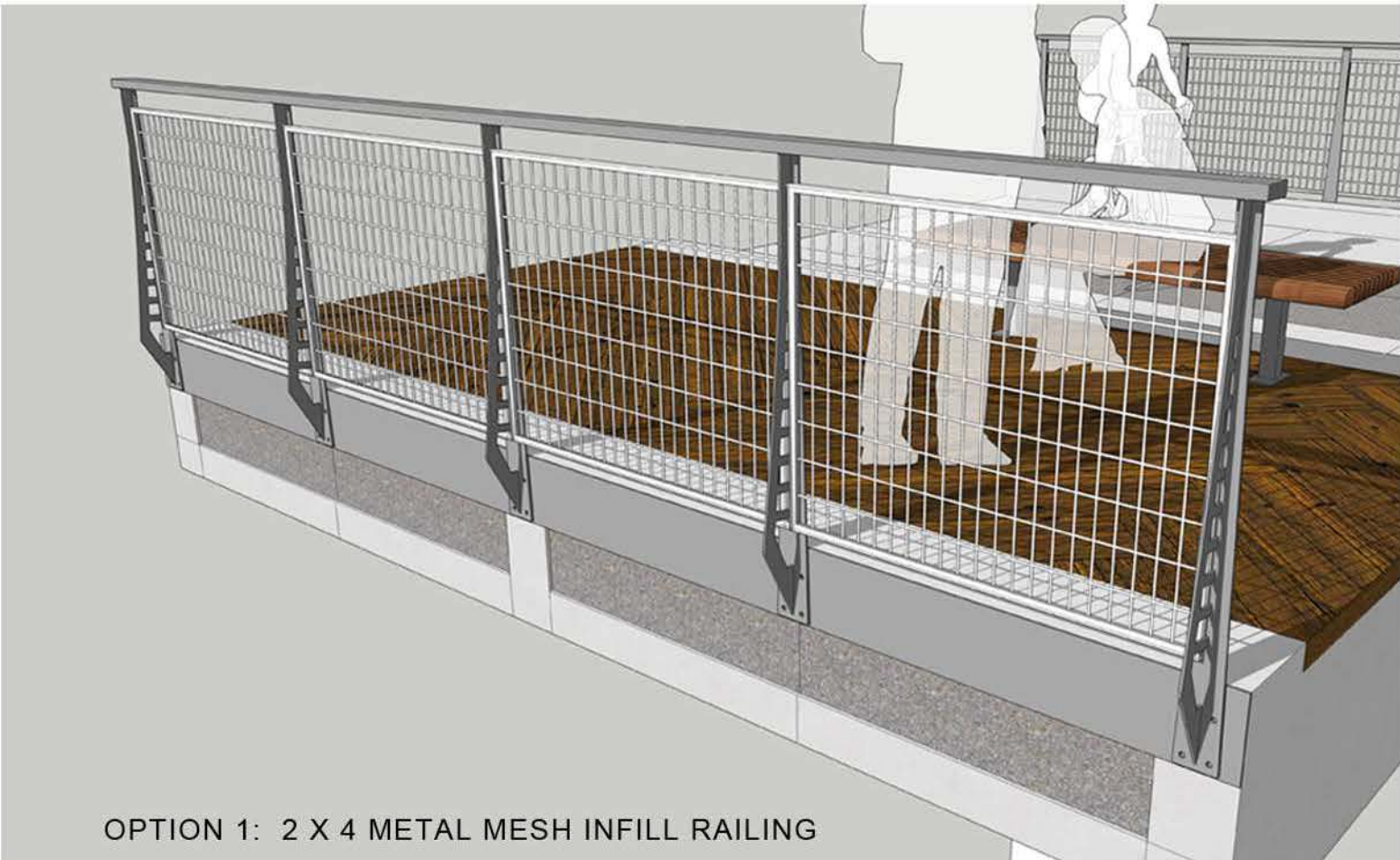
1" X 1" CHAIN LINK FENCE ATTACHED ON STRUCTURE MEMBERS



WEST APPROACH



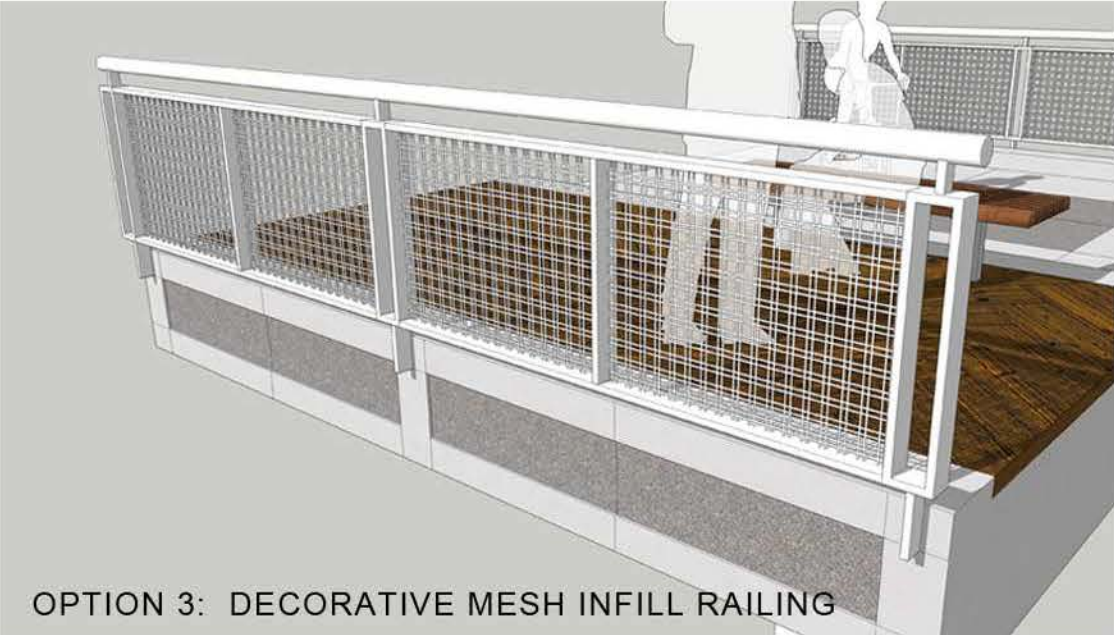
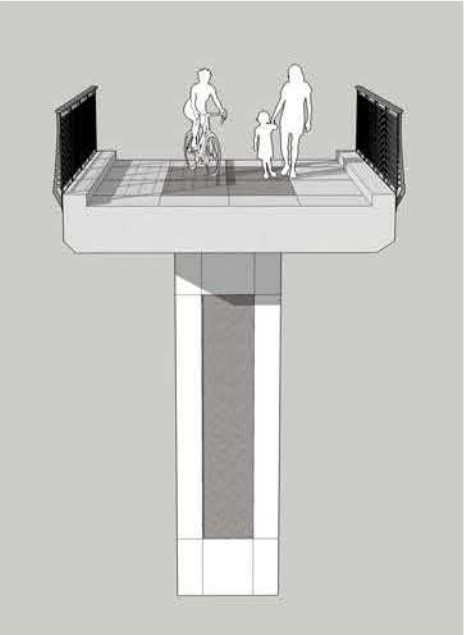
# ENHANCED RAILING OPTIONS



OPTION 1: 2 X 4 METAL MESH INFILL RAILING



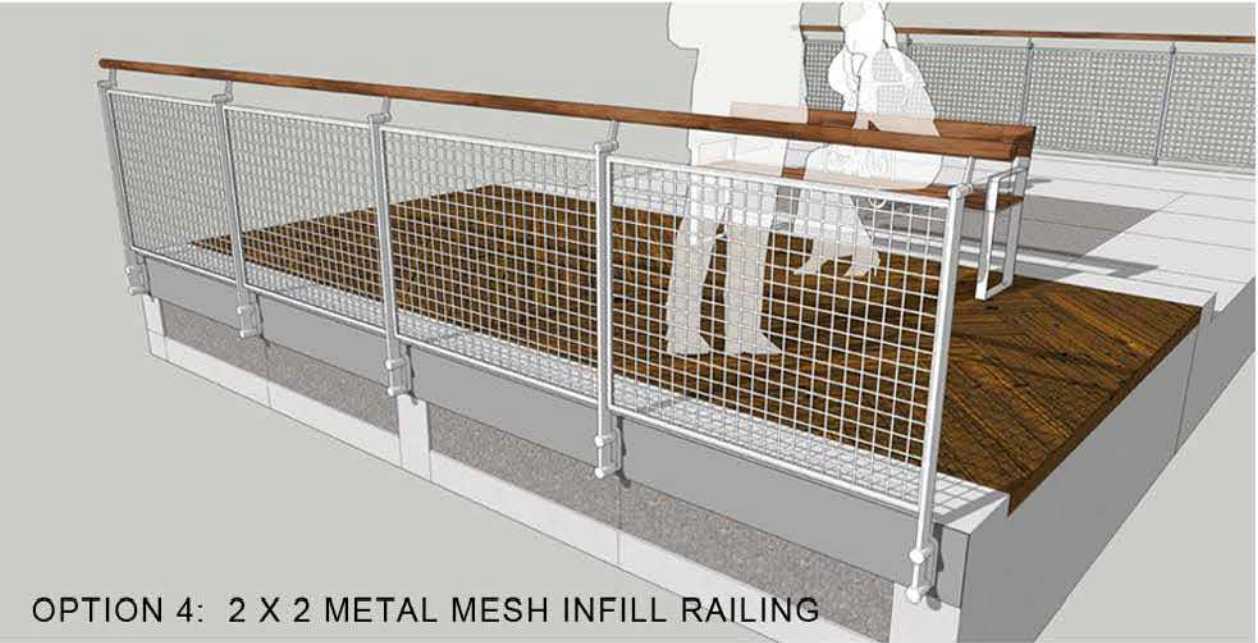
OPTION 2: CABLE RAILING



OPTION 3: DECORATIVE MESH INFILL RAILING



1" X 1" METAL MESH FENCE ATTACHED ON STRUCTURE MEMBERS



OPTION 4: 2 X 2 METAL MESH INFILL RAILING