



**DRAFT**

**Potrero Canyon  
Pedestrian Crossing  
Feasibility Study**

**Technical  
Memorandum**



August 2, 2016

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## 1. Executive Summary

A pedestrian crossing from Potrero Canyon Park to Will Rogers State Beach is needed to provide safe access across Pacific Coast Highway (PCH). This feasibility study examines four alternatives: 1) extend Potrero Park trail to Temescal Canyon Road; 2) at-grade crossing of PCH; 3) underground crossing of PCH; and 4) bridge crossing of PCH, and focuses on factors such as cost, constructability, permitting, and agency review. The results of this study indicate that a bridge crossing may be most feasible based on the evaluation factors, most notably due to constructability and safety concerns.

The bridge would span from the Bathhouse at Will Rogers State Beach across the parking lot and across PCH, connecting on the north side of PCH to the pedestrian trail from Potrero Canyon Park. The bridge would meet the needs of park users and would need to meet the requirements of the California Department of Transportation (CalTrans) and the City of Los Angeles Department of Transportation (LADOT).

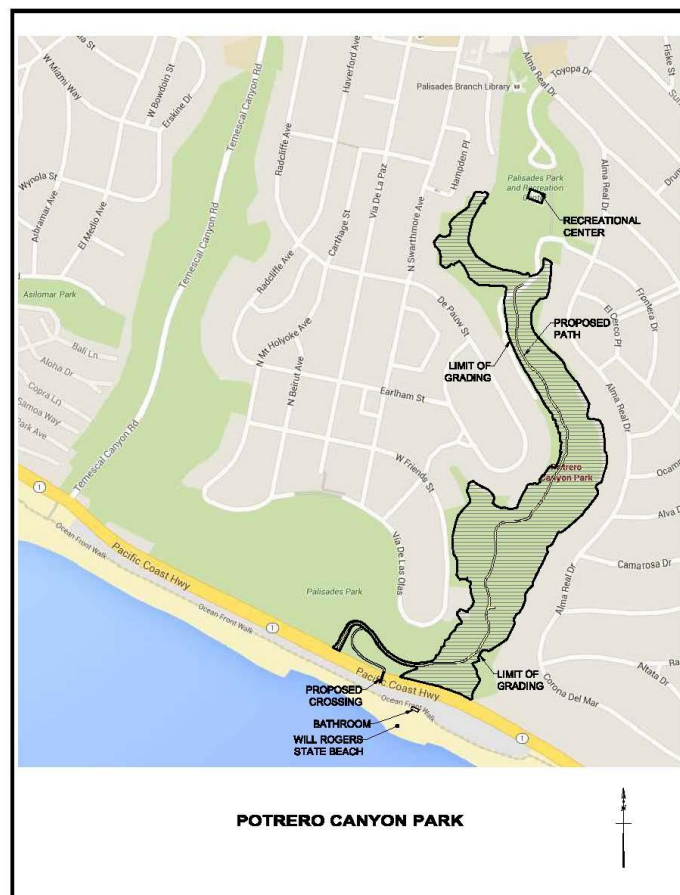


Figure 1. Potrero Canyon Park Vicinity Map

## 1.1. Introduction

The Potrero Canyon Project includes the development a nature park through grading, landscaping, and slope stabilization, stretching from the Palisades Park Recreation Center to PCH. The Park includes trails and riparian vegetation through a series of wetland basins. The park is intended to create permanent slope stabilization to an area having a history of landslides and is intended to protect homes located along the ridge of the canyon. As shown in Figure 1, the improvements to the canyon will be located within the canyon and areas adjacent to PCH.

Potrero Canyon Park is being developed under a permit from the California Coastal Commission. Due to the location of the path's southerly terminus from Potrero Park and the need to get users across PCH, the City of Los Angeles is in the process of determining the best path forward for connecting the proposed park to the beach. Special Condition 28 of the Coastal Development Permit requires that alternatives for a pedestrian crossing of PCH be evaluated.

## 1.2. Purpose/Method

The purpose of this Technical Memorandum (TM) is to evaluate alternatives based on selected criteria, to safely access Potrero Canyon Park from Will Rogers State Beach across PCH or vice versa. Currently, there is no direct access from Potrero Canyon Park to the beach. The only pedestrian and bike access from the park to the beach is to use a poorly graded trail along the north side of PCH to a signalized crossing at the Temescal Canyon Road intersection, which is located nearly ½ mile from the mouth of Potrero Canyon.

Each alternative was evaluated based on the following factors:

1. Traffic Impacts: While the Trail to Temescal Road option may avoid impacts to PCH by using an existing signalized crossing, there is temptation for pedestrians to unsafely short cut across PCH directly to the beach to avoid the ½ mile walk to Temescal Road. This has been a common occurrence in the existing condition. LADOT and CalTrans are averse to mid-block at-grade crossings due to safety concerns and permanent traffic impacts, and a subgrade culvert crossing has constructability concerns. The bridge option remains quite viable due to low traffic impacts.
2. Maintenance: In meetings with the City of Los Angeles, they have stated a preference for a low level of maintenance. The current at-grade crossing at Temescal Canyon Road or a new at-grade crossing provides the least maintenance relative to the other two options. Electrical power, pumps, and piping would be necessary for the tunnel dewatering, thereby requiring a high level of maintenance. Bridges also require maintenance, especially in the coastal climate.
3. Connectivity: All three new crossing options meet the criteria of connecting Will Rogers State Beach to Potrero Canyon Park across PCH. The Temescal Canyon Road trail provides a connection, albeit circuitous.

4. Aesthetics: The main aesthetic impact for the at-grade crossing would be increased roadway signs and additional infrastructure on the highway. An underground tunnel is susceptible to graffiti and homeless encampments. The pedestrian bridge, although impactive to the viewshed, could be made architecturally pleasing with a facade highlighting the sense of place and the connection of the Park to the Beach. There are several options to improve the bridge's aesthetics; one example is iron wheels placed at the ramp entrances similar to the Baum Bridge ramp entrances located in Los Feliz.
5. Footprint Impact: The primary concerns are limiting the impact to PCH, the parking lot at Will Rogers State Beach, and minimizing exposure to the high tide line. An underground option would limit impacts to the parking lot and highway, but would face a challenge of mitigating flood and groundwater impacts. An at-grade crossing has potential to affect the parking lot count of the parking lot, and additional striping (along with signs) will need to be placed on the highway. With a 16-foot clearance, the bridge will have no impact to the highway, parking lot, or bike path. However, the ramps must remain away from the slope on the Potrero Canyon Park side, and must be able to fit within a small footprint west of the bathrooms at Will Rogers State Beach.
6. Security: The visibility that benefits security would be best with the at-grade and bridge options. The trail to Temescal could be made visible to the public with the improvements, but the underground crossing of PCH would pose visibility challenges.
7. Stakeholder Approval: LADOT and CalTrans will have safety concerns with an at-grade crossing between intersections on PCH. Approval is also unlikely for an underground structure requiring impacts to PCH and the maintenance of pumps in high groundwater. A bridge meeting height clearance, width, footprint impact, and ADA requirements, along with the trail to Temescal Road, are most likely to gain consensus. The Los Angeles County Beaches and Harbors has stated that no parking lot stalls can be impacted and the parking lot count must remain the same.
8. Right of Way (ROW): For the trail to Temescal Road, the right of way is available. For the three new PCH crossing alternatives, Caltrans would have to approve and allow encroachment. As the tunnel and bridge options require property owned by the County of Los Angeles on the Will Rogers State Beach, right of way or easements would have to be acquired from them.
9. Cost: Improving the trail to Temescal Canyon Road and using that existing crossing would have low capital costs. An at-grade crossing would also be a low cost option. The construction costs for a tunnel are predicted to be the highest, largely due to the need for retaining walls, highway impacts, traffic control, and utility conflicts. The bridge alternative has a cost estimate close to the tunnel, yet is still less than the tunnel because it has less below grade impacts.

Quantity take-offs and rough order of magnitude, preliminary opinion of probable construction costs (POPCC) for each alternative have been developed in Appendix A: Preliminary Opinion of Probable Construction Costs.

While there are additional factors in place, these are the primary factors in the determination of the best alternative to cross PCH. If situations change (funding restrictions, change of view from a stakeholder), then the factors should be revisited for further evaluation.

Research methods included speaking with stakeholders regarding impacts, site visits, collecting as-builts, reviewing overhead images, determining typical construction methods, reviewing design standards, and researching costs.

## 2. Crossing Overview

Four different crossings were identified: existing trail improvements, an at-grade crossing, an underground crossing, and a bridge crossing. These four options must safely connect pedestrians across PCH.

### 2.1. Improve the Existing Trail to Temescal Canyon Road

From Potrero Canyon Park, pedestrians must walk approximately 1/2 mile west, parallel to PCH on the north side, to an existing signalized crossing at an intersection at Temescal Canyon Road. This trail is a poorly graded existing path that joins the trail from Potrero Canyon Park. Portions of the trail are close to the ROW and there are no signs to guide pedestrians. The City would need to grade, fence, sign and maintain the path to provide proper safety and encourage its use. These improvements could be done in conjunction with one of the other alternatives.

**Cost: \$1,210,000 (See Appendix A, Option 1 for details)**



**Figure 2. Existing Trail to Temescal Canyon Road Layout**



## 2.2. At-Grade Crossing

An at-grade crossing would be cost-effective and simple to implement; however, mid-block at-grade crossings are a safety concern. The crossing would need to begin near the parking lot bathrooms, cross the existing parking lot without compromising any existing parking, cross PCH at a perpendicular angle, and connect to Potrero Canyon Park through a graded path.

The Los Angeles County Beaches and Harbors has stated that no parking lot stalls can be impacted and the parking lot count must remain the same. Due to this restriction, the at-grade crossing cannot begin adjacent to the bathrooms but rather 125 feet west of the bathroom structure where there is a striped out area with no existing parking stalls. However, an existing planter and guardrail would need to be removed to provide an unencumbered passage to PCH.

An at-grade highway crossing would include full overhead traffic signals, flashing warning lights, possibly at-grade flashing lights at the crosswalk, and advanced flashing warning signs. These lights would need to be installed because this crossing does not occur at an intersection or existing stop light. Approval of a crossing, not located at an intersection or adjacent to an existing crossing, would be difficult to obtain due to major concerns over pedestrian safety and traffic flow. Pedestrian studies from the City of Long Beach and the Florida Department of Transportation show higher accident and fatality rates amongst pedestrians at mid-block crossings versus crossing at an intersection. The policy of many jurisdictions in southern California requires the use of traffic signals for crossings at mid-block locations.

Once across the highway, the at-grade crossing will connect to the Potrero Canyon Park trail.

**Cost: \$792,000 (See Appendix A, Option 2 for details)**



**Figure 3. At-Grade Crossing Layout**

### 2.3. Underground Crossing

An underground crossing would consist of a 12 foot wide x 10 foot high precast concrete box running below PCH, perpendicular to the highway. It would extend from beyond the PCH northerly ROW, under PCH, under the Beach State Park parking, and below the bike path.

The tunnel would daylight to at-grade landings on both sides of the highway. On the south side, the tunnel would connect to the existing bathhouse paved area. On the north side, the tunnel would connect to the Potrero Park trail. Per ADA regulations, these connections would need to have a slope less than 8%, likely require intermediate landings, and likely require three railings: one on each side of the ramp and one in the center of the ramp. Furthermore, at-grade fencing and/or railings would need to be provided around the ramps for safety.

The concrete box crossing would have to be straight, and the floor would be approximately 20 feet below street grade. The top of the concrete tunnel would need to have a minimum clearance of 12" below all existing utilities. Since the exact horizontal and vertical location of the 8" gas, 30" sewer, and 30" water is unknown, potholing would be required prior to final design. It is possible the sewer line is lower than 9 feet below existing grade, which would require deepening of the tunnel.

Permanent pump stations (one at each end of the tunnel) will be required to pump out all ground and storm water in the tunnel. These pumps will have a significant impact on the maintenance costs to the City.



**Figure 4. Underground Crossing Layout**

Construction would be difficult, whether by jack and bore (due to high water table and non-cohesive soils) or by open cut and cover. It is highly unlikely that Caltrans would permit the disruption to highway traffic that cut and cover would require. The cut and cover model would require a segmented approach with lane closures in order to cut open the street and install the cast-in-place box through trenches. During construction, dewatering will be a major



consideration and likely require sump pumps to run nearly 24 hours a day since the bottom of the structure will be below sea level.

**Cost: \$6,137,000 (See Appendix A, Option 3 for details)**

## **2.4. Bridge Crossing**

A bridge over PCH is consistent with other crossings of PCH in adjacent Santa Monica, where pedestrians can access the beach via a pedestrian bridge over the highway. On the Will Rogers Beach side, the bridge would have a landing for a spiraling ramp adjacent to the parking lot bathrooms (bathhouse), elevate over the parking lot and highway, and connect to Potrero Canyon Park through a linear bridge ramp to join the park trail.

The nearby Los Angeles County Fire Department uses the Will Rogers State Park parking lot to conduct practice exercises and requires a minimum clearance of 16 feet. This minimal clearance will be provided across the parking lot and across PCH.

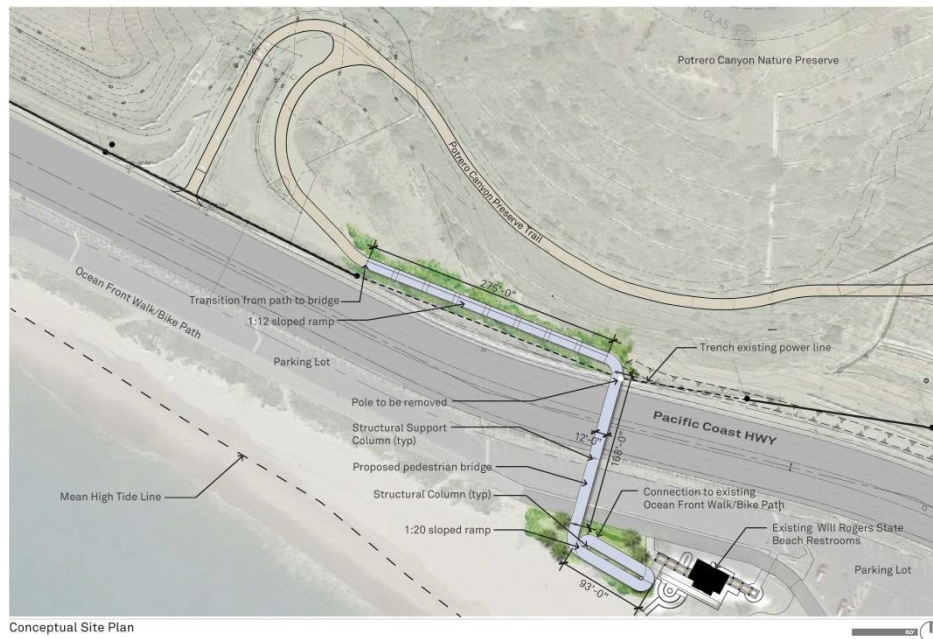
Supporting columns would be placed outside of the State highway's ROW where columns would be close enough to provide the maximum structural support while not infringing on traveled paths or parking lot spaces. In addition, the columns cannot impact the existing 8" gas and 30" sewer on the south side of PCH, and avoid the 30" water line on the north side of PCH. Since the exact horizontal and vertical location of the underground utilities is unknown, potholing would be required prior to column placement for final design.

There are above ground utilities on the north side of PCH currently identified as Time Warner Cable, Verizon, and LADWP power. The proposed bridge would be in conflict with these overhead lines, and they would likely require undergrounding between the two nearest poles.

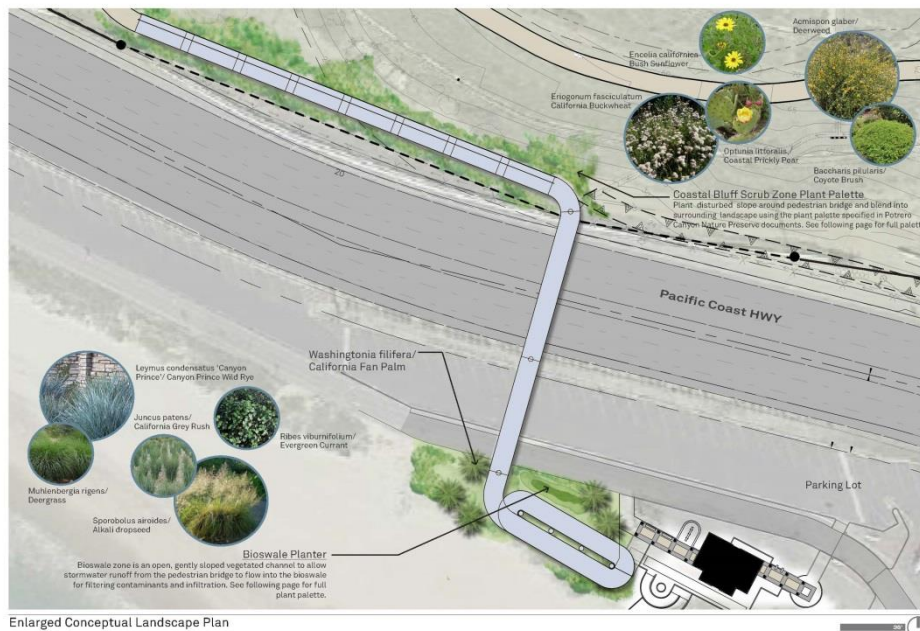
Protecting pedestrians is a primary concern on the bridge, and measures need to be implemented to avoid objects falling onto the highway. As such, a minimum 8-foot high fence needs to be constructed on the bridge and ramps.

A straight ramp running parallel to PCH needs to be placed on the Potrero Canyon side of the park, which will provide a connection from the bridge to the Park trail. Because of the history of landslides in the area, we have avoided using the slope to support the ramps. The ramp is placed 10 feet outside of the PCH ROW to minimize the length of bridge while allowing for maintenance on both sides of the ramp.

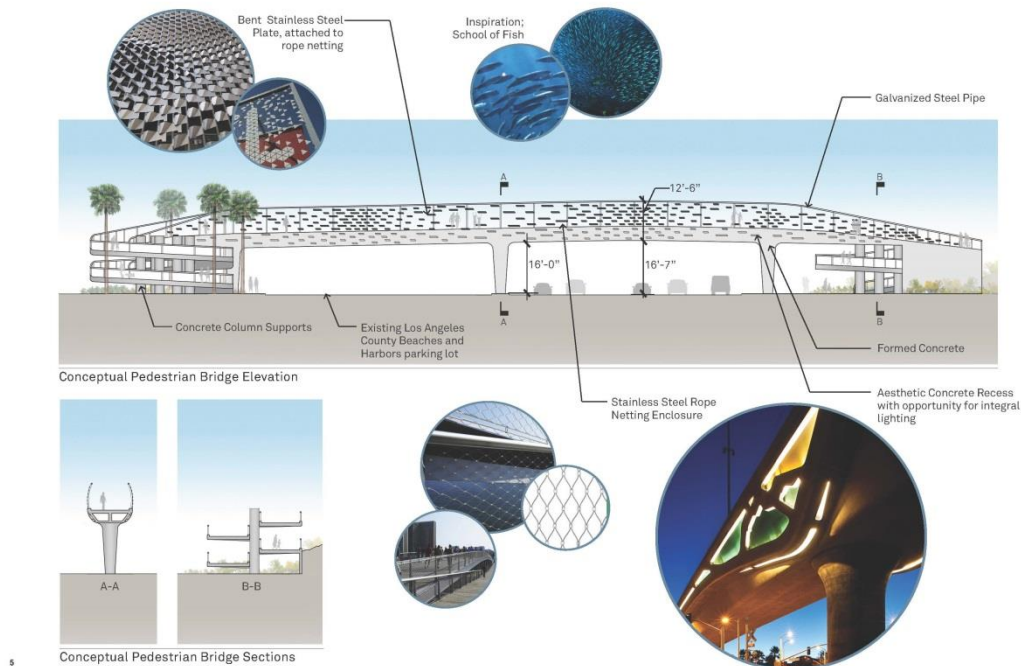
**Cost: \$4,538,000 (See Appendix A, Option 4 for details)**



**Figure 5. Bridge Crossing Layout**



**Figure 6. Landscaping Layout**



**Figure 7. Bridge Elevation and Finishes**

## 2.5. Alternatives Analysis Matrix

The matrix below presents a summary of the constraints and benefits of each alternative.

Alternative	Opinion of Costs	Disadvantages	Advantages
<b>Existing Crossing at Temescal Canyon Road (Section 2.1)</b>	<b>\$1,210,000</b>	<ul style="list-style-type: none"> <li>• Not a direct connection to the beach</li> <li>• Safety Concern - tempts unauthorized crossing of PCH and parking lot</li> <li>• Additional grading required</li> <li>• Security – less visible areas would need to be mitigated</li> </ul>	<ul style="list-style-type: none"> <li>• Low level of capital costs and maintenance</li> <li>• No additional traffic impacts</li> <li>• Positive visual improvement</li> <li>• Proper, existing signalized intersection</li> <li>• Closes gap for loop trail</li> <li>• Can be done in combination with other alternatives</li> </ul>

<b>At-Grade Crossing</b> (Section 2.2)	<b>\$792,000</b>	<ul style="list-style-type: none"> <li>• Safety concern for mid-block highway crossing</li> <li>• High impacts to permanent traffic</li> <li>• LADOT and CalTrans approval challenges</li> </ul>	<ul style="list-style-type: none"> <li>• Low construction cost</li> <li>• Low traffic impacts during construction</li> <li>• Provides direct at-grade connection to beach</li> <li>• Minimal ADA constraints</li> <li>• Avoids impacts to parking</li> </ul>
<b>Underground Crossing</b> (Section 2.3)	<b>\$6,137,000</b>	<ul style="list-style-type: none"> <li>• Costly construction</li> <li>• High maintenance</li> <li>• Major traffic impacts during cut and cover installation</li> <li>• Potential impacts to existing utilities</li> <li>• Safety and security in tunnel</li> <li>• Extensive ramp structures could impact the beach and/or parking</li> <li>• Potential for homeless encampments in the tunnel</li> <li>• Agency approvals could be difficult</li> </ul>	<ul style="list-style-type: none"> <li>• The permanent structure will have no impacts to traffic on PCH</li> <li>• Avoids impacts to the parking</li> <li>• Provides a grade - separated crossing</li> </ul>
<b>Bridge Crossing</b> (Section 2.4)	<b>\$4,538,000</b>	<ul style="list-style-type: none"> <li>• High level of cost and maintenance</li> <li>• Extensive ramp structures</li> <li>• Visual and beach park impacts</li> <li>• Requires relocation and/or undergrounding of LADWP power lines</li> </ul>	<ul style="list-style-type: none"> <li>• The permanent structure will have no impacts to traffic on PCH</li> <li>• Minimal impacts to beach parking lot</li> <li>• Provides a grade - separated crossing</li> <li>• Less maintenance costs than the proposed tunnel</li> <li>• Gives highest visibility to Potrero Canyon Park</li> <li>• High likelihood for stakeholder approval</li> </ul>

### **3. Permit Conditions for the Potrero Canyon Crossing**

This Section provides a general description of the permit requirements for approval of the Potrero Canyon crossing:

#### **3.1. California Coastal Commission Permit**

The Project is located within the “Coastal Zone”, which falls under jurisdictional approval for any development. It is recommended to begin this permit process early in the design, as it can be a long lead item.

#### **3.2. Los Angeles Department of Transportation**

Once constructed, LADOT will be responsible for the operation and maintenance of any crossing structure. It is important to communicate with LADOT early in the design process for approval of any conceptual and final designs, since their department will be responsible for sign-off and acceptance of ownership.

#### **3.3. Los Angeles Bureau of Engineering**

The Los Angeles Bureau of Engineering – Structural Engineering Division would perform review services for a bridge designed by a private consultant. Since the bridge will not be located on private parcels, it is unlikely that the Los Angeles Department of Building and Safety (LADBS) will review any portion of the bridge. However, connecting path and landscaping would likely be reviewed by LADBS – Planning and Grading divisions.

Several departments could be involved in approval of the design including planning, grading, cultural affairs, disabled access review, green building (due to a structure over \$200,000 in value), and structural department.

#### **3.4. California Department of Transportation**

Any signage, striping or encroachments within the ROW will be under Caltrans jurisdiction. Crossing over any Caltrans right-of-way will require review and approval of overhead structures, particularly for clearance. In addition, Caltrans will review to verify that all their design criteria and specifications are met.

#### **3.5. Los Angeles County Beaches and Harbors**

Will Rogers State Beach and the accompanying parking lot are owned and maintained by LA County Beaches and Harbors. Due to the impact on their property, the County will be concerned with property rights, adequate clearance of the bridge over the parking lot, connectivity to the existing bathhouse, infrastructure protection, maintaining the setbacks from the high tide line, and impacts to the existing parking and their operations.



## **4. Conclusions, Recommendations and Next Steps**

### **4.1. Conclusions and Recommendations**

Each alternative was evaluated for advantages and disadvantages. Choosing one of the three new PCH crossing alternatives would provide easier access between Potrero Canyon Park and Will Rogers State Beach than the existing condition. All four options meet the purpose of providing access from the beach to the park. However, two of these alternatives have safety, maintenance and stakeholder approval issues that would likely remove them from consideration.

Based upon the evaluation of the applicable criteria, the proposed pedestrian bridge is the most feasible alternative to connect Potrero Canyon Park to Will Rogers State Park Beach. Once a preferred option is chosen, the actions listed below will be recommended for developing the Project to the next phase.

### **4.2. Next Steps**

The results of the evaluation suggest that the bridge alternative is the most viable option for a pedestrian crossing from Potrero Canyon Park to Will Rogers State Beach over PCH. The following steps should be taken to advance the design of the bridge:

1. Contact stakeholders including Coastal Commission, LADWP, Los Angeles City Department of Transportation, California Department of Transportation, and Los Angeles County Beaches and Harbors to obtain buy-in of the bridge concept and location.
2. Perform a full utility investigation of the site including potholing of utilities on the south side of PCH. These results could help determine where the column supports for the bridge could be in conflict with any utility lines.
3. Contact the City of Los Angeles Council District 11 to set up a community planning meeting. The intent is to show the benefits of the proposed bridge to the community, receive feedback, and address any concerns. This will mitigate negative reaction moving forward with the project.
4. Identify potential funding sources for the construction and maintenance of the bridge. Consult with financial programmers to assess the length of time required to achieve full funding based on the funding sources and their level of contribution.
5. Soil conditions, onsite and offsite drainage, and impacts to the overhead LADWP power line need to be investigated for feasibility at future design phases.

# **APPENDIX A:**

## **Preliminary Opinion of Probable Construction Costs**

Preliminary Opinion of Probable Construction Cost - Potrero Canyon Bridge Option 1 - Trail to Temescal Canyon					
				Date: 06/01/2016	
	Description	Qty	Unit	Unit Cost	Total
1	Mobilization	1	LS	\$15,000	\$15,000
2	Grow and kill - weed abatement	2	AC	\$1,500	\$3,000
3	Grubbing, fine grading, etc.	2	AC	\$10,890	\$21,780
4	Agronomic soil testing	1	LS	\$500	\$500
5	Grade Trail	3000	CY	\$10	\$30,000
6	12' wide D.G. hiking trails w/ plastic wood header	24834	SF	\$6	\$152,729
7	New meter and backflow (from Temescal Cyn. Road)	1	LS	\$10,000	\$10,000
8	Irrigation mainline: 2"	2000	LF	\$10	\$20,000
9	Irrigation system (15' both side path w/4 zones)	2	AC	\$29,225	\$43,838
10	Hydroseeding/Erosion control (15' both sides path)	2	AC	\$11,470	\$22,940
11	Tree Planting	2	AC	\$1,500	\$3,000
12	Shrub planting	2	AC	\$1,500	\$3,000
13	6' Trail Fence	5000	LF	\$50	\$250,000
14	Gate with Trilogy Lock	1	EA	\$10,000	\$10,000
15	Plant establishment & Maintenance (1 year)	2	AC	\$5,000	\$10,000
16	Vegetation monitoring & yearly reports, 5 years	1	LS	\$5,000	\$5,000
17	Lighting	1	LS	\$10,000	\$10,000
18	Electrical	1	LS	\$5,000	\$5,000
19	Site Handling and Disposal	1	AL	\$10,000	\$10,000
	Hard Costs Sub Total				\$625,787
20	General Conditions	15%	LS	\$93,868	\$93,868
21	Qualified Safety Representative	80	Hr	\$120	\$9,600
22	Design	10%	LS	\$62,579	\$62,579
23	Construction Manager	1	LS	\$10,000	\$10,000
24	Community Liaison	30	Hr	\$140	\$4,200
25	Survey Services	5%	AL	\$31,289	\$31,289
26	Certified Payroll	1	AL	\$8,000	\$8,000
27	Permits	2%	LS	\$12,516	\$12,516
28	Bonds, Insurance, Inspection (Payment and Performance)	4%	LS	\$25,031	\$25,031
29	Contractor Overhead and Profit	20%	LS	\$125,157	\$125,157
	Sub Total				\$1,008,027
30	Contingency	20%	LS		\$201,605
	Sub Total				\$201,605
				TOTAL:	\$1,209,633
Notes:					
1. The unit cost data is derived from MARRS in-house sources and RS Means 2016 Q2 Construction Cost Data.					
2. This is a rough order of magnitude preliminary opinion of probable costs only, and is intended for a rough cost projection used for budget planning purposes in the early stage concept development of a project. Actual construction costs may vary. MARRS will not be responsible for, or liable for, unauthorized changes or uses of these values.					
3. No preliminary design was made available at the time of this estimate.					
4. Prices are based on current economic conditions and do not include escalation.					
5. This Opinion of Cost assumes that all improvements will be constructed at one time.					
6. At this stage of plans, the quantity take off were performed when possible and parametric estimates and allowances are used for items that cannot be quantified.					
7. This Opinion of Cost does not include costs for right of way or easements.					
8. This Opinion of Cost does not include existing utility relocation, removal or disposal.					

Preliminary Opinion of Probable Construction Cost - Potrero Canyon Bridge Option 2 - At Grade Crossing					
				Date:	04/22/2016
	Description	Qty	Unit	Unit Cost	Total
1	Mobilization	1	LS	\$30,000	\$30,000
2	Clearing and Grubbing	1	LS	\$15,000	\$15,000
3	Traffic Control including signs	1	LS	\$25,000	\$25,000
4	Landscaping	1	LS	\$40,000	\$40,000
5	Traffic striping including pavement markings - PCH	1	LS	\$10,000	\$10,000
6	Traffic striping including pavement markings - Parking lot	1	LS	\$10,000	\$10,000
7	Overhead cantilever Traffic Signals	2	EA	\$70,000	\$140,000
8	Pedestrian signal push buttons	2	EA	\$7,000	\$14,000
9	At-grade pedestrian flashing lights	1	LS	\$30,000	\$30,000
10	12' wide x 12" thick soil cement access road	454	SY	\$30	\$13,620
11	Guard rail removal	1	LS	\$4,000	\$4,000
12	Advance Warning Sign	2	EA	\$5,000	\$10,000
	<b>Hard Costs Sub Total</b>				<b>\$341,620</b>
13	General Conditions	15%	LS	\$51,243	\$51,243
14	Qualified Safety Representative	360	Hr	\$120	\$43,200
15	Design	10%	LS	\$34,162	\$34,162
16	Construction Manager	4%	LS	\$13,665	\$13,665
17	Community Liaison	80	Hr	\$140	\$11,200
18	Survey Services	5%	AL	\$17,081	\$17,081
19	Certified Payroll	1	AL	\$8,000	\$8,000
20	Permits	2%	LS	\$6,832	\$6,832
21	Bonds, Insurance, Inspection (Payment and Performance)	4%	LS	\$13,665	\$13,665
22	Contractor Overhead and Profit	20%	LS	\$68,324	\$68,324
	<b>Sub Total</b>				<b>\$608,992</b>
23	Contingency	30%	LS		\$182,698
	<b>Sub Total</b>				<b>\$182,698</b>
				<b>TOTAL:</b>	<b>\$791,690</b>
<b>Notes:</b> <ol style="list-style-type: none"> <li>The unit cost data is derived from MARRS in-house sources and RS Means 2016 Q2 Construction Cost Data.</li> <li>This is a rough order of magnitude preliminary opinion of probable costs only, and is intended for a rough cost projection used for budget planning purposes in the early stage concept development of a project. Actual construction costs may vary. MARRS will not be responsible for, or liable for, unauthorized changes or uses of these values.</li> <li>No preliminary design was made available at the time of this estimate.</li> <li>Prices are based on current economic conditions and do not include escalation.</li> <li>This Opinion of Cost assumes that all improvements will be constructed at one time.</li> <li>At this stage of plans, the quantity take off were performed when possible and parametric estimates and allowances are used for items that cannot be quantified.</li> <li>This Opinion of Cost does not include costs for right of way or easements.</li> <li>This Opinion of Cost does not include existing utility relocation, removal or disposal.</li> </ol>					

Preliminary Opinion of Probable Construction Cost - Potrero Canyon Bridge Option 3 - Underground Tunnel					
				Date:	04/21/2016
	Description	Qty	Unit	Unit Cost	Total
1	Mobilization	1	LS	\$40,000	\$40,000
2	Cleaning and Grubbing	1	LS	\$30,000	\$30,000
3	Aggregate base	370	CY	\$85	\$31,583
4	Structural Excavation	4100	CY	\$58	\$236,570
5	Structural Backfill	1000	CY	\$52	\$52,340
6	Tunnel Ballast	1	LS	\$150,000	\$150,000
7	Dewatering	1	LS	\$100,000	\$100,000
8	Soldier Piles	1	LS	\$180,000	\$180,000
9	18" Thick Structural Concrete - Tunnel Sections	575	CY	\$465	\$267,375
10	12" Thick Structural Concrete - Ramp Sections	765	CY	\$590	\$451,350
11	Sump Pump for Groundwater Discharge	2	EA	\$15,333	\$30,666
12	Metal Railing - Ramps	1120	LF	\$210	\$235,200
13	Traffic Control Requirement including signs	1	LS	\$250,000	\$250,000
14	Traffic Striping including pavement marking	1	LS	\$45,000	\$45,000
15	Allowance for utility line support - water and sewer force main	1	LS	\$100,000	\$100,000
16	Allowance for utility line support - dry utilities	1	LS	\$50,000	\$50,000
17	Landscaping	1	LS	\$50,000	\$50,000
18	Striping	1	LS	\$20,000	\$20,000
19	Furnish and Install 6" Road Base	46	CY	\$85	\$3,910
20	Furnish and Install 3" Asphalt	2500	SF	\$15	\$37,500
21	Low Point Catch Basin	2	EA	\$40,000	\$80,000
22	Storm Drain 18" line	100	LF	\$865	\$86,500
23	Storm Drain Outlet to Ocean	2	EA	\$15,000	\$30,000
24	12' wide x 12" thick soil cement access road	750	SY	\$30	\$22,500
25	Tunnel Ventilation - Railings and Grill	1	LS	\$40,000	\$40,000
26	Logistics and Alternate Traffic allowances	1	LS	\$90,000	\$90,000
27	Lighting	1	LS	\$80,000	\$80,000
28	Monitoring, Testing, Sampling, Site Storage, and Handling of Soils Containing RCRA Hazardous Waste	1	LS	\$25,000	\$25,000
<b>Hard Costs Sub Total</b>					<b>\$2,815,494</b>
29	General Conditions	15%	LS	\$422,324	\$422,324
30	Qualified Safety Representative	1400	Hr	\$120	\$168,000
31	Design	10%	LS	\$281,549	\$281,549
32	Construction Manager	4%	LS	\$112,620	\$112,620
33	Community Liaison	200	Hr	\$140	\$28,000
34	Survey Services	5%	AL	\$140,775	\$140,775
35	Certified Payroll	1	AL	\$20,000	\$20,000
36	Permits	2%	AL	\$56,310	\$56,310
37	Bonds, Insurance, Inspection (Payment and Performance)	4%	LS	\$112,620	\$112,620
38	Contractor Overhead and Profit	20%	LS	\$563,099	\$563,099
<b>Sub Total</b>					<b>\$4,720,791</b>
39	Contingency	30%	LS		\$1,416,237
<b>Sub Total</b>					<b>\$1,416,237</b>
				<b>TOTAL:</b>	<b>\$6,137,028</b>
<b>Notes:</b> <ol style="list-style-type: none"> <li>The unit cost data is derived from MARRS in-house sources and RS Means 2016 Q2 Construction Cost Data.</li> <li>This is a rough order of magnitude preliminary opinion of probable costs only, and is intended for a rough cost projection used for budget planning purposes in the early stage concept development of a project. Actual construction costs may vary. MARRS will not be responsible for, or liable for, unauthorized changes or uses of these values.</li> <li>No preliminary design was made available at the time of this estimate.</li> <li>Prices are based on current economic conditions and do not include escalation.</li> <li>This Opinion of Cost assumes that all improvements will be constructed at one time.</li> <li>At this stage of plans, the quantity take off were performed when possible and parametric estimates and allowances are used for items that cannot be quantified.</li> <li>This Opinion of Cost does not include costs for right of way or easements.</li> <li>This Opinion of Cost does not include existing utility relocation, removal or disposal.</li> </ol>					



Preliminary Opinion of Probable Construction Cost - Potrero Canyon Bridge Option 4 - Pedestrian Bridge					
				Date:	06/01/2016
	Description	Qty	Unit	Unit Cost	Total
1	Mobilization	1	LS	\$80,000	\$80,000
2	Clearing and Grubbing	1	LS	\$30,000	\$30,000
3	Traffic Control including signs	1	LS	\$70,000	\$70,000
4	Landscaping - Bioswale (3500 sq ft)	3500	SF	\$2	\$7,000
5	Landscaping - Coastal Bluff Srub (8000 sq ft)	1	LS	\$4,000	\$4,000
6	Landscaping - Washingtonia Filifera (6000 sq ft)	1	LS	\$4,000	\$4,000
7	Landscaping - Trees	1	LS	\$40,000	\$40,000
8	Irrigation	1	LS	\$25,000	\$25,000
9	Architectural Concrete panels (Precast - Custom)	1	LS	\$150,000	\$150,000
10	Safety Construction Fencing - Staging	1	LS	\$7,000	\$7,000
11	Excavation and Export	560	CY	\$60	\$33,600
12	Trenching and backfill for Power line (140 lf)	1	LS	\$6,000	\$6,000
13	Power line rerouting Utility company charges	1	LS	\$150,000	\$150,000
14	Geotextiles for Erosion Control	1	LS	\$10,000	\$10,000
15	Prestressed concrete piles - 24" (12)	730	VLF	\$93	\$67,671
16	Pile cap	10	EA	\$1,294	\$12,935
17	Foundations	90	CY	\$308	\$27,743
18	Bridge Columns (3)	30	CY	\$1,563	\$46,888
19	Ramp Columns (7)	64	CY	\$1,901	\$121,677
20	Grade Beam	52	CY	\$1,398	\$72,712
21	Backfill and compaction	2800	LCY	\$11	\$30,800
22	Precast Concrete Girder	4	EA	\$28,828	\$115,312
23	Orthotropic Deck	6500	SF	\$35	\$227,500
24	Structural Concrete - Ramps	120	CY	\$650	\$78,000
25	Concrete Barrier	500	LF	\$140	\$70,000
26	4" AC - Allowance	1	LS	\$25,000	\$25,000
27	Architectural Bent Stainless Steel Plates	1	LS	\$25,000	\$25,000
28	Architectural Fencing	1	LS	\$35,000	\$35,000
29	Main Span Railing	450	LF	\$180	\$81,000
30	Approach Railing	1940	LF	\$75	\$145,500
31	Protection of Existing Structures	1	LS	\$50,000	\$50,000
32	Bollards	8	EA	\$917	\$7,336
33	Gates	2	EA	\$8,000	\$16,000
34	Lighting	1	LS	\$45,000	\$45,000
35	Electrical	1	LS	\$70,000	\$70,000
36	Repair of Traffic striping and marking	1	LS	\$10,000	\$10,000
37	Site Handling and Disposal	1	LS	\$25,000	\$25,000
38	Equipment and Hoisting	1	LS	\$50,000	\$50,000
39	Monitoring, Testing, Sampling, Site Storage, and Handling of Soils Containing RCRA Hazardous Waste	1	LS	\$25,000	\$25,000
	<b>Hard Costs Sub Total</b>				<b>\$2,097,673</b>
40	General Conditions	15%	LS	\$314,651	\$314,651
41	Qualified Safety Representative	960	Hr	\$120	\$115,200
42	Design	10%	LS	\$209,767	\$209,767
43	Construction Manager	1	LS	\$83,907	\$83,907
44	Community Liaison	80	Hr	\$140	\$11,200
45	Survey Services	5%	AL	\$104,884	\$104,884
46	Certified Payroll	1	AL	\$8,000	\$8,000
47	Permits	2%	LS	\$41,953	\$41,953
48	Bonds, Insurance, Inspection (Payment and Performance)	4%	LS	\$83,907	\$83,907
49	Contractor Overhead and Profit	20%	LS	\$419,535	\$419,535
	<b>Sub Total</b>				<b>\$3,490,677</b>
50	Contingency	30%	LS		\$1,047,203
	<b>Sub Total</b>				<b>\$1,047,203</b>
				<b>TOTAL:</b>	<b>\$4,537,880</b>
<b>Notes:</b> 1. The unit cost data is derived from MARRS in-house sources and RS Means 2016 Q2 Construction Cost Data. 2. This is a rough order of magnitude preliminary opinion of probable costs only, and is intended for a rough cost projection used for budget planning purposes in the early stage concept development of a project. Actual construction costs may vary. MARRS will not be responsible for, or liable for, unauthorized changes or uses of these values. 3. No preliminary design was made available at the time of this estimate. 4. Prices are based on current economic conditions and do not include escalation. 5. This Opinion of Cost assumes that all improvements will be constructed at one time. 6. At this stage of plans, the quantity take off were performed when possible and parametric estimates and allowances are used for items that cannot be quantified. 7. This Opinion of Cost does not include costs for right of way or easements. 8. This Opinion of Cost does not include existing utility relocation, removal or disposal.					

# **APPENDIX B:**

## **Stakeholders Contacts**

## Stakeholders Contacts

Name	Title	Agency	Phone	E-mail
Rob Hancock	Engineering Geologist	City of Los Angeles - Bureau of Engineering, Geotechnical Division	213-847-0526	<a href="mailto:robert.hancock@lacity.org">robert.hancock@lacity.org</a>
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