

United States Department of the Interior  
National Park Service

# National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in National Register Bulletin, *How to Complete the National Register of Historic Places Registration Form*. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions.

## 1. Name of Property

Historic name: San Francisco-Oakland Bay Bridge (Amendment) DRAFT

Other names/site number: NRHP 00000525

Name of related multiple property listing:  
N/A

(Enter "N/A" if property is not part of a multiple property listing)

## 2. Location

Street & number: N/A

City or town: San Francisco and Oakland State: California County: San Francisco and Alameda

Not For Publication:  Vicinity:

## 3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended,

I hereby certify that this \_\_\_ nomination \_\_\_ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60.

In my opinion, the property \_\_\_ meets \_\_\_ does not meet the National Register Criteria. I recommend that this property be considered significant at the following level(s) of significance:

\_\_\_ national \_\_\_ statewide \_\_\_ local

Applicable National Register Criteria:

\_\_\_ A \_\_\_ B \_\_\_ C \_\_\_ D

Signature of certifying official/Title:	Date
State or Federal agency/bureau or Tribal Government	

In my opinion, the property ___ meets ___ does not meet the National Register criteria.	
Signature of commenting official:	Date
Title :	State or Federal agency/bureau or Tribal Government

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**National Park Service Certification**

I hereby certify that this property is:

- entered in the National Register
- determined eligible for the National Register
- determined not eligible for the National Register
- removed from the National Register
- additional documentation accepted
- other (explain:) \_\_\_\_\_

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Signature of the Keeper

Date of Action

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**5. Classification**

**Ownership of Property**  
 (Check as many boxes as apply.)

Private:

Public - Local:

Public - State:

Public - Federal:

**Category of Property**  
 (Check only **one** box.)

Building(s)

District

Site

Structure

Object

**Number of Resources within Property**

(Do not include previously listed resources in the count)

Contributing	Noncontributing	
<u>3</u>	_____	buildings
_____	_____	sites
<u>2</u>	<u>8</u>	structures
_____	_____	objects
<u>5</u>	<u>8</u>	Total

Number of contributing resources previously listed in the National Register: 15

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## 7. Description

### Architectural Classification

(Enter categories from instructions.)

Other: Suspension bridge

Other: Truss bridge

**Materials:** (enter categories from instructions.)

Principal exterior materials of the property: Concrete, Steel, Timber Piles

### Narrative Description

(Describe the historic and current physical appearance and condition of the property. Describe contributing and noncontributing resources if applicable. Begin with a **summary paragraph** that briefly describes the general characteristics of the property, such as its location, type, style, method of construction, setting, size, and significant features. Indicate whether the property has historic integrity.)

The San Francisco-Oakland Bay Bridge (SFOBB), also referred to as the Bay Bridge, was entered in the National Register of Historic Places (National Register) on August 13, 2001. Subsequent to the registration the bridge was subject to an extensive seismic retrofit program. This document serves to amend the National Register registration form with the most current information.

### Summary

The San Francisco-Oakland Bay Bridge (SFOBB) was originally listed in the National Register of Historic Places in 2001 under Criteria A and C in the areas of engineering and transportation. The bridge is significant at the national level with a period of significance of 1936, its completion date. Under Criterion A the bridge was found eligible due to its "significant influence on transportation in California and directly in the Bay Area."<sup>1</sup> The bridge was found significant under Criterion C for its engineering design. The need to span 4.5 miles of San Francisco Bay between two major urban centers resulted in a bridge system that was, at the time of its completion in 1936, inordinately large and complex. The SFOBB was, at that point, the longest bridge in the world, had the deepest piers, the greatest length suspension span (the combined spans were longer than any other suspension span) and the Yerba Buena Island (YBI) tunnel bore had the largest diameter. The cantilever span was also the longest in the United States. The Oakland Approach to the East Bay Crossing was determined to be a non-contributing resource due to extensive changes made in the 1950s and 1960s to accommodate the removal of rail lines from the bridge, and the introduction of unidirectional travel on the bridge decks.

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<sup>1</sup> John J. Mascitelli, Karen Origel, and Sean Riley, *National Register of Historic Places Registration Form: San Francisco-Oakland Bay Bridge* (Pinole, CA: OHP, 1999), Section 8, Page 1

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Because of the extensive seismic work made to the various components of the bridge during the 1999-2013 seismic retrofit, several resources previously considered contributing to the significance of the property are now noncontributing or have been removed altogether. The San Francisco Approach was completely rebuilt and reconfigured. The East Bay Crossing (Bridge 33-0025) was removed, with the exception of five support piers: E1, E2, E21, E22 and E23. These structures no longer reflect the significance of the SFOBB and are no longer contributing resources. Three buildings have been demolished: the Transbay Transit Terminal Building, the Yerba Buena Island Key System Electrical Substation and the Yerba Buena Island Firehouse.

A new East Span was erected between 2002 and 2013 as part of the seismic retrofit project. Because this structure postdates the period of significance and has not been evaluated for significance in its own right, it is not currently considered a contributing resource to the SFOBB.

Two structures: the West Span and the YBI Tunnel; and three buildings: the Key System Electrical Substation – San Francisco, Bay Bridge Electrical Substation and Key Pier Electrical Substation continue to contribute to the significance of the bridge and remain contributing resources.

<b>Table 1. Contributing Resources</b>	
<b>Name</b>	<b>Map Reference Number</b>
West Bay Crossing (34-0003)	C-1
(Yerba Buena) Island Crossing (34-0004)	C-2
San Francisco Key System Electrical Substation	C-3
Bay Bridge Electrical Substation	C-4
Key Pier Electrical Substation.	C-5

<b>Table 2. Non-contributing Resources</b>	
<b>Name</b>	<b>Map Reference Number</b>
SF Upper Deck Off Ramp (34-116F)	NC-6
SF Upper Deck Off Ramp (34-117S)	NC-7
SF Lower Deck Approach Structure (34-118R)	NC-8
SF Upper Deck Approach Structure (34-118L)	NC-9
Transit Terminal Ramp (34-119Y)	NC-10
Harrison Street Undercrossing (34-120Y)	NC-11
East Bay Crossing (33-0025)	NC-12
Oakland Approach	NC-13

For National Register purposes, the resource is considered one structure (see Figure 1). In reality, the SFOBB is actually a system of structures stretching between San Francisco and Oakland. For the purposes of this update, the text will refer to five segments identified in the

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original nomination, which includes one segment that is located outside of the NRHP boundary due to loss of integrity. These segments were composed of the following contributing structures:

#### San Francisco Approach

- SF Upper Deck Off Ramp (34-116F)—Demolished and replaced.
- SF Upper Deck Off Ramp (34-117S)—Demolished and replaced.
- SF Lower Deck Approach Structure (34-118R)—Highly altered.
- SF Upper Deck Approach Structure (34-118L)—Demolished and replaced.
- Transit Terminal Ramp (34-119Y)—Demolished and replaced.
- Harrison Street Undercrossing (34-120Y)—Demolished and replaced.

West Bay Crossing (34-0003)

(Yerba Buena) Island Crossing (34-0004)

East Bay Crossing (33-0025)—Demolished and replaced.

Oakland Approach—Non-contributing due to loss of integrity; outside of NRHP boundary.

Additionally, six buildings were originally listed as contributing resources of the bridge:

- Transbay Transit Terminal Building—Demolished 2011.
- San Francisco Key System Electrical Substation
- Yerba Buena Island Key System Electrical Substation—Demolished 2004.
- Yerba Buena Island Firehouse—Demolished 2004.
- Bay Bridge Electrical Substation
- Key Pier Electrical Substation.

A Pacific Gas and Electric (PG&E) electrical substation was identified as a noncontributing resource, and was demolished in 2015.

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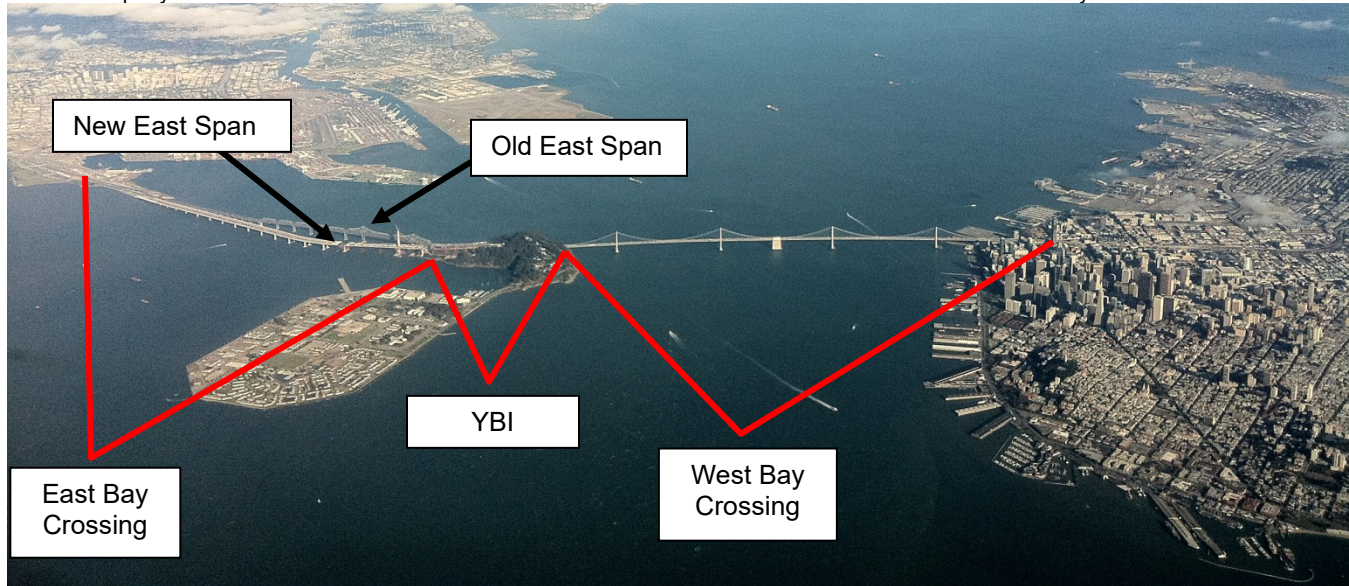


Figure 1: San Francisco-Oakland Bay Bridge, looking south, image from commons.wikimedia.org, accessed 1/24/2020.

## **NARRATIVE DESCRIPTION**

### **The San Francisco Approach**

The San Francisco Approach, also called the West Approach, linked the city streets with the bridge. It stretched from Fifth Street to the San Francisco Anchorage at Beale Street within the City of San Francisco. It originally comprised six elements: two Upper Deck Off Ramps, Upper and Lower Deck Approach Structures, Transit Terminal Ramp, and the Harrison Street Undercrossing. Two contributing buildings were also included in this segment, the Key Electrical System Substation – San Francisco and the Transbay Transit Terminal Building.

The Upper Deck Off Ramps and Upper and Lower Deck Approach Structures were composed of haunched reinforced concrete girders carrying reinforced concrete slabs supported on multi-column bents. These bridges originally carried automobile traffic from city streets onto and off the SFOBB. As a result of the retrofit the Upper Deck Off Ramps and Upper Deck Approach Structure were demolished and replaced. Only the Lower Deck Approach Structure remains in a highly altered state. Retrofit of the West Approach was completed in 2009.

### **Key System Electrical Substation – San Francisco**

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Key System Electrical Substation - San Francisco, also known as the Sterling Street Substation, is located at Second and Harrison Streets in San Francisco. This one story rectangular concrete box-shaped building is approximately 87 feet long (east to west) by 41 feet wide and originally housed mechanical equipment supplying electricity to the trains running on the bridge. Today the building is used for storage. There has been no change to the building since the original National Register registration.

**West Bay Crossing (Bridge 34-0003)**

The West Bay Crossing, also known as the West Span (34-0003), is comprised of two back-to-back suspension spans, each approximately 700 feet long. One side is anchored in San Francisco, the other on Yerba Buena Island. The two spans share a centralized anchorage located in the San Francisco Bay. The bridge has two decks: westbound traffic is carried on the upper deck, and eastbound traffic on the lower deck. As originally designed, the upper deck was used for two-way automobile traffic, while the lower deck was used for two-way traffic for both trucks and Key System railcars.

**Island Crossing (Bridge 34-0004, Key System Electrical Substation – Yerba Buena Island and the Yerba Buena Island Firehouse)**

The Island Crossing is composed of the 540 foot long Yerba Buena Island Tunnel (34-0004) as well as the viaduct approaches on either end of the tunnel. The west viaduct connects the Yerba Buena Island anchorage of the West Span with the tunnel, while the east viaduct connects the tunnel with the East Span of the bridge. Both viaducts were originally constructed in a similar manner to the first West Approach in San Francisco, composed of reinforced concrete slab, beam and bent structures. Portions of the viaducts were reconstructed in the early 1960s when the railroads were removed from the bridge.

The Yerba Buena Island Tunnel itself is a segmental arch often called a “horseshoe” tunnel with decorative stepped raw concrete portals at either end. The interior tunnel walls and ceiling of the tunnel are tiled on the upper deck, while the walls of the lower deck are bare concrete.

**East Bay Crossing (Bridge 33-0025)**

The East Bay Crossing, also known as the East Span (Bridge 33-0025), was originally a series of trusses and girder spans connecting the Yerba Buena Island with the Oakland Approach. As part of the seismic retrofit this portion of the bridge was demolished after an entirely new bridge was constructed on an altered alignment to the north. All elements of the original bridge were removed except for piers E1 and E2 on Yerba Buena Island, and piers E21, E22 and E23, on the Oakland shore, which have been left in place.



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**Oakland Approach**

The Oakland Approach, connecting the East Span with the Oakland Touchdown and the toll plaza to the east, was originally comprised of reinforced concrete slab, beam and bent structures through which the lower deck distributed the rail lines and truck traffic, while the upper deck supported automobiles. Nearly all the original materials of the Oakland Approach were replaced in the early 1960s, when the rail was removed and both decks of the bridge were opened for auto traffic.

**Bay Bridge Electrical Substation**

The substation is located in Oakland, south of the bridge, at the end of the narrow peninsula that extends into the San Francisco Bay from the Bay Bridge toll plaza. The Bay Bridge Electrical Substation is a flat roofed concrete building approximately 90 feet long by 42 feet wide, with a small (22 foot x 10 foot) extension at the left side of the south facade, giving the building an "L" shape. It has a slightly projecting base and pilasters. Originally constructed to provide power for trains that ran across the bridge. The building is now primarily used for storage. The Bay Bridge Electrical Substation remains essentially unaltered from when the original National Register registration was completed.

**Key Pier Electrical Substation**

The substation is located in Oakland, adjacent to the Bay Bridge Substation, south of the bridge. The Key Pier Electrical Substation is a concrete building approximately 42 feet wide by 32 feet long, with a slightly projecting base and pilasters. It was originally built in 1926 as an electrical substation for the Key System, which provided streetcar service throughout Oakland and other East Bay communities with connecting ferry service to San Francisco. The building is now primarily used for storage. The Key Pier Electrical Substation remains essentially unaltered since the original National Register nomination was completed.

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## 8. Statement of Significance

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### Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A. Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B. Property is associated with the lives of persons significant in our past.
- C. Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D. Property has yielded, or is likely to yield, information important in prehistory or history.

### Criteria Considerations

(Mark "x" in all the boxes that apply.)

- A. Owned by a religious institution or used for religious purposes
- B. Removed from its original location
- C. A birthplace or grave
- D. A cemetery
- E. A reconstructed building, object, or structure
- F. A commemorative property
- G. Less than 50 years old or achieving significance within the past 50 years

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**Areas of Significance**

(Enter categories from instructions.)

Engineering

Transportation

**Period of Significance**

1936

**Significant Dates**

1936

**Significant Person**

(Complete only if Criterion B is marked above.)

**Cultural Affiliation**

N/A

**Architect/Builder**

Purcell, Charles H.

Andrew, Charles E.

Woodruff, Glenn B.

**Summary Statement of Significance**

The San Francisco-Oakland Bay Bridge retains sufficient historic integrity to demonstrate its continued historic significance under Criteria A and C. The San Francisco-Oakland Bay Bridge remains the only direct route for vehicles between San Francisco and the East Bay. As such, it has a singular importance in both the economy and social structure of the entire Bay Area. This is reflected in the fact that the bridge carries more than one-third of the combined total traffic for all of the state-owned bridges in California.<sup>2</sup> The bridge was originally constructed to cope with increased transportation needs between San Francisco and Oakland that could no longer be met by ferries. With the bridge's opening, the ease of movement meant that the two cities became even more closely integrated than they had been previously. The bridge's importance to both the Bay Area and the state of California as a whole has only increased since its completion in 1936.

<sup>2</sup> During fiscal year 2018-19, a total of 45,760,984 toll-paying vehicles crossed the bridge. Bay Area Toll Authority, "San Francisco-Oakland Bay Bridge" Accessed February 1, 2021. <https://mtc.ca.gov/about-mtc/what-mtc/bay-area-toll-authority/san-francisco-oakland-bay-bridge>

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The San Francisco-Oakland Bay Bridge retains its integrity of **Location** and **Setting** by connecting the cities of San Francisco and Oakland via Yerba Buena Island. Despite the continued development of San Francisco's Financial and Rincon Hill Districts, the West Span is still visually dominant and evokes a strong sense of place for the city's waterfront and the neighborhoods from which it can be seen.

The integrity of **Design** has been reduced by the removal of the cantilever East Span, but the SFOBB still reflects the ingenuity of the original plans. The designers, under Chief Engineer Charles H. Purcell, had to create not just a bridge, but a bridge system that could extend five miles across mudflats, deep water shipping channels, and a rocky island. The use of different bridge types in the East and West Spans reflects different seabed foundation conditions discovered during the planning process. Where the West Span could use a suspension bridge anchored to bedrock, the East Span required a cantilever bridge to cope with piers built on deep sediment. The replacement East Span, while not contributing to the SFOBB's significance, represents a modern approach to the same design challenges. The West Span remains country's longest suspension bridge. Its longest individual spans are 2310' which makes them the sixth longest in the U.S.

The SFOBB remains demonstrative of the period in which it was built and continues to exhibit the integrity of the **Workmanship** that went into its construction on the larger scale. The bridge is a direct product of the construction techniques that were available in the 1930s, and reflects the state of the art for very large-scale civil engineering projects during this time. Though the entire project, from legal authorization to grand opening, was completed in only seven years, the SFOBB remains a robust and essential element in the state's transportation system.

Most of the SFOBB's historic **Materials** are retained on the contributing features, as the retrofit sought to strengthen, rather than replace, the existing structures where possible. The main structural elements of the West Span and the Island Crossing remain essentially as they were completed in 1936. The primary changes to the West Span, detailed below, were the replacement of lattice truss members with steel plates, and the replacement of rivets throughout the bridge with tempered steel bolts. The Island Crossing's internal decks were rebuilt between 1960 and 1962 to accommodate the removal of Key System tracks and the transition to exclusively vehicular use.<sup>3</sup>

The integrity of **Feeling** is somewhat reduced as the retrofit project caused much of the truss system of the West Span to be made visually thicker and more robust when compared to the original multi-element lattice construction. There were also an additional number of bolts

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<sup>3</sup> N.C. Raab, "Bay Bridge: Second Phase of Reconstruction Nearing Completion," *California Highways and Public Works*. Vol. 41 no. 1-2 (January-February 1962).

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installed, beyond those that replaced rivets, but this is not readily apparent to anyone crossing the bridge in a vehicle.

The integrity of **Association** with transportation under Criterion A remains, despite the removal of some contributing resource due to seismic retrofit work. For Criterion C, the retrofit had a greater impact because the original East Span helped to illustrate the engineering solutions the designers produced to deal with conditions discovered in San Francisco Bay. The East Span was originally meant to be a suspension bridge like the West Span, but bedrock could not be located at a reasonable depth beneath the seabed. The cantilever structure that was ultimately built was a response to the necessity of placing the bridge foundations on clay. Despite this, the engineering significance and design of both the West Span and Yerba Buena Island Tunnel remains clearly recognizable.

Taken as a complete resource, the SFOBB still exhibits the significance and character that make it eligible for continued inclusion on the National Register.

### **Changes to Contributing Resources Comprising the Property**

The original National Register nomination form listed 15 contributing resources (six buildings and nine structures) as well as one noncontributing building. Because of the substantial alterations made to the various components of the bridge during the seismic retrofit several resources previously considered contributing to the significance of the property are now noncontributing or have been removed altogether.

### **The San Francisco Approach**

The San Francisco Approach, including bridges 34-116F, 34-117S, 34-118L, 34-119Y and 34-120Y, was torn down and replaced in the same location. Bridge 34-118R does remain, albeit in a highly altered state. The six structures comprising the San Francisco Approach are no longer considered contributing resources of the SFOBB. Additionally, the Transbay Transit Terminal Building, Key System Electrical Substation – Yerba Buena Island and Yerba Buena Island Firehouse were razed. As such, they are no longer considered contributing resources of the bridge.

Seismic retrofit work on the West Approach was one of the most complex projects in the California Department of Transportation's history. "Retrofit by replacement" allowed the entire section to be replaced in the same location while maintaining traffic flow. The project provided each deck of the highway its own independent column and foundation support system, whereas previously the decks were supported by a single foundation system.

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The Transit Terminal Ramp, and the Harrison Street Undercrossing, also known as the Loop Ramps, originally connected the West Span and the West Approach with the Transbay Transit Terminal building. The Transit Terminal Ramp consisted of multiple concrete T-beam spans, with steel plate girder spans at local street overcrossings. It carried interurban trains between the lower deck of the bridge and the Transbay Transit Terminal. Following the conversion of the lower deck to automobile traffic in the 1960s, this element of the SFOBB served busses rather than trains. The Transit Terminal Ramp was razed in 2011, as part of the Transbay Transit Center redevelopment project.

The Harrison Street Undercrossing was a concrete box girder span crossing over Harrison Street. It originally carried interurban trains over Harrison Street, heading to and from the Transbay Transit Terminal. Following the conversion of the lower deck to automobile traffic in the 1960s this element of the SFOBB served busses rather than trains. This section was demolished in 2011, as part of the Transbay Transit Center redevelopment project (Figure 2 below).



Figure 2. Demolition of San Francisco Approach. Undated Caltrans photo,

### Transbay Transit Terminal Building

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The Transbay Transit Terminal Building was located in the South of Market area of San Francisco on Mission and First Streets. The building was three stories with a basement constructed of reinforced concrete and a steel framed roof. California granite clad the building. It was designed by Timothy L. Pfleuger, Arthur Brown Jr. and John J. Donovan, who also served as consulting architects on the design of the SFOBB. The building originally served as a train station. It was razed in 2011 to make way for the Transbay Transit Center project.

**West Bay Crossing (Bridge 34-0003)**

The seismic strengthening of the West Span included work on the truss, towers and anchorages as well as the suspension cables. Alterations to the truss consisted of the addition of steel plates the full height of the vertical members, replacement of rivets with high-strength bolts and the addition of small bumpers to the vertical and diagonal members where the suspension cables pass through two of the bents. Additional bracing was added underneath the upper and lower level roadways and the truss members connecting the decks were replaced with perforated steel plates. Retrofit of the trusses included all of the diagonal and lateral members and approximately 25 percent of the top and bottom chords. The work changed the trusses from their open character, built up of many smaller components, to a heavier and more solid appearance (Figures 3 and 4 below).

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Figure 3: Lower deck, showing lattice truss members, image from "Bay Bridge Artery," Chris Carlsson, 2013, [www.foundsf.org](http://www.foundsf.org), accessed 1/24/20.



Figure 4: Northern truss member, Span W2, PP84, Lane 1, taken 7/20/17.

Work on the four towers included replacing rivets with high-strength bolts, the addition of stiffening plates on both the exterior face and interior webs of the two vertical legs of each tower, installation of shear keys at the tower bases as well as lock-up devices to prevent the stiffening members from slamming against the towers.

The central anchorage was jacketed in additional reinforced concrete for approximately one-third of its total height and shear keys added to the cable bent structure at the top of the pier. The jacketing of the anchorage was designed to conform to the existing shape (Figures 5 and 6). All three anchorages were also strengthened internally. The retrofit was completed in 2004.



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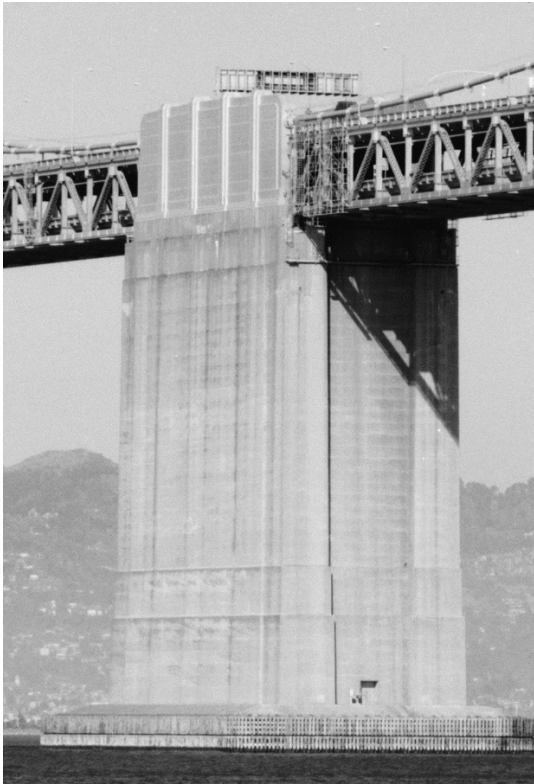


Figure 5: Center Anchorage, 1999. Historic American Engineering Record, photo HAER CAL 38-SANFRA 141—23 (detail)



Figure 6: Center Anchorage, 2015. Nicolas Janberg, Structurae.net, accessed 4/27/2020.

**Island Crossing (Bridge 34-0004, Key System Electrical Substation – Yerba Buena Island and the Yerba Buena Island Firehouse)**

The retrofit of the west viaduct required reinforcement of the bent structure by installing high strength steel rods, anchor bolts, reinforcement to pier pedestals and adding concrete jackets. Existing shear walls between two bents were extended. For the east viaduct a different approach was taken; the upper deck was replaced with a cast in place concrete box girder structure. A unique construction method was employed in which the entire upper deck superstructure was built adjacent to the existing viaduct. At the same time a new substructure was constructed. When all was complete the original upper deck was demolished and the new deck slid into place onto the waiting piers. Retrofit on the west viaduct was completed in 2000, the east viaduct was completed in 2013.

The Yerba Buena Island Tunnel did not require retrofit, however on the east portal a grid of rock bolts was installed above the arched head walls spanning the portals and catchment walls. A similar technique was employed above the west portal. Work was completed in 2000.

**Key System Electrical Substation – Yerba Buena Island**

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The Key System Electrical Substation - Yerba Buena Island was located on Yerba Buena Island east of the east portal and north of the East Span of the bridge. It was a small one story rectangular concrete box approximately 50 by 36 feet that housed machinery supplying electricity to the trains running on the SFOBB. The building was demolished in 2004 as part of the seismic retrofit of the East Bay Crossing.

### **Yerba Buena Island Firehouse**

The Yerba Buena Island Firehouse was located on Yerba Buena Island east of the east portal and north of the East Span of the bridge. It was a single story concrete building approximately 63 by 31 feet. It originally housed fire trucks that served the bridge. The building was razed in 2004 as part of the seismic retrofit of the East Bay Crossing.

### **East Bay Crossing (33-0025)**

The East Bay Crossing (33-0025) was replaced on a new alignment and the old bridge was razed. All the piers were demolished with the exception of E1, E2, E21, E22 and E23. The Oakland Approach was rebuilt to conform to the side by side viaduct configuration of the new East Bay Crossing. Finally, the PG&E Electrical Substation previously considered noncontributing has been demolished.

The East Bay Crossing was originally a series of trusses and girder spans connecting the Yerba Buena Island with the Oakland Approach. As part of the seismic retrofit this portion of the bridge was demolished after an entirely new bridge was constructed on an altered alignment to the north. All elements of the original bridge was removed except for piers E1 and E2 on Yerba Buena Island, and piers E21, E22 and E23, on the Oakland shore, which have been left in place. Demolition of the East Span was completed in 2018.

The new East Span is made up of two distinct elements, a 1.2 mile Skyway connecting the Oakland Approach to the signature self-anchored suspension (SAS) span, located near Yerba Buena Island. Unlike a traditional suspension bridge where the cables are anchored to the ground, a self-anchored suspension bridge employs a single cable anchored to the road deck, which on the East Span is composed of a steel box girder with an orthotropic deck.

The Skyway is composed of two parallel precast, post-tensioned, segmental concrete box girder viaducts (Figure 7 below). Four hundred and fifty-two girders, which are three-cells of variable-depth, were erected by employing the balanced cantilever method. The tallest box girders stand three stories high and were the largest segments of their kind ever cast, having to be lifted into place by custom-made winches. The typical span is 525 feet long. The viaducts carry 5 lanes of

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traffic in each direction with two 10-foot-wide shoulders and a bicycle-pedestrian path on the south side. When completed in 2013, measuring 2,047 feet long, the new East Span was both the longest self-anchored suspension bridge ever constructed as well as the world's widest bridge at 258.33 feet.



Figure 7: Skyway under construction to the north of the original bridge structure. Undated Caltrans photo, baybridgeinfo.org, accessed 4/27/2020.

### **Oakland Approach**

As part of the seismic retrofit project the Oakland Approach was again rebuilt, this time to conform to the side by side viaduct configuration of the East Bay Crossing. The two roadway sections were constructed along with a new electrical substation and extensive relocation of underground utilities. New structures were required and include cast-in-place, pre-stressed concrete box-girders supported by a cast-in-place, reinforced concrete substructures. The Oakland Approach was completed in 2013.

### **PG&E Electrical Substation**

The original National Register registration form identified the PG&E Electrical Substation as a non-contributing resource of the SFOBB. The substation was never used in connection with the bridge or the rail lines that ran across the bay. It was demolished in 2015.

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## 11. Form Prepared By

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**United States Department of the Interior**  
National Park Service

**National Register of Historic Places**  
**Continuation Sheet**

San Francisco-Oakland Bay Bridge
Name of Property
San Francisco and Alameda
Counties, California
County and State
N/A
Name of multiple listing (if applicable)

Section number Photos Page 1

**SFOBB Nomination Update Photograph Log**

Name of Property: San Francisco-Oakland Bay Bridge  
City or Vicinity: San Francisco; Oakland  
County: San Francisco and Alameda Counties  
State: CA  
Name of Photographer: John Huseby / Caltrans District 4 Photography  
Location of Original Digital Files: Caltrans District 4, 111 Grand Ave., Oakland CA 94612

Photo #1 (CA\_San Francisco County\_SFOBB\_0001)  
West Bay Crossing (34-0003), southern side, camera facing west.  
Date of photo: 7/13/2017

Photo #2 (CA\_San Francisco County\_SFOBB\_0002)  
West Bay Crossing (34-0003), upper deck, camera facing southwest.  
Date of photo: 4/3/2020

Photo #3 (CA\_San Francisco County\_SFOBB\_0003)  
West Bay Crossing (34-0003), upper deck, camera facing southwest.  
Date of photo: 4/3/2020

Photo #4 (CA\_San Francisco County\_SFOBB\_0004)  
West Bay Crossing (34-0003), upper deck and center anchorage, camera facing southeast.  
Date of photo: 12/22/2016

Photo #5 (CA\_San Francisco County\_SFOBB\_0005)  
West Bay Crossing (34-0003), lower deck, camera facing northeast.  
Date of photo: 2/1/2021

Photo #6 (CA\_San Francisco County\_SFOBB\_0006)  
West Bay Crossing (34-0003), lower deck, camera facing northeast.  
Date of photo: 2/1/2021

Photo #7 (CA\_San Francisco County\_SFOBB\_0007)  
West Bay Crossing (34-0003), deck structure at center anchorage connection, camera facing southwest.  
Date of photo: 2004. Visual inspection in February 2021 confirms that there have been no changes in this location since 2004.

Photo #8 (CA\_San Francisco County\_SFOBB\_0008)  
West Bay Crossing (34-0003), lower deck, structural detail, camera facing northeast.

**United States Department of the Interior**  
National Park Service

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**National Register of Historic Places**  
**Continuation Sheet**

Section number Photos Page 2

Date of photo: 2/1/2021

Photo #9 (CA\_San Francisco County\_SFOBB\_0009)  
West Bay Crossing (34-0003), tower structural detail, camera facing southeast.  
Date of photo: 2/8/2021

Photo #10 (CA\_San Francisco County\_SFOBB\_0010)  
West Bay Crossing (34-0003), structural detail west of center anchorage, camera facing southwest.  
Date of photo: 2/8/2021

Photo #11 (CA\_San Francisco County\_SFOBB\_0011)  
West Bay Crossing (34-0003), structural detail and seismic damper, camera facing north.  
Date of photo: 2004. Visual inspection in February 2021 confirms that there have been no changes in this location since 2004.

Photo #12 (CA\_San Francisco County\_SFOBB\_0012)  
Yerba Buena Island Crossing (34-0004), eastern portal, upper deck, camera facing southwest.  
Date of photo: 5/20/2020

Photo #13 (CA\_San Francisco County\_SFOBB\_0013)  
Yerba Buena Island Crossing (34-0004), eastern portal, upper deck, camera facing southwest.  
Date of photo: 5/20/2020

Photo #14 (CA\_San Francisco County\_SFOBB\_0014)  
Yerba Buena Island Crossing (34-0004), western portal, upper deck, camera facing northeast.  
Date of photo: 5/20/2020

Photo #15 (CA\_San Francisco County\_SFOBB\_0015)  
Yerba Buena Island Crossing (34-0004), upper deck, camera facing southwest.  
Date of photo: 5/20/2020

Photo #16 (CA\_San Francisco County\_SFOBB\_0016)  
Yerba Buena Island Crossing (34-0004), lower deck, camera facing northeast.  
Date of photo: 5/20/2020

Photo #17 (CA\_San Francisco County\_SFOBB\_0017)  
San Francisco Key System Electrical Substation, camera facing northeast.  
Date of photo: 2/1/2021

Photo #18 (CA\_San Francisco County\_SFOBB\_0018)

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**Continuation Sheet**

San Francisco-Oakland Bay Bridge
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Section number Photos Page 3

San Francisco Key System Electrical Substation, camera facing southwest.  
Date of photo: 2/1/2021

Photo #19 (CA\_Alameda County\_SFOBB\_0019)  
Key Pier and Bay Bridge Electrical Substations, southern facades, camera facing north.  
Date of photo: 2/1/2021

Photo #20 (CA\_Alameda County\_SFOBB\_0020)  
Bay Bridge Electrical Substation, southern facade, camera facing northeast.  
Date of photo: 2/1/2021

Photo #21 (CA\_Alameda County\_SFOBB\_0021)  
Bay Bridge Electrical Substation, southern facade, camera facing northwest.  
Date of photo: 2/1/2021

Photo #22 (CA\_Alameda County\_SFOBB\_0022)  
Key Pier Electrical Substation, southern facade, camera facing northwest.  
Date of photo: 2/1/2021

Photo #23 (CA\_Alameda County\_SFOBB\_0023)  
Key Pier Electrical Substation, western side, camera facing east.  
Date of photo: 2/1/2021

**Paperwork Reduction Act Statement:** This information is being collected for nominations to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.). We may not conduct or sponsor and you are not required to respond to a collection of information unless it displays a currently valid OMB control number.

**Estimated Burden Statement:** Public reporting burden for each response using this form is estimated to be between the Tier 1 and Tier 4 levels with the estimate of the time for each tier as follows:

- Tier 1 – 60-100 hours
- Tier 2 – 120 hours
- Tier 3 – 230 hours
- Tier 4 – 280 hours

The above estimates include time for reviewing instructions, gathering and maintaining data, and preparing and transmitting nominations. Send comments regarding these estimates or any other aspect of the requirement(s) to the Service Information Collection Clearance Officer, National Park Service, 1201 Oakridge Drive Fort Collins, CO 80525.