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SIXTH STREET VIADUCT REPLACEMENT PROJECT
FACT SHEET

PROJECT DESCRIPTION

The Sixth Street Viaduct (also known as the Sixth Street Bridge) is a 3,500-foot bridge in Los Angeles that connects historic Boyle Heights on the east side with the downtown Arts District on the west. The bridge spans the Los Angeles River and the 101 Freeway, local surface roads as well as 18 railroad tracks operated by five different railroad agencies including Union Pacific and Metrolink. The earlier viaduct on this site, built in 1932, was closed for demolition in January 2016.

The new Sixth Street Viaduct was designed by the HNTB-led team that won an international design competition decided by public vote. The viaduct accommodates vehicles and pedestrians, as did the original, and provides dedicated lanes for bikes.

A new 12-acre public park running below the bridge, accessible by multiple stairways and a monumental helical bike ramp, will provide access to much-needed recreational fields with restrooms and a café, the LA River, public art, and a programmed arts plaza. The new bridge will become a destination in Los Angeles as much as a thoroughfare.

The new viaduct, a tied arch bridge referred to as the “Ribbon of Light,” pays homage in its design to the 1932 bridge, which had two pairs of iconic arches over the LA River section of the structure and appeared in countless films, television shows, music videos, and commercials. The new bridge employs a series of 10 pairs of sculptural arches with the tallest pairs placed adjacent to and framing the LA River where the original arches stood and another taller pair that span US101 as a gateway on the east. The canted arches, which allow the bridge to embrace its deck and open to the sky above, recall the iconic beauty of the original bridge and create a new cinematic choreography through sequential views framing the city for travelers moving along the bridge. The new viaduct is the largest bridge project in the history of Los Angeles, with a cost of $588 million.

LOCATION

The Sixth Street Viaduct spans the LA River and the 101 Freeway to connect Boyle Heights on the east side with the downtown Arts District on the west.

KEY DATES	January 2016	Demolition of original 1932 bridge begins
	June 2016	Construction of new bridge foundation begins
	January 2017	Construction of new bridge superstructure begins
	Summer 2022	Bridge opens to vehicles, bicycles and pedestrians
	TBD, Anticipated 2024-2025	PARC project (Park, Arts, River, and Connectivity) scheduled for completion

DESIGN TEAM

HNTB is the prime consultant leading the design team and is the Architect-of-Record and Engineer-of-Record; Michael Maltzan Architecture and Dissing+Weitling, architecture; Hargreaves Jones, landscape architecture; AC Martin, urban planning; Light Projects Limited, bridge lighting; EMI, Geotechnical Engineer of Record; MGE, bridge independent check; Pac Rim Engineering, structural design support; V&A, traffic; NCG and Armeni Consulting Services, construction cost estimating; West Wind Laboratories, wind consultant.

PROJECT LEADERSHIP

- The viaduct is a federal building project through the U.S. Department of Transportation administered by the State of California's Caltrans and is led by the Los Angeles City Bureau of Engineering under City Engineer Gary Lee Moore, in partnership with the City's Bureau of Contract Administration.

CONTRACTOR

- Construction is led by Skanska/Stacy and Witbeck, a Joint Venture as the CMGC.

FACTS & STATE-OF-THE-ART ENGINEERING INNOVATIONS

- Bridge replacement required due to severe degradation of concrete due to alkali silica reactive aggregates used during original construction.
- Designed to remain undamaged from an earthquake happening on average, once every 1,000 years.
- The viaduct is believed to be the longest seismically isolated tied arch concrete bridge in the world.
- EPS, the isolation bearing manufacturer, reports that the isolators used on the viaduct have the highest lateral capacity to vertical load ratio and highest probability against failure of any isolation bearing they ever manufactured.
- The isolators were the first "stiffening" isolator bearings designed to provide a low lateral shear resistance at the design earthquake followed by a large lateral capacity at greater displacements. The impetus for this innovation was the placement of the bearings within the columns, which

provided the motivation to develop a concept that would provide a much more robust design.
  - The Rams new SoFi Stadium's seismically isolated roof uses the "stiffening isolation bearing" developed for the Sixth Street Viaduct.
  - Columns fitted with triple friction pendulum bearings allow for a 36-inch sway in any lateral direction before stiffening. Ultimate bearing displacement capacity is over 50 inches.
  - The new span boasts an additional 40 feet width over the original bridge, totaling 100 feet wide, with dedicated lanes for pedestrians, bicycles and vehicles.
  - 110,000 tons of concrete and 8,250 tons of steel were used to build the new viaduct connecting historic Boyle Heights to the downtown Arts District over the last decade.
  - Each viaduct piling extends up to 165 feet underground, equivalent to a 16-story building.
  - Each of the 10 pairs of arches required 260 cubic yards of concrete, that's more than 65 concrete truck loads per arch.
  - To reduce potential for cracking, liquid nitrogen was injected into the concrete as it was poured to cool it down to ambient temperature. At a rate of four vertical feet per hour, it took 12 to 14 hours of continuous concrete pouring for each arch.
  - The substructure features concrete "Y-Bents" that flow seamlessly into the arches and uses grade 80 reinforcement instead of grade 60 — a first for a California bridge.
  - Earned an Envision Platinum award from the Institute for Sustainable Infrastructure.

OVERALL STATISTICS

- Cast-in-place concrete, network tied arch bridge
- Viaduct is 3,500 feet
- Viaduct is curved along a 5,000-foot radius
- Viaduct is 100 feet wide
- Overall rise from west to east is 63 feet
- 6.47 acres of deck area
- Viaduct crosses: Santa Fe Ave., 18 railroad tracks operated by 5 different agencies, the LA River, Mission Rd., Anderson St., Clarence St., and the 101 and 5 Freeways
- Construction required 110,000 tons of concrete and 8,250 tons of steel

ARCHES & BENTS

- 10 pairs of arches (20 arches total)
- 2 pairs of arches over the railroads rise to 60 feet above the road deck, or 113 feet above ground level
- 7 pairs of typical arches are 30 feet tall
- 1 pair at Boyle Heights is 40 feet tall

- Arches cant outward 9 degrees
- Longest arch spans are 250 feet over the rail lines
- Typical arch span is 200 feet
- Arches are 10 feet wide
- 18 Y-bents (or piers)
- 23 columns (one column supports a portion of the west ramp that is part of the viaduct)
- The viaduct is built on 32 seismic base isolators with triple pendulum friction bearings at columns, abutments and stairs. Viaduct details allow for movement in any direction of up to 30 inches in an earthquake

STAIRS, RAMPS, SIDEWALKS

- 4 stairs connect to the ground east of the river
- 1 stair connects to the arts plaza (west of the river at Santa Fe)
- West Ramp connects to Mateo St.; an East Ramp has two access points (north and south) and connects to Mission Rd.
- There is a 10-foot bike lane on each side of viaduct
- 8-foot sidewalks expand to 14 feet at jump spans (unsupported span between arches)

LIGHTING

- Linear LED lighting built into the traffic barriers provides low (to the ground) level street/pedestrian lighting – minimizes light pollution and adds to the dramatic effect of traveling over the viaduct
- Accent lighting illuminates the underside of the arches from below the deck, controlling light spillage and providing the maximum effect

PARC

When the viaduct is complete, the Bureau of Engineering will begin construction of the Sixth Street Park, Arts and River Connectivity Improvements Project (PARC), 12 acres of open and recreational space under the viaduct, including access to the LA River, an arts plaza, public art, and numerous community amenities such as sports courts, structures for staff, café and restrooms.