KAW RIVER BRIDGE

BIKE/
PEDESTRIAN
CONNECTOR

KAW RIVER BRIDGE
BIKE/PEDESTRIAN CONNECTOR

1.
PROJECT INTRODUCTION

2.
HISTORY & EVOLUTION

3.
COMMUNITY ENGAGEMENT

4.
SITE CONTEXT

5.
CASE STUDIES

6.
DESIGN CONCEPTS

7.
IMPLEMENTATION PLAN

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APPENDIX


el dorado

1.
PROJECT INTRODUCTION

project goals & scope
project details
design team & stakeholder group
project schedule

PROJECT GOALS & SCOPE

PROJECT GOALS

1. Improve public health by increasing active transportation and recreational opportunities.
2. Increase multi-modal transportation options.
3. Improve connectivity to adjacent jurisdictions.
4. Improve quality of life and attract new residents to the urban core.
5. Enhance environmental quality and improve access to regional environmental assets, such as the Kansas River.

PROJECT SCOPE

1. Engineering feasibility
2. Concept design
3. Community engagement
4. Implementation plan
5. Trail connections to Kaw Valley Levee and Riverfront Heritage Trail

PROJECT DETAILS

A MID-AMERICA REGIONAL COUNCIL (MARC) PLANNING SUSTAINABLE PLACES GRANT:

Allowed the Unified Government of Wyandotte County to hire a design team to complete an engineering assessment and high level conceptual design of alternative uses for the bridge that include a trail and potential enterprises such as a restaurant or other commercial uses.

THE CITY OF KANSAS CITY, MISSOURI:

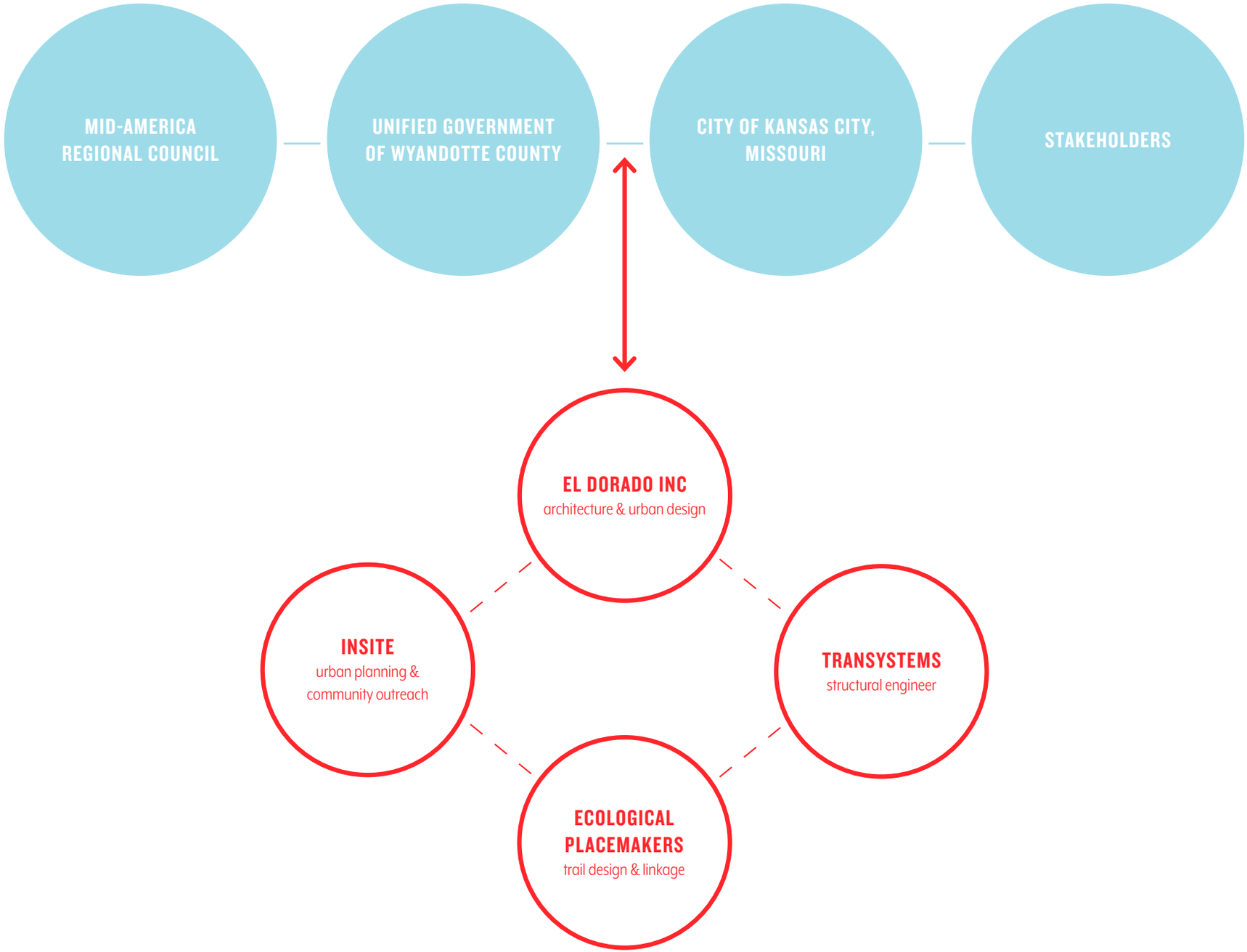
Owner of the bridge, but the bridge is physically located in Kansas City, Kansas.

THE UNIFIED GOVERNMENT OF WYANDOTTE COUNTY:

Project sponsor, partnering with the city of Kansas City, Missouri.

FLYING TRUSS LLC:

Bridge lessee to explore a potential bike or pedestrian trail with a 50-year lease agreement, four years of which allow for structural analysis and conceptual design of the bridge.


MID-AMERICA REGIONAL COUNCIL
UNIFIED GOVERNMENT OF WYANDOTTE COUNTY
CITY OF KANSAS CITY, MISSOURI
STAKEHOLDERS
EL DORADO INC
architecture & urban design
INSITE
urban planning & community outreach
TRANSYSTEMS
structural engineer
ECOLOGICAL PLACEMAKERS
trail design & linkage

DESIGN TEAM & STAKEHOLDER GROUP

DESIGN TEAM MEMBERS

David Dowell	el dorado inc
Chris Burk	el dorado inc
Kara Schippers	el dorado inc
Brock Traffas	el dorado inc
Daniel Serda	inSITE planning
Megan Painter	inSITE planning
Roberto Castillo	inSITE planning
Brett Shoffner	Ecological Placemakers
Matt Johnson	TranSystems
Frank Weatherford	TranSystems

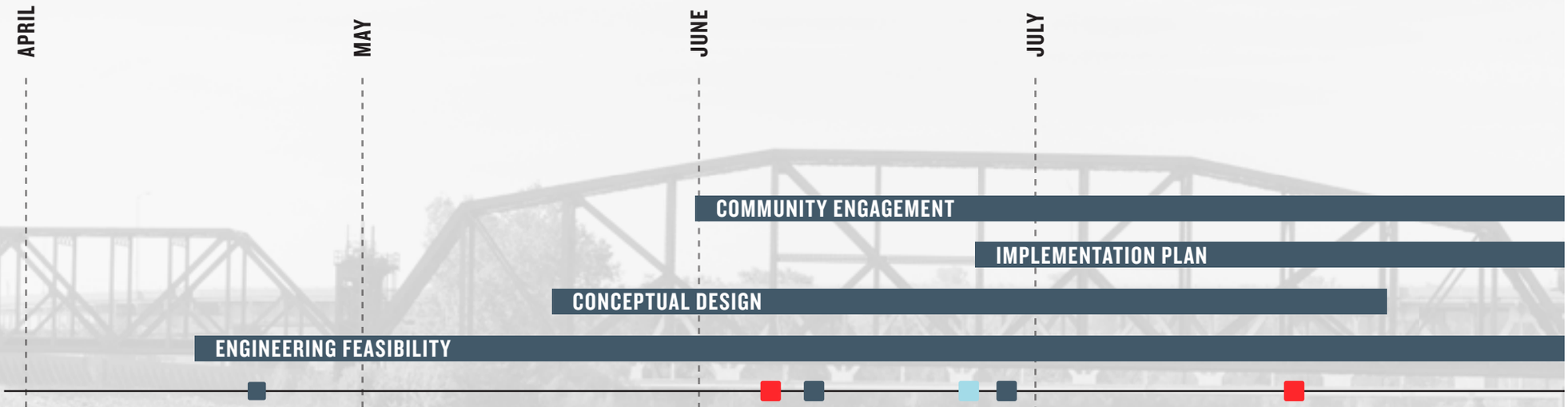
CLIENT GROUP

Lideana Laboy	UG - Project Manager
Beth Dawson	MARC - Senior Land Use Planner - Client
Mario Vasquez	KCMO - Public Works - Property Owner

STAKEHOLDER MEMBERS

N/A	American Crane & Tractor - Property Owner
Tina Medina	Armourdale Renewal Association
Melissa Clark	Fairfax Industrial Association - Executive Director
Cathy Smith	Faultless Starch
John McGurk	Flying Truss LLC - Bridge Lessee
Mike Zeller	Flying Truss LLC - Bridge Lessee
Steve Foutch	Foutch Brothers - Property Owner
James “Bundy” Jenkins	Kaw Valley Drainage District - Commissioner
Joseph Roth	Kaw Valley Drainage District
Megan Crigger	KCMO - Director of Creative Services
Katherine Cartter	KCMO - Economic Development Analyst
Wes Minder	KCMO Engineer - Bike/Ped Coordinator
Kyle Elliott	KCMO - Planner
Tom Kimes	KCMO - Waterways Division / KC Rowing Club
Bill Haw Jr.	Livestock Exchange LLC - Property Owner
Bill Haw Sr.	Livestock Exchange LLC - Property Owner
Kathi Butler	Prime/Premier Investments - Property Owner
Melissa Sieben	UG - County Administrator
Rob Richardson	UG - Director of Planning
Jeff Fisher	UG - Director of Public Works
Rick Behrens	UG - Levee Trail Coordinator
Troy Shaw	UG - Public Works - Engineering Division
Brent Thomson	UG - Public Works - Engineering Division
Geoffrey Henggeler	U.S. Army Corps of Engineers - Safety Coordinator
Anthony Hall	U.S. Army Corps of Engineers
Scott Brown	West Bottoms Association / Central Industrial District Association

PROJECT SCHEDULE



KANSAS RIVER BOAT TOUR
Wednesday, April 26th
(3-6 pm, Kaw Point)

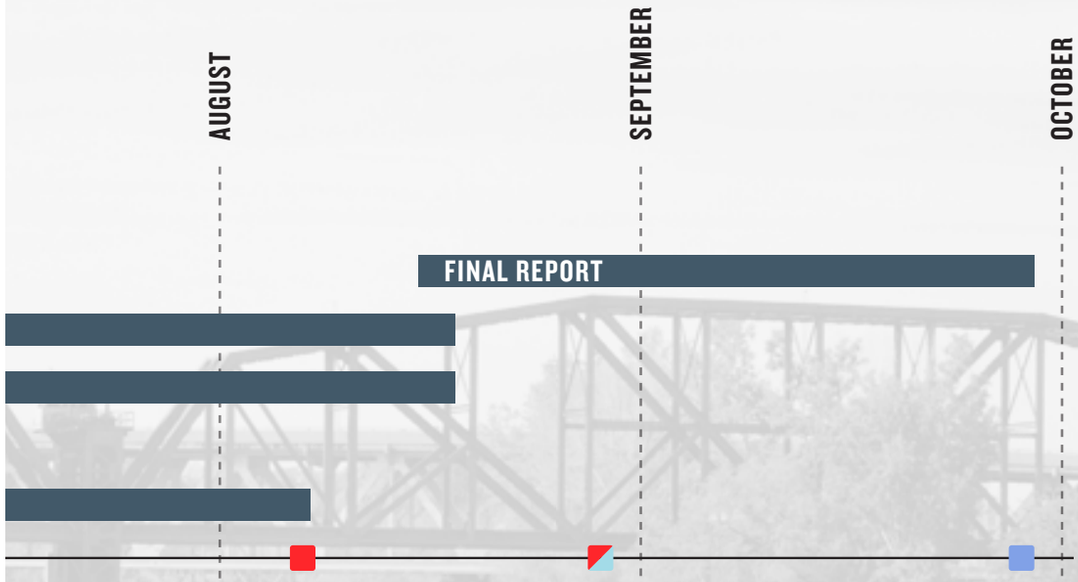
STAKEHOLDER MEETING #1
Thursday, June 8th
(4-5:30 pm, Irene H. Ruiz Library)
Agenda: Scope, Site Analysis, Vision

LEVEE FEST
Saturday, June 10th
(11-2 pm, Armourdale Levee Trail)

PUBLIC MEETING #1
Thursday, June 22nd
(6:30 pm, Wagstaff Theatre)
Agenda: Project Introduction

ARA SUMMER CAMP
Thursday, June 27th
(1-2:30 pm, Armourdale Community Ctr.)

CLIENT MEETING
Tuesday, July 25th
(3:30-5 pm, Unified Govt. Office)
Agenda: Project Background, Review of Stakeholder Meeting #1 and Public Meeting #1, Preliminary Concepts



STAKEHOLDER MEETING #2
Thursday, August 10th
(3:30-5 pm, Irene H. Ruiz Library)
Agenda: Review of Previous Presentations, Preliminary Concepts

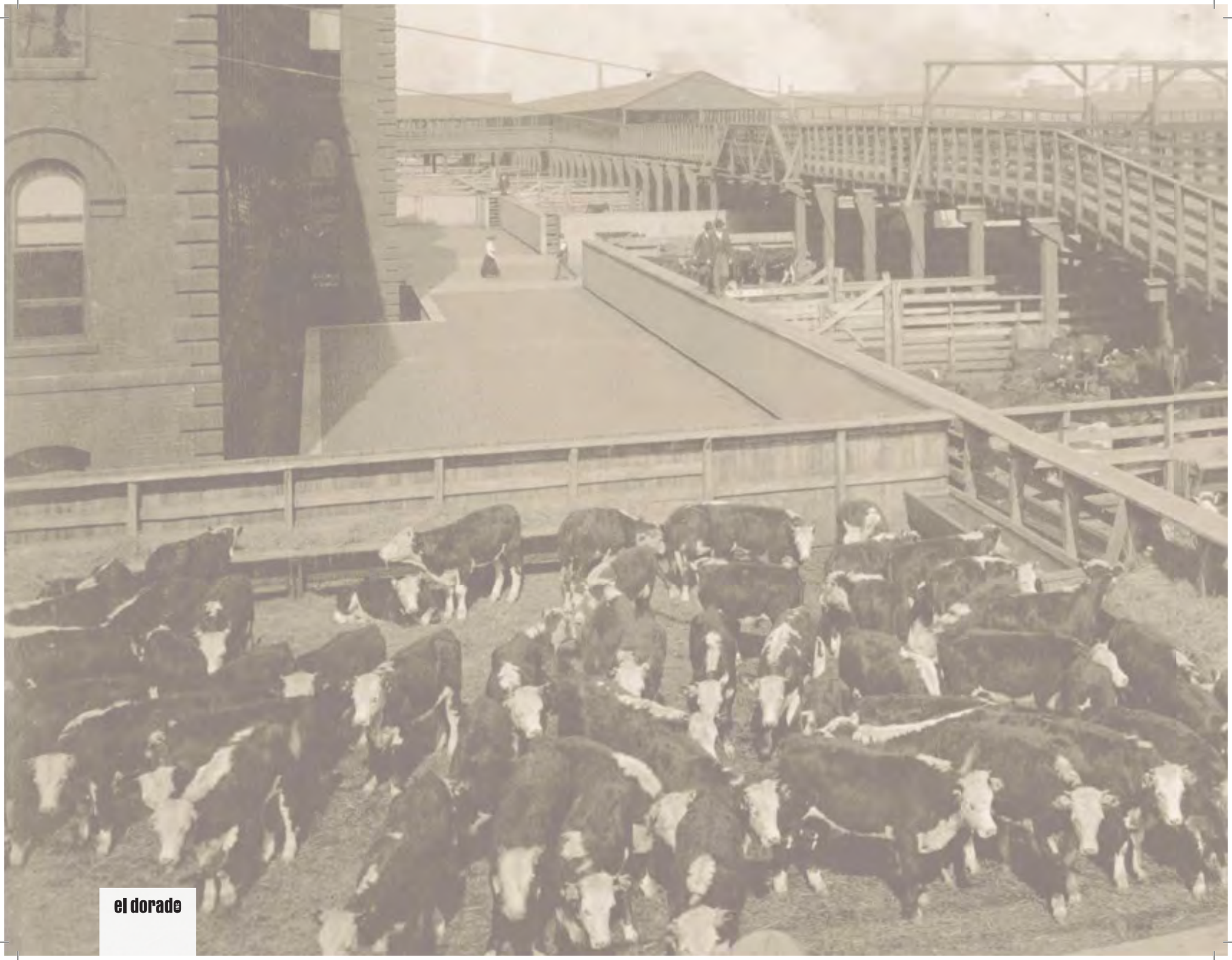
STAKEHOLDER MEETING #3
Wednesday, August 30
(3:30-4:30 pm, Wagstaff Theatre)
Agenda: Concept Development, Implementation Plan

PUBLIC MEETING #2
Wednesday, August 30
(5:30-7 pm, Wagstaff Theatre)
Agenda: Review of Public Meeting #1, Concept Development, Implementation Plan

DRAFT OF FINAL REPORT
Friday, September 29th

Spanning six months, the project focused on engineering feasibility, community engagement and improvement, trail development and connectivity, conceptual design explorations and an implementation plan, all culminating in this report.

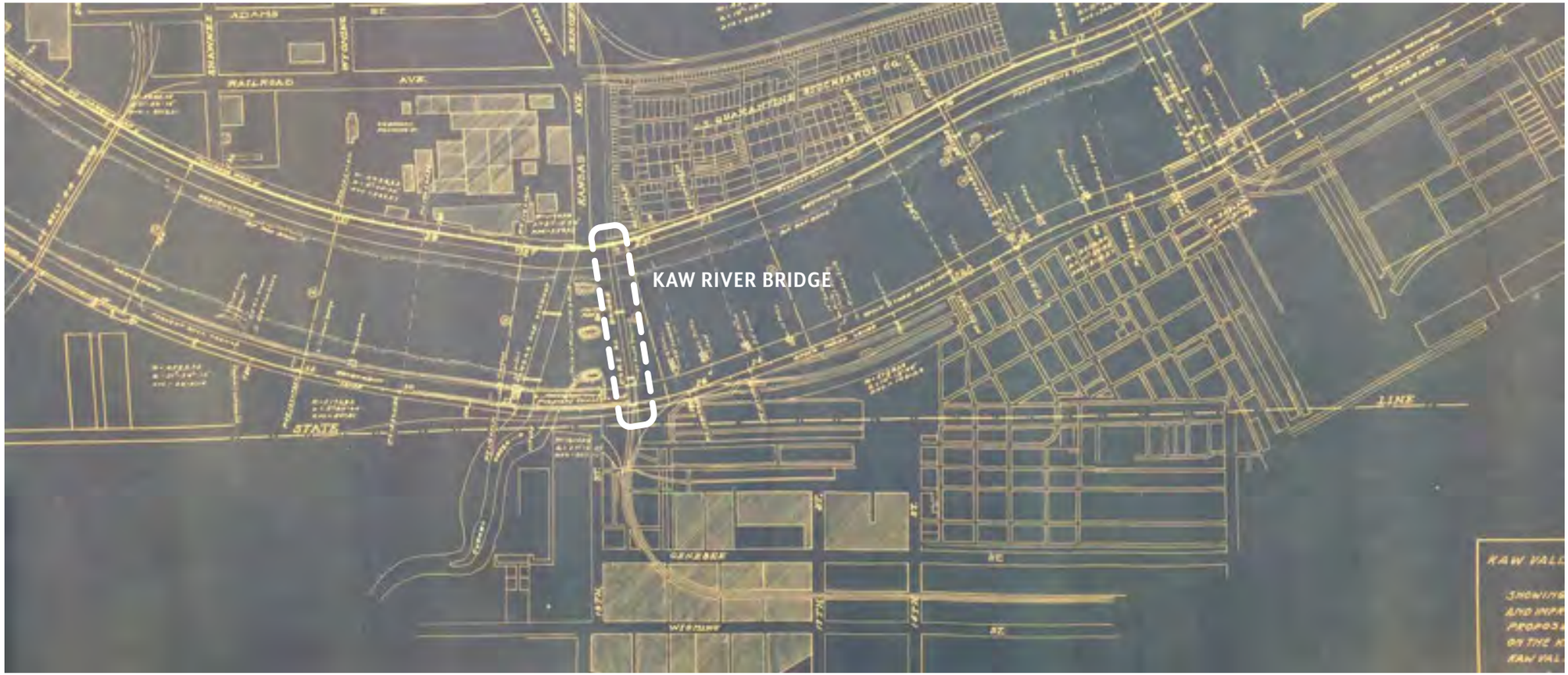
Events and meetings took place on both sides of the State Line, promoting a sense of shared purpose and benefit.

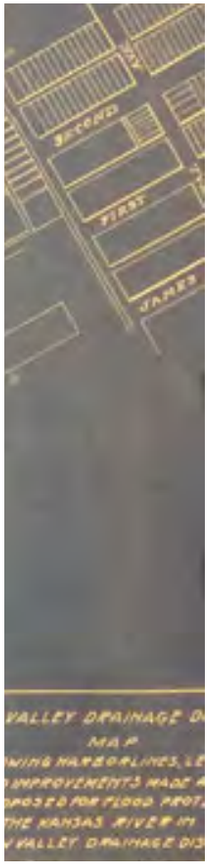


el dorado

2.
HISTORY & EVOLUTION

kaw river bridge & kansas city's regional economy
engineering changes
historical sources & further information


KAW RIVER BRIDGE
ADAMS
RAILROAD
AVE.
STATE
LINE



KAW RIVER BRIDGE & KANSAS CITY'S REGIONAL ECONOMY

From the time of its initial construction in the 1880s, the Kaw River Bridge served as essential infrastructure in the growth and expansion of Kansas City's bi-state economy. The original crossing, a wood-pile bridge erected by the Chicago Rock Island and Pacific Railway, played a central role in distributing freight and livestock to the Kansas City Stockyards. The crossing also served as an important route for cargo being shipped throughout the region.

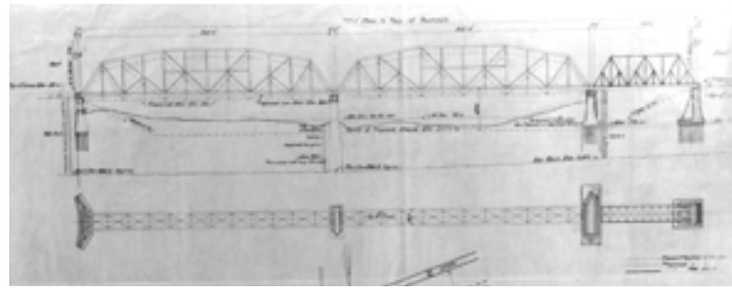
The original wood-pile bridge was washed away by the raging waters of the 1903 Kansas River Flood, which devastated the West Bottoms and the region's economy. In the immediate aftermath, the Rock Island was forced to divert its trains to the Missouri Pacific Bridge downstream, which slowed movement of the company's freight through Kansas City for up to two hours. Within a month, the Rock Island had replaced the original wood pile bridge with a similar temporary structure, and soon began planning for a permanent replacement.

In 1905, the Rock Island hired the American Bridge Company of New York to build the new Kaw River Bridge at an estimated cost of $170,000 ($4.5 million in 2017 dollars). The new structure contained two Pennsylvania-style steel trusses, a design commonly used for both railroad and vehicular bridges during the early twentieth century. Pennsylvania trusses are distinguished by a camel-back profile, and reinforcement with 6 full-length and 6 half-length pin-connected struts along each face. Each approach is framed by an ascending arch tied together at the top by a series of pin-connected plates.

The new span was originally set at an elevation two feet higher than its predecessor. The temporary wood pile bridge served as a falsework for the new steel superstructure. The concrete foundations for each of the bridge abutments were set forty feet below the riverbed.

That same year, the Kaw Valley Drainage District (K.V.D.D.) was chartered by the Kansas legislature to build and maintain levees and other flood control improvements in Armourdale and the West Bottoms. The K.V.D.D. also was authorized to control, regulate and maintain the channel of the Kansas River, as well as "to prescribe, regulate and fix the height of" bridges across the Kansas River.

These powers would be the subject of lawsuits filed by various railroads, which challenged the K.V.D.D.'s powers as an unconstitutional interference in interstate commerce. One of those cases eventually reached the U.S. Supreme Court. The resulting body of case law firmly established the K.V.D.D.'s authority to regulate railroad bridges and approaches to ensure they did not interfere with the operation or maintenance of the Kansas River levees.



ENGINEERING CHANGES

The Kaw River Bridge opened to service for the Chicago, Rock Island and Pacific Railway in the summer of 1906. The bridge's two trusses each spanned 302 feet, with a total crossing length from bank to bank of approximately 700 feet.
In 1912, a third span was added to the Kaw River Bridge. Also built by the American Bridge Company, the additional span, a smaller, prefabricated Baltimore Truss, was required when the Kaw Valley Drainage District's (K.V.D.D.) expanded the right (east) bank of the Kansas River to improve flow rates and mitigate against future flooding.

The third span connected the original, easternmost pier, which abutted the original east Harbor Line, to the revised east bank of the Kaw River levee system. The channel expansion widened the Harbor Line by approximately 120 feet. The third span represents a physical resolution of the legal challenges to the K.V.D.D.'s authority over the bridges and abutments in the river channel. Engineered drawings in the Kansas City Stockyards Collection of the Kansas City Public Library annotate the consent and approval of both the Rock Island and the K.V.D.D. to the expanded river crossing. Similar changes were made to other bridges downstream.

During the mid-20th century, additional flood control improvements initiated by K.V.D.D. would require further significant changes to the Kaw River Bridge. In 1949, as part of a $10 million federal flood control program in Wyandotte County, the Drainage District requested bids to install screw lift mechanisms on the Kaw River and Union Pacific Bridges. The U.S. Army Corps of Engineers (USACE) awarded the $309,332 contract ($3.2 million in 2017 dollars) for the KRB lift mechanisms to Kansas City, Kansas-based L.G. Barcus & Sons Construction.

In 1950, lift spans were erected on each of the Kaw River Bridge's piers, along with control rooms and motor-driven screw jack mechanisms on the east end of each Pennsylvania truss. The screw jacks were designed to lift the entire bridge during a flood event, to prevent damming caused by the accumulation of debris along the face of the bridge structure. In 1964, during a staged flood control exercise, USACE engineer teams successfully utilized the four motor-driven screw jacks to lift the entire bridge eight feet in less than 10 minutes.

After 1980, ownership of the Kaw River Bridge shifted to the St. Louis Southwestern Railway Company, which had acquired some assets of the Chicago, Rock Island and Pacific Railway Company during the latter company's bankruptcy and subsequent court-ordered dissolution.

In 1987, the City of Kansas City, Missouri acquired title to the bridge, easements and related property near the former Kansas City Stockyards as part of land assembly to provide additional parking for Kemper Arena. As part of the negotiation of title, the Kaw Valley Drainage District permanently lifted the entire bridge into a locked, open configuration, at an estimated cost of $25,000.

Special thinks to Joanna Marsh, Special Collections Librarian of The Kansas City Public Library for facilitating access and use of the KC Stockyards archives.

HISTORICAL SOURCES & FURTHER INFORMATION

BOOKS & NEWSPAPERS

"Rock Island Completes Bridge at Kansas City." *Topeka Daily Capital* (Topeka, Kan.), June 23, 1903, p.6.

"Rock Island Begins Work on Their New Bridge." *Kansas City Globe* (Kansas City, Kan.), September 25, 1905, p.1.

American Bridge Company of New York, *Illustrations of Typical Railway and Highway Bridges*. New York: January 1908, University of Michigan Libraries / HathiTrust Digital Library.

"To Raise a Rail Bridge; Contract for Rock Island Span Goes to Barcus Firm." *Kansas City Times* (Kansas City, Mo.), December 8, 1949, p.43.

"Low in Span Lift Bids; Kansas City, Kansas, firm offers $309,332 figure for project." *Kansas City Times* (Kansas City, Mo.), November 30, 1949, p.29.

Karl L. Peterson, "Everything for a Flood but Water." *Kansas City Times* (Kansas City, Mo.). March 14, 1964, p.26.

Historic images courtesy of Kansas City Public Library.

HISTORICAL MAPS

C.R.I. & P. R'y. Kansas City Terminal Division. Kaw River Bridge, Kansas City. *General Plan of Present and Proposed Structures.* Office of Engineer B&B, Chicago, March 14, 1905. Series 3: Transportation Infrastructure, Subseries 3-2: Rivers, Roads, and Railways, 1894-1954, OS f.2, #51, *Kansas City Stockyards Collection* (SC167), Missouri Valley Special Collections, Kansas City Public Library, Kansas City, Mo.

Kaw Valley Drainage Board. *Map Locating Chicago, Rock Island & Pacific Ry. Bridge with reference to Harbor Line's* [sic]. Approved by Kaw Valley Drainage Board, January 29, 1910. Series 2: Flood Control in the Kaw Valley Drainage District, Subseries 2-2: Kansas and Missouri Rivers, 1885-1976, OS f.2, #21, *Kansas City Stockyards Collection* (SC167), Kansas City Public Library.

Chicago, Rock Island and Pacific Ry. *Main Line Over Kaw River - General Plan Showing Proposed Changes of Kaw River Bridge.* N.d., Series 3: Transportation Infrastructure, Subseries 3-2: Rivers, Roads, and Railways, 1894-1954, OS f.3, #76, *Kansas City Stockyards Collection* (SC167), Kansas City Public Library.

General Layout showing the Rock-Island Track System and Kansas Avenue between Adams and Genessee Streets. N.d., Series 3: Transportation Infrastructure, Subseries 3-2: Rivers, Roads, and Railways, 1894-1954 and n.d., OS f.3, #76, *Kansas City Stockyards Collection* (SC167), Kansas City Public Library.

Kansas City Stock Yards. *Map showing the stretch of Kansas River between K.C. Terminal Ry. Bridge and James Street Bridge.* Kansas City Wyandotte Co. Kansas. Office of H.A. Wise, Engineer, October 11, 1912. Series 2: Flood Control in the Kaw Valley Drainage District, Subseries 2-2: Kansas and Missouri Rivers, 1885-1976, OS f.1, #19, *Kansas City Stockyards Collection* (SC167), Kansas City Public Library.

LEGAL SOURCES

Kansas Legislature. Kansas Statutes, Chapter 24, Article 4; incorporating General Statutes of 1905: Chapter 31, Article 3: *Drainage Districts.*

Kansas Supreme Court. *Kaw Valley Drainage District v. Kansas City Southern Railway Co., Kaw Valley Drainage District v. Kansas City Terminal Railway Co.* Nos. 18,064 and 18,065. 87 Kan. 272 (1912).

United States Supreme Court. *Kansas City Southern Railway. Co. v. Kaw Valley Drainage District*, 233 U.S. 75 (1914).

Kansas Supreme Court. *Kaw Valley Drainage District v. Missouri Pacific Railway Co.*,161 Pac. 937 (1916).

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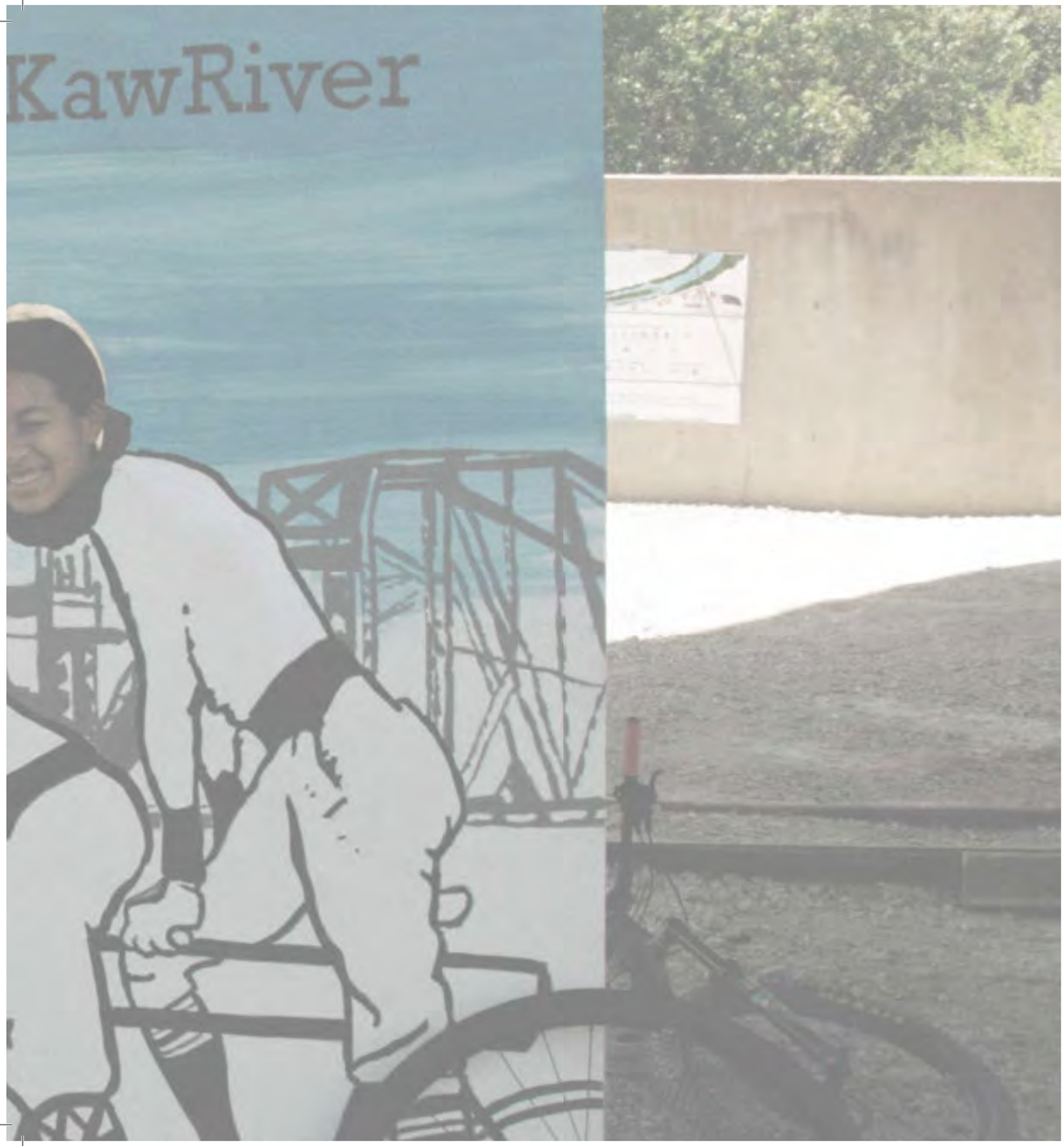


3.
COMMUNITY ENGAGEMENT

kansas river boat tour
levee fest
armourdale summer camp
public meetings
additional outreach

KANSAS RIVER BOAT TOUR
APRIL 26, 2017; KAW POINT

To become familiar with the bridge and the ecosystem surrounding it, the design team and client group first came together to tour the Kaw River.

Viewing the bridge and surrounding context from the river was an effort to give the design team and client group a more holistic, respectful view of the environment they would be working in.

A previous boat tour for the design team also covered the Missouri River, moving under the Jordan "Buck" O'Neil Bridge, Heart of America Bridge, and finally the Christopher S. Bond Bridge, with numerous railway bridges in-between. This tour emphasized the history of Kansas City's bridges and the roles they play in conveying in all types of traffic, vehicular, rail lines, pedestrians, and cyclists, connecting numerous neighborhoods, cities, and two states.


wRiver

LEVEE FEST
JUNE 10, 2017; ARMOURDALE LEVEE TRAIL

DOT EXERCISE RESULTS:

I would most likely visit this bridge if it had...

...a walking and biking trail.

★★★★★★★★★★★★★★
★★★★★★★★★★★★★★
★★★★★★★★

...kayaking and boating

★★★★★★★★★★★★★★

...a place to enjoy views

★★★★★★★★★★★★★★

...a place for kids to learn about the river

★★★★★★★★

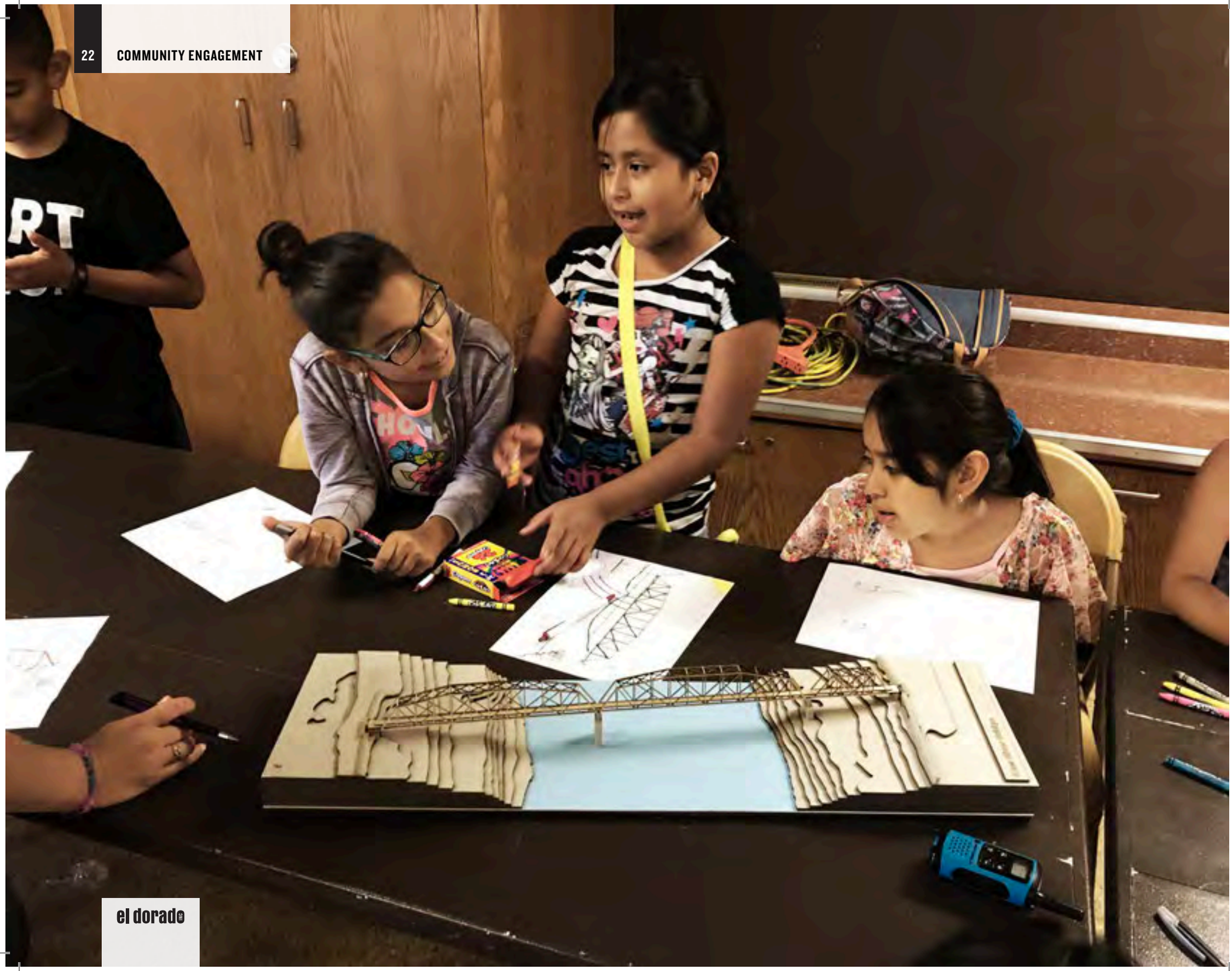
...a restaurant

★★★★★★★★

The design team set up a booth at Levee Fest, a day of food, community, and activities to bring awareness to the ongoing efforts to expand the levee trail. Because a rehabilitated Kaw River Bridge has the potential to be the centerpiece of an expanded levee trail, this proved to be an ideal event to bring awareness to the project as well.

Engaging with the public, we posed a simple question, "How could the abandoned bridge directly across from Kemper Arena become a landmark destination and bike trail connection?"

Numerous programs and uses for the bridge were discussed, with most respondents suggesting the most appropriate way to rehabilitate the bridge is for it to become a bike and pedestrian connector.

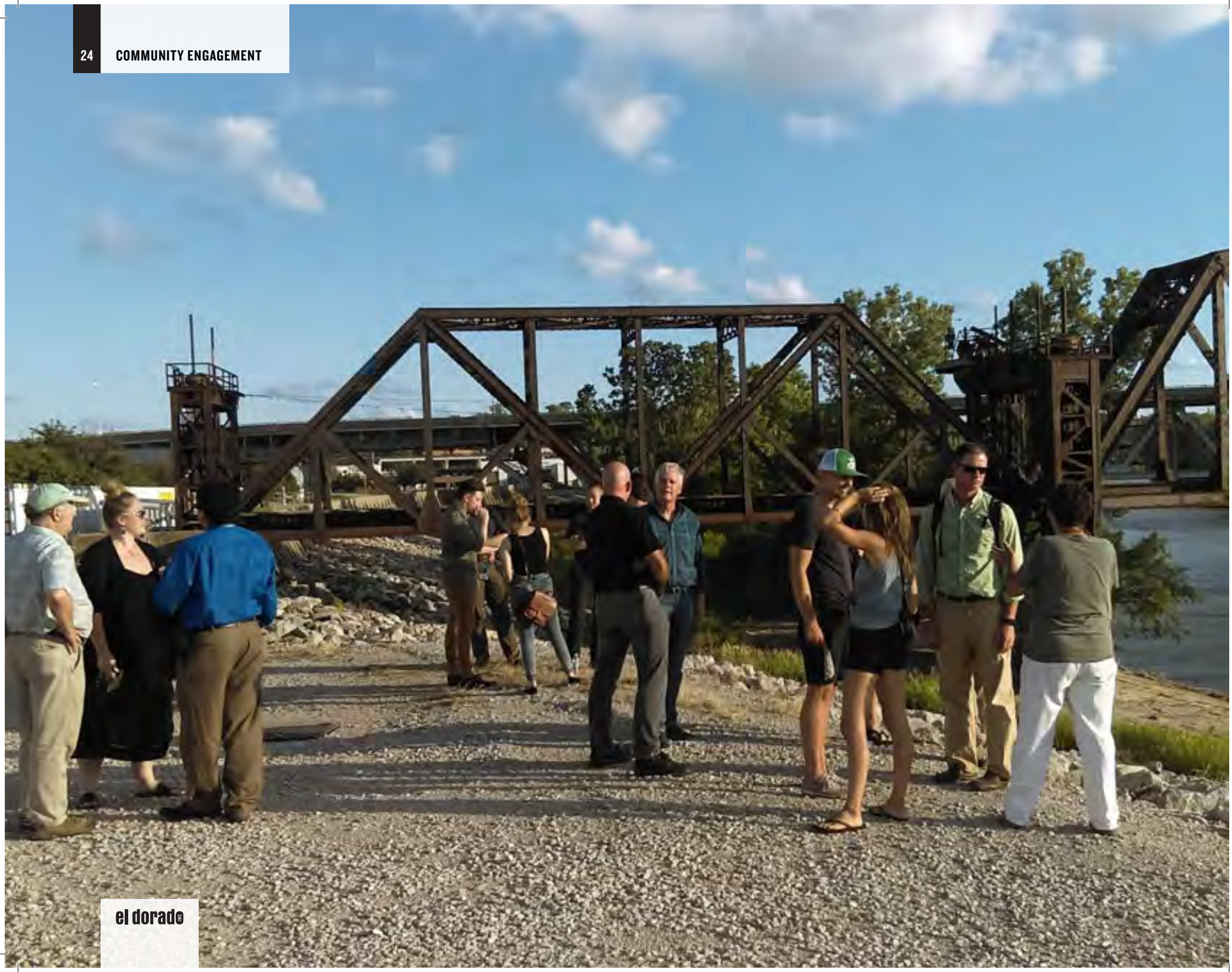


ARMOURDALE SUMMER CAMP
JUNE 27, 2017; ARMOURDALE COMMUNITY CENTER

The design team spent an afternoon with a group of 30 kids attending Armourdale Summer Camp. They discussed the roles of architects, engineers, and planners on a project like Kaw River Bridge. Topics covered included precedents, what the kids thought about the bridge and their neighborhood, and where they would go if they could bike anywhere.

The day culminated in an activity that asked the kids to draw their ideal bridge reuse, assuming the role of architect, engineer, or planner. They were asked to envision what goes on the bridge, what goes on the banks, and what events could even take place under the bridge.

Ideas ranged from zip lines to slides to swings atop the bridge.

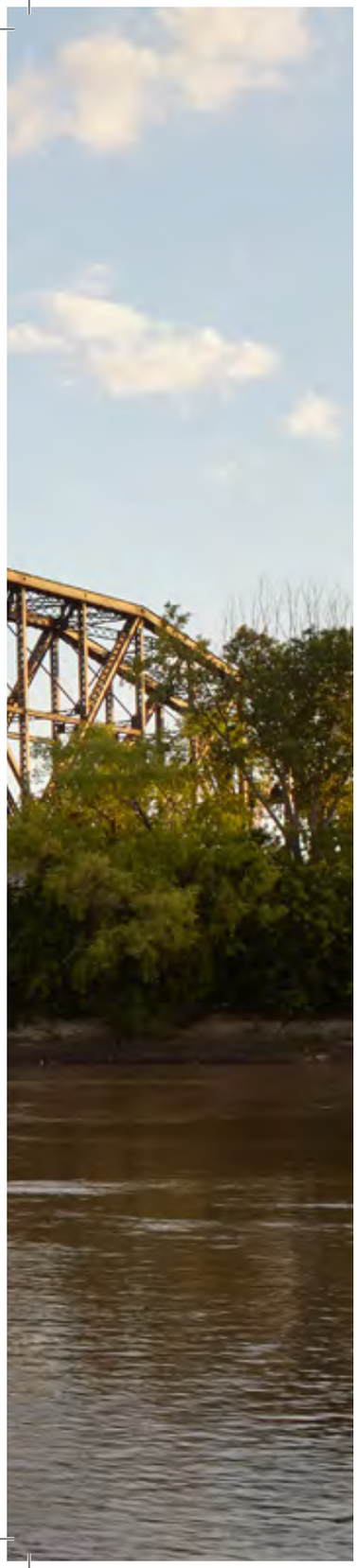


PUBLIC MEETINGS
JUNE 22, 2017 & AUGUST 30, 2017; WAGSTAFF THEATRE

Both public meetings were held in Wagstaff Theater in the American Royal Complex, immediately adjacent to the Kaw River Bridge.

The first public meeting introduced the goals and intentions of the project, the history of the bridge and adjacent neighborhoods, infrastructure and connections that exist today, precedent studies to illustrate comparable projects in other places, and the potential economic impacts that a project like this can have.

The second public meeting focused on clarifying the goals of the project and the feasibility study. We reviewed site conditions and the bridge structural analysis. We presented bridge re-purposing design concepts, broken into three phases along with off-structure approaches to the east and west, along with suggested parking areas.



ADDITIONAL PUBLIC OUTREACH MEETINGS & TOURS

01. WESTSIDE HOUSING MEETING
April 20

02. KCDC STUDIO CRITIQUE
May 9

03. ARMOURDALE RENEWAL MEETING
May 15

04. KVDD MEETING
May 24

05. LIVESTOCK EXCHANGE MEETING
June 26

06. WEST BOTTOMS CID MEETING
July 17

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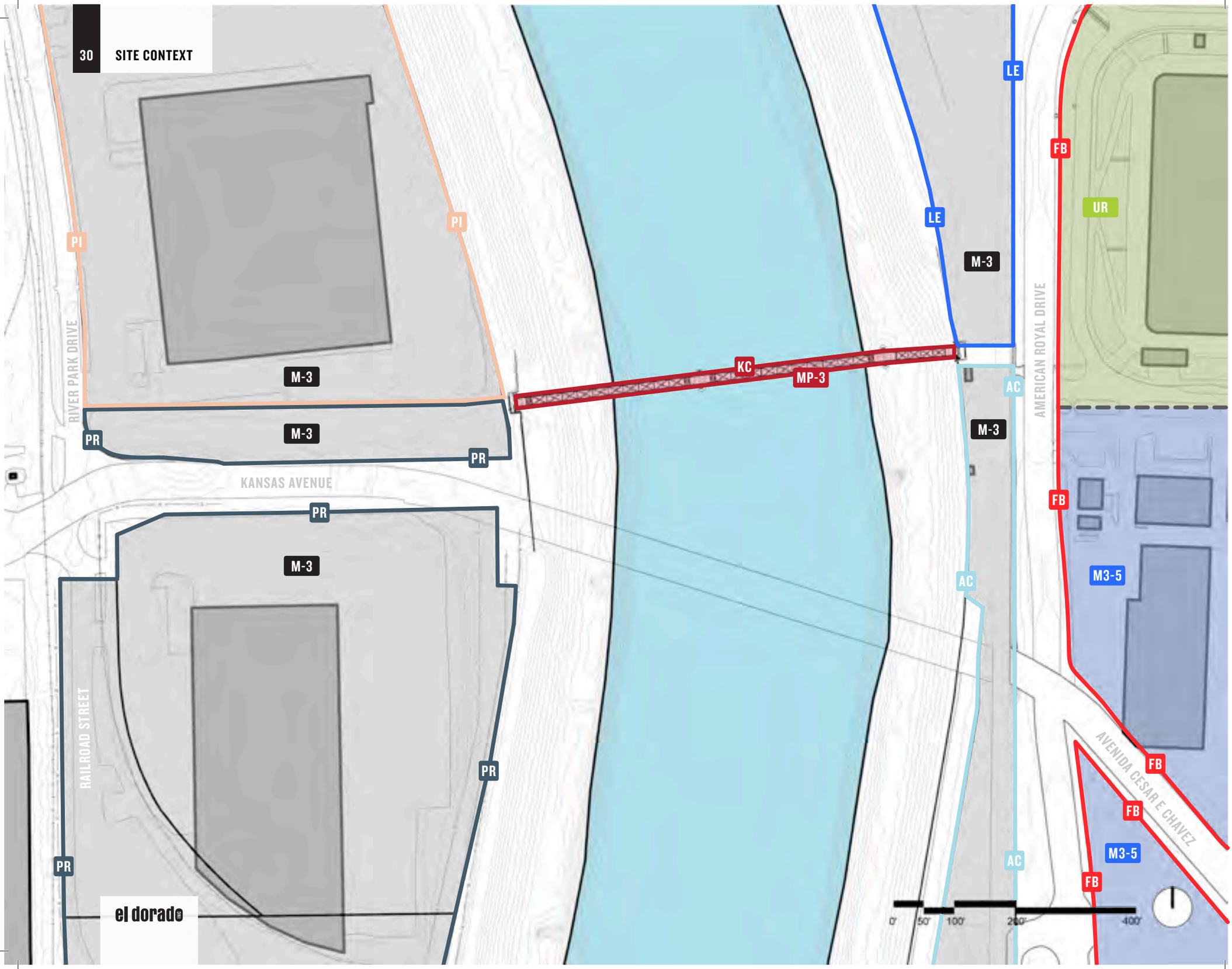
4.
SITE CONTEXT*

adjacent site analysis
topography & bridge elevation
existing connections
potential improvements
future connections

** The design team has made every effort to obtain the most up-to-date and accurate information available. However, some of the content in this section was generated from numerous sources, some of which may contain discrepancies from that which is being shown. Any further development will require a complete, up-to-date survey of the project site.*


PI
PI
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M-3
M-3
PR
PR
KANSAS AVENUE
PR
M-3
RAILROAD STREET
PR
PR
KC
MP-3
LE
LE
M-3
AC
M-3
AC
AC
AMERICAN ROYAL DRIVE
FB
UR
FB
M3-5
FB
FB
M3-5
FB
AVENIDA CESAR E CHAVEZ
0'
50'
100'
200'
400'

ADJACENT PROPERTY OWNERS & ZONING

- FB — Foutch Brothers
- AC — American Crane & Tractor
- LE — Livestock Exchange
- PI — Premier Investments
- PR — Prime Investments
- KC — Kansas City, Missouri
- M-3 — UG: M-3 Zoning
- MP-3 — UG: MP-3 Zoning
- UR — KCMO: UR Zoning
- M3-5 — KCMO: M3-5 Zoning

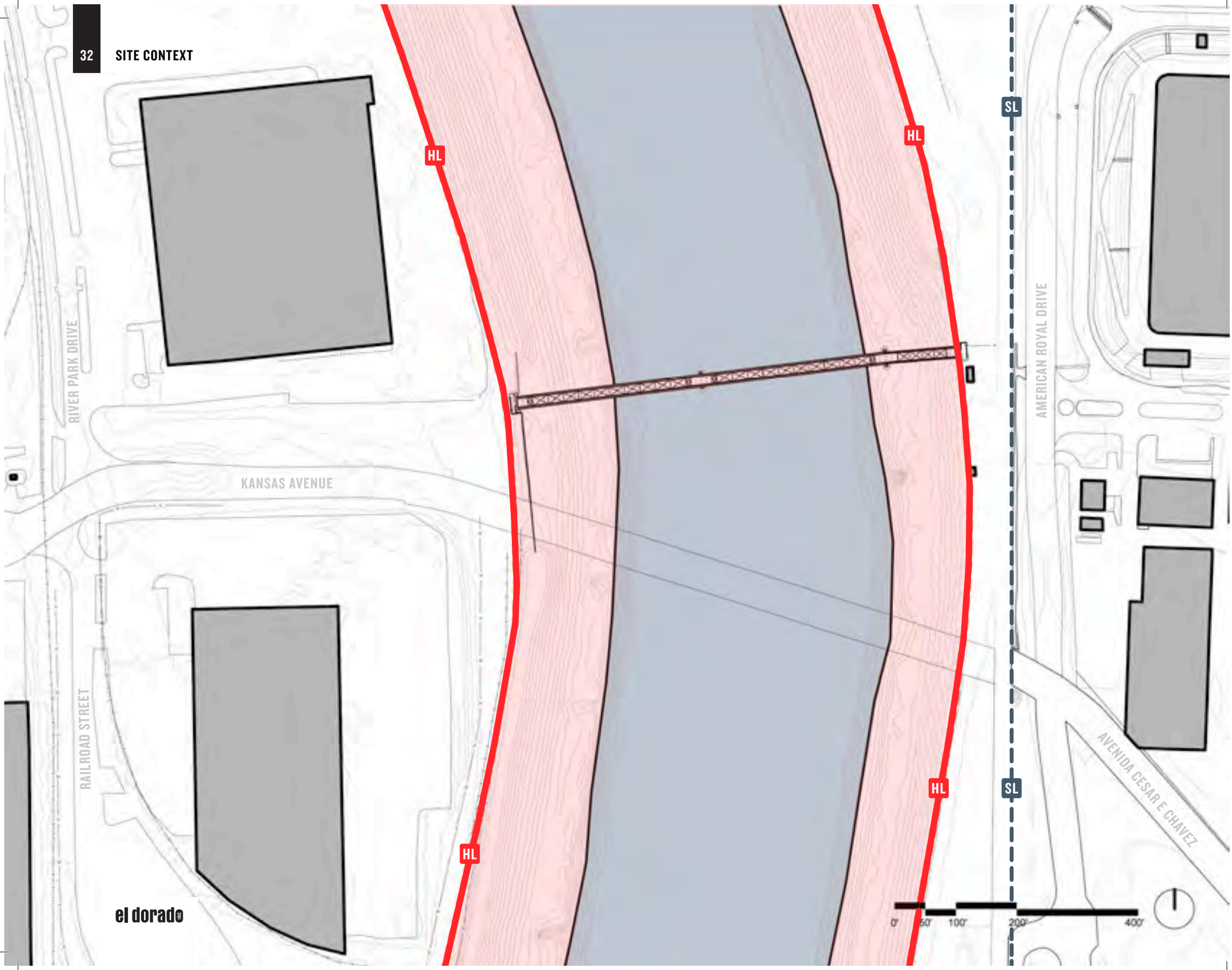
Adjacent properties are largely zoned M-3 in Kansas or M3-5 in Missouri, meaning “heavy industrial use.” One exception is a portion of the parcel owned by Foutch Brothers that contains Kemper Arena. This building is proposed to be redeveloped into a youth sports hub and health clinic, thus the UR, or “urban redevelopment” zoning.

The undeveloped parcel of land owned by Livestock Exchange LLC. to the north east of the bridge is currently zoned M-3. It is not likely to be an industrial use if developed in the future, though the zoning will remain the same.

While not currently zoned, the bridge will need to be for future development. It is anticipated it will be zoned MP-3, meaning “planned heavy industrial,” per recommendation from UG Department of Urban Planning & Land Use.

SOURCES:

KCK DotMaps
KCMO Parcel Viewer
1993 Holmes Survey of Parcel 901401
1985 Rhodes Survey of CRIP Bridge
1999 LTD Engineering Survey of KCK Parcels 258200, 258201, & 258202
2014 BHC Rhodes Survey of KCK Parcel 901400 and KCMO Parcels 214579 & 214578


HL
HL
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SL
SL
RIVER PARK DRIVE
KANSAS AVENUE
RAILROAD STREET
AMERICAN ROYAL DRIVE
AVENIDA CESAR E CHAVEZ
0'
50'
100'
200'
400'

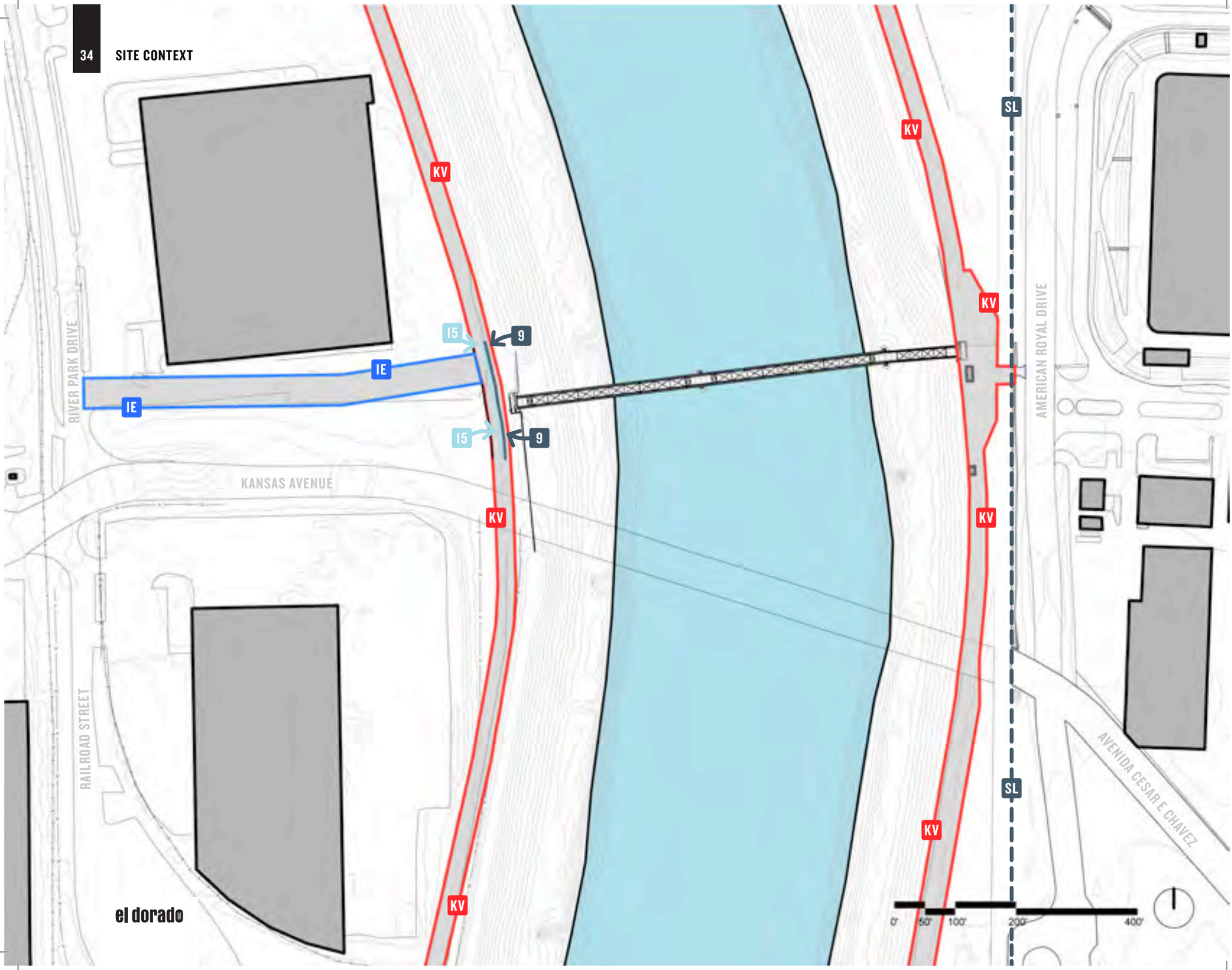
US HARBOR LINE

The U.S. Harbor Line is the perimeter of the flood management system to the Kansas River. The channel contained by this line is under the authority of the U.S. Army Corps of Engineers in cooperation with the local authority, in this case, Kaw Valley Drainage District. (KVDD)

Under federal law (33 USC 404), Harbor Lines may be defined by the Secretary of the Army to preserve and protect public harbors. Development within the Harbor Lines is typically restricted to promote floodwater management and erosion control. Any encroachments or other improvements within the Harbor Lines are subject to regulatory review and approval by both the U.S. Army Corps of Engineers and KVDD.

SOURCES:

KCK DotMaps
KCMO Parcel Viewer
1993 Holmes Survey of Parcel 901401
1985 Rhodes Survey of CRIP Bridge
1999 LTD Engineering Survey of KCK Parcels 258200, 258201, & 258202
2014 BHC Rhodes Survey of KCK Parcel 901400 and KCMO Parcels 214579 & 214578


KV
SL
IE
I5
9
RIVER PARK DRIVE
KANSAS AVENUE
RAILROAD STREET
AMERICAN ROYAL DRIVE
AVENIDA CESAR E CHAVEZ
0'
50'
100'
200'
400'

EASEMENTS
KAW VALLEY DRAINAGE DISTRICT

- KV — KVDD Permanent Right-of-Way
- IE — KVDD Ingress and Egress
- 9 — 9' KVDD Easement
- 15 — 15' KVDD Easement
- SL — KS/MO State Line

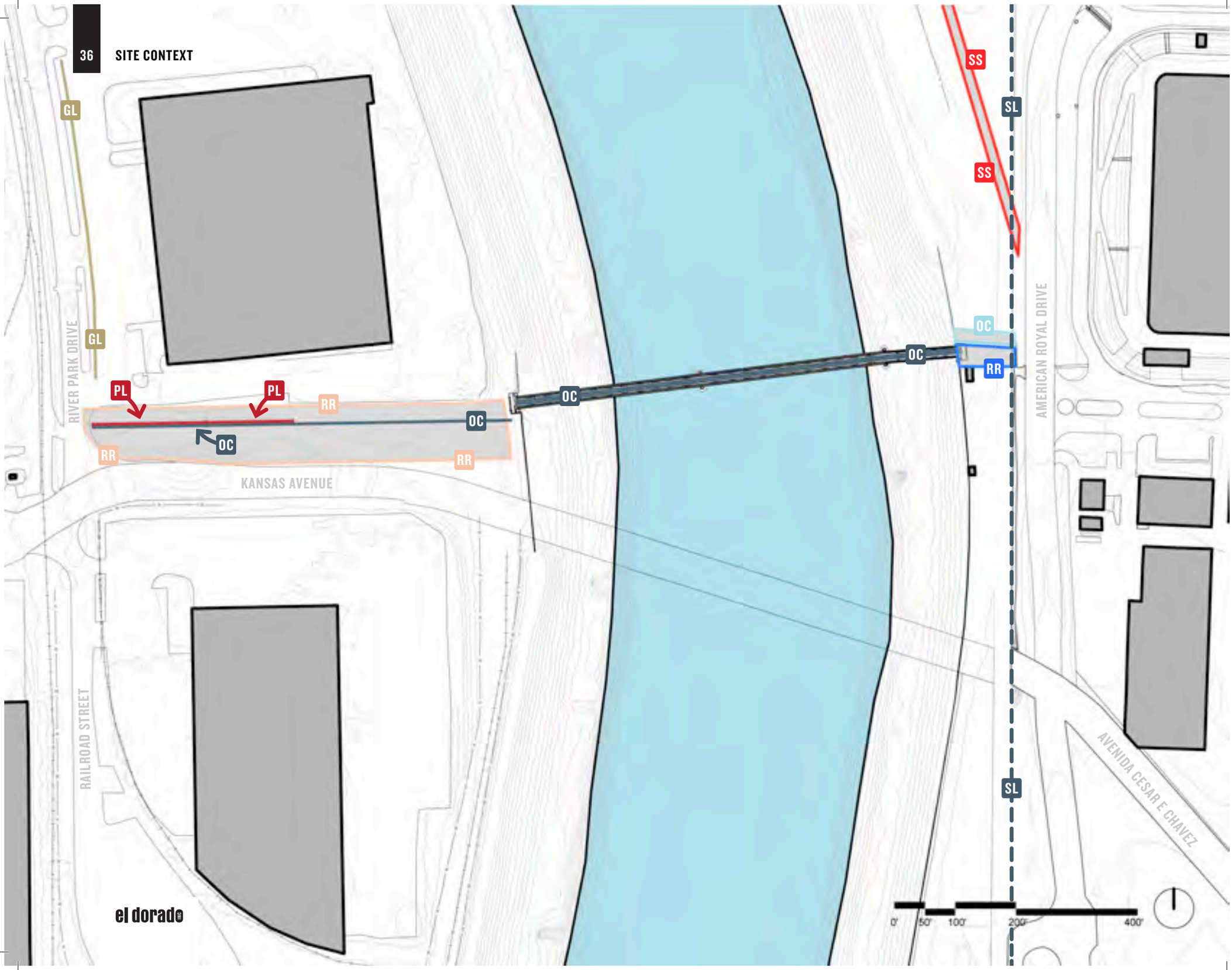
On the outside of the U.S. Harbor line, Kaw Valley Drainage District maintains a permanent right-of-way with varying width that primarily functions as a levee access road.

On the east side of the Kaw River Bridge, the KVDD right-of-way expands out, providing a levee road access point from American Royal Drive.

In addition to the right-of-way, KVDD maintains numerous easements on the west side of the Kaw River Bridge. These include a 9' and 15' easement contained entirely inside of the KVDD right-of-way and a permanent ingress and egress easement connecting the levee road on the west to River Park Drive.

SOURCES:

KCK DotMaps
KCMO Parcel Viewer
1993 Holmes Survey of Parcel 901401
1985 Rhodes Survey of CRIP Bridge
1999 LTD Engineering Survey of KCK Parcels 258200, 258201, & 258202
2014 BHC Rhodes Survey of KCK Parcel 901400 and KCMO Parcels 214579 & 214578


GL
GL
RIVER PARK DRIVE
PL
PL
RR
OC
OC
RR
RR
KANSAS AVENUE
OC
OC
SS
SS
SL
OC
RR
AMERICAN ROYAL DRIVE
SL
AVENIDA CESAR E CHAVEZ
RAILROAD STREET
0'
50'
100'
200'
400'

el dorado

EASEMENTS
UTILITIES, ET CETERA.

- SS — 15' Sewer Line Easement
- OC — 20' Optical Cable Easement
- RR — 30' Railroad Right-of-Way
- RR — 100' Railroad Right-of-Way
- OC — Optical Cable Easement
- PL — Overhead Power Line Easement
- GL — 20' Gas Line Easement
- SL — KS/MO State Line

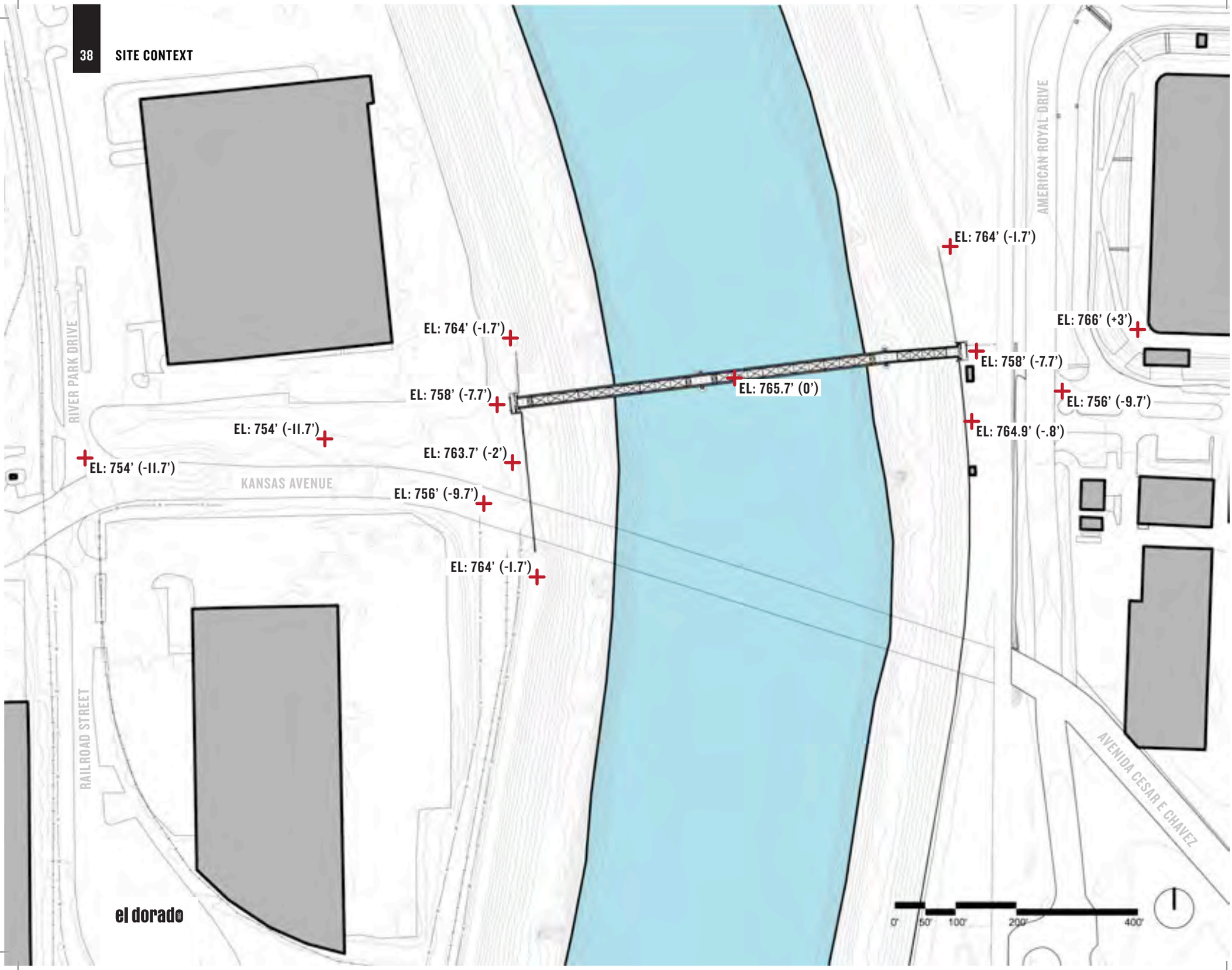
In addition to the KVDD right-of-way and numerous easements, there are several railroad right-of-ways and utility easements on the adjacent properties.

The Kaw River Bridge conveys an optical cable across the Kansas River, terminating into an underground optical cable and resultant easement on the west side of the bridge.

Also on the west side of the bridge, the 100' railroad right-of-way paired with the KVDD permanent ingress and egress easement have not allowed any significant development on the parcel owned by Prime Investments *(ref. property owners map on page 30)*.

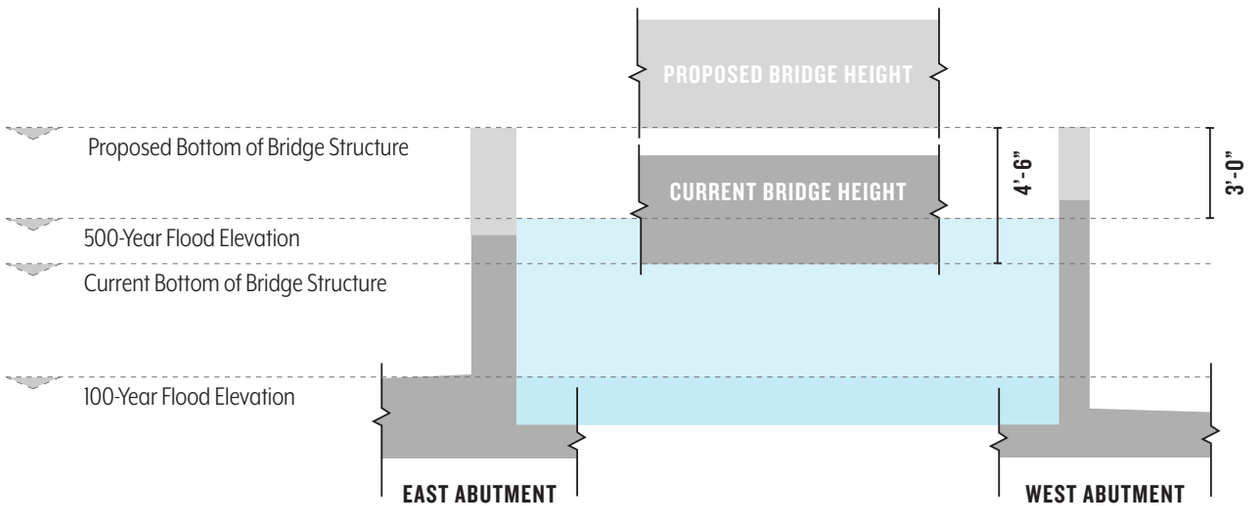
SOURCES:

KCK DotMaps
KCMO Parcel Viewer
1993 Holmes Survey of Parcel 901401
1985 Rhodes Survey of CRIP Bridge
1999 LTD Engineering Survey of KCK Parcels 258200, 258201, & 258202
2014 BHC Rhodes Survey of KCK Parcel 901400 and KCMO Parcels 214579 & 214578


RIVER PARK DRIVE
AMERICAN ROYAL DRIVE
KANSAS AVENUE
RAILROAD STREET
AVENIDA CESAR E CHAVEZ
EL: 764' (-1.7')
EL: 766' (+3')
EL: 758' (-7.7')
EL: 765.7' (0')
EL: 758' (-7.7')
EL: 756' (-9.7')
EL: 754' (-11.7')
EL: 764.9' (-.8')
EL: 763.7' (-2')
EL: 754' (-11.7')
EL: 756' (-9.7')
EL: 764' (-1.7')
0'
50'
100'
200'
400'

el dorado

SITE TOPOGRAPHY & BRIDGE ELEVATION



LONGITUDINAL SECTION LOOKING SOUTH

There are significant elevation differences between the bridge deck, adjacent properties, and public access to the east and west of the bridge. Differences in elevation range from two feet (2') to just under twelve (12').

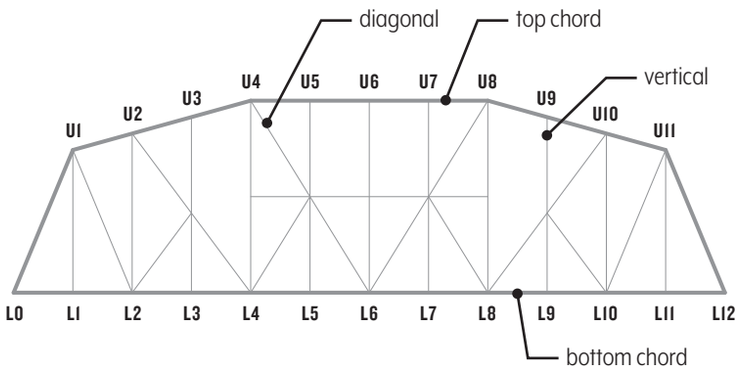
In addition, the levees immediately surrounding the site are likely to be raised by the US Army Corps of Engineers in the near future, allowing them to not be impacted by a 500-year flood.

Per the US Army Corps of Engineers and KVDD recommendations, repurposing the bridge will require elevating the bridge structure at least 3' - 0" above the 500-year flood elevation. Otherwise, the structure, in its entirety, will need to be removed at it poses a hazard during floods.

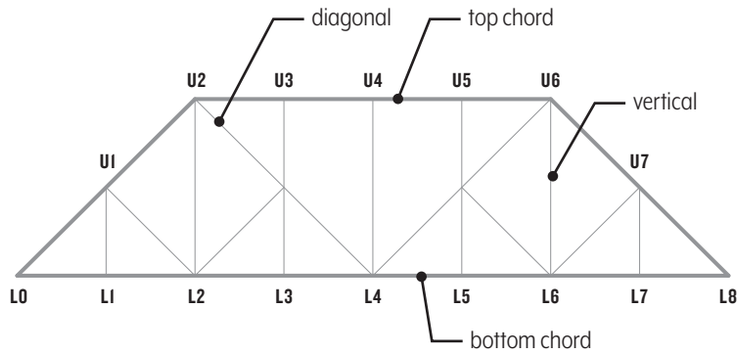
After raising the bridge, the elevation differences to connect the bridge to adjacent public right-of-way becomes even more significant. East and west approaches in this study take these elevations into consideration.

SOURCES:

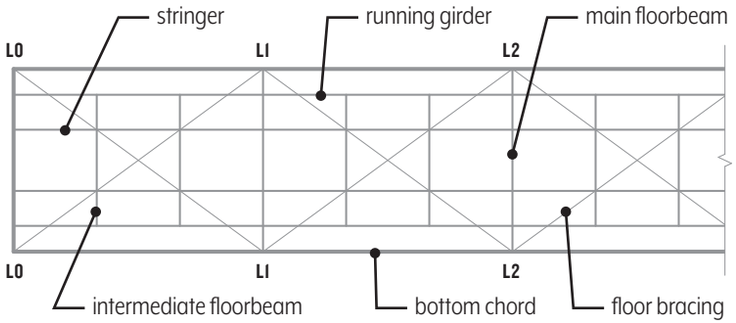
KCK DotMaps
KCMO Parcel Viewer
1993 Holmes Survey of Parcel 901401
1985 Rhodes Survey of CRIP Bridge
1999 LTD Engineering Survey of KCK Parcels 258200, 258201, & 258202
2014 BHC Rhodes Survey of KCK Parcel 901400 and KCMO Parcels 214579 & 214578



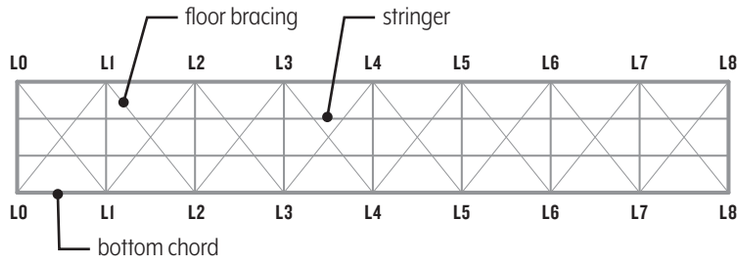
SPANS 1 & 2 TRUSS LABELS



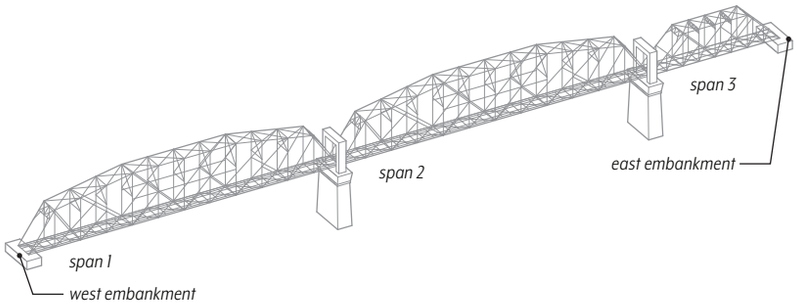
SPAN 3 TRUSS LABELS



SPANS 1 & 2 FLOOR SYSTEM LABELS



SPAN 3 FLOOR SYSTEM LABELS



3d line diagram of bridge

BRIDGE ANALYSIS

typical pinned connection of main span

INSPECTION PROCEDURE AND STRUCTURE DESCRIPTION

TranSystems completed an in-depth visual inspection of the structure during the week of April 17th, 2017. A team of five inspected all above water and above ground portions of the structure - no below water inspection of the substructure was conducted.

The 3-span truss bridge consists of two main spans over the Kansas River and a shorter approach truss on the east end. Span 1 is considered the westernmost span and Span 3 is the easternmost span. The two main span trusses are connected at the panel points by either 5" or 8" diameter pins depending on the location. An example is shown in the photo to the left. The main span truss and floor system labeling is shown in the diagram on the adjacent page. The short approach span truss (Span 3) on the east side is connected by riveted gusset plates at the panel points. Span 3 truss and floor system labeling is shown in the diagram on the adjacent page.

All three spans are a modified Pratt truss design; Pratt type trusses generally have diagonal members in tension and vertical members in compression. Each span has also been retrofitted after original construction with a screw type vertical lift mechanism. All spans are currently blocked in the maximum raised position by permanent supports shown on page 44.

The inspection techniques consisted of protected climbing of the truss vertical and diagonal members as well as a detailed inspection of the truss floor system. The truss upper chords and upper panel points were accessed using Society of Professional Rope Access Technicians (SPRAT) techniques.

During the inspection, individual member sizes, lengths, and geometry were documented for each truss. Overall measurements of the trusses were also taken during the inspection. In addition to these general geometric dimensions, defects and deficiencies that may have an effect on the capacity of the structure were gathered using both notes and photographs.

access to upper panel points

typical loss to stringer top flange

impact damage to LI-UI on span 3

typical loss in secondary member

missing bridge ties from fire

broken Lomas nut at pin

INSPECTION RESULTS

The findings of the inspection are detailed on this page. This narrative is not an exhaustive list of the inspection results, but serves as a description of the significant issues found.

The bridge has moderate losses to the stringers and floorbeams throughout the truss floor system. The loss found is typically between 10%-20% of the area of the section and is concentrated in areas that have held debris and water. Some of these areas include the top flange of the stringers under the timber ties, and connections between the stringers and floorbeams. Loss of this type and severity is typical for bridges of this age and usage.

Impact damage has bent member L1-U1 in the south truss of Span 3 out of plane approximately 4". There are also small tears in the steel associated with this impact damage. The other main truss members are in better condition with only minor bends likely due to impact damage when the bridge was in use. Many of the mating surfaces of the pin connected members at the lower chord main truss spans have developed pack rust between them leading to swelling and minor section loss.

Advanced section loss was noted on several of the bracing connections below the level of the bridge deck. Several bracing connection plates have 4"-5" diameter holes from section loss. Pack rust was also noted between many of the closely connected bracing members in this area of the bridge. These types of bracing members are considered secondary, not primary structural members. They are intended to provide stability to the primary members and provide some structural capacity for out-of-plane loading, such as wind load. Since these bracing members are considered secondary, loss on these members is of less concern than on the main structural members.

The main span trusses have a secondary horizontal member mid-height of each truss spanning the middle four bays. The plates connecting this member to the other truss members are severely deteriorated, with advanced section loss and holes.

The timber ties have serious decay and rot, with several completely missing. Extensive fire damage was also noted to the timber ties at several locations throughout the bridge. Access to the bridge is difficult and dangerous because of the missing or damaged timber ties.

A Lomas nut was placed on each end of the pins connecting the main span trusses during construction to secure the members. Two of these Lomas nuts at the panel points are damaged, one on the top chord is cracked but intact and one on the bottom chord is completely broken, with half the nut missing.

permanent blocking at supports

RECOMMENDED MAINTENANCE AND REPAIR

Since the structure has been unused for several years, several items of deferred maintenance and repair are recommended. These items should be considered general maintenance to be completed regardless of the interim or final use of the structure. Other, more specific, repair or strengthening is recommended and summarized in the design concepts section to accommodate the intended reuse of the bridge.

1. The two Lomas nuts damaged on the truss should be replaced. These nuts are intended to secure the eyebars at the panel points. Without functioning nuts there is a small danger of an eyebar becoming loose from vibration.

2. Secondary connection plates with holes should be replaced with new members. These secondary members are intended to stabilize the truss from transverse loads, such as wind; as well as provide bracing to primary structural members.

3. The damaged vertical member in the East Span (Span 3) should be straightened and repaired. The existing damage introduces eccentric or off-center loading on this member. However, since this member is in tension for typical loading scenarios, there is no danger of buckling under load.

4. The existing timber ties and rail should be removed from the structure. Since the intended use of the bridge is as a trail and gathering space, the existing timber ties and rail are not needed.

5. It is anticipated the Army Corps of Engineers will raise the levee walls to accommodate the revised 500-year flood elevation throughout the project site. This will require the bridge to be raised approximately 4'-6" so it too will clear the new 500-year flood elevation. The existing lift mechanisms at each bearing are currently blocked up at the maximum elevation they were designed to achieve. Additionally, they have had wiring and other mechanical pieces scavenged and have been left exposed to the elements with no maintenance for decades. As a result, they are non-functioning. In order to raise the structure out of the new anticipated 500-year flood elevation, the lift mechanisms will need to be modified. This modification will likely involve removing portions of the lifting mechanisms to allow the bridge to be raised by temporary jacks placed at the supports. After the bridge has been raised to its new position, permanent supports will be added at the bearings to support it, similar to the existing structure. If the structure is raised to a higher elevation, the existing columns will need to be extended or replaced with new, longer members, or replaced with concrete pedestals. At that time, the new design will be based on the actual loads anticipated from the new use of the structure. Elevating the structure could be accomplished during any phase of work.

STRUCTURE MODELING AND CAPACITY CALCULATION

The information gathered during the visual inspection was used to model the existing bridge in a structural

analysis program called STAAD Pro V8i. Section properties, member sizes and lengths, as well as observed deterioration collected in the field were entered into the modeling program and Excel spreadsheets to determine existing capacity and the suitability of the structure for a range of possible future uses.

The American Association of State Highway and Transportation Officials (AASHTO) publishes a design guide for pedestrian structures. This design guide indicates pedestrian bridges should be designed for a live (pedestrian) load of no less than 90 pounds per square foot (PSF). This live loading served as the basis of the structural calculations. Additionally, since there are no plans available for the structure showing material strengths, an assumption was made based on the date of construction.

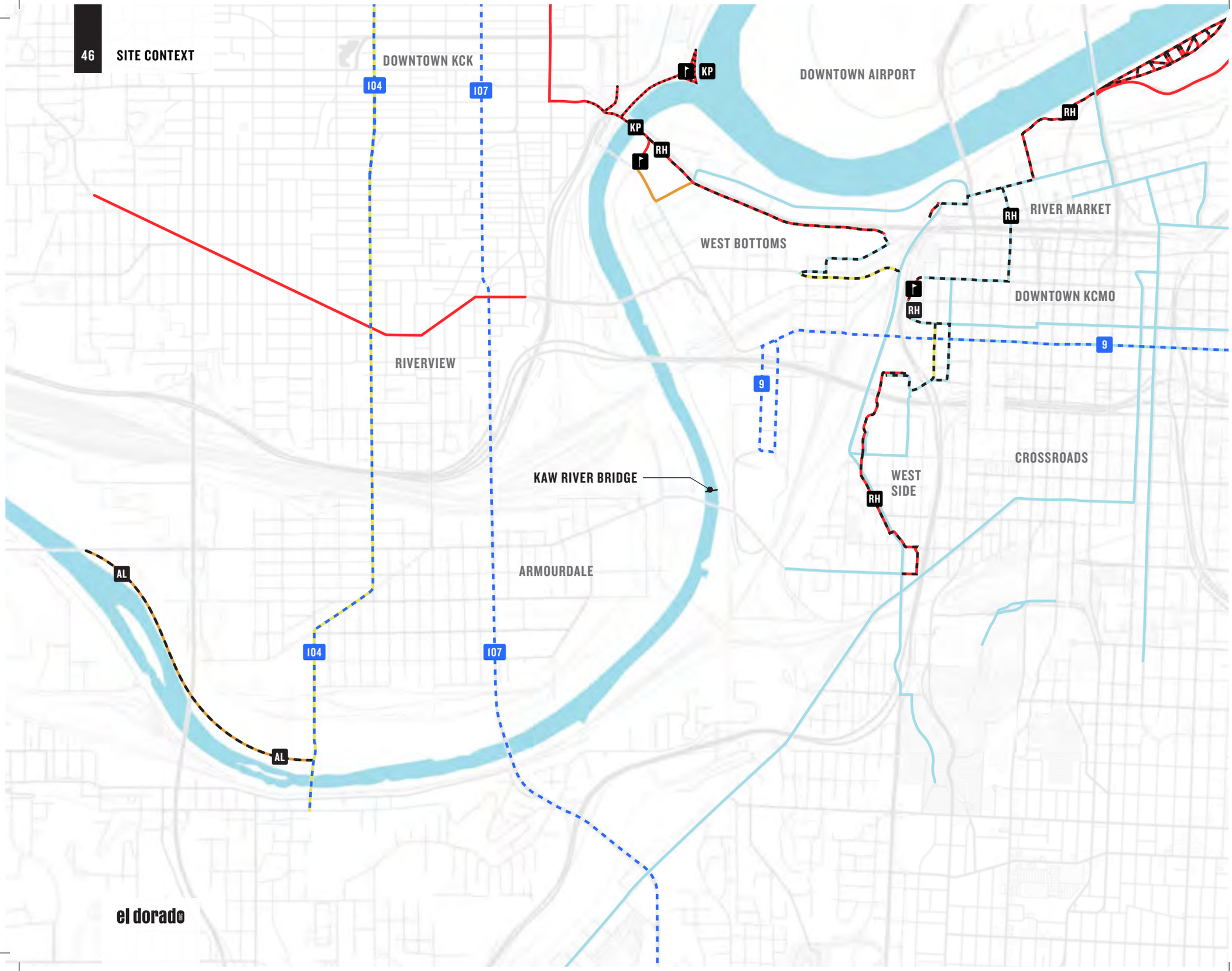
The common element of reuse envisioned by this report is a multi-use trail through the center of the trusses.

This trail will maximize the available space between the trusses and will be approximately 10' wide. All new horizontal surface construction was assumed to be a 6" concrete deck supported on 16" transverse beams attached directly to the longitudinal running girders near the truss bottom chords. This is a change from the way the existing track is supported. The existing track is supported on intermediate stringers and floorbeams that frame into the longitudinal running girders. Since much of the deterioration noted during the inspection was in these intermediate members, bypassing them and supporting the new structure directly on the running girders has the benefit of reducing the reliance on the most deteriorated members of the structure in Spans 1 and 2.

Because of the preliminary nature of the calculations and uncertainty involved with predicting the actual future use and loading applied to the structure, the results shown are conservative. Any member that shows stresses within 35% of its capacity is assumed to require strengthening. However, depending on the actual future use of the bridge the strengthening shown in the following sections may or may not be required.

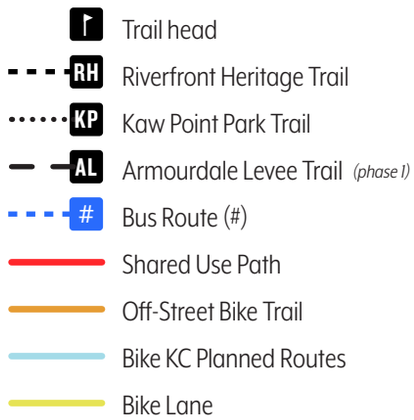
The results of the analysis indicate the structure is able to carry the intended loading as envisioned in this concept. Some later phases of the concept require strengthening of selected truss members to provide an acceptable factor of safety. More detailed discussion of the analysis for each phase is included in the design concepts section of this report.

A full structural engineering report was compiled by TranSystems and is contained in a separate, supplemental document.


DOWNTOWN KCK
104
107
DOWNTOWN AIRPORT
KP
KP
RH
RH
RH
RIVER MARKET
WEST BOTTOMS
DOWNTOWN KCMO
RH
9
9
RIVERVIEW
KAW RIVER BRIDGE
CROSSROADS
WEST SIDE
RH
AL
ARMOURDALE
104
107
AL

el dorado

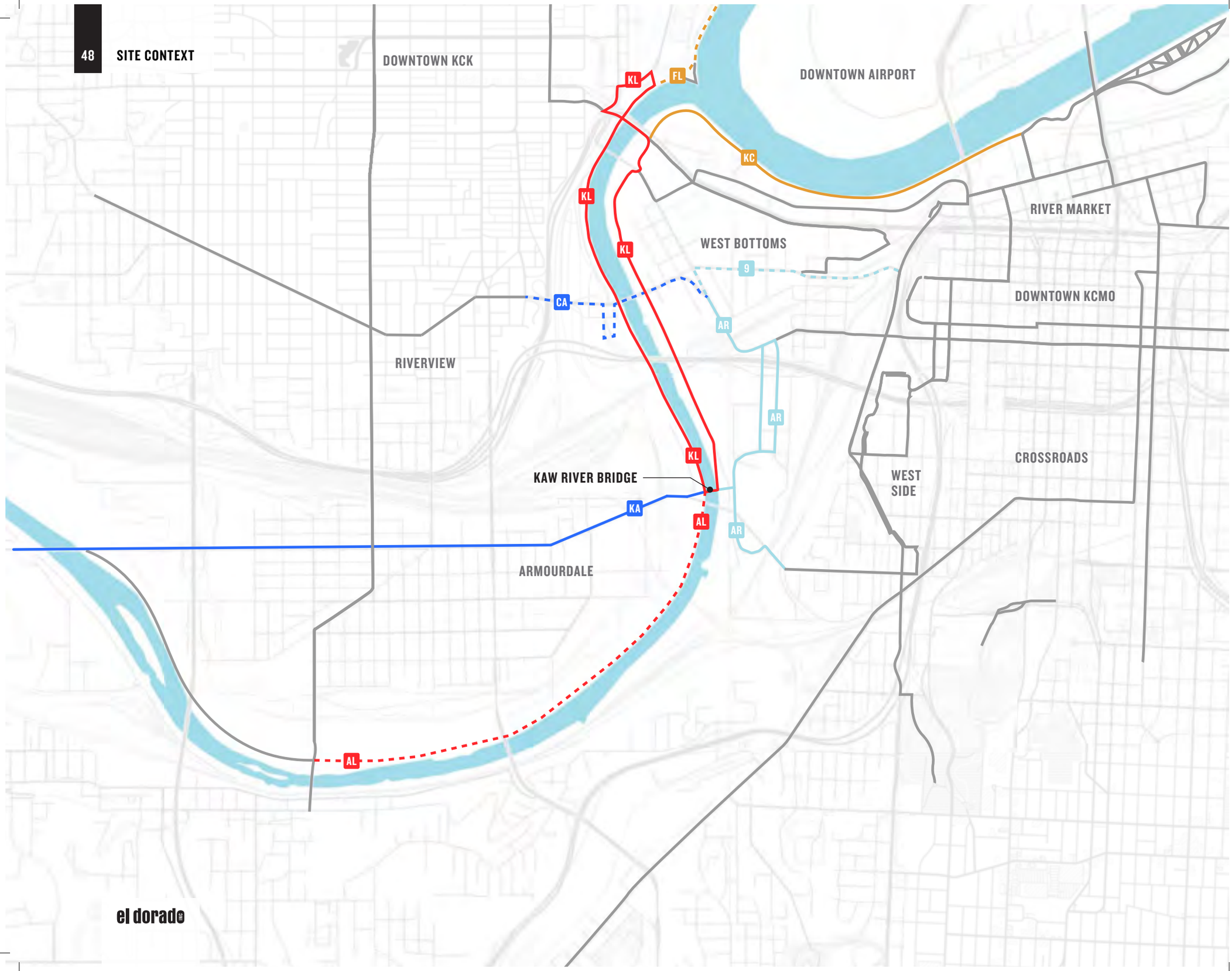
EXISTING TRAILS, BIKEWAYS, & CONNECTING BUS ROUTES



The Kaw River Bridge is situated in an area conducive for pedestrian and cycling connectivity improvements. Currently, there are no active sidewalks, bike lanes, or trails that directly connect to this structure. Bus routes come close, but without dedicated pedestrian-level infrastructure, connections to the bridge are not safe. The major opportunity lies in activating this space into a usable place that can function simultaneously as a transportation link, recreational trail, and educational/ amenity center.

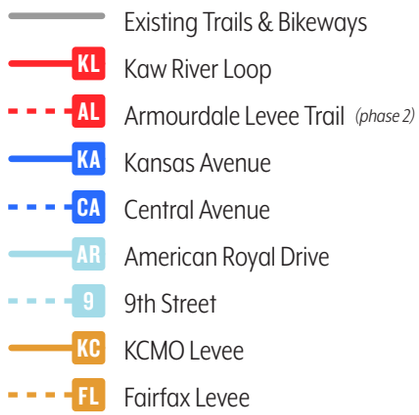
The Unified Government has recently completed the 10th/12th street bikeway that added new sidewalks and bike infrastructure from Quindaro Boulevard to Metropolitan Avenue. This new bikeway connects to an existing trail section along the Armourdale Levee from 12th to 18th streets and also to existing bikeway sharrows on Central Avenue west of 5th street. To the north is the Kaw Point connector and 5th street trail that connects north to the Jersey Creek Greenway. This system as currently built is disjointed and unlikely to be used heavily other than by serious, commuting cyclists. Sidewalks or shared use trails must also be constructed from Kansas Avenue and American Royal Drive/State Line to allow foot traffic accessibility.

Sign-only bikeways do exist in Kansas City, Missouri and will eventually have dedicated bike infrastructure added as streets are resurfaced and improved, recent examples include Southwest Boulevard and 20th Street. The Riverfront Heritage Trail is also a short distance to the north paralleling the Missouri River and providing an opportunity to extend riverfront accessibility. While there is an appearance of a more built-out system, without dedicated bikeway infrastructure these roads remain unsafe for use by the general public. Signage-only does not change driver behavior or provide reasonable expectations of safety for any cyclist. Sidewalks or shared use trails must also be constructed near American Royal Drive to allow foot traffic accessibility to the Kaw River Bridge.


DOWNTOWN KCK
DOWNTOWN AIRPORT
KL
FL
KC
KL
KL
RIVER MARKET
WEST BOTTOMS
9
CA
DOWNTOWN KCMO
AR
RIVERVIEW
AR
KL
CROSSROADS
KAW RIVER BRIDGE
WEST SIDE
KA
AL
AR
ARMOURDALE
AL

el dorado

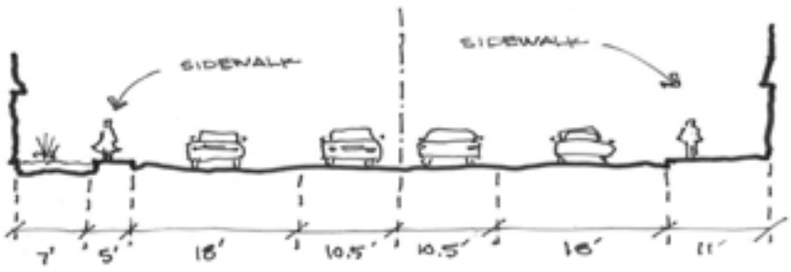
FUTURE AND PROPOSED TRAILS AND BIKEWAYS



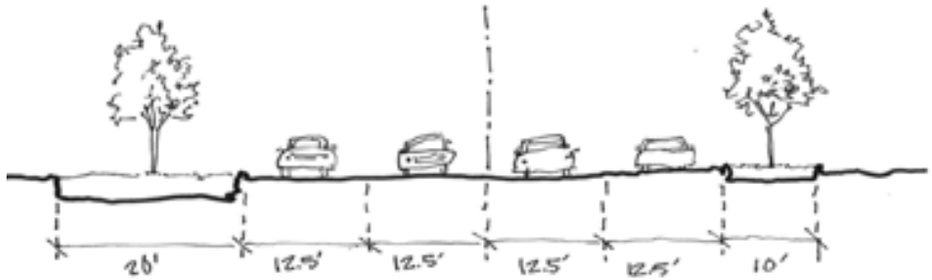
Opportunity abounds for the Kaw River Bridge as a pedestrian and cycling connectivity center. Sidewalks leading to/from the site will allow pedestrian activity to flourish and make nearby bus routes feel not so distant. Opening the levees to public use creates multiple recreational loop opportunities. Off-road and on-street dedicated cycling infrastructure creates a vital transportation link across the Kansas River and helps bridge division between the neighborhoods of Armourdale and West Bottoms, the two distinct municipalities of Kansas City, as well as Kansas and Missouri. There is a truly special opportunity for addressing transportation inequalities, health disparities, and environmental concerns through this project.

Levees within the Kaw Valley Drainage District can be opened and improved as shared use trails, like with what has happened with the existing trail section along the Armourdale Levee top from 12th to 18th streets. The Kaw River Bridge allows for a continuation of this existing trail to the east, from 12th street to Kansas Avenue, with further connectivity into Kansas City, Missouri. Opening these area levees provides for further regional connectivity into the v and both statewide trails system. The bridge structure itself is the centerpiece of a proposed Kaw River Loop.

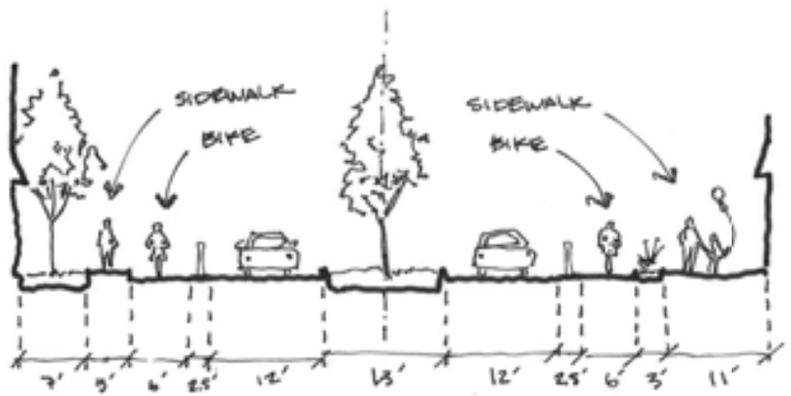
The Kaw River Loop would connect the Kaw River Bridge directly with Kaw Point Park, all on the safety of shared use trail. On the Armourdale side, the trail would run within the existing levee wall until north of Central Avenue where it would then parallel existing railroad tracks before tying directly into the Kaw Point Park boardwalk and Riverfront Heritage Trail connector. This connector trail and existing Woodsweather Bike/Pedestrian Bridge would be used as the northern section of the Kaw River Loop. The trail would then return to the Kaw River Bridge on the eastern side of the Kansas River on existing levee top. This proposed loop would be just over 3 miles in length – perfect for recreational runners, cyclists, and visitors to the area. Sections of the loop could be used by commuting cyclists or for river access by paddlers. Public art and environmental or historical kiosks can also be incorporated as places to create and educate.



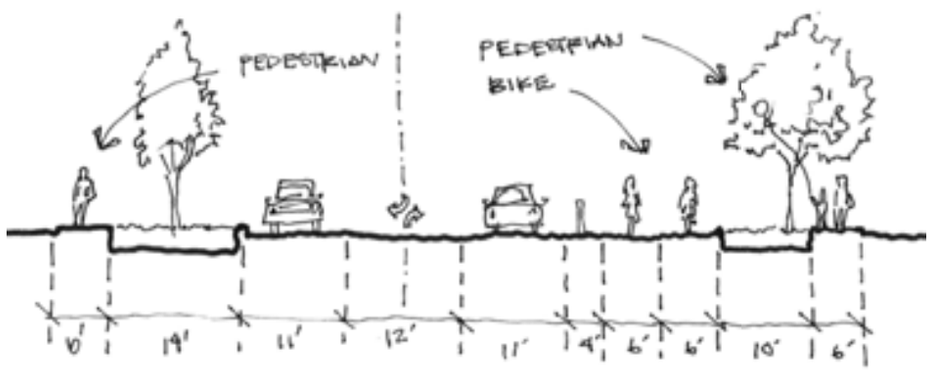
KANSAS AVENUE: CURRENT STREETSCAPE
street section looking west



AMERICAN ROYAL DRIVE: CURRENT STREETSCAPE
street section looking south



KANSAS AVENUE: POTENTIAL STREETSCAPE
street section looking west



AMERICAN ROYAL DRIVE: POTENTIAL STREETSCAPE
street section looking south

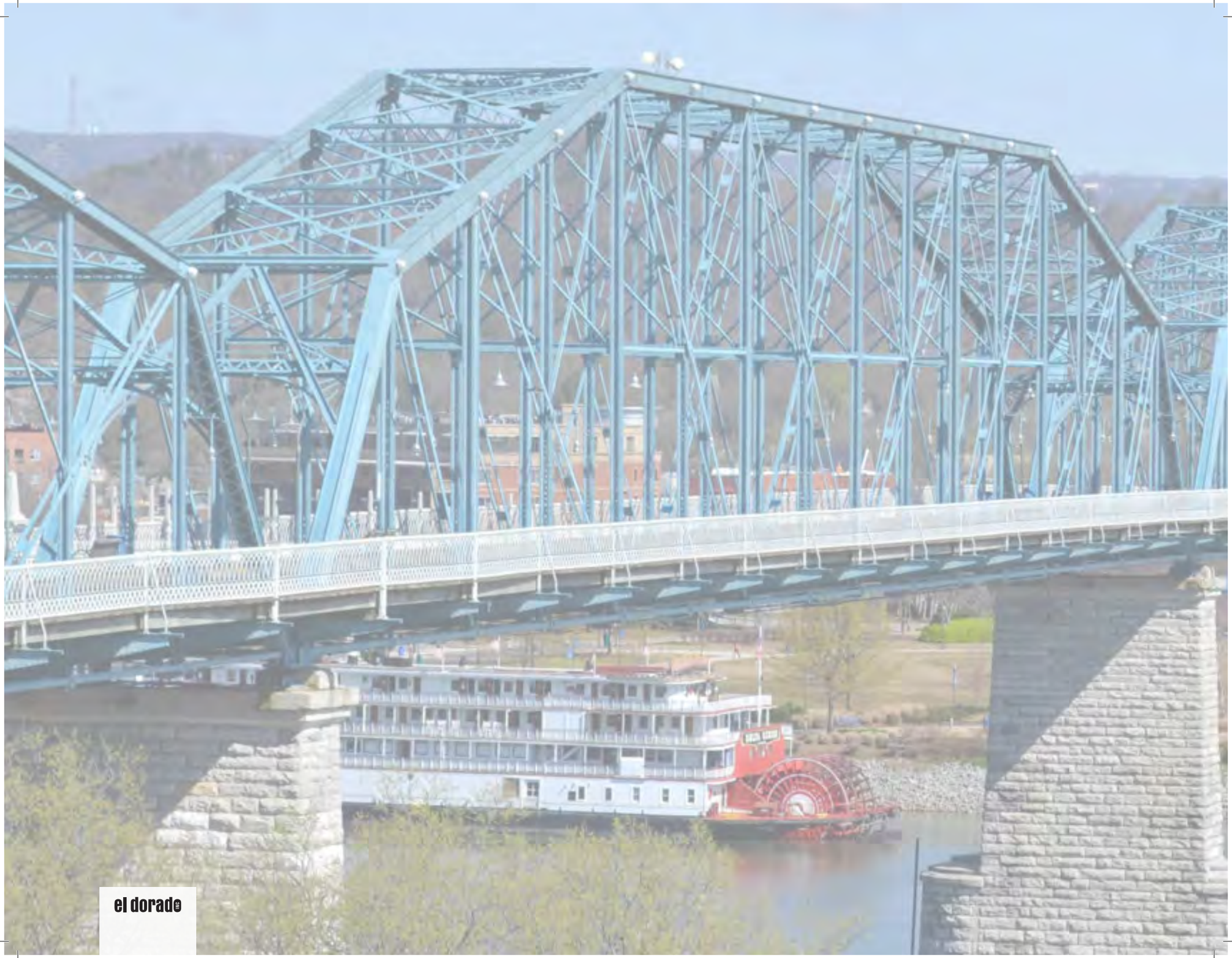
POTENTIAL IMPROVEMENTS
KANSAS AVENUE, AMERICAN ROYAL DRIVE, & TRAILS

levee trail on top of embankment

levee trail on inside of levee wall

On-street cycling infrastructure and pedestrian improvements along Kansas Avenue and American Royal Drive are paramount for bridge accessibility as a transportation link. Both of these streets could accommodate road diets *(see sketches on adjacent page)* and provide important connections to and from the existing bikeways systems in Kansas City, Kansas and Kansas City, Missouri. Kansas Avenue would connect to the 10th/12th street bikeway, Armourdale Levee Trail, and future improvements for the 7th street corridor. American Royal Drive improvements would connect to Avenida Cesar Chavez to the south and Genessee/Wyoming to the north into the rest of Kansas City, Missouri's bikeway system. Improvements to these adjacent roadways would undoubtedly attract commuters to use this bridge as the safe way to cross from Kansas to Missouri and vice-versa.

On-street improvements can also be made across or under the Central Avenue viaduct in Kansas City, Kansas and 9th street in Missouri. Access to the Kaw River Bridge would then be made on the proposed Kaw River Loop.

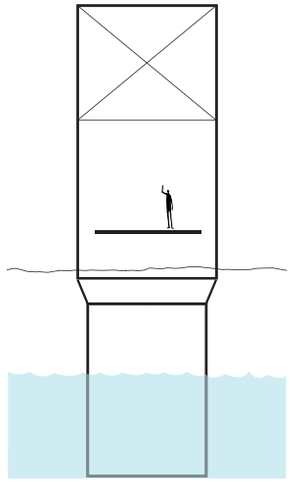

el dorado

5.
CASE STUDIES

union railway bridge
walnut street bridge
ayang railroad bridge
economic impacts

UNION RAILWAY BRIDGE
DES MOINES, IA

01. SIMPLE CROSSING



ARCHITECT
Safdie Rabines Architects

YEAR BUILT
1891

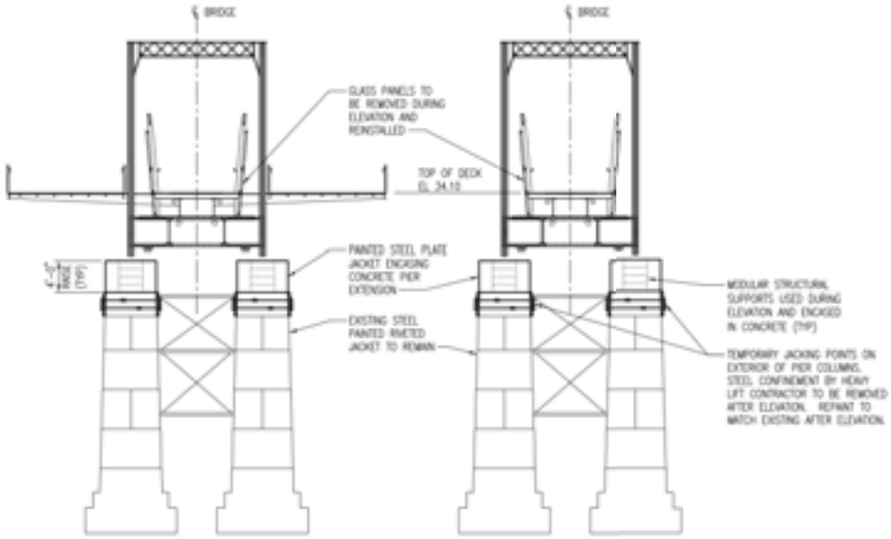
YEAR ABANDONED
1995

YEAR REHABILITATED
2006 (Raised in 2017)

LENGTH
385'

SOURCES:
Safdie Rabines Architects
Stanley Consultants, Inc.
The Des Moines Register

el dorado



OVERLOOK SECTION **TYPICAL SECTION**

The Des Moines Union Railway Bridge was transformed from 2004-2006 into a bike/pedestrian connector completed in two phases.

Phase 1 addressed deferred maintenance and laid the groundwork for the improvements to come in the second phase. This included improvements and repairs to the steel superstructure, removal of railroad ties, rails, lead paint, and addressing various deferred maintenance items.

Phase 2 involved painting the bridge red, installation of a wooden pedestrian walk surface, guardrails constructed of glass and white-painted steel, new bridge lighting, and the circular observation platform between the two truss spans in the middle of the river.

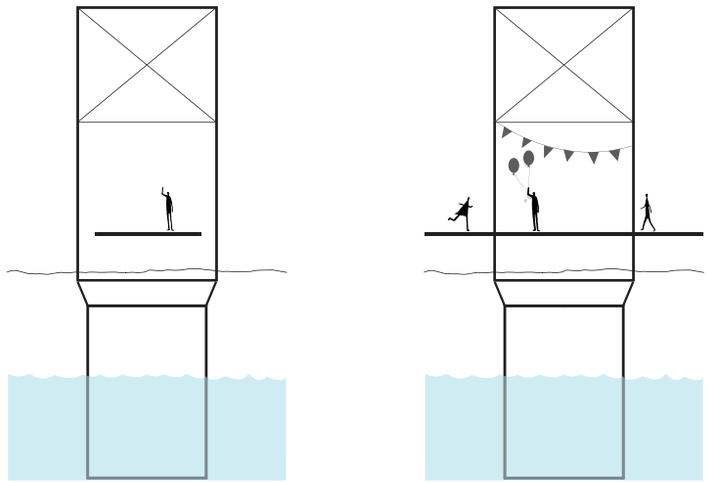
In late 2016 to mid-2017, the bridge was raised four feet at a cost of $2.5 million to clear the 500-year flood line. This required the approach ramps to be redesigned and rebuilt to maintain accessibility to the bridge. No additional amenities or improvements were added during this time.

el dorado

WALNUT STREET BRIDGE
CHATTANOOGA, TN

01. SIMPLE CROSSING

02. MULTI-PURPOSE EVENT/ ACTIVITY CROSSING



ARCHITECT
Hargreaves Associates

YEAR BUILT
1890

YEAR ABANDONED
1978

YEAR REHABILITATED
1993

LENGTH
2,376'

COST
$4.5 million (original rehabilitation, 1993 cost)
$7.7 million (2017 cost)
$1.3 million (2010 rehabilitation)
$1.5 million (2017 cost)

SOURCES:
American Planning Association
Bureau of Labor Statistics (inflation calculator)

el dorado

A historically-significant structure, the Walnut Street Bridge is the oldest and largest surviving truss bridge in the South and was the first non-military highway bridge to span the Tennessee River.

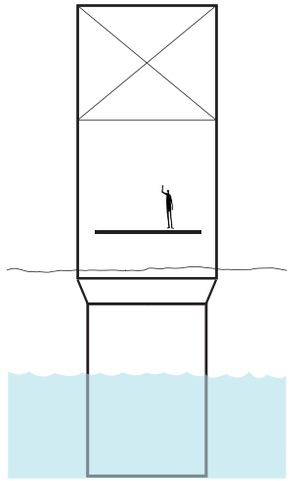
When re-opened to pedestrian traffic after rehabilitation in 1993, it was the longest pedestrian bridge in the world. This rehabilitation was relatively minor, with the majority of funds allocated towards structural inspection, deferred maintenance, repairs, and ensuring safety and accessibility. A product of immense public support, $2 million of the original $4.5 million rehabilitation cost was funded by private donors.

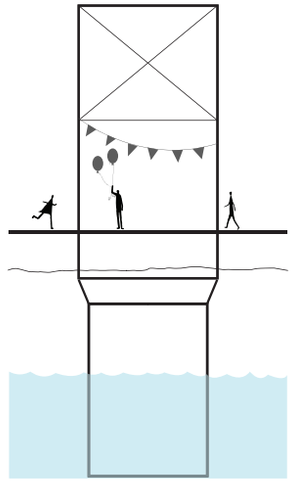
From 2009 to 2010, the original asphalt surface was removed and replaced with a timber surface at a cost of $1.3 million.

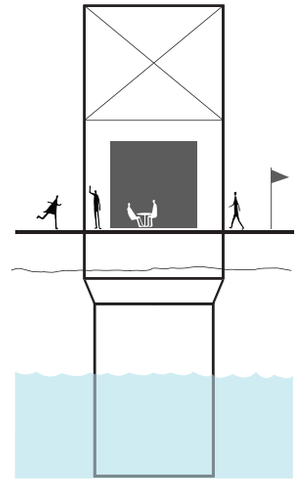
The 35' wide bridge deck works well for both formal and informal activities, ranging from passive to active. Regular events include festivals, fundraising, and community celebrations.

AYANG RAILROAD BRIDGE
DONG-DU, DAEGU, SOUTH KOREA

01. SIMPLE CROSSING | 02. MULTI-PURPOSE EVENT/ ACTIVITY CROSSING | 03. ON-BRIDGE AMENITY/ TRAILHEAD







ARCHITECT
CA Plan

YEAR BUILT
1935

YEAR ABANDONED
2008

YEAR REHABILITATED
2013

LENGTH
850'
approximate total bridge length
195' x 16'
approximate on-bridge amenity structure dimensions

SOURCES:
CA Plan Architects
DesignBoom
Architectism


COFFEE IN KONA

The Ayang Railroad bridge is the sole precedent found for a new, enclosed amenity structure located entirely on a rehabilitated railroad bridge.

The new program hosted by the amenity structure includes a meditation area, touchscreen kiosks serving as a digital museum of the bridge, observation and outlook spaces, rest areas, and a coffee shop.

Similar to the proposed phasing structure of the Kaw River Bridge, the bridge rehabilitation and new construction was split into two phases. Phase 1 saw the rehabilitation of the bridge, construction of cultural amenities, and accessibility improvements. Phase 2 included all of the infrastructure and improvements necessary for a commercial enterprise on the bridge and on the land adjacent to the structure.

el dorado

CHATTANOOGA RIVERFRONT REDEVELOPMENT adjacent to Walnut Street Bridge

CHATTANOOGA & DES MOINES: BROADER ECONOMIC IMPACTS

CHATTANOOGA, TN

- $120 million public/private partnership between:
  - $56 million in city bonds (hotel tax)
  - $47 million from private donors
  - $17 million from land sales and state sources

- 130 acres of redevelopment (south of the Tennessee River) completed in just three years

- Spurred $1 billion in adjacent private investment and a master plan for the north side of the Tennessee River

DES MOINES, IA

- $70 million public/private partnership between:
  - City of Des Moines
  - State of Iowa
  - Principal Financial ($10 million for Phase 1)
  - Meredith Foundation ($2 million for trail)
  - Other smaller, private donors

- Connects 300 miles of Central Iowa trails

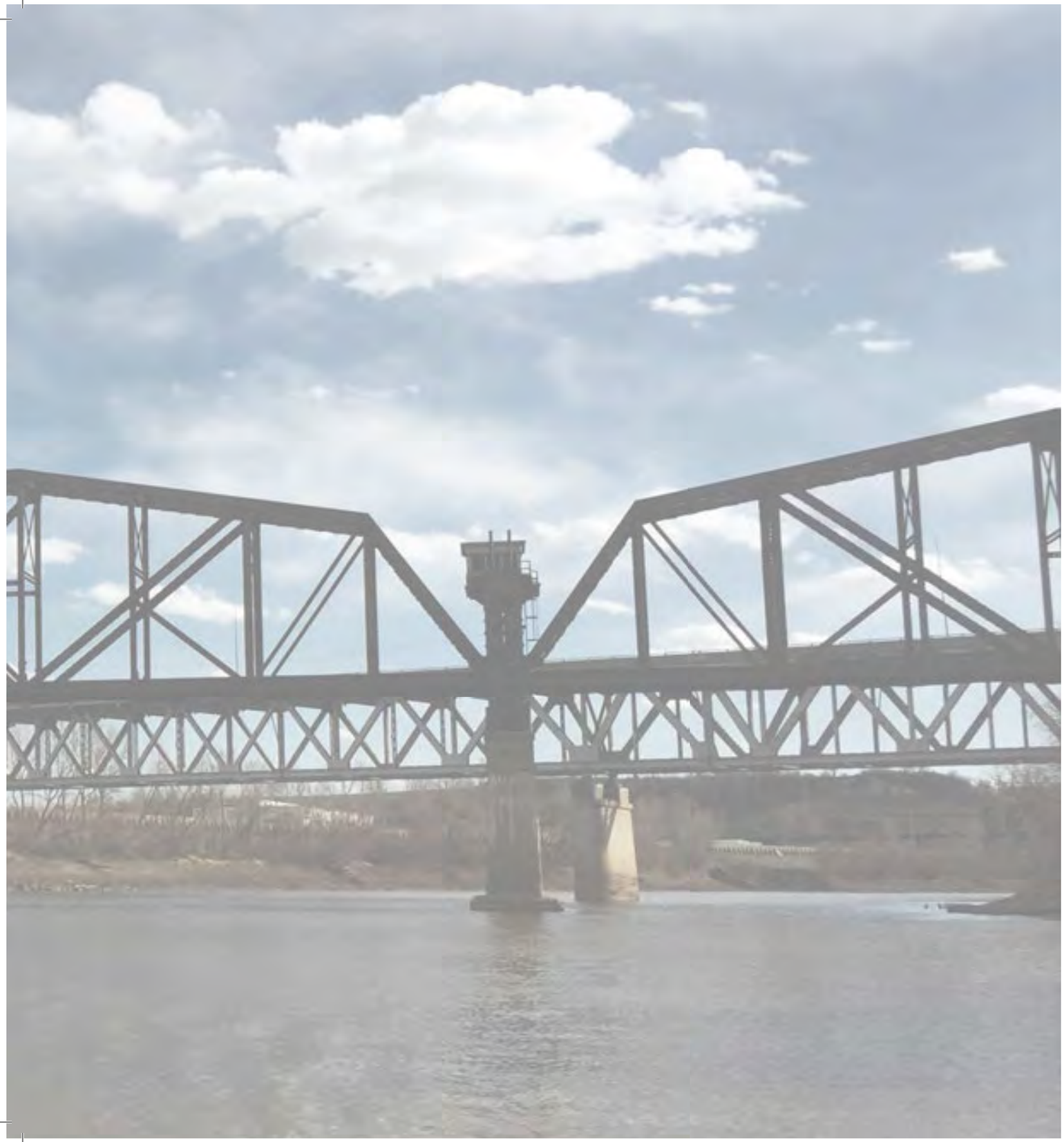
- Pump station is part of a larger $111 million effort to reduce the impacts of flooding downtown and downstream to gain FEMA accreditation

Each project has proved to be a spur for greater riverfront redevelopment and connections. In both cases, there was little to no riverfront activity before the rehabilitation of the bridges.

In Chattanooga, the Walnut Street Bridge serves as a synergistic connection between downtown and Northshore: a growing, locally-focused neighborhood of restaurants, housing, shopping, and cultural attractions.

A similar story is found in Des Moines. The connection created by the Union Railway Bridge between downtown Des Moines and the East Village neighborhood instigated millions of dollars of public infrastructure and private development: driven by increased pedestrian connectivity and access to the river.

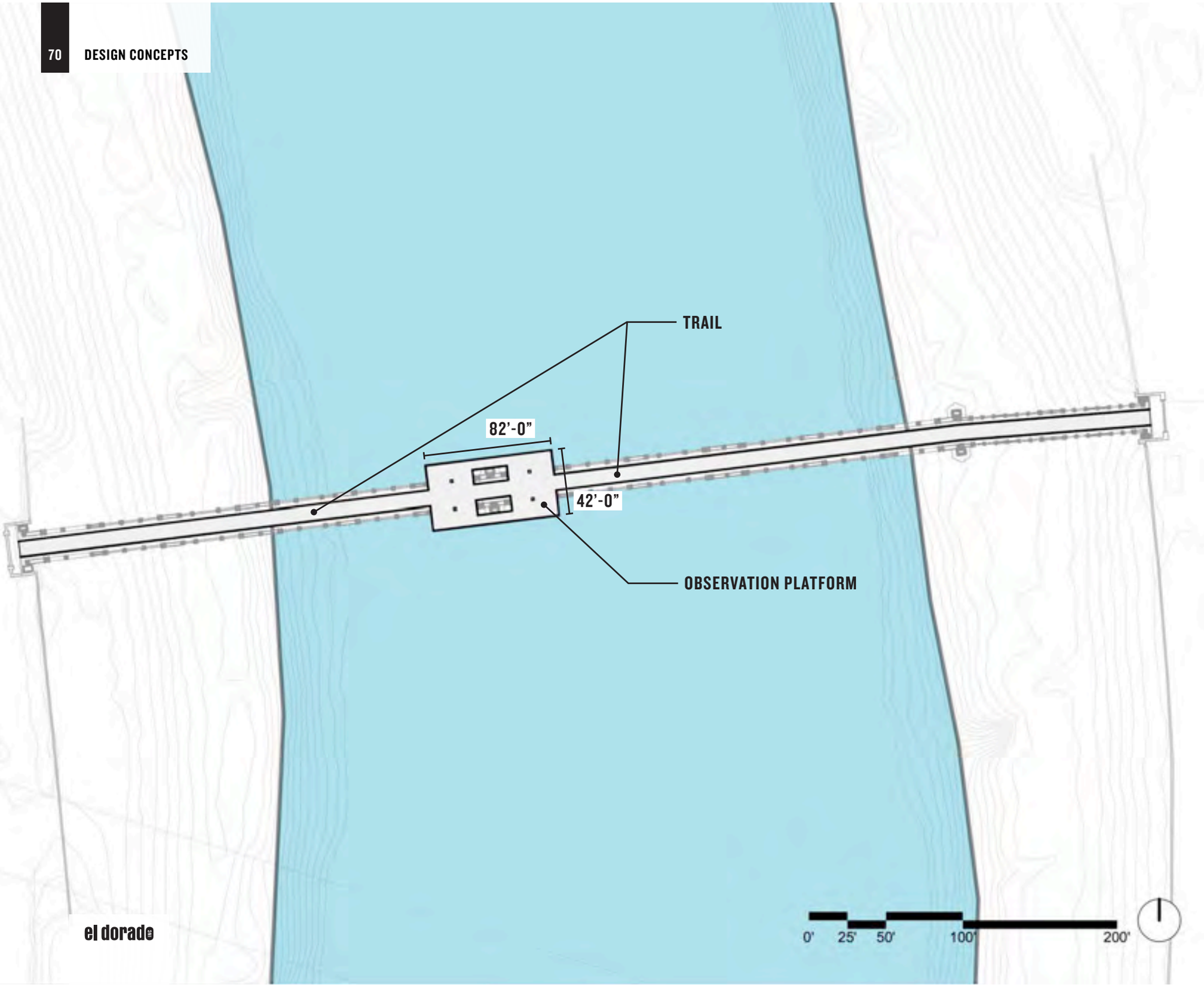

el dorado



6.
DESIGN CONCEPTS*

phase 1: simple trail
phase 2: amenity platform
phase 3: on-deck amenity structure
east approach
west approach

** the information provided in this section is conceptual and not for construction use*


TRAIL
82’-0”
42’-0”
OBSERVATION PLATFORM
0’
25’
50’
100’
200’

PHASE I
SIMPLE TRAIL

PROS
Less costly, lets public get close to key structural feature of bridge, and provides passive space off trail.

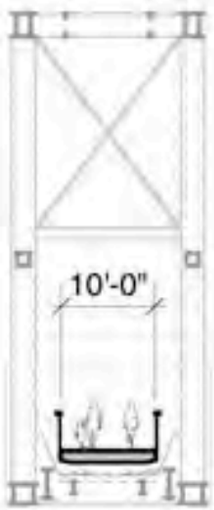
CONS
No accommodation of amenities like restaurant or restrooms, limited area of passive space.

PROGRAMMABLE SPACE*:
0 gsf

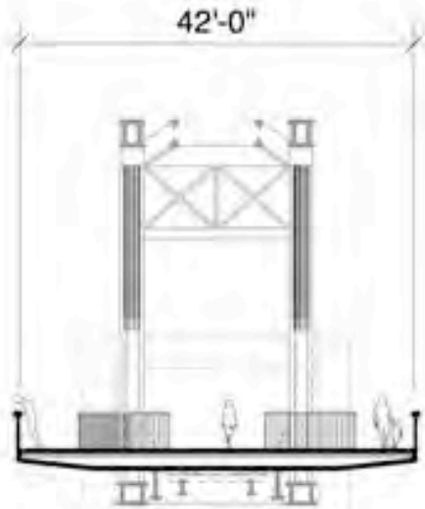
** "Programmable Space" is a designated area used to support a future private enterprise without interfering with the proposed trail system.*

This phase proposes placing a 10'-0" wide trail the length of the bridge in the middle of the three structural spans.

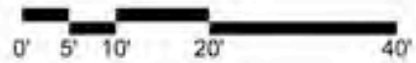
The trail, crossing the river inside of the three structural spans is 733' long, not including the length of the proposed off-structure approaches that connect the bridge to a public right-of-way. Although the national park service suggests an urban trail can have a maximum of 1,200' intervals between resting places, the design team proposes that a passive space is critical in this phase. This passive space, an observation deck placed between two of the structural spans, is not only a place for resting, but also a place to learn about the river and bridge while enjoying views in all directions.

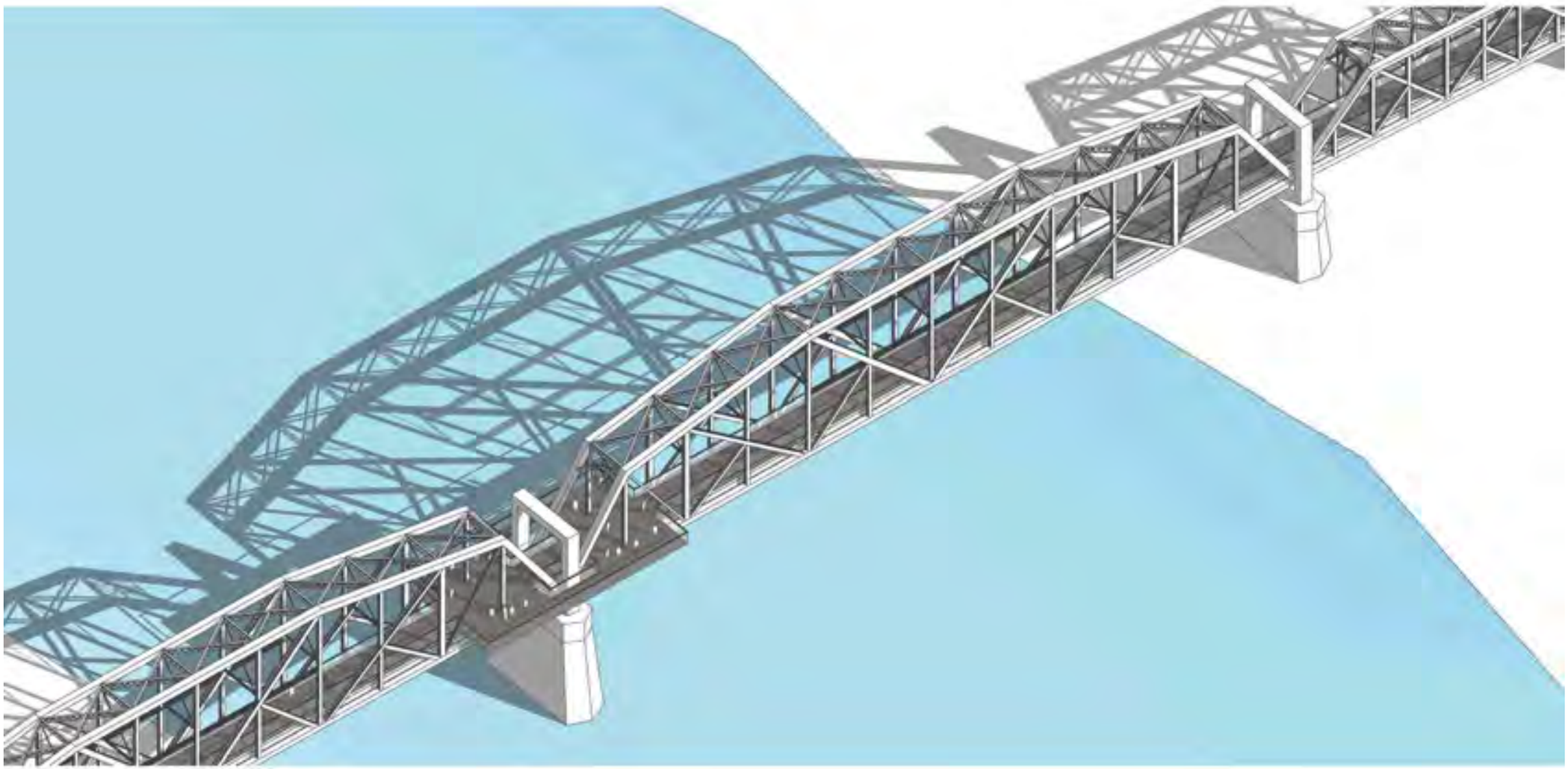


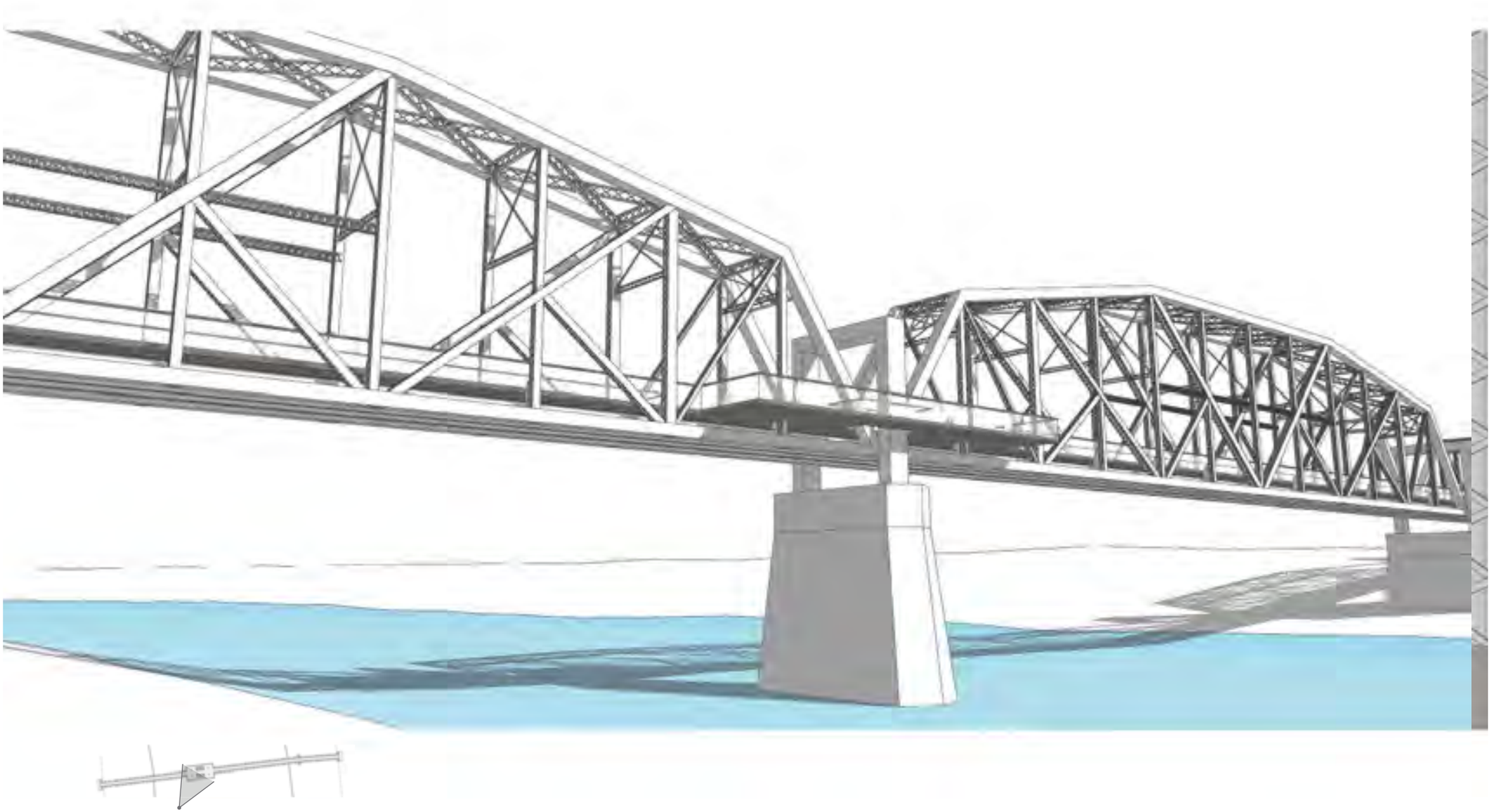
SECTION THROUGH TRAIL

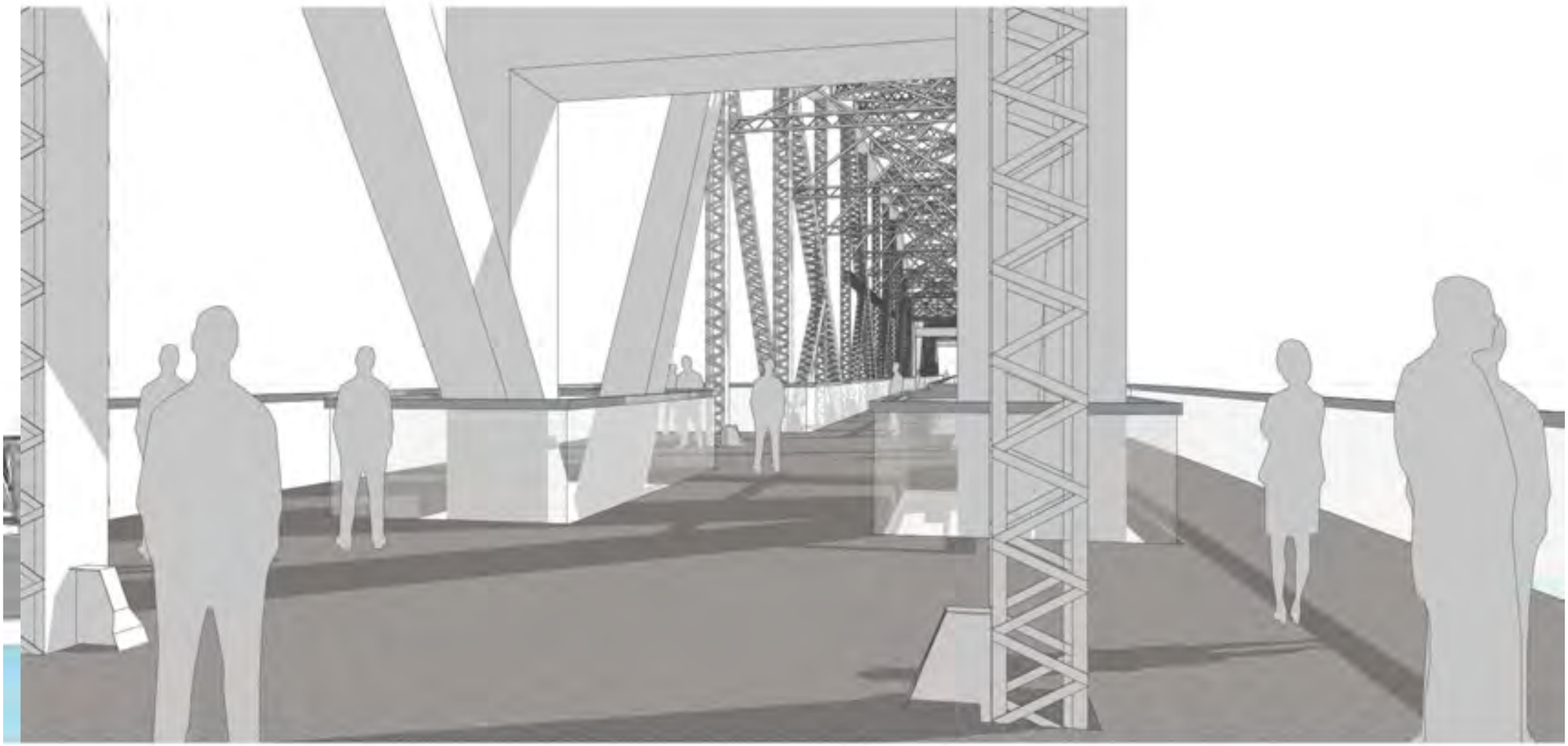


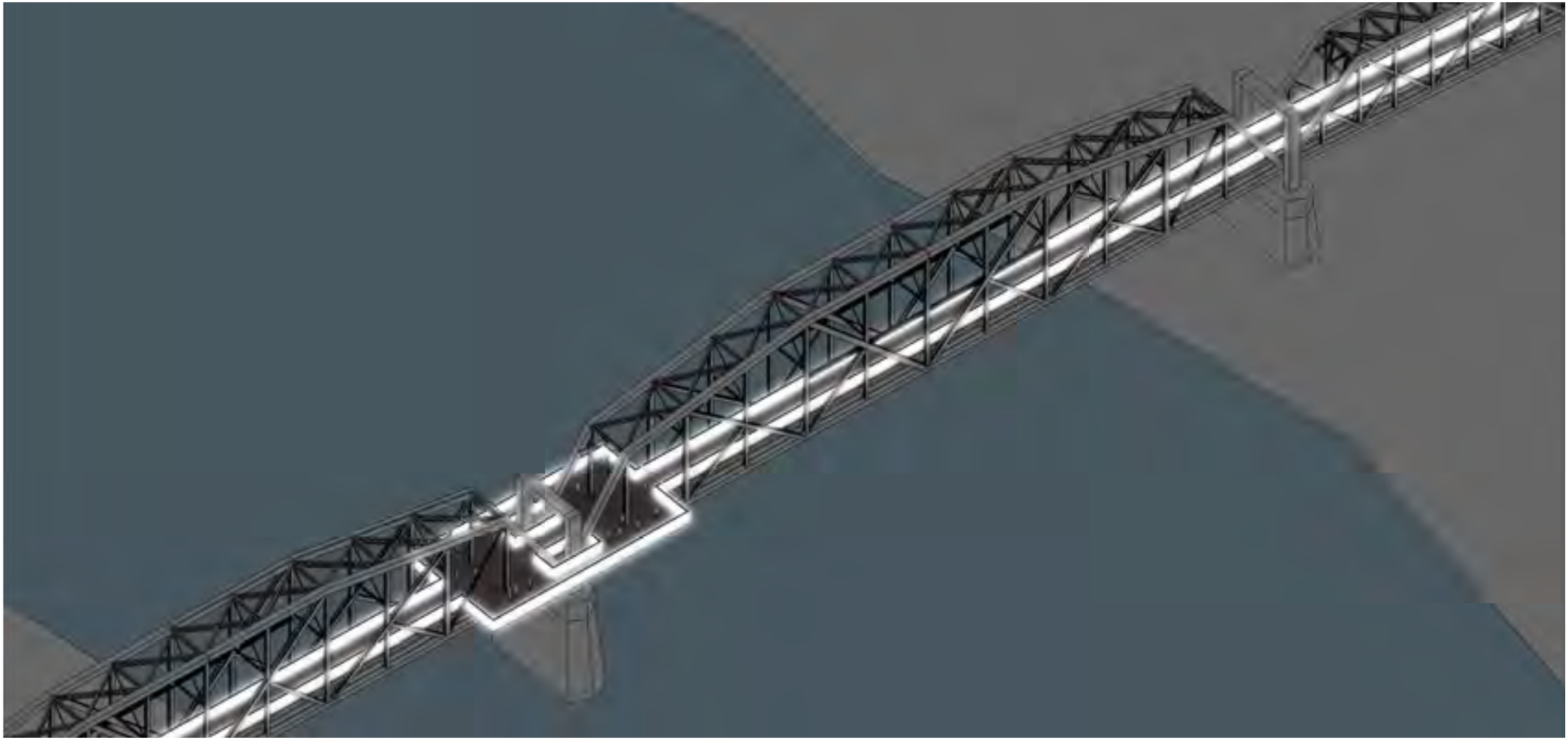
SECTION THROUGH OBSERVATION DECK

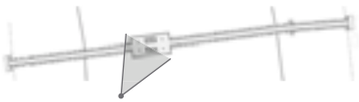












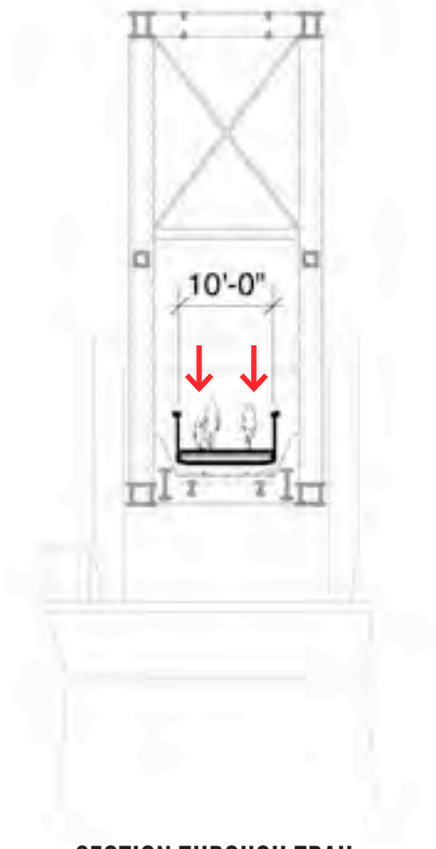
LIGHTING STRATEGIES PHASE I

IMAGE: Liberty Bridge, Greenville, SC: Derek Porter Studio

To both respect the elegance of the structural spans and ensure safe, comfortable use of the bridge from dawn to dusk, lighting design should play a key role in all phases of development.

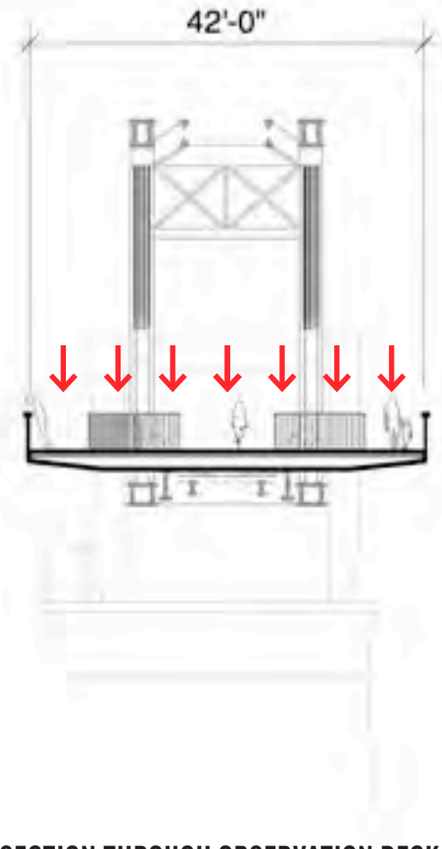
In Phase 1, the design team proposes that the entire trail and observation deck be illuminated entirely through LED fixtures embedded within handrails, similar to the lighting design by Derek Porter for the Liberty Bridge.

This approach positions light only where necessary, minimizing light pollution in the area. This concept can also be easily expanded upon in latter phases of development, if and when they occur.



SECTION THROUGH TRAIL

LIVE LOAD: 173 PSF[1]
DEAD LOAD: 1,420 PLF[2]



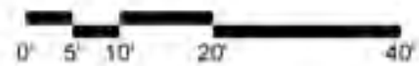
SECTION THROUGH OBSERVATION DECK

LIVE LOAD: 90 PSF[1]
DEAD LOAD: 5,380 PLF[3]

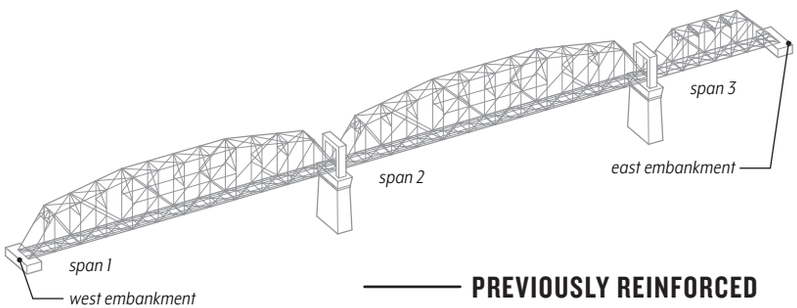
1. The live load includes loading from pedestrians, cyclists, tables, chairs, and other various equipment.

2. The dead load at trail locations of 1,420 PLF is the additional loading on the bridge structure by the improvements. This applied dead load includes a 10' wide trail (assumed 6" thick concrete with a total width of 12' to account for railings), railings, additional support superstructure, and an arbitrary increase of 10% to account for unknowns.

3. The dead load at platform locations of 5,380 PLF is the additional loading on the bridge structure by the improvements. This applied dead load includes a 43' wide platform (assumed 6" thick concrete), railings, additional support superstructure, and an arbitrary increase of 20% to account for unknowns.



STRUCTURAL ANALYSIS PHASE I



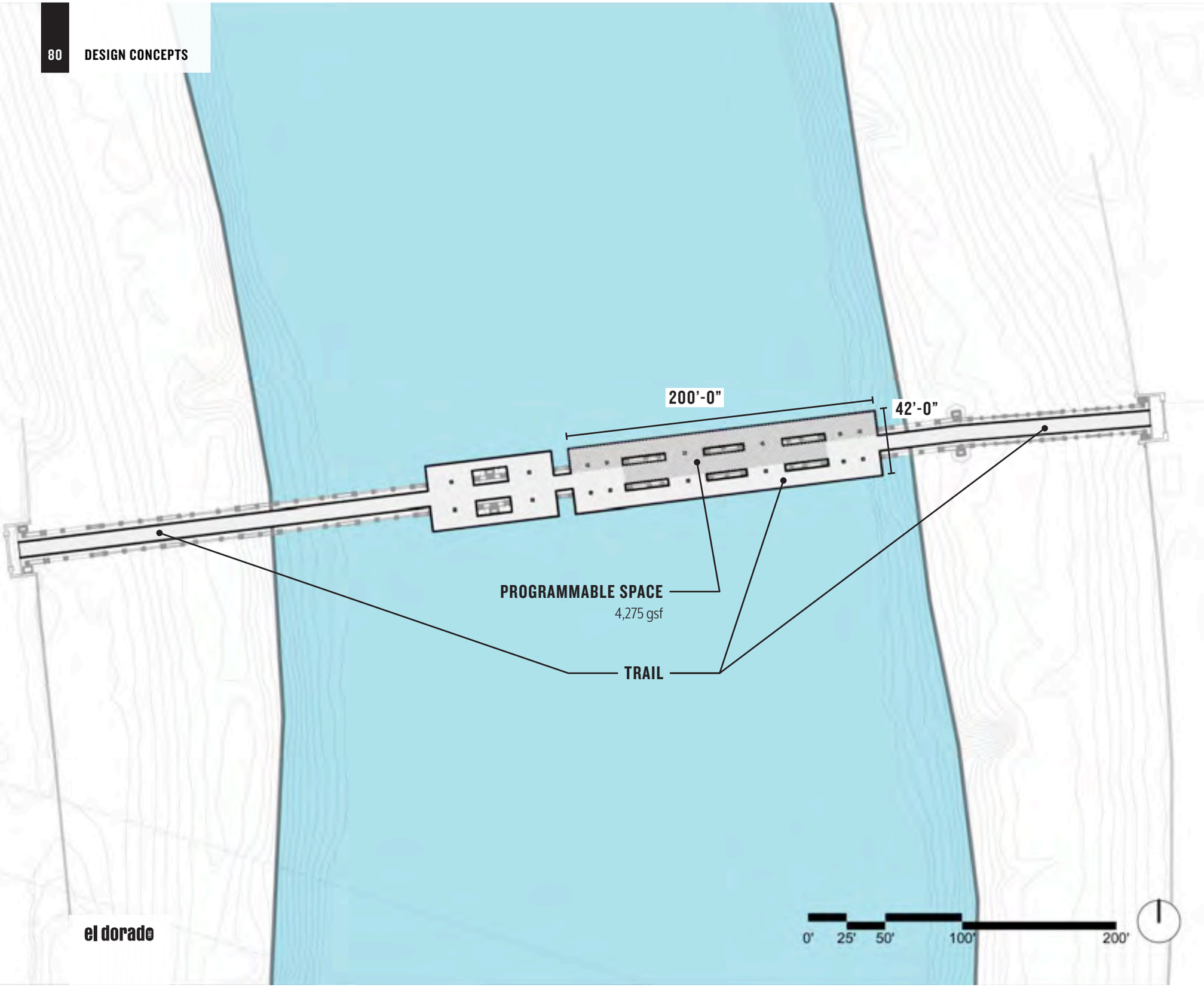
*reinforcing not required in this phase

Phase 1 of the project includes a multi-use trail through the center of the truss and a cantilevered observation platform centered over the river pier (Pier 1). The observation platform is envisioned to be approximately 82' long by 42' wide.

Loading on the truss from the trail was modeled as a continuous load applied to the longitudinal girders. A pedestrian loading of 450 pounds per foot (PLF) was applied to each running girder for the new trail and 1,890 PLF was applied to each running girder in the area of the observation platform.

The analysis of the structure shows that Phase I work could be easily supported without modifications to the main structural elements of the bridge. The proposed cantilevered section, while large in area, is placed near the pier and consequently produces low stresses on the truss members.

Deferred maintenance, including elevating the bridge, would be performed prior to this phase; see "Bridge Analysis" on page 41 for more information.


200'-0"
42'-0"
PROGRAMMABLE SPACE
4,275 gsf
TRAIL
0'
25'
50'
100'
200'

PHASE 2
AMENITY PLATFORM

PROS

Ample passive and active space on bridge, ample amenity opportunities.

CONS

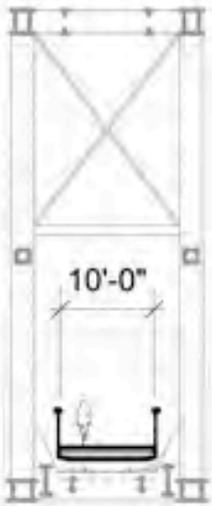
Expensive, event on bridge blocks natural flow of movement on trail.

PROGRAMMABLE SPACE*:
4,275 gsf

** "Programmable Space" is a designated area used to support a future private enterprise without interfering with the proposed trail system. The division between the "Programmable Space" and trail system, by means of a barrier, would be determined during future design phases once the program is known.*

Phase 2 of the project adds an amenity platform that measures 200' long by 42' wide centered within one of the trusses. In total, this approach provides 4,275 gross square feet of usable space. A 10' wide minimum trail remains outside of this usable space at all times, a stipulation in the lease between the City of Kansas City, Missouri, and Flying Truss, LLC.

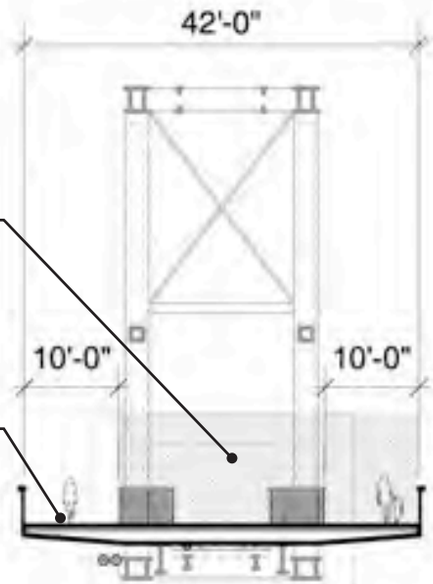
Although intended to be used only seasonally in the beginning, the amenity platform provides an opportunity to begin hosting events on the bridge. This will initiate the process of creating an image of the bridge as a cultural and event destination.



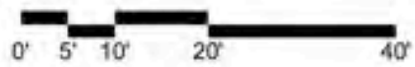
SECTION THROUGH TRAIL

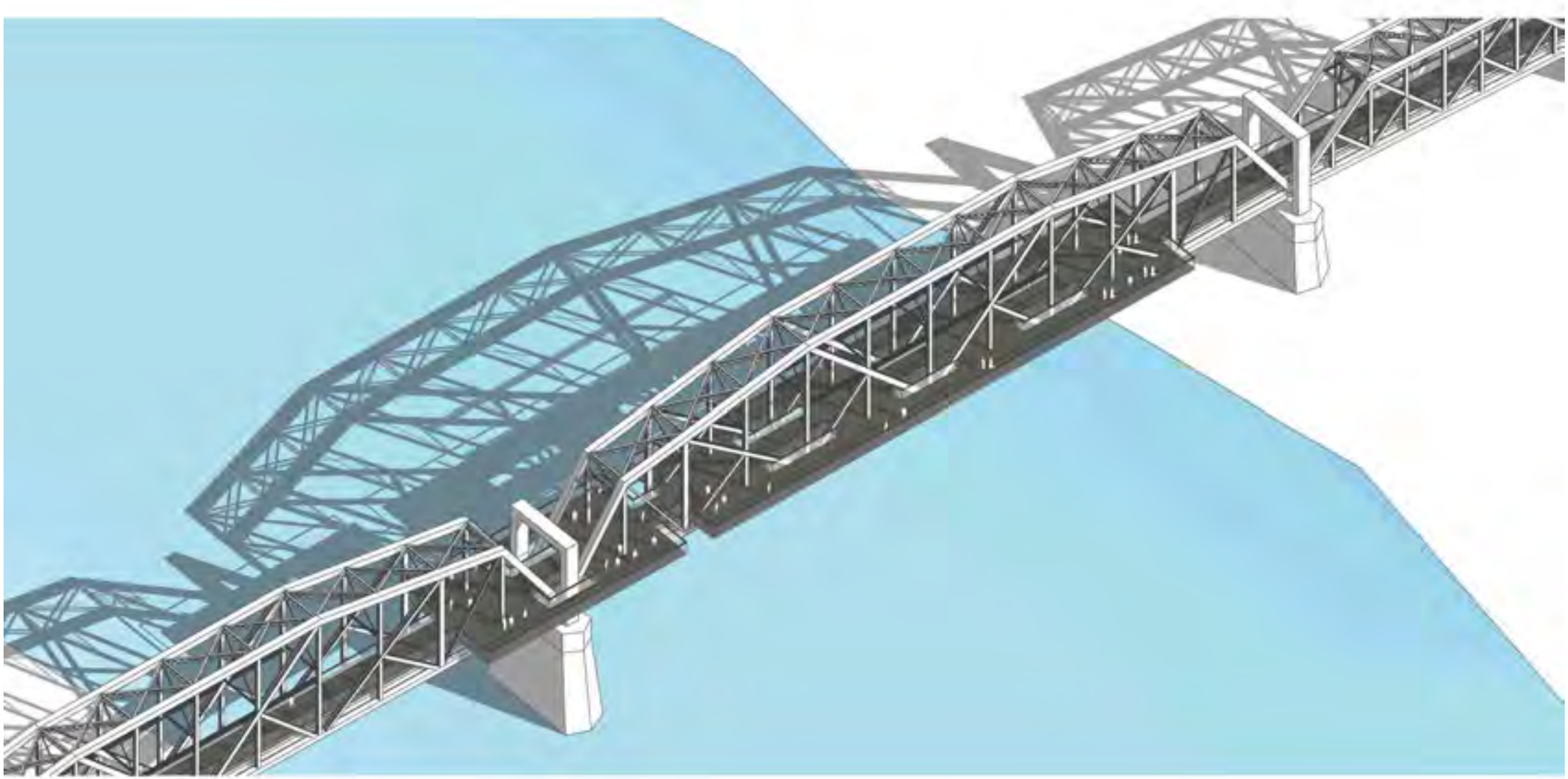
PROGRAMMABLE SPACE
area closed to pedestrians and cyclists during event

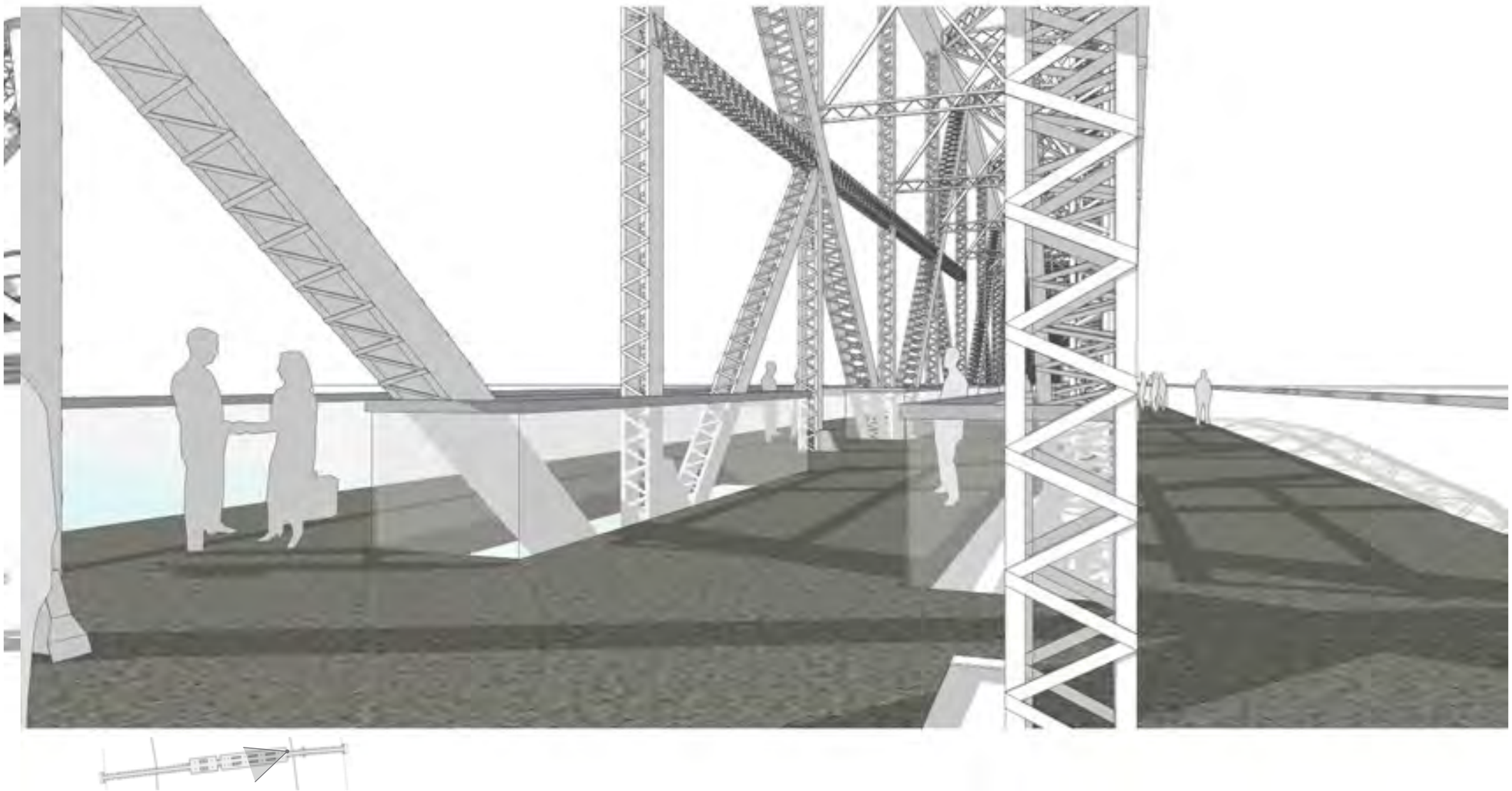
BIKE/PEDESTRIAN TRAIL
exclusive of programmable space

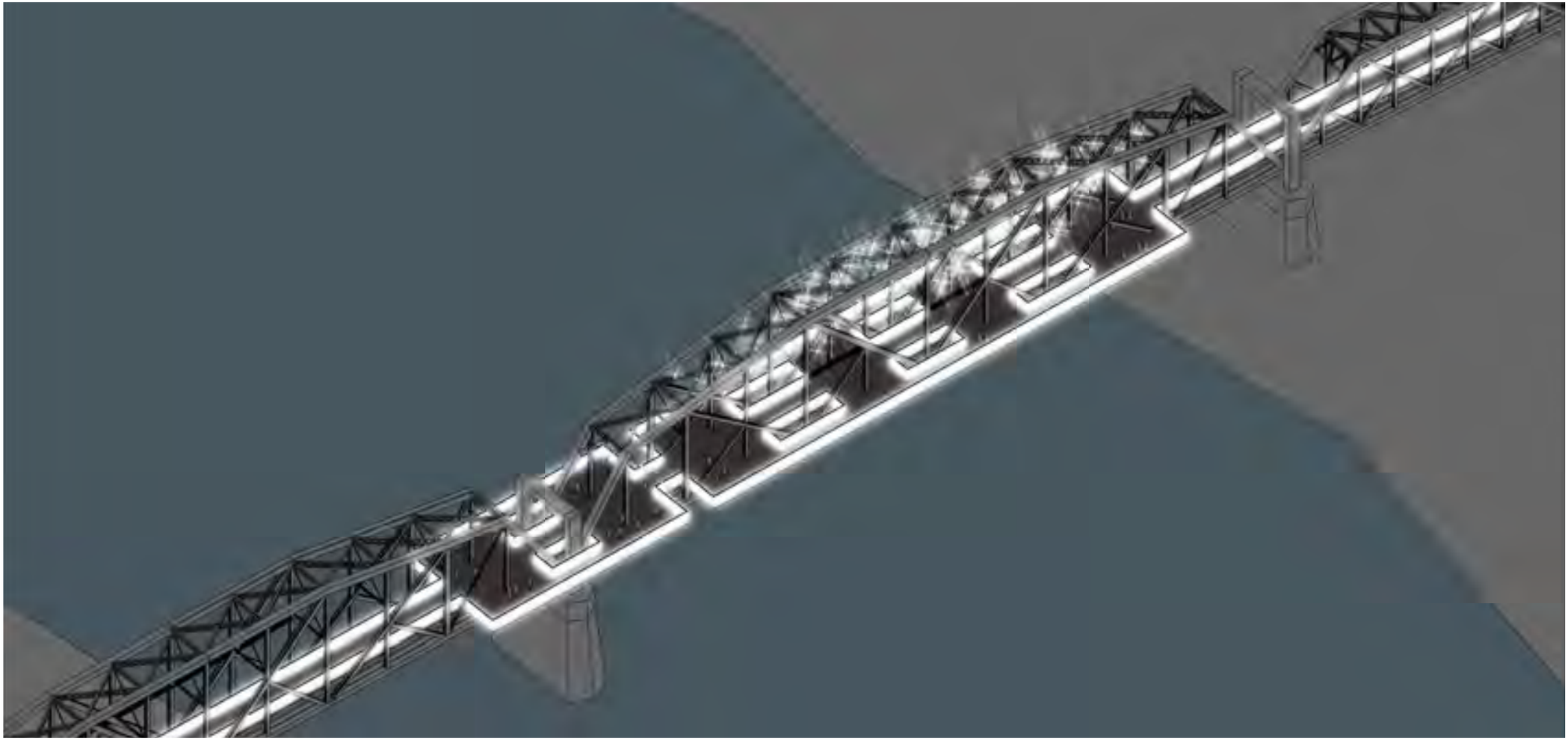


SECTION THROUGH AMENITY PLATFORM







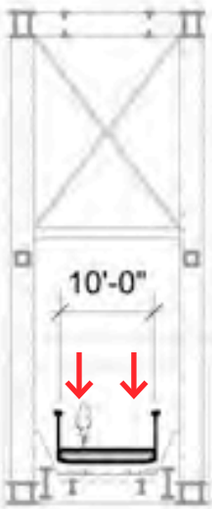


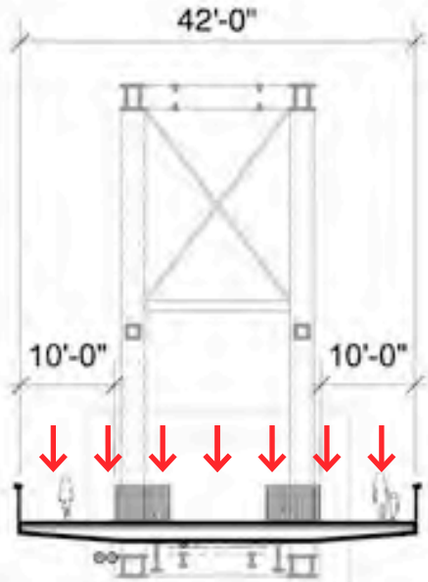
LIGHTING STRATEGIES PHASE 2

IMAGES: Kaw River Bridge cathedral-like space and Dissonant Clouds, Orlando Event Center, FL: Derek Porter Studio

To compliment the focused, yet nuanced nature of the illuminated handrail lighting in Phase 1, Phase 2 lighting takes an ambient approach to illuminating the cathedral-like space within the structural span.

Inspired by Derek Porter's "Dissonant Clouds," the design team imagines a comparable approach to Phase 2 lighting.





SECTION THROUGH TRAIL

LIVE LOAD: 173 PSF[1]
DEAD LOAD: 1,420 PLF[2]

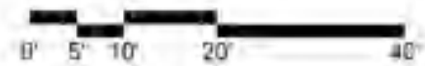
SECTION THROUGH AMENITY PLATFORM

LIVE LOAD: 90 PSF[1]
DEAD LOAD: 5,380 PLF[3]

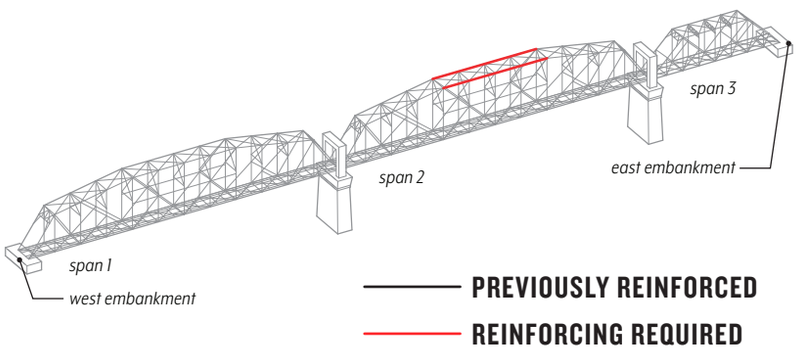
1. The live load includes loading from pedestrians, cyclists, tables, chairs, and other various equipment.

2. The dead load at trail locations of 1,420 PLF is the additional loading on the bridge structure by the improvements. This applied dead load includes a 10' wide trail (assumed 6" thick concrete with a total width of 12' to account for railings), railings, additional support superstructure, and an arbitrary increase of 10% to account for unknowns.

3. The dead load at platform locations of 5,380 PLF is the additional loading on the bridge structure by the improvements. This applied dead load includes a 43' wide platform (assumed 6" thick concrete), railings, additional support superstructure, and an arbitrary increase of 20% to account for unknowns.



STRUCTURAL ANALYSIS PHASE 2

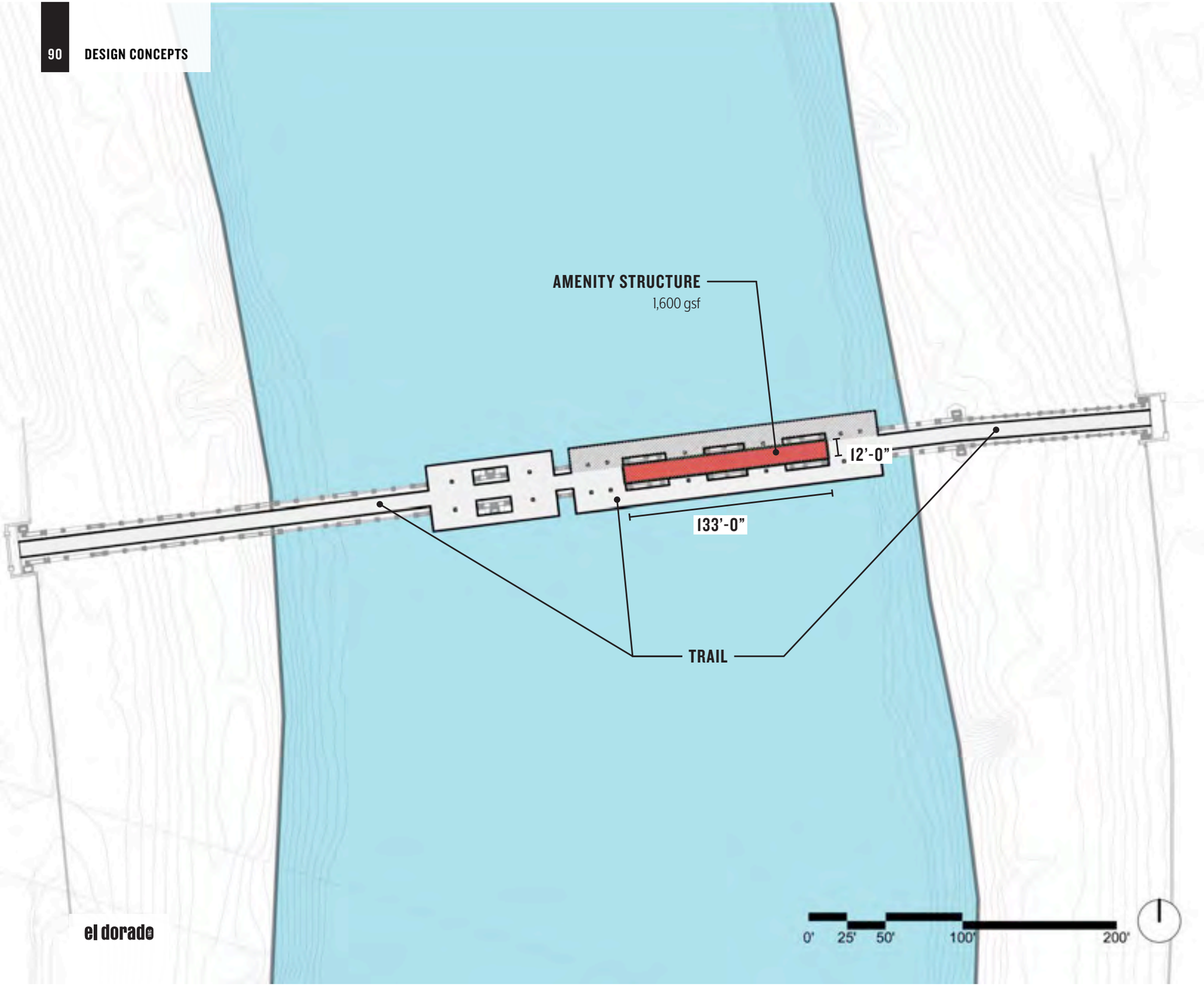


Phase 2 of the project involves removing a 200' long portion of the trail constructed in Phase 1 from Span 2 so a new amenity platform can be constructed in its place. The amenity platform will be 42' wide, similar to the Phase I observation platform width.

Also similar to Phase 1, the code required pedestrian loads produced 450 PLF on the running girders in the area of the 10' wide trail, and 1,890 PLF on the girders in the area of the new event space.

Since the new event space is added in the center of Span 2, it significantly increases the stresses on the main truss members. This analysis of the structure during this phase of work shows that the upper chord of both trusses in Span 2, between U4 and U8, will need to be strengthened using additional steel plates to increase its capacity.

In Phase 2, there are no changes to the loading of Spans 1 or 3; consequently, these spans have adequate capacity and need no additional reinforcing.


AMENITY STRUCTURE
1,600 gsf
12'-0"
133'-0"
TRAIL
0'
25'
50'
100'
200'

PHASE 3
ON-DECK AMENITY STRUCTURE

PROS
Ample passive and active space on bridge, ample amenity opportunities. Trail is uninterrupted by amenity structure.

CONS
Most expensive of all concepts. Requires numerous structural modifications to bridge and substructure. Required parking for large amenity structure could be problematic. Difficult to phase.

PROGRAMMABLE SPACE*:
4,275 gsf

AMENITY STRUCTURE*:
1,600 gsf

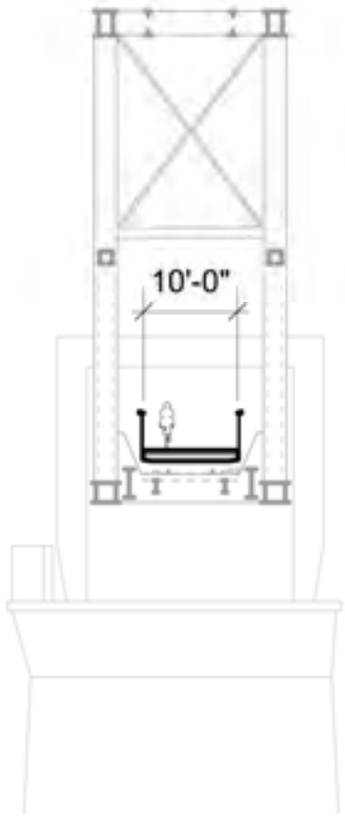
** "Programmable Space" is a designated area used to support a future private enterprise without interfering with the proposed trail system. The division between the "Programmable Space" and trail system, by means of a barrier, would be determined during future design phases once the program is known. "Amenity Structure" is a proposed building that resides within the "Programmable Space."*

In Phase 3, an enclosed amenity structure with all the required infrastructure is built on the amenity platform constructed in Phase 2. This ensures the commercial enterprise on the bridge is viable year-round.

The dimensions of the amenity structure are dictated by the interior volume of the structural span without extensive modifications to the bridge. This results in a 1,600 gross square foot, single-story structure that is 12'-0" wide by 133'-0" long. This feasibly provides enough space for a kitchen, restrooms, bar/point of sale, and mechanical space. The majority of the seating remains outside on the cantilevered portion of the amenity platform.

Coordination of necessary infrastructure onto the bridge , such as water, sewer, grease, communicates, etc. will be required for the amenity structure.

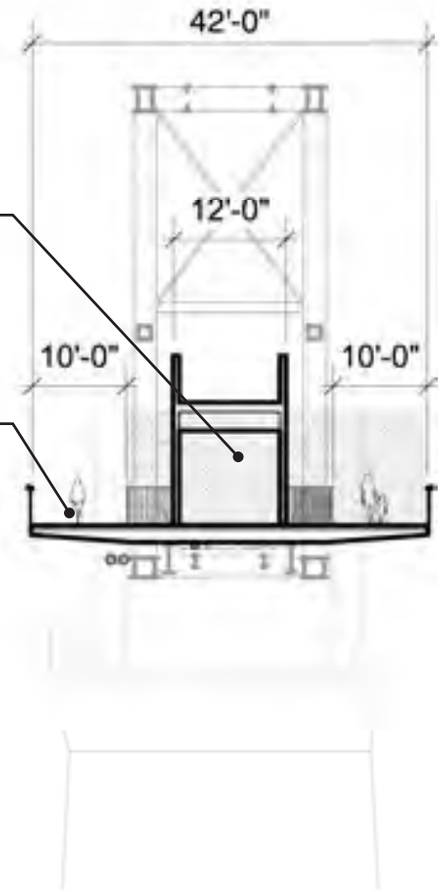
The design team has not explored the programming or design of amenity structure. The parameters set forth here are in response to the constraints of the truss structure and consideration of code required head clearances as well as accessibility.



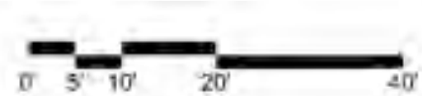
SECTION THROUGH TRAIL

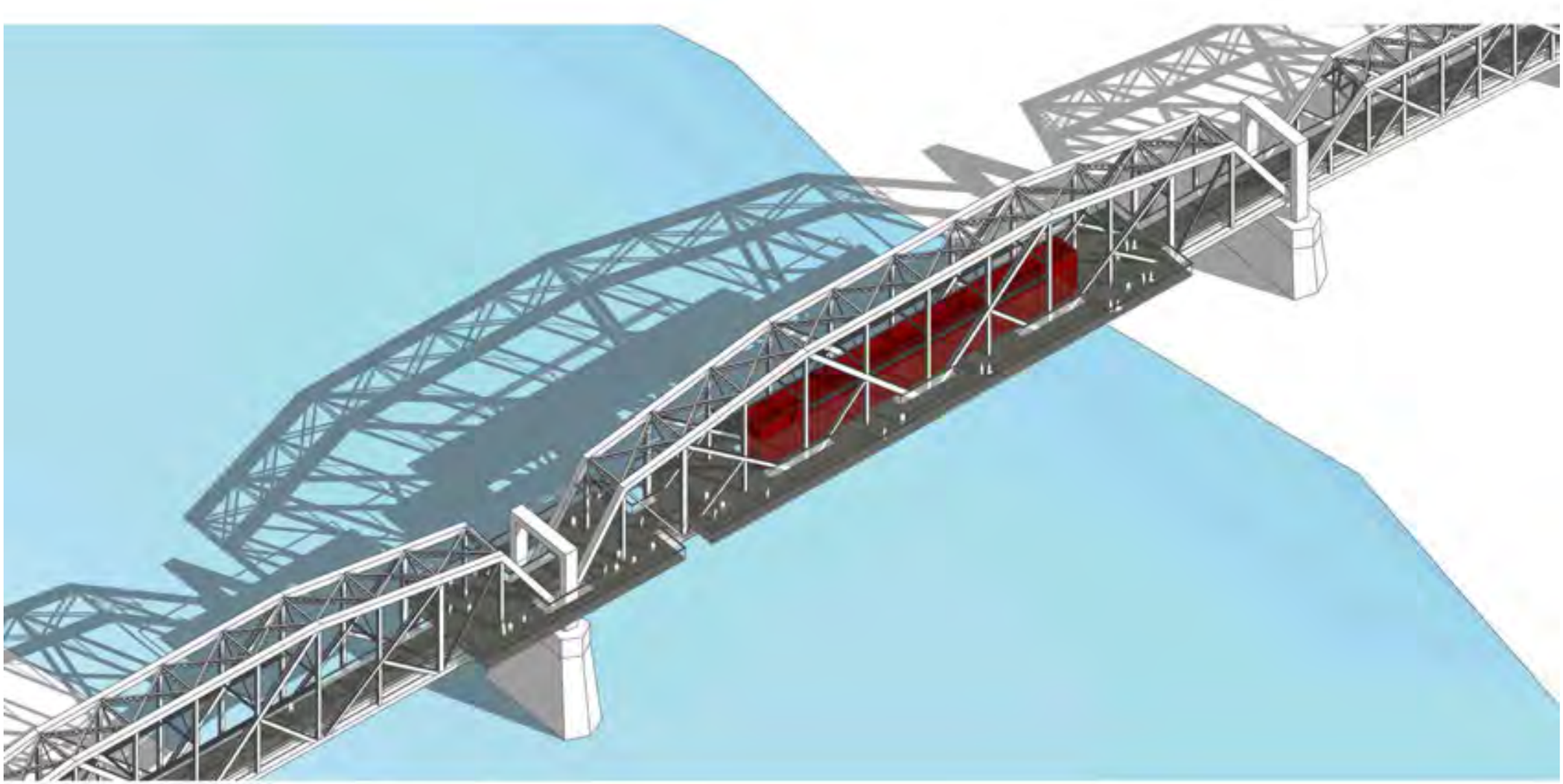
PROGRAMMABLE SPACE
area closed to pedestrians and cyclists during event

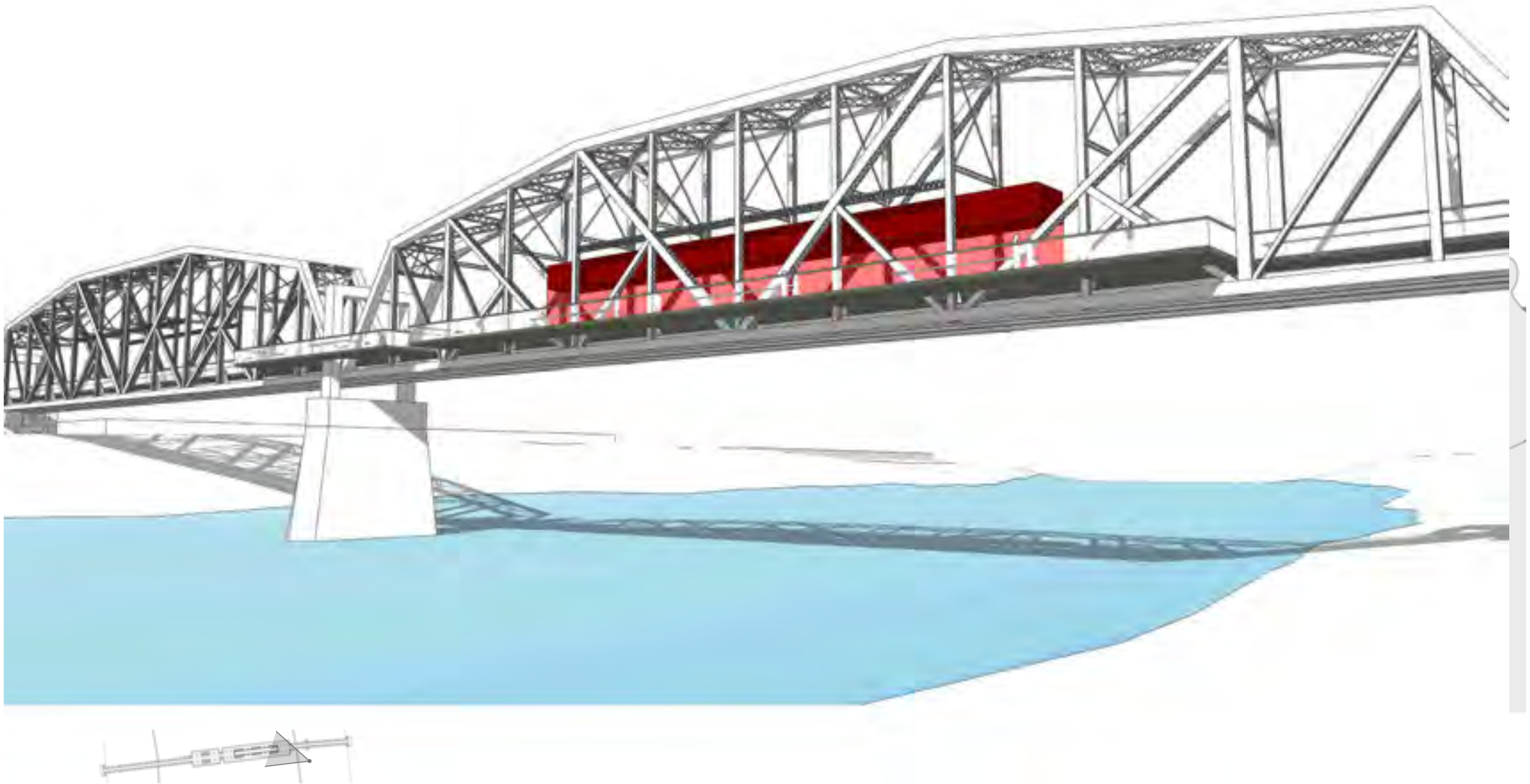
BIKE/PEDESTRIAN TRAIL
exclusive of programmable space

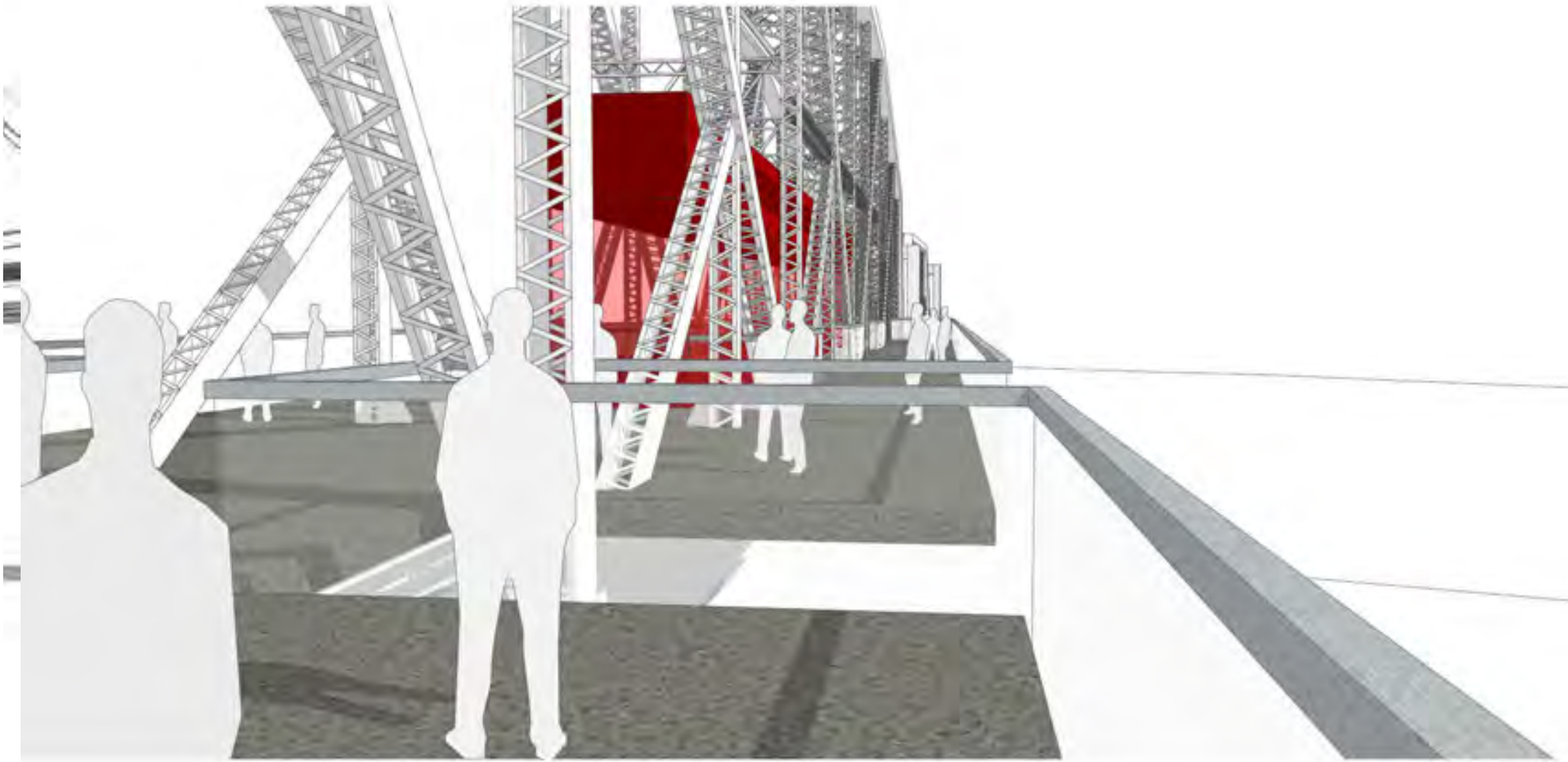


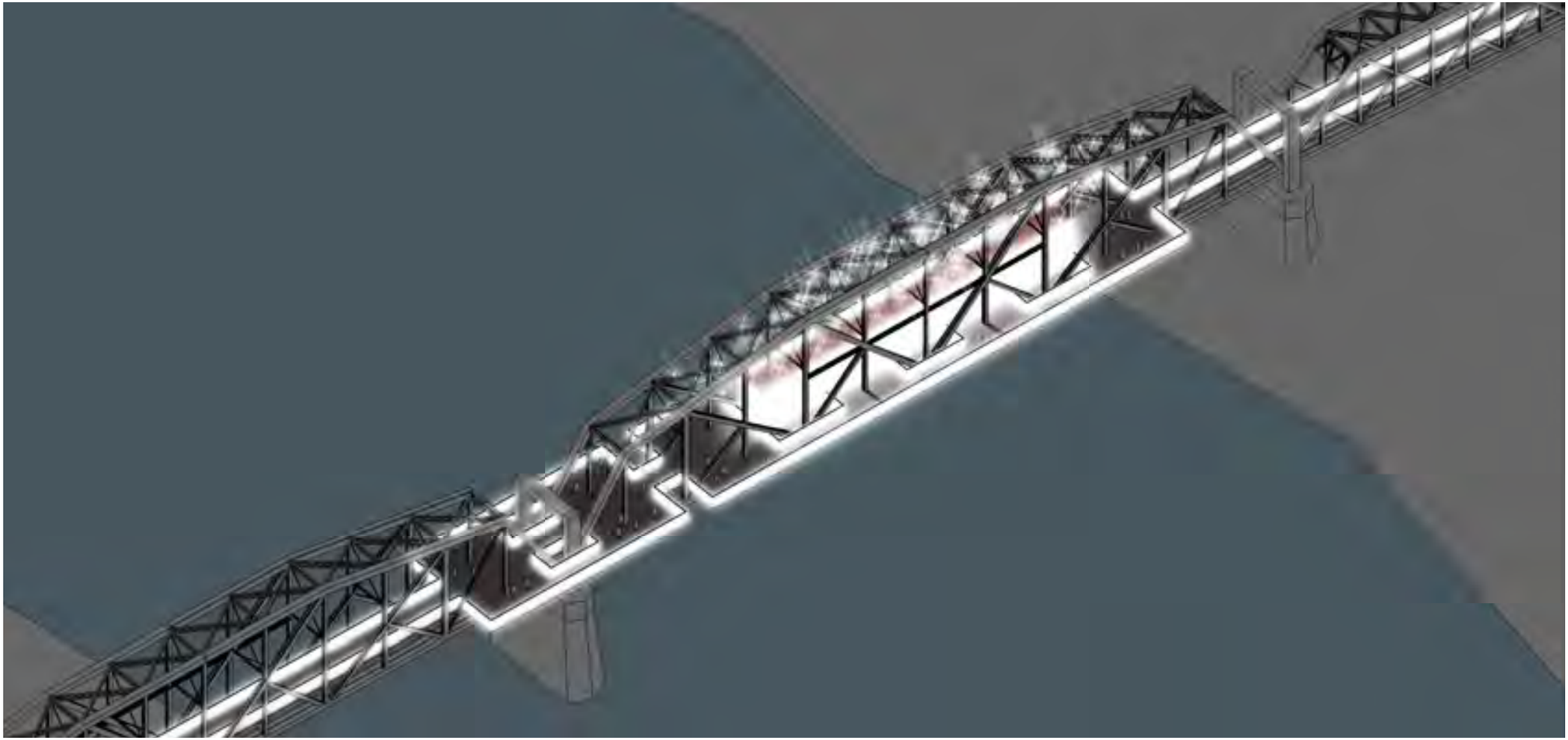
SECTION THROUGH AMENITY STRUCTURE

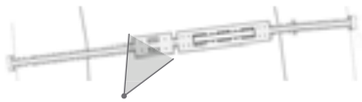












LIGHTING STRATEGIES PHASE 3

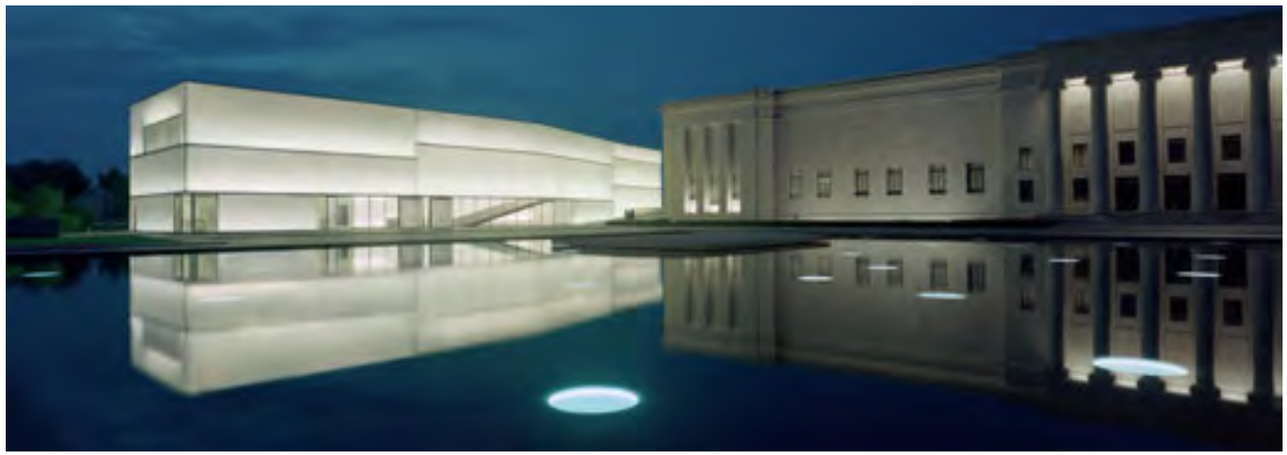
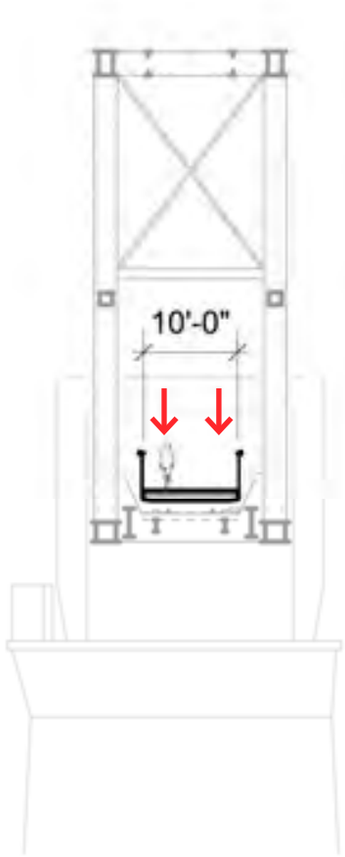


IMAGE: Bloch Building, Kansas City, MO: Steven Holl Architects, BNIM, and Renfro Design Group

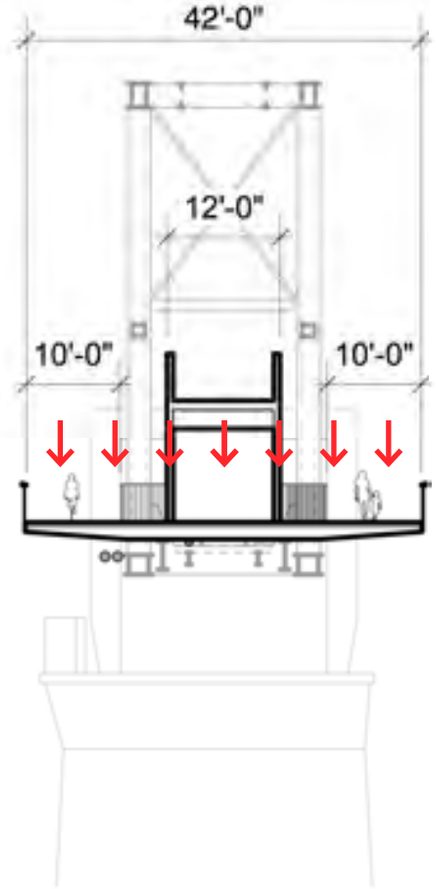
Building upon the lighting suggestions set forth in Phase 1 and Phase 2, the design team recommends consistency when considering lighting strategies for the future Amenity Structure.

Imagining the structure as an elegant, singular luminaire works well in a historical context. Inspiration can be found nearby in the Bloch Addition to the Nelson Atkins Museum of Art, designed by Steven Holl Architects in partnership with BNIM, with lighting design by Renfro Design Group.



SECTION THROUGH TRAIL

LIVE LOAD: 173 PSF[1]
DEAD LOAD: 1,420 PLF[2]



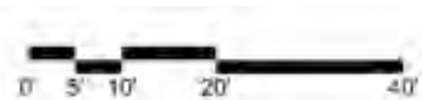
SECTION THROUGH AMENITY STRUCTURE

LIVE LOAD (ON PLATFORM): 90 PSF[1]
LIVE LOAD (INSIDE BUILDING): 100 PSF[1]
DEAD LOAD: NOT INCLUDED[3]

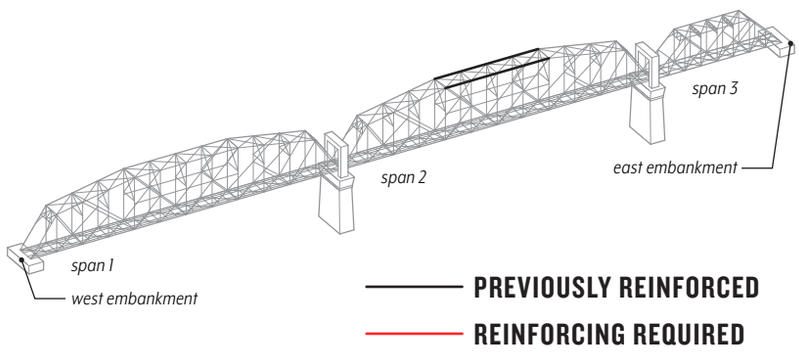
1. The live load includes loading from pedestrians, cyclists, tables, chairs, and other various equipment.

2. The dead load at trail locations of 1,420 PLF is the additional loading on the bridge structure by the improvements. This applied dead load includes a 10' wide trail (assumed 6" thick concrete with a total width of 12' to account for railings), railings, additional support superstructure, and an arbitrary increase of 10% to account for unknowns.

3. The dead load applied to the bridge by the Phase 3 amenity structure is not included in calculations or this report due to the preliminary nature of the program and structure itself.



STRUCTURAL ANALYSIS PHASE 3

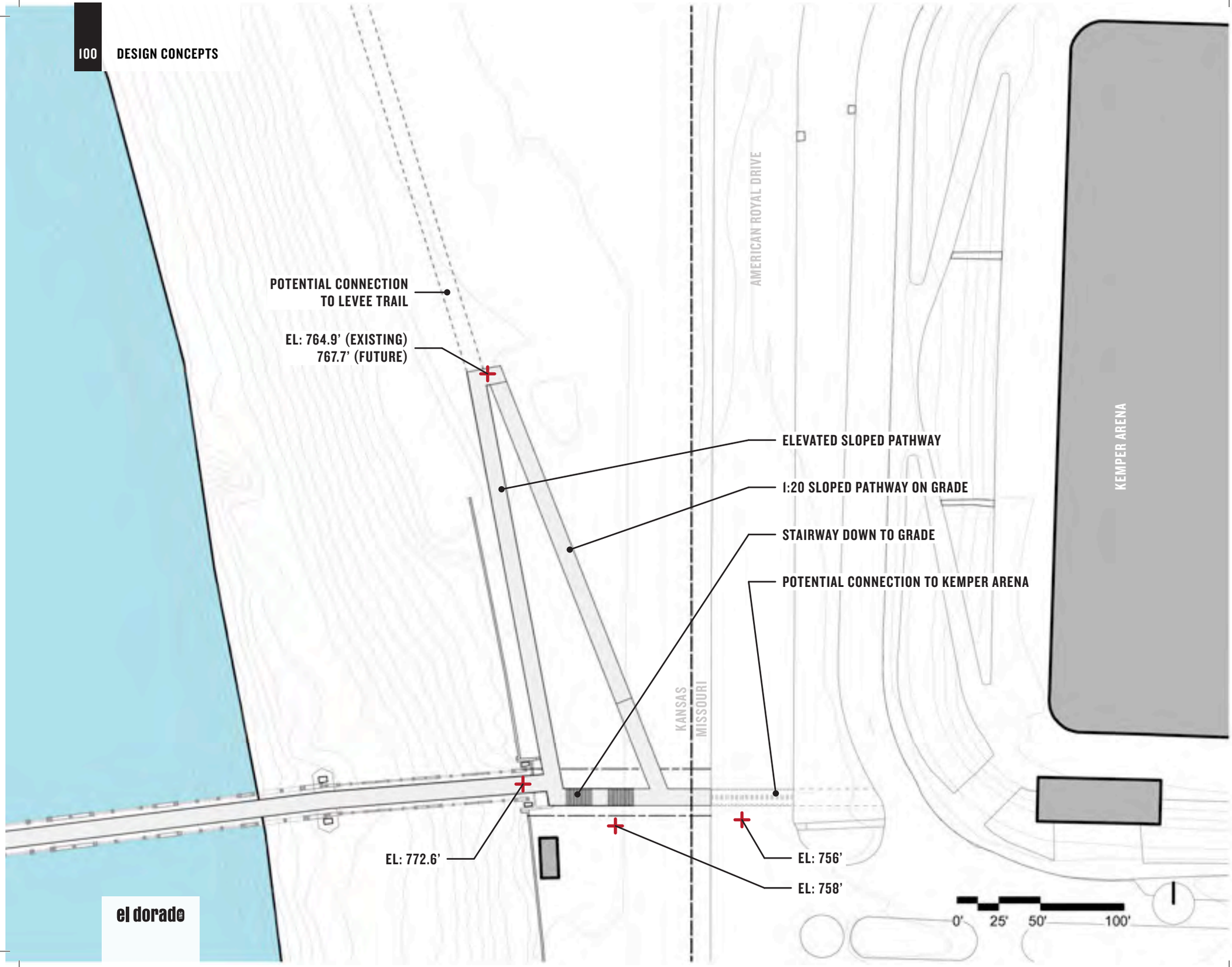


Phase 3 of the project envisions a private structure built on the amenity platform constructed in Phase 2. The structure would be confined to the 12' wide area between the truss lines and be approximately 132'-10" long.

The building load supported by the bridge was estimated to be 50 PSF. This load included an allowance for the building and roof dead loads as well as a live load on the roof. A increased live load of 100 PSF was also applied to the structure in the area of the building only. Those areas outside the footprint of the building continued to include 90 PSF for the pedestrian live load.

The analysis of the structure during this phase of work shows it will require similar strengthening of upper chord members as the Phase 2 work. It is anticipated that all strengthening required of the structural members could be completed in Phase 2 to alleviate the need for any additional strengthening in Phase 3.

Similar to Phase 2, there are no changes to the loading of Spans 1 or 3; consequently, these spans have adequate capacity and need no additional reinforcing.


POTENTIAL CONNECTION TO LEVEE TRAIL
EL: 764.9' (EXISTING)
767.7' (FUTURE)
ELEVATED SLOPED PATHWAY
1:20 SLOPED PATHWAY ON GRADE
STAIRWAY DOWN TO GRADE
POTENTIAL CONNECTION TO KEMPER ARENA
EL: 772.6'
EL: 756'
EL: 758'
AMERICAN ROYAL DRIVE
KEMPER ARENA
KANSAS
MISSOURI
0'
25'
50'
100'

EAST APPROACH PHASE I

PROS

Least expensive, makes good connection to levee for potential future trail connection, improvement of public side of levee embankment.

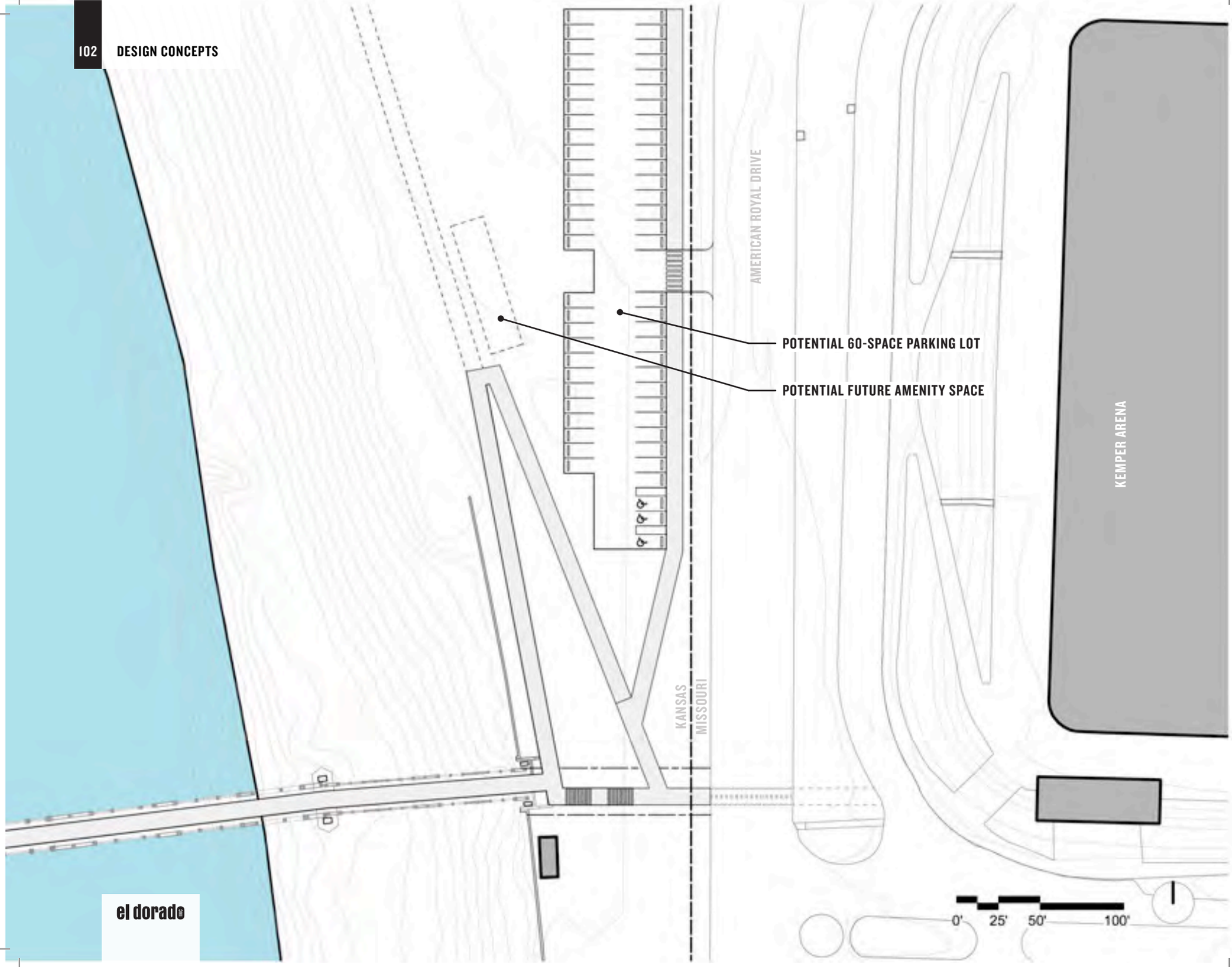
CONS

Requires deal with a supportive, adjacent private property owner, larger area to maintain.

After the bridge is raised 4'-6", there is a 15' to 16' difference in elevation between the walking surface of the trail on the bridge and public right-of-way. This necessitates a roughly 300' long, 1:20 inclined pathway to connect the improvements on the bridge to American Royal Drive.

When the inclined pathway reaches its northernmost point, it is at an ideal elevation for connection into the levee trail, providing it has been developed and functional at this time.

Due to the large area necessary for this approach, it is possible that this area could be developed and landscaped in a way that educates people about the river ecosystem. Similar to the riverfront in Chattanooga, it could also provide spaces for socialization and informal gatherings.


AMERICAN ROYAL DRIVE
POTENTIAL 60-SPACE PARKING LOT
POTENTIAL FUTURE AMENITY SPACE
KEMPER ARENA
KANSAS
MISSOURI
0'
25'
50'
100'

EAST APPROACH PHASE 2

PROS

Least expensive, makes good connection to levee for potential future trail connection, improvement of public side of levee embankment. Provides required parking for 4,275 gsf on-bridge amenity space.

CONS

Requires deal with a supportive, adjacent private property owner, larger area to maintain.

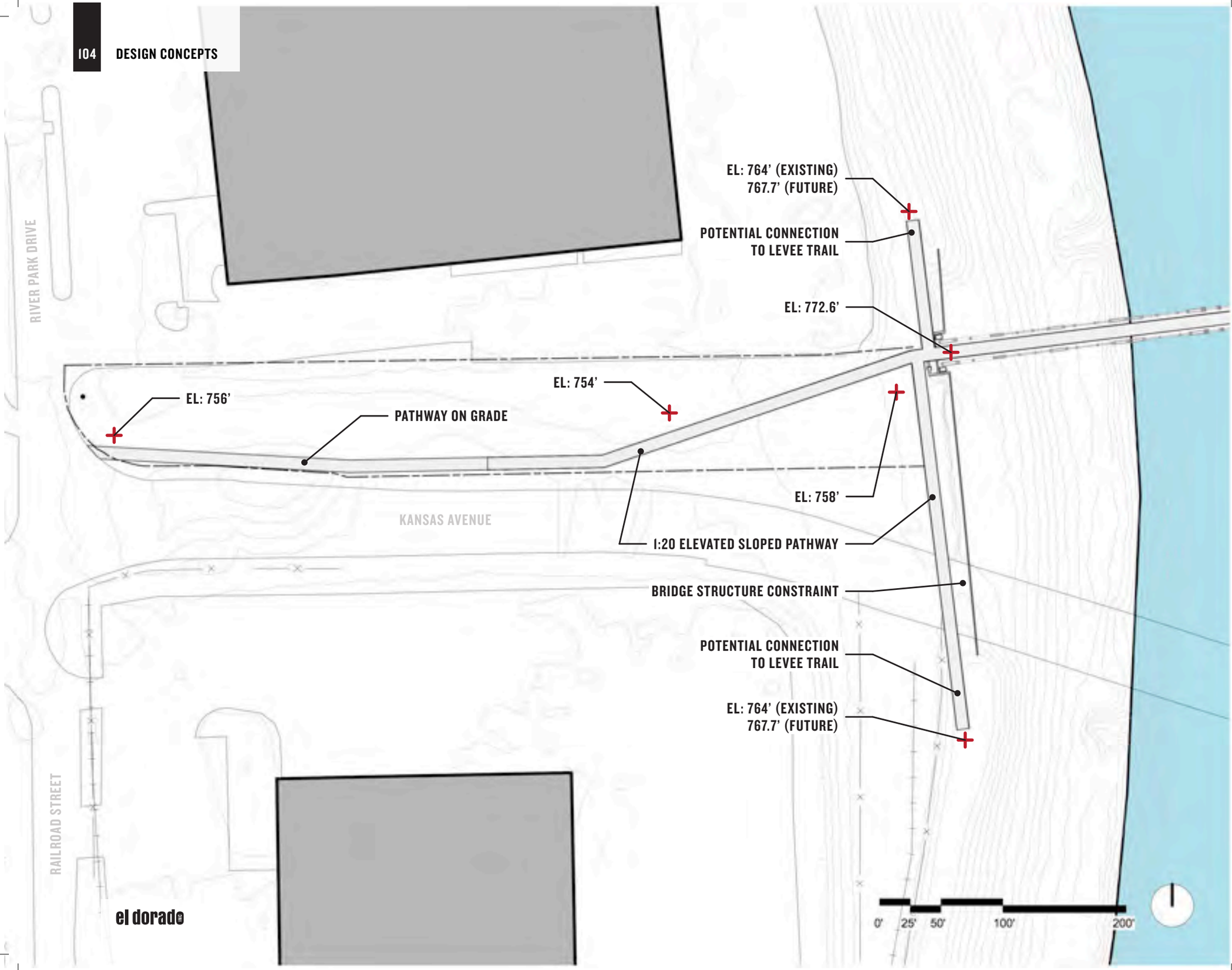
Any type of on-bridge amenity will require parking, regardless if there is an enclosed structure or not.

Preliminary parking calculations were based off 4,275 gross square feet of amenity space. Of that, 2,675 gross square feet is considered “seating area,” and the remaining 1,600 gross square feet covered by the amenity structure is considered “other area.” This balance resulted in a minimum requirement of 60 parking spaces, 3 of those being accessible.

While large, a 60-space parking lot can comfortably fit on the parcel while still allowing ample space for future improvements.

SOURCE:

UG DIV. 9, Section 27-68
1 Parking Stall/50 SF Seating Area - 54 Stalls Required
1 Parking Stall/300 SF Other Area - 6 Stalls Required


EL: 764' (EXISTING)
767.7' (FUTURE)
POTENTIAL CONNECTION
TO LEVEE TRAIL
EL: 772.6'
EL: 754'
EL: 756'
PATHWAY ON GRADE
EL: 758'
KANSAS AVENUE
1:20 ELEVATED SLOPED PATHWAY
BRIDGE STRUCTURE CONSTRAINT
POTENTIAL CONNECTION
TO LEVEE TRAIL
EL: 764' (EXISTING)
767.7' (FUTURE)
RIVER PARK DRIVE
RAILROAD STREET
0'
25'
50'
100'
200'

WEST APPROACH PHASE I

PROS

Strong linkage to Armourdale, cost effective, makes good connection to levee for potential future trail connection.

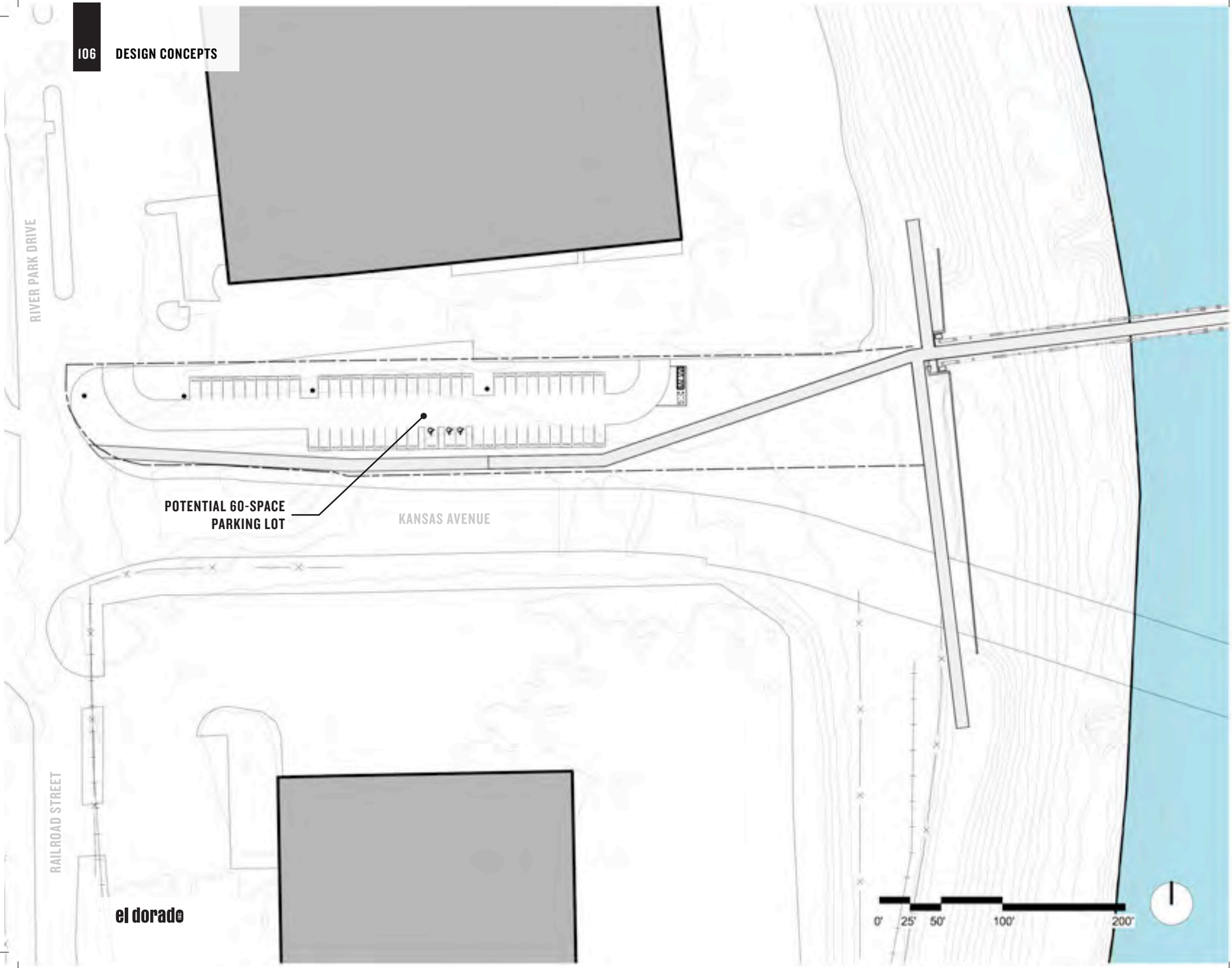
CONS

Requires intersection/pedestrian/bike upgrade at River Park Drive and Kansas Avenue. Additional easement and/or land acquisition necessary.

Similar to the east side, there is a 15' to 16' difference in elevation between the walking surface of the trail on the bridge and public right-of-way. This necessitates a roughly 300' long, 1:20 inclined pathway to connect the improvements on the bridge to the intersection of River Park Drive and Kansas Avenue.

This inclined approach works well within the confines of the existing parcel of land to the west of the bridge.

The connections to the Armourdale levee trail could also be easily accommodated by a 1:20 elevated sloped pathway, providing that the Armourdale levee trail is fully-functional at the time.


RIVER PARK DRIVE
POTENTIAL 60-SPACE
PARKING LOT
KANSAS AVENUE
RAILROAD STREET
0'
25'
50'
100'
200'

WEST APPROACH PHASE 2

PROS

Strong linkage to Armourdale, cost effective, makes good connection to levee for potential future trail connection. Provides required parking for 4,275 gsf on-bridge amenity.

CONS

Requires intersection/pedestrian/bike upgrade at River Park Drive and Kansas Avenue. Additional easement and/or land acquisition necessary. Parking is accessed through adjacent private property.

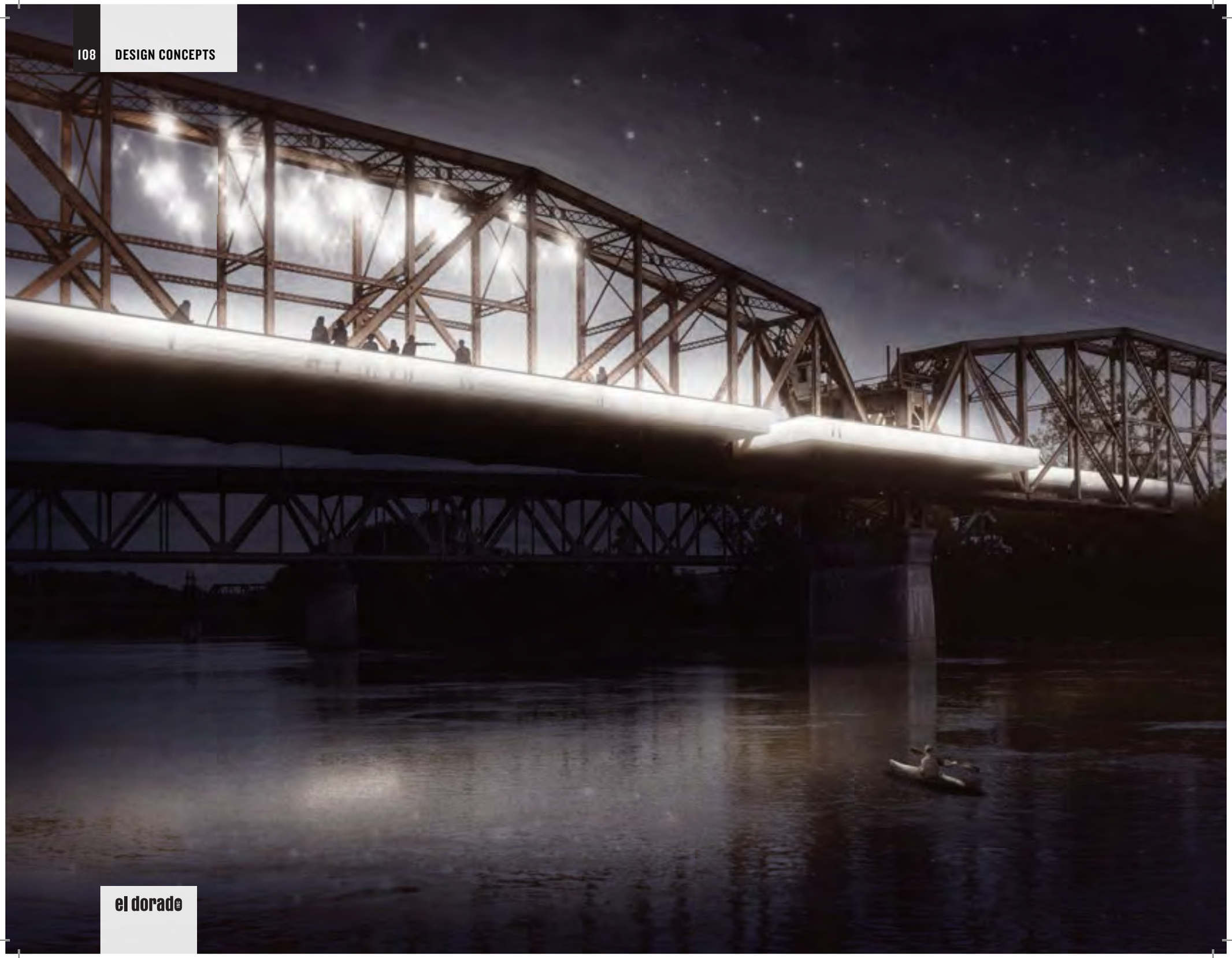
Like the east approach, a 60-space parking lot required by a 4,275 gross square foot on-bridge amenity can comfortably fit on the parcel while still allowing enough space for the trail and approach pathways.

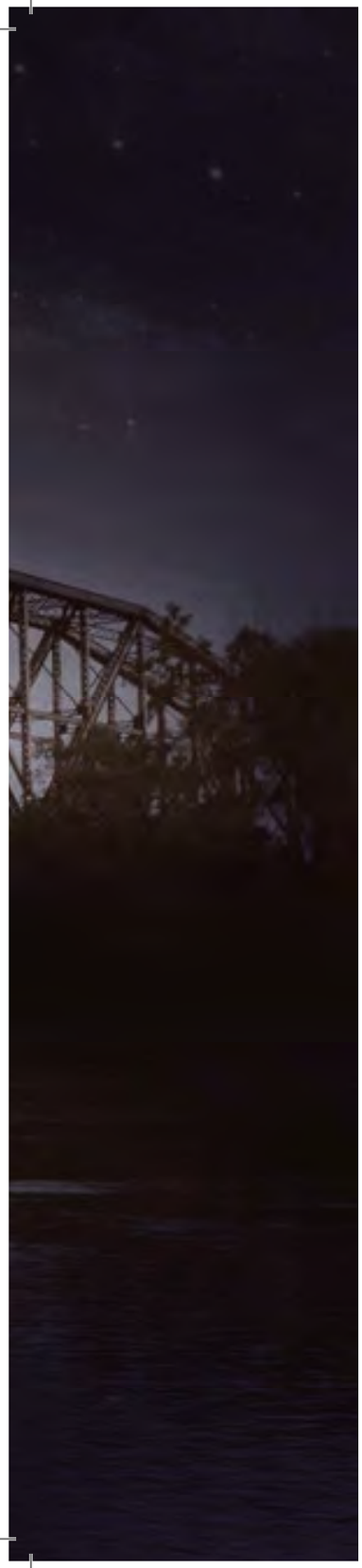
If the existing power lines above the proposed parking lot were to be buried or relocated, the parking lot could be condensed and become more efficient.

Much like the east approach, it is possible that this area gained through efficiency could be developed and landscaped in a way that educates people about the river ecosystem and provide spaces for socialization and informal gatherings.

SOURCE:

UG DIV. 9, Section 27-68
1 Parking Stall/50 SF Seating Area - 54 Stalls Required
1 Parking Stall/300 SF Other Area - 6 Stalls Required





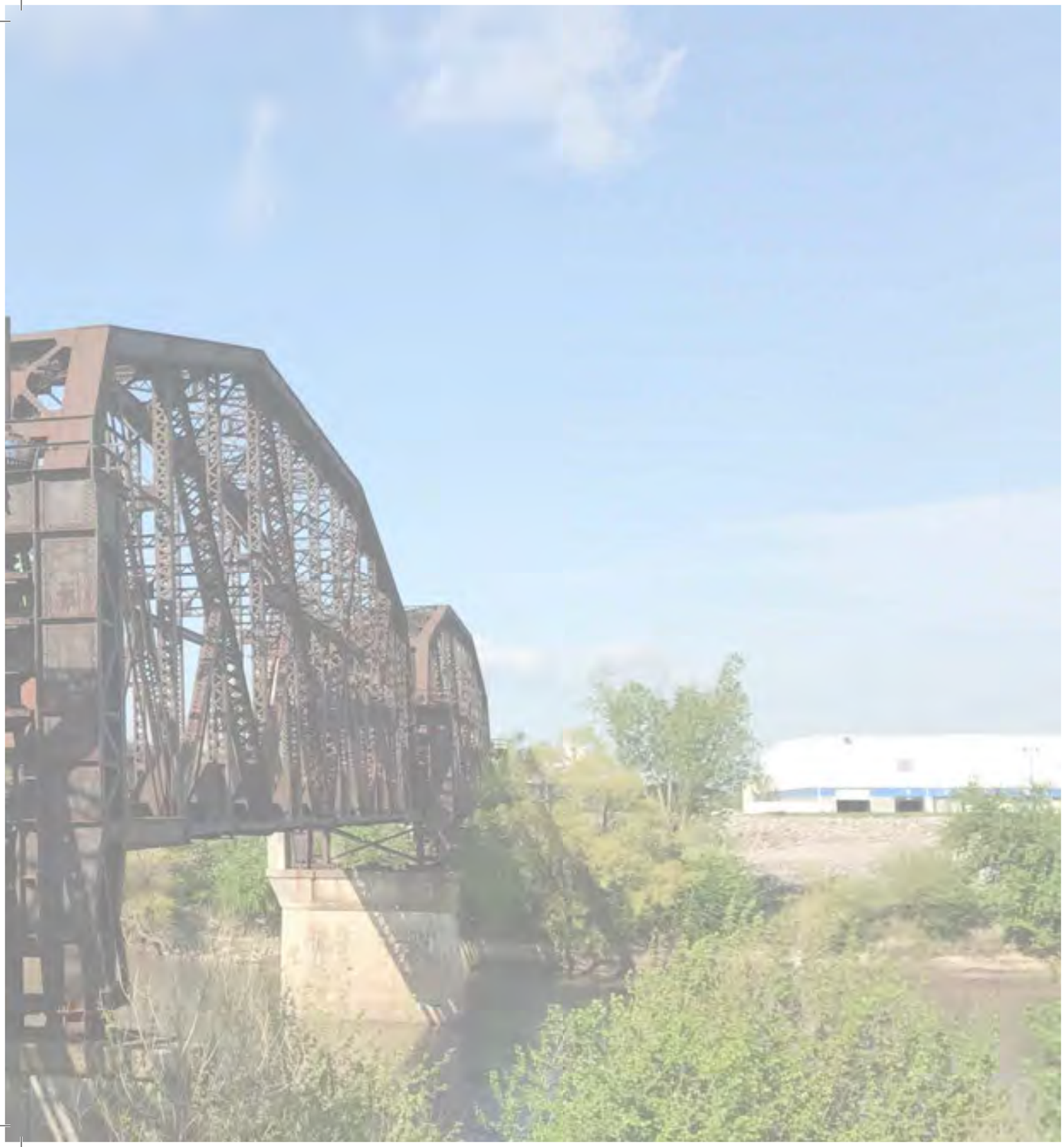
A REVITALIZED KAW RIVER BRIDGE

Similar to the Union Railway Bridge in Des Moines and the Walnut Street Bridge in Chattanooga, it's likely that the increased connectivity and activity in the immediate area will have a significant economic impact and could help spur a greater riverfront redevelopment.

The West Bottoms and Armourdale are currently seeing multiple projects in development and are anticipating many others. A rehabilitated Kaw River Bridge would benefit each of these projects, and could instigate numerous others.

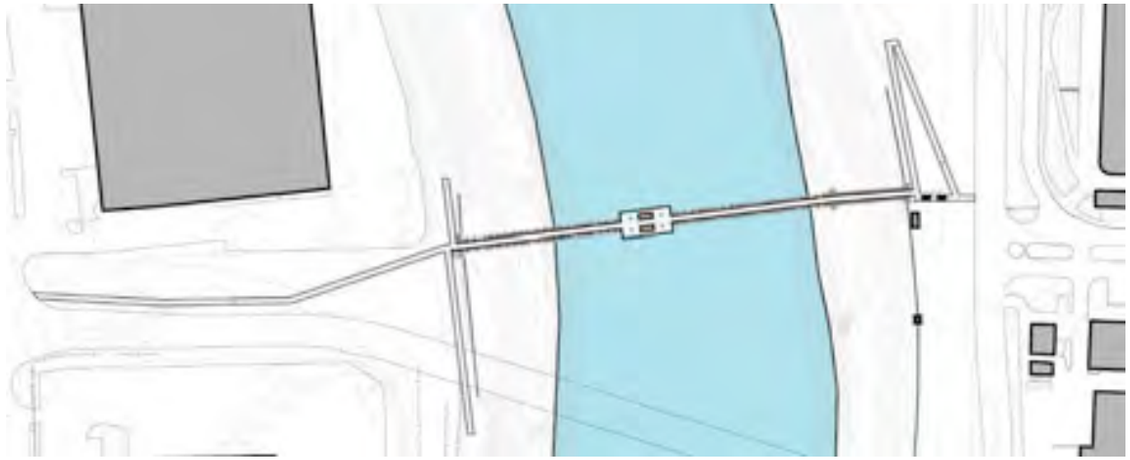
The stage is set for a much more dynamic and valuable riverfront along the Kaw River. Through shared public / private investment in this area, the joy of our area's most profound natural system can be enjoyed by all people in Metropolitan Kansas City.


el dorado



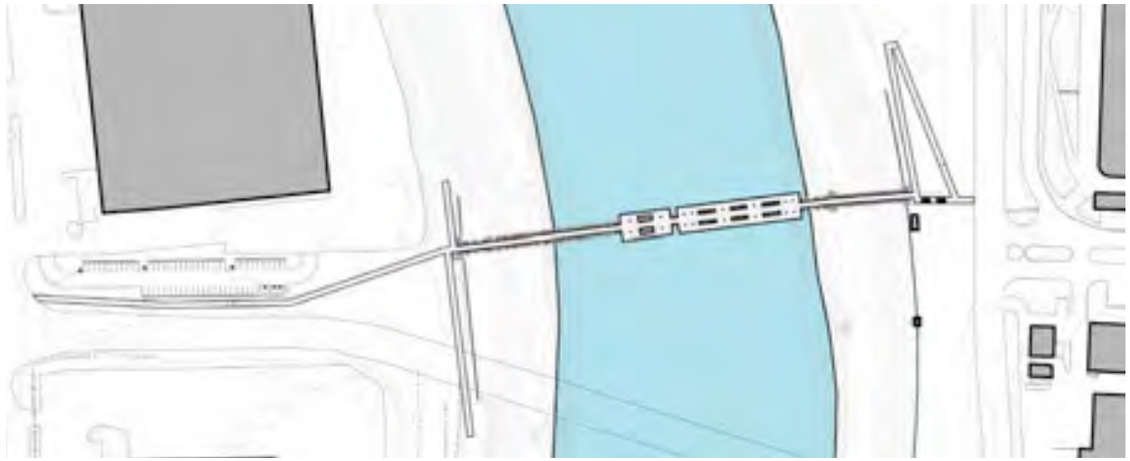
7.
IMPLEMENTATION PLAN

recommended phasing
cost estimates
economic benefits
funding opportunities



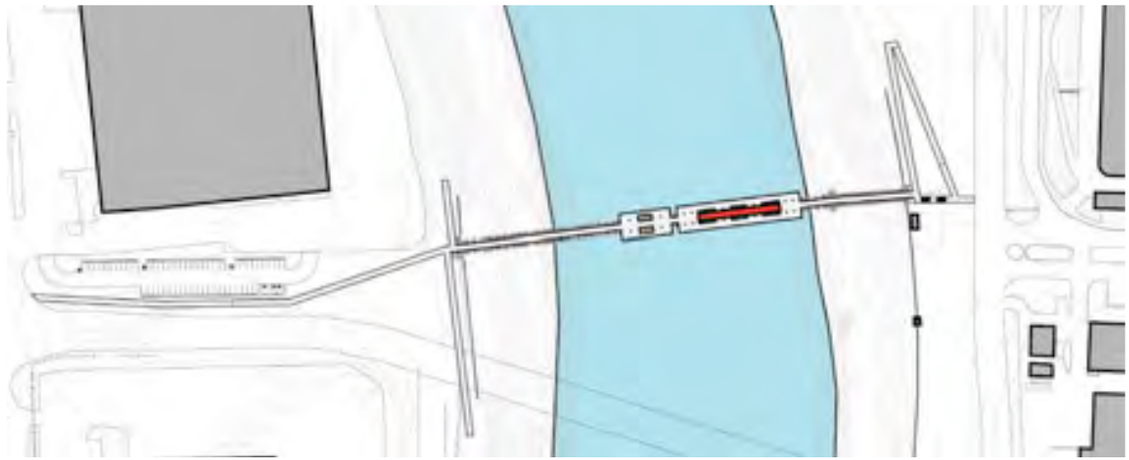
PHASE 1

Simple Trail, East & West Approaches



PHASE 2

Amenity Platform, West Parking Lot



PHASE 3 *by others*

On-Deck Amenity Structure

RECOMMENDED PHASING

Primarily due to logistics and funding, the project is envisioned to be a multi-phase endeavor.

These recommended phases have been developed based on a logical sequence of events. Each phase of development should take into consideration future phases to the greatest extent possible. If funding permits, multiple phases could be executed at once.

PRE-PHASE 1

Before rehabilitation of the bridge, certain deferred maintenance items will need to be addressed. Those items are noted in the "Bridge Analysis" section beginning on page 41 and in the following conceptual cost estimate. The design team also recommends raising the bridge 4'-6" to clear the 500-year flood elevation before any phase 1 work begins.

PHASE 1

Phase 1 is focused on establishing bike and pedestrian connectivity across the Kansas River, with an important passive break area roughly mid-span. The trail, along with the east and west approaches, is to be constructed in this phase. On the east, the proposed approach would require acquisition or easement use of at least a portion of the undeveloped parcel currently owned by Livestock Exchange LLC. On the west, if the Armourdale levee trail is completed and fully-functional by the time of Phase 1, then the elevated connections can be constructed as well. It is anticipated that this phase of work could be funded through a mix of private and public sources.

PHASE 2

Phase 2 sets the groundwork for a commercial endeavor on the bridge. A portion of the trail constructed in Phase 1 will need to be demolished to allow for the improvements in this phase. An amenity platform provides opportunity to host seasonal events. The parking lot on the west side of the bridge provides required parking for such events and is proposed to be constructed in this phase. If the elevated connections to the levee trail on the west side of the bridge are not completed in Phase 1, there is the possibility to construct them in this phase. Similar to phase 1, this phase is likely to be funded by a mix of public and private sources.

PHASE 3 *by others*

Phase 3 is entirely focused on the addition of an enclosed structure on the bridge and related infrastructure, building upon the amenity platform constructed in Phase 2. Due to the commercial nature of the on-bridge enterprise, this phase is anticipated to be funded entirely by private sources.

DEFERRED MAINTENANCE

Item	Quantity	Unit	Unit Cost	Total Cost
Lomas Nut Replacement	2	each	$2,500	$5,000
Connection Plate Replacement	1	LS	$30,000	$30,000
Span 3 Vertical Repair	1	each	$15,000	$15,000
Design/Estimating Contingency			20%	$10,000
Deferred Maintenance Total				**$60,000**

BRIDGE RAISE

Bridge Raise	1	LS	$350,000	$350,000
Design/Estimating Contingency			20%	$70,000
Bridge Raise Total				**$420,000**

PHASE 1 - SIMPLE TRAIL, EAST & WEST APPROACHES

Tie and Rail Removal	723	LF	$35	$25,317
Main Span Trail Superstructure	7,055	SF	$60	$423,280
Observation Deck Superstructure	3,444	SF	$70	$241,080
Lighted Handrail	1,671	LF	$550	$919,050
Elevated Approach Spans	8,232	SF	$120	$987,840
Lighted Handrail, Approaches	756	LF	$550	$415,800
Elevated Approach Substructure	5	each	$40,000	$200,000
At-grade Trail, Approaches	7,548	SF	$4	$30,192
Pedestrian Lighting	3	each	$8,000	$24,000
Miscellaneous	1	LS	$100,000	$100,000
Design/Estimating Contingency			20%	$673,312
Phase 1 Total				**$4,039,871**

PHASE 1 - OPTIONAL LEVEE CONNECTION

Elevated Connection to Levee	4860	SF	$120	$583,200
Lighted Handrail, Approaches	810	LF	$550	$445,500
Substructure, Approaches	3	each	$40,000	$120,000
Design/Estimating Contingency			20%	$229,740
Phase 1 - Option Total				**$1,378,440**

PHASE 2 - AMENITY PLATFORM, WEST PARKING LOT

Phase 1 Trail Removal	2200	SF	$30	$66,000
Amenity Platform Superstructure	8400	SF	$70	$588,000
Lighted Handrail	453	LF	$550	$249,150
Event Space Lighting	1	LS	$75,000	$75,000
Truss Strengthening	1	LS	$50,000	$50,000
Parking Lot - West Approach	22,700	SF	$6	$136,200
Parking Lot Lighting	6	each	$8,000	$48,000
Miscellaneous	1	LS	$50,000	$50,000
Design/Estimating Contingency			20%	$252,470
Phase 2 Total				**$1,514,820**

PHASE 3 - ON-DECK AMENITY STRUCTURE *by others, not included in conceptual cost estimate*

PROJECT CONTINGENCY*

40% **$2,965,252**

CONCEPTUAL COST ESTIMATE THROUGH PHASE 2:

$10,378,383

This conceptual estimate was compiled in 2017. A rate of 4% inflation per year is recommended for future planning.

** The project contingency includes utility relocation, right-of-way acquisition, permitting, architecture/engineering fees, construction inspection, legal fees, and various other unforeseen costs.*

COST ESTIMATES

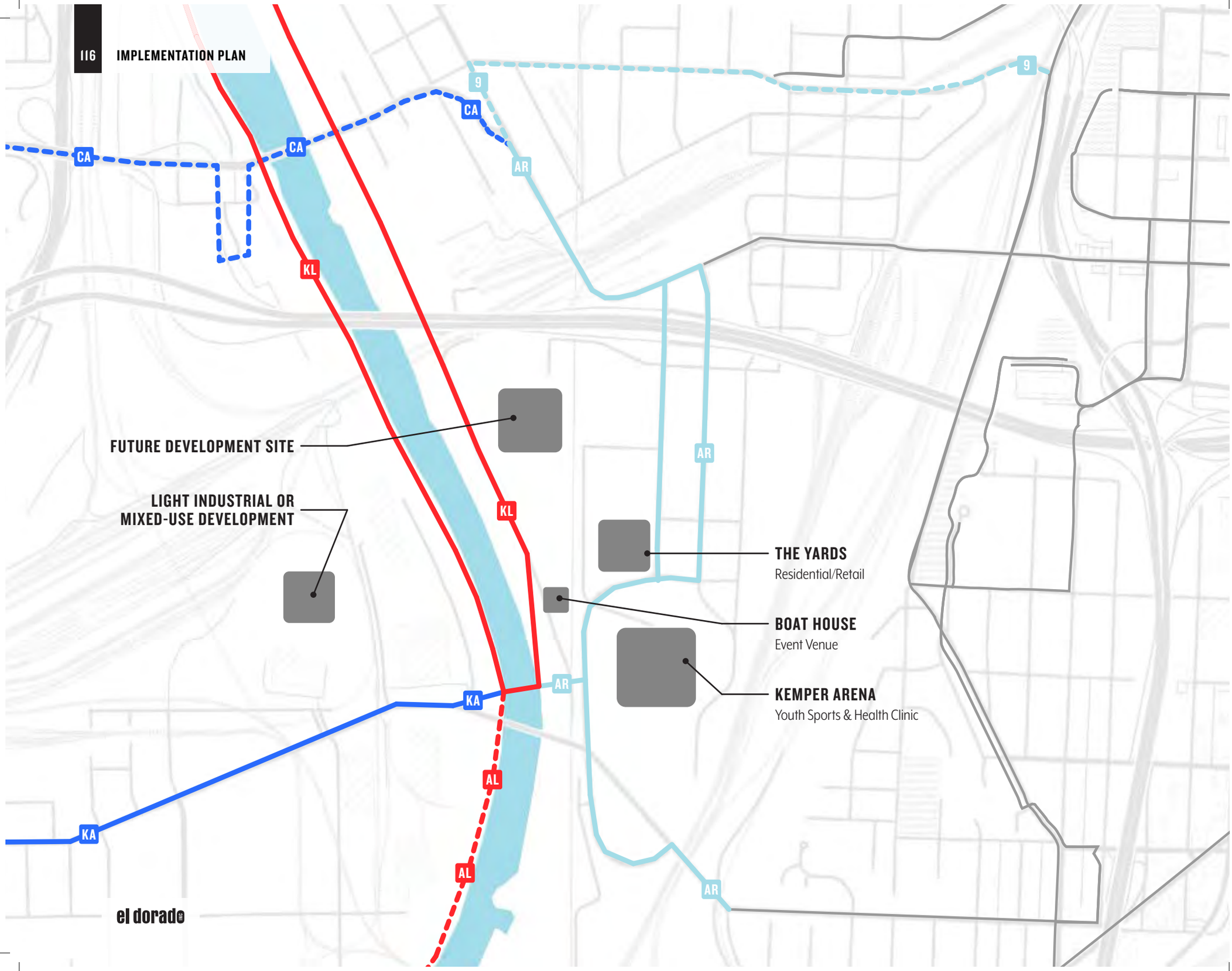
The cost estimate on the adjacent page was prepared by TranSystems and el dorado inc.

Because the bridge is about 105 years old and has been unused for several years, several items of deferred maintenance and repair need to be addressed before proceeding. Although raising of the bridge could take place during any phase of the project, if completed after Phase 1, the elevated pathways and inclined approach trails would need to be rebuilt. These are two of the most expensive components in Phase 1.

The City of Des Moines recently raised the Union Railway Bridge 4'-0" to clear the 500-year flood elevation. This bridge raise required the improvements on the bridge to be removed and reinstalled once the bridge was raised and both approaches to the bridge to be entirely rebuilt. This work was done at a cost of $2.5 million and did not involve any additional improvements or programmable space to the bridge.

Thus, the design team recommends undertaking deferred maintenance and raising the bridge 4'-6" to clear the 500-year flood line before moving forward with any phase of the project. Proactively addressing the flood line issue reduces duplicate expenses in future phases to rebuild the approaches and to reconfigure the improvements on the bridge if it is raised later.

Once deferred maintenance and raising the bridge is completed, the rest of the project, along with the optional components can be phased in as funding and logistics allow.


9
CA
CA
CA
AR
KL
FUTURE DEVELOPMENT SITE
LIGHT INDUSTRIAL OR
MIXED-USE DEVELOPMENT
KL
AR
THE YARDS
Residential/Retail
BOAT HOUSE
Event Venue
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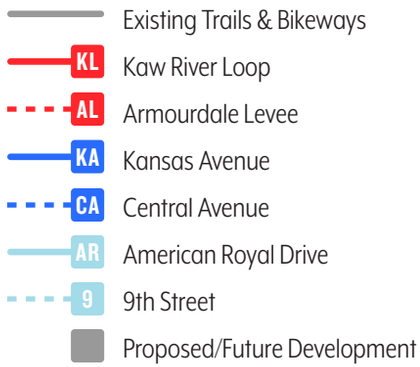
ECONOMIC BENEFITS



Although the potential direct economic benefit of the proposed private use and activities on the Kaw River Bridge are beyond the scope of this study, the consultant team did confer with economic development staff at both the Unified Government and the City of Kansas City, Missouri. The potential economic benefit of the proposed use on the bridge, as well as the indirect benefit of rehabilitating the bridge for active transportation and recreational use, could be dramatic.

The Unified Government Research Division provided the study team with aggregated 2016 retail sales figures for select groups of restaurant/eatery/tavern establishments in Wyandotte County. National and regional flagship tenants that typically draw visitors from the entire metropolitan region generated combined retail and alcohol sales of $385 per square foot. At the lower end, smaller local/neighborhood-oriented eateries and taverns, generated combined sales of $92 per square foot. These figures suggest that a unique, marquee destination located on the Kaw River Bridge could generate annual sales exceeding $2 million.

Beyond the potential economic impact and fiscal benefit of economic activities on the bridge itself, however, a range of studies from across the United States have documented the dramatic economic impact spurred by investments in riverfront access and recreational amenities.

Public infrastructure investments in projects like the Atlanta Beltline, Boston's Rose Kennedy Greenway, and Chattanooga's 21st Century Riverfront have generated private investment at a massive scale, with returns on investment ranging from 6:1 to 40:1. These projects also have led to significant adjacent property values increases (from 24% to 49%, over roughly five-year periods), as formerly industrial and largely-inaccessible areas were activated by a range of recreational, retail, and entertainment venues and related commercial enterprises.

It is not difficult to envision to the kinds of dramatic, catalytic changes that public investment in the Kaw River Bridge might generate. A range of future developments already have been proposed or are underway near the Kaw River Bridge, both in the

West Bottoms and Armourdale. Moreover, while only about one-third of the land area in the West Bottoms is located in Kansas City, Kansas, that portion includes some of the larger, undeveloped sites in this burgeoning area. Proposed uses range from additional industry to hundreds of units of multifamily urban housing, as well as additional entertainment and restaurant uses. The redevelopment of Kemper Arena, which is just beginning at the time of this report, may draw from 2,000-3,000 visitors to the area daily, and tens of thousands of visitors in conjunction with seasonal sports tournaments and family-oriented events.

While Armourdale is known primarily as a key center for regional industry, with nearly 300 business establishments generating over $2 billion in annual revenues, the east end of Kansas Avenue is populated by older, modestly-scaled buildings that might be prime targets for redevelopment, as well as under- and un-developed tracts that are opportune sites for pedestrian-scaled urban infill. Kansas Avenue already contains several acclaimed ethnic restaurants and markets, extending from Art's Mexican Products on the east, to Jarocho Pescados y Maridos near 7th Street Expressway, and El Pollo Rey and San Antonio Market further to the west, as well as Bichelmeyer Meats, which has served as one of the region's most distinctive butcher shops for over seven decades. Reinforced by investments in alternative, active transportation, Armourdale and the Kansas Avenue corridor could become one of Kansas City's most distinctive ethnic food and market corridors.

National studies have demonstrated dramatic increases in local spending, commercial investment, tourism and property values generated by the proximity of neighborhoods and local businesses to regional bicycle trails and greenways. The potential economic benefit of the Kaw River Bridge crossing could therefore translate increased visitor and recreational traffic into the revitalization and economic resurgence of the entire Armourdale neighborhood.

SOURCES:

1. From Trail Towns to TrOD: Trails and Economic Development. Washington, DC: Rails-to-Trails Conservancy, August 2007.

2. CSL International. Economic Impact Study: Detroit Riverfront 2013. Detroit, Mich.: Detroit RiverFront Conservancy, 2013.

3. Flusche, Darren. Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure. Washington, DC: Advocacy Advance, a partnership of the League of American Bicyclists and the Alliance for Biking and Walking, July 2012.

4. Sasaki Associates. Three Rivers Park Economic Impact Analysis. Pittsburgh, Pa.: Riverlife, 2015.

5. Shivy, V.A., et. al. Economic Impact of the James River Park System. Richmond, Va.: L. Douglas Wilder School of Government and Public Affairs, Virginia Commonwealth University, April 2017.

6. Economic baseline information about Armourdale is based on Kansas Dept. of Revenue / Wyandotte County 1% sales tax distribution data furnished by the Unified Government Research Division, as well as third-party data analyzed by inSITE planning.

Special thanks to Mike Grimm, Research Division, Unified Government for providing the economic baseline data for Wyandotte County business establishments.

Also a special thanks to Eric Roche, Chief Data Officer and Performance Management Analyst, KCMO City Manager's Office and Mari Ruck, Commissioner of Revenue at City of Kansas City, Missouri for providing limited economic information from KCMO.

FLINT HILLS NATURE TRAIL

2015-2016 KDOT Transportation Alternatives (TA) awarded project. This 117-mile trail passes through five counties and spans from Osawatomie to Herington, Kansas. The TA grant awarded $3,046,463 to the project, requiring a $761,616 local match, bringing the total investment to $3,808,079.

ELGIN HOTEL

2017 Heritage Trust Fund (HTF) awarded project. Opened in 1886 in Marion, Kansas, the Elgin was a community hub for both travelers and locals. After closing in the late 1960's, the hotel fell into disrepair. Recent efforts beginning in 2016 have revitalized portions of the hotel into a boutique bed and breakfast. HTF awarded the Elgin a $90,000 grant to assist in further restoration efforts.

FUNDING OPPORTUNITIES

PRIMARY FUNDING SOURCES

The **Transportation Alternatives (TA) Program** provides funding for projects and programs defined as transportation alternatives that advance non-motorized transportation facilities, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, historic transportation preservation, environmental mitigation and vegetation management activities; recreational trail program projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.

The TA Program is a Federal program authorized under Section 1122 of the Federal transportation act, *Moving Ahead for Progress in the 21st Century* **(MAP-21)**. The TA Program is codified under Title 23 of the United States Code, sections 213(b) and 101(a)(29). In the Kansas City region, the TA Program is administered by the Mid-America Regional Council (MARC) under contract to the Kansas Department of Transportation (KDOT). TA Program applications are processed and projects are awarded funds through MARC.

MAP-21 provides for the reservation of funds apportioned to a state under Section 104(b) of Title 23. The national total reserved for TA each Federal Fiscal Year (FFY)—the FFY runs from October 1st to September 30th of the following year—is equal to 2% of the total amount authorized from the Highway Account of the Highway Trust Fund. The estimate of nation-wide TA funding for FFY 2017 and FFY 2018 is $835,000,000 and $850,000,000 respectively. These amounts can serve as broad estimates for the state's funding levels for FFY 2017 and FFY 2018. KDOT does not receive an actual TA funding amount until the beginning of a FFY, or sometimes later. Kansas' TA Funding level is determined by the state's proportionate share of the national total from FFY 2009 TE funding.

Additionally, Kansas has also elected to continue the **Recreational Trails Program** (RTP), which is administered by the Kansas Department of Wildlife Parks & Tourism (KDWP&T). The RTP is a set-aside amount of Kansas' TA Program allocation. In the past, the grant program provided an 80/20 match, on a reimbursement basis, for eligible recreational trail and trail-related projects. This means that you must fund 100% of the project and KDWPT will reimburse you up to 80% of the approved total cost, though you need not complete the entire project before applying for reimbursement.

Generally, overhead or administrative costs will not be funded from the RTP program, but a portion of these costs may be used as part of the local match. The

SELECT RECREATIONAL TRAIL PROGRAM-FUNDED PROJECTS, FY 2007- FY 2017*

DB Record ID	Project Year	Project Name	City	State	County	Federal	Local	Total
10539	2015	40 Highway Historic Bridge Restoration	Grandview	MO	Jackson	$200,000	$322,000	$522,000
10550	2016	MKT Trail Bridges 5 & 7 Replacement Project	Columbia	MO	Boone	$150,000	$100,000	$250,000
10394	2007	Trail Renovation and Construction	Watkins Mill	MO	Clay	$48,885	$21,067	$69,952
6216	2012	Clinton State Park Facility Improvements	Lawrence	KS	Douglas	$263,987	$79,763	$343,750
10419	2008	Hodge Park Trail Construction	Kansas City	MO	Platte	$100,000	$98,852	$198,852
10471	2011	Riverfront Heritage Trail - Beardsley Road Connector	Kansas City	MO	Jackson	$100,000	$125,000	$225,000
10505	2013	Riverfront Heritage Trail - Mulberry Connector	Kansas City	MO	Jackson	$99,518	$170,482	$270,000
10530	2015	Trolley Track Trail Repairs and Rehabilitation	Kansas City	MO	Jackson	$200,000	$203,000	$403,000
10539	2015	40 Highway Historic Bridge Restoration	Grandview	MO	Jackson	$200,000	$322,000	$522,000
10513	2014	Rock Island Interpretive Trail Spur	Belle	MO	Maries, Osage	$72,328	$20,846	$93,174
10556	2016	Second Creek Trail Segment 1	Kansas City	MO	Platte	$150,000	$1,015,523	$1,165,523
10440	2010	Prairie Creek Greenway	Platte City	MO	Platte	$100,000	$40,648	$140,648
10421	2008	Little Creek Trail Construction and Renovation	Florissant	MO	St. Louis	$99,970	$168,629	$268,599
10416	2008	Tower Grove Park Historic Cycle and Foot Trail Construction	St. Louis	MO	St. Louis	$99,186	$66,124	$165,310
10422	2008	Queen Park Trail Construction of New Asphalt Trail	St. Louis	MO	St. Louis	$100,000	$292,912	$392,912
10423	2008	Creve Coeur Lake Memorial Park Construction of New Asphalt Trail	St. Louis	MO	St. Louis	$100,000	$578,588	$678,588
10446	2010	City of Fenton/Meramec Greenway Trailhead and Trail Connection	Fenton	MO	St. Louis	$51,521	$31,538	$83,059
10481	2012	Meramec Greenway Trail Extension	Fenton	MO	St. Louis	$99,996	$66,482	$166,478
10449	2010	Forest Park Dual Path Segments IV & V	St. Louis	MO	St. Louis	$100,000	$160,000	$260,000
10497	2013	Tower Grove Park Historic Trail Restoration	St. Louis	MO	St. Louis	$82,352	$54,902	$137,254
10494	2013	Forest Park Dual Path System, Asphalt Trail Renovation	St. Louis	MO	St. Louis	$100,000	$70,000	$170,000
10456	2010	Rockaway Beach/Empire Electric Community Trail	Rockaway Beach	MO	Taney	$84,253	$21,063	$105,316
10511	2014	Joe Dice Suspension Bridge - Final Phase	Warsaw	MO	Benton	$100,000	$239,700	$339,700
10501	2013	Hinkson Creek Trail Bridge Renovation	Columbia	MO	Boone	$100,000	$67,000	$167,000

AVERAGE TOTAL RTP PROJECT COST: $297,421

Average RTP Federal Share: $116,750
Range, Federal Funding: $48,885 to 263,987
Average RTP Local Share: $180,672
Range, Local Match: $20,846 to $1,015,523

SOURCE:
Recreational Trails Program Project Database (https://www.fhwa.dot.gov/environment/recreational_trails/, accessed Sept. 24, 2017)

** The figures listed above are for the selected projects only.* ***Some listed recreational projects were also funded separately by federal transportation sources.*** *For FY2017, the State of Kansas was apportioned a total of $1,384,250 in federal RTP funds.*

local match must be detailed and may not be from any other Federal source. Trail and trail-related project proposals will not be accepted where the primary objective is to provide an alternative transportation corridor, such as bicycle lanes marked on an existing highway or sidewalks. All projects selected must fall into one or more of three categories: motorized, non-motorized, or diversified recreational trail or trail-related projects. **Proposals that provide for improved ADA and environmental impacts will receive a high priority.** All proposals must contain a completed environmental checklist, which is included with the application materials. Projects that provide for motorized recreation activities are encouraged, as 30% of the funding is to be devoted to motorized projects.

Established in 2006, the **National Flood Risk Management Program (NFRMP)** is a collaborative effort that integrates and synchronizes the flood risk management projects, programs, and authorities of the U.S. Army Corps of Engineers (USACE) with those of other federal agencies, as well as state, regional, and local agencies. NFRMP helps to reduce the risk of loss of life and property damage from riverine and coastal flooding, and increase the resilience of local communities through structural and nonstructural measures. Federal flood control funding usually covers 65 - 75% of a flood control project's cost, with the balance to be covered by cooperating local governments. The NFRMP and other federal flood control programs require active collaboration between USACE and local entities like the KVDD, UG, and City of Kansas City to identify project priorities as part of USACE's annual work plan process.

OTHER FUNDING SOURCES

Administered by the **Kansas State Historic Preservation Office** (SHPO), the **Heritage Trust Fund** (HTF) is a state program that provides matching funds for the preservation of properties listed in the **National Register of Historic Places** or the **Register of Historic Kansas Places.** The HTF reimburses expenses for projects that preserve or restore historic properties. Qualifying expenses include professional fees and construction costs. Individual grant awards may not exceed $90,000 and must be matched 20% by the grant recipient. Yearly grant rounds are highly competitive. Applications are due each year in November, and grant awards are announced the following February. All HTF-funded work must meet the *Secretary of the Interior's Standards for Rehabilitation*. Typical uses of Heritage Trust Fund grants include rehabilitation projects.

Kansas SHPO also administers the **Historic Preservation Fund** (HPF), which is underwritten by federal appropriations to finance local preservation activities that will contribute to planning for the preservation of the built environment and archaeological resources. Up to 60 percent of the cost of eligible activities can be funded through

KANSAS CITY METROPOLITAN REGION, TRANSPORTATION IMPROVEMENT PROGRAM-FUNDED PROJECTS, FY 2016 - FY 2020*

343107	2020	Moonlight Road Safe Routes to Schools	Gardner	KS	Johnson	$252,000	$98,000	$350,000
356101	2016	Coffee Creek Streamway Trail	Overland Park	KS	Johnson	$865,720	$1,680,450	$2,546,170
345120	2015	City Center Mixed Use Bike/Hike Trail	Lenexa	KS	Johnson	$232,000	$138,000	$370,000
345121	2015	Quivira Road Sidewalk 83rd Street to 85th Street	Lenexa	KS	Johnson	$470,020	$165,240	$635,260
345123	2018	Lackman Trail From Sar-Ko-Par Trails Park to 95th Street & I-435	Lenexa	KS	Johnson	$890,000	$360,000	$1,250,000
345125	2018	Renner Mixed-Use Trail	Lenexa	KS	Johnson	$250,000	$109,460	$359,460
349238	2017	Meadow Lane Trail	Olathe	KS	Johnson	$1,038,000	$789,000	$1,827,000
349239	2017	Olathe Safe Routes to School	Olathe	KS	Johnson	$476,000	$118,000	$594,000
349240	2015	Connect Downtown Olathe	Olathe	KS	Johnson	$101,000	$84,200	$185,200
349246	2020	Cedar Creek Trail	Olathe	KS	Johnson	$500,000	$1,710,000	$2,210,000
350222	2014	Prairie Trace - Hilltop Campus Trail	Overland Park	KS	Johnson	$276,000	$109,000	$385,100
350228	2019	Bicycle Master Plan Implementation	Overland Park	KS	Johnson	$400,000	$100,000	$500,000
353085	2016	Connect Shawnee	Shawnee	KS	Johnson	$458,500	$347,000	$805,500
280110	2011	Kaw Point Connector	Kansas City	KS	Wyandotte	$1,281,100	$148,800	$1,429,900
259192	2014	Missouri River/Jersey Creek Connector, Phase 1	Kansas City	KS	Wyandotte	$880,000	$420,000	$1,300,000
259198	2016	12th and 10th Street Bikeway, Metropolitan to Quindaro	Kansas City	KS	Wyandotte	$800,000	$245,520	$1,045,520
259199	2015	Safe Routes KCK Walking School Bus Expansion	Kansas City	KS	Wyandotte	$120,000	$30,000	$150,000
259200	2018	Safe Routes KCK Phase E: Edison, White & Noble Prentis	Kansas City	KS	Wyandotte	$500,000	$215,000	$715,000
735026	2018	Bel-Ray Connector Trail	Belton	MO	Cass	$500,000	$252,500	$752,500
738107	2017	Mopac Trail Phase 3	Pleasant Hill	MO	Cass	$415,980	$103,990	$519,970
510080	2017	Shoal Creek Trail - Segment 4	Gladstone	MO	Clay	$500,000	$375,000	$875,000
518012	2016	Rock Creek Greenway - Phase 1	Gladstone	MO	Clay	$450,000	$308,580	$758,580
518014	2020	Rock Creek Greenway Trail - Phase 2	Gladstone	MO	Clay	$400,000	$170,000	$570,000
410070	2017	US 169 Bike/Ped Overpass (Route 152 Segment 10)	Kansas City	MO	Clay	$500,000	$3,642,000	$4,142,000
510061	2016	Vivion Road Trail (Phase 3)	Kansas City	MO	Clay	$296,000	$74,000	$370,000
510075	2017	Route 152 Trail Segment 12	Kansas City	MO	Clay	$850,000	$854,000	$1,704,000
510076	2017	Big Shoal Trail Segment 1	Kansas City	MO	Clay	$500,000	$425,000	$925,000
510077	2018	Big Shoal Trail Segment 2	Kansas City	MO	Clay	$350,000	$257,000	$607,000
510079	2018	Searcy Creek Trail Segment 2	Kansas City	MO	Clay	$500,000	$358,000	$858,000
510082	2019	Big Shoal Creek Trail Segment 3	Kansas City	MO	Clay	$500,000	$623,000	$1,123,000
519005	2016	Southview Elementary Sidewalk	Kearney	MO	Clay	$129,300	$30,000	$159,300
519006	2016	Clear Creek Crossing Trail	Kearney	MO	Clay	$200,000	$345,000	$545,000
666005	2020	Blue Branch Creek - Pedestrian Bridge	Grain Valley	MO	Jackson	$119,210	$29,900	$149,110
627020	2018	135th Street Multipurpose Trail	Grandview	MO	Jackson	$150,000	$38,000	$188,000
627021	2015	Restoration of 40 Highway Bridge - Phase 1	Grandview	MO	Jackson	$66,860	$40,000	$106,860
627022	2016	Truman Farm Home Trail	Grandview	MO	Jackson	$587,750	$143,940	$731,690
627023	2017	Restoration of 40 Highway Bridge - Phase 2	Grandview	MO	Jackson	$453,140	$143,290	$596,430
628139	2019	Truman Depot Renovations and Pacific Avenue Trail	Independence	MO	Jackson	$350,000	$160,000	$510,000
634070	2015	Longview Lake Multi-Use Trail	Jackson County	MO	Jackson	$217,980	$53,500	$271,480
611158	2015	Cliff Drive Livability Improvements	Kansas City	MO	Jackson	$547,880	$136,970	$684,850
611173	2015	Cliff Drive and Spirit of Kansas City Scenic Byways Trail Project	Kansas City	MO	Jackson	$926,620	$231,660	$1,158,280
611175	2017	Blue River Trail - Brush Creek to Stadium Drive	Kansas City	MO	Jackson	$450,000	$550,000	$1,000,000
611176	2016	Minor Park Trail Connection	Kansas City	MO	Jackson	$450,000	$150,000	$600,000
611182	2017	Blue River Trail - Stadium Drive to Truman Road	Kansas City	MO	Jackson	$500,000	$1,000,000	$1,500,000
611183	2017	Swope Park Blue River Connector Trail	Kansas City	MO	Jackson	$500,000	$170,000	$670,000
611184	2017	Brush Creek and Blue River Confluence Trail	Kansas City	MO	Jackson	$500,000	$175,000	$675,000
611185	2016	Little Blue Trace Trail South Bridge Connector	Kansas City	MO	Jackson	$500,000	$299,000	$799,000
611187	2017	Charlotte Holmes Bikeways	Kansas City	MO	Jackson	$72,740	$89,130	$161,870
611188	2018	Paseo Boulevard Bikeways	Kansas City	MO	Jackson	$727,800	$438,000	$1,165,800
611189	2017	Lexington Gladstone Bikeways	Kansas City	MO	Jackson	$298,460	$228,690	$527,150
611194	2019	11th/12th Street Bikeways	Kansas City	MO	Jackson	$300,000	$140,490	$440,490
611195	2020	Missouri River Trail Segment 1	Kansas City	MO	Jackson	$500,000	$1,026,000	$1,526,000
611196	2019	Trolley Connector Trail Segment 2	Kansas City	MO	Jackson	$500,000	$168,000	$668,000
611197	2020	Martha Truman Connector Trail	Kansas City	MO	Jackson	$250,000	$430,000	$680,000
410061	2017	KCI Corridor Trail Segment 1 - Old Tiffany Springs Road to Tiffany Springs Parkway	Kansas City	MO	Jackson	$500,000	$367,840	$867,840
634067	2018	Rock Island Corridor Acquisition, Phase 1 Implementation and Construction Project	Jackson County	MO	Jackson	$10,000,000	$2,500,000	$12,500,000

AVERAGE TOTAL TIP PROJECT COST: $1,049,023

Average TIP Federal Share: $631,253
Range, Federal Funding: $66,860 to $10,000,000
Average TIP Local Share: $417,771
Range, Local Match: $29,900 to $3,462,023

SOURCE:
Mid-America Regional Council, "Kansas City Metropolitan Region Transportation Improvement Program, Fiscal Years 2016-2020" (May 17, 2017).

** The figures listed above are for the selected Pedestrian and/or Bikeways projects only. The federal share for some listed projects includes a mix of Transportation Alternative and other federal sources, such as Congestion Mitigation-Air Quality (CMAQ) funds. Individual project figures may also include funding drawn across multiple federal fiscal years.*

this program. Importantly, each year, SHPO is required to expend ten percent of its annual HPF allocation on activities undertaken by **Certified Local Governments** (CLGs). The Unified Government is a qualified CLG. Through property identification and evaluation, communities may assess their historic properties and develop plans for their recognition and preservation. HPF projects must result in a tangible product. Eligible products include, but are not limited to preservation plans for historic properties, National Register historic district nominations, and educational and programmatic products and activities, such as walking tours, interpretive signage, websites, and workshops.

The **Sunflower Foundation** has previously announced annual grant rounds and issued a new Request for Proposals to build trails in Kansas. In 2016, the Sunflower Foundation announced it was not requesting funding applications for trails.

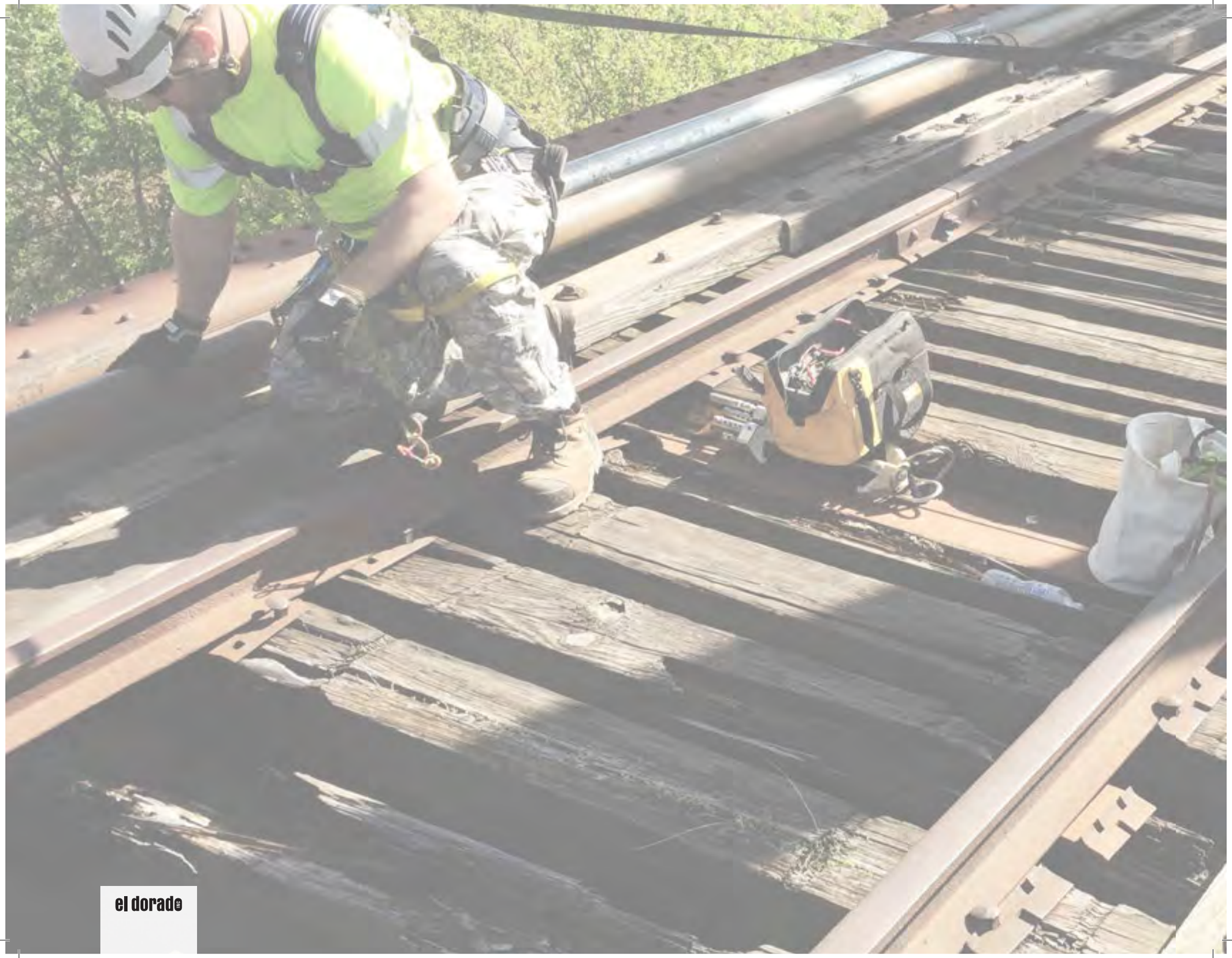
In the past, the foundation has invited communities, schools and non-profit organizations to submit proposals for building, enhancing or connecting trails in order to create safe, accessible places for outdoor physical activity. The following is a list of the previous RFPs issued for potential trail projects:

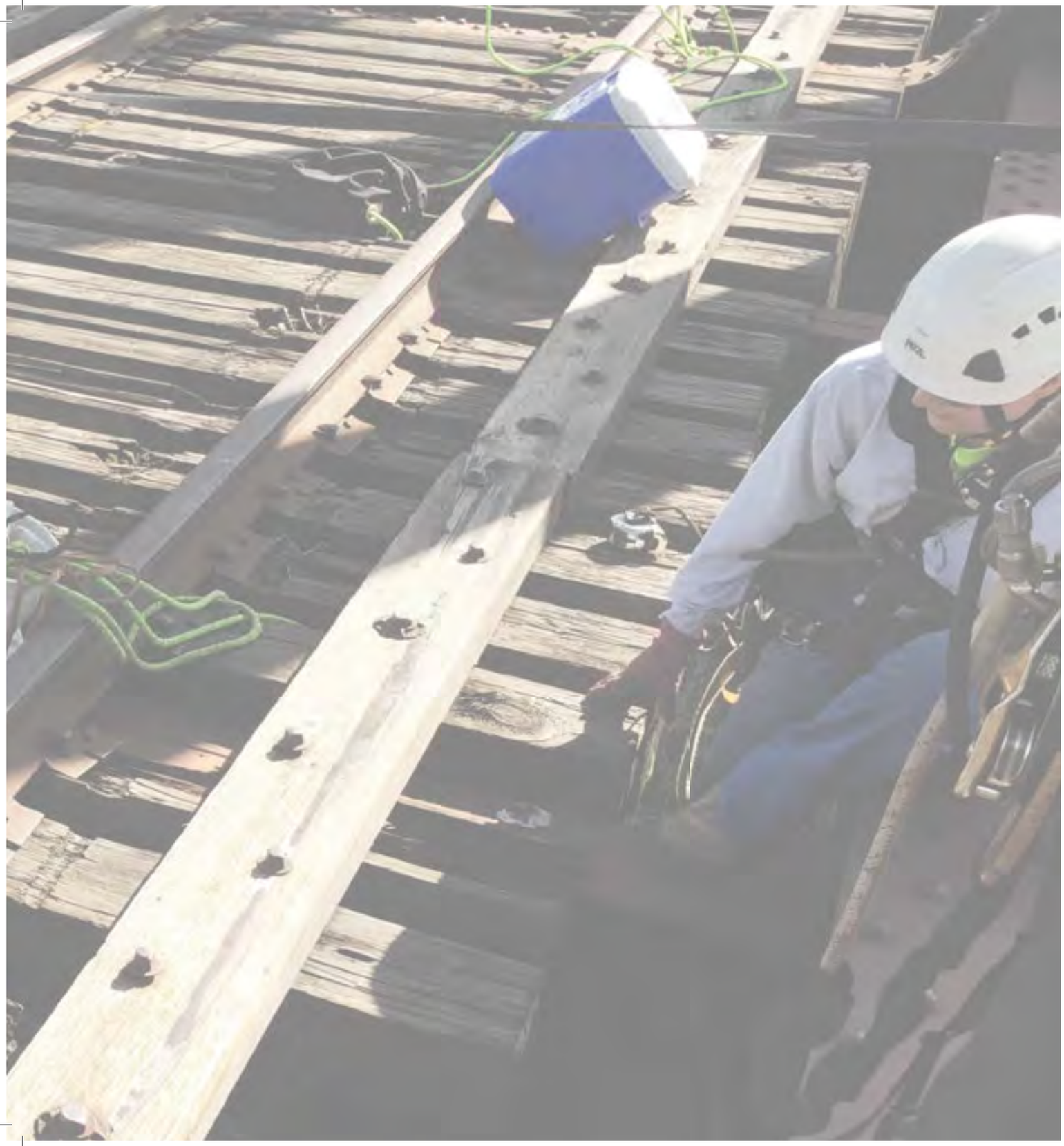
RFP #15-102 – Community-Based New Trails or Trail Expansion
This RFP is designed for communities seeking to construct a trail at least 1/2 mile long, or expand an existing trail by adding 1/2 mile. Funding is available up to $55,000, contingent upon project budget and bids. All grants require a $1 for $1 match.

RFP #15-103 – Community-Based Existing Trail Improvements
This RFP is designed for communities that wish to improve an existing trail with either infrastructure (such as bridges), trees for trail shading and/or distance signage. Funding is available up to $20,000, contingent upon project budget and bids. All grants require a $1 for $1 match.

RFP #15-104 – Community-Based Trail Connectors
This RFP is designed for communities seeking to link an existing trail with another trail or key access point to improve usability. The trail connector may be less than 1/2 mile. Funding is available up to $30,000, contingent upon project budget and bids. All grants require a $1 for $1 match.

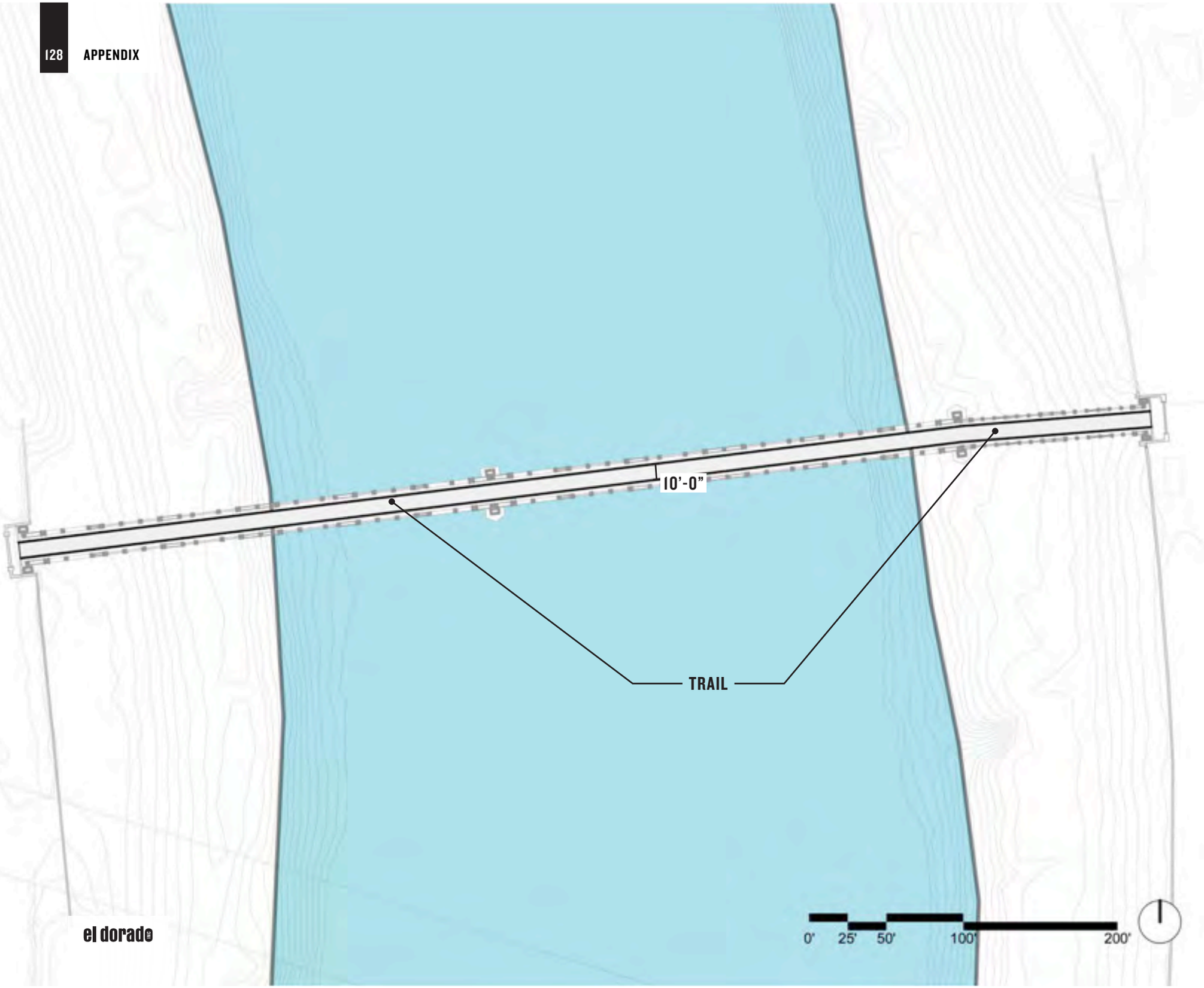
RFP #15-105 – School-Based New Trails
This RFP is designed for schools seeking to construct a trail at least 1/4 mile long on school property. Funding is available up to $25,000, contingent upon project budget and bids. All grants require a $1 for $1 match.


el dorado

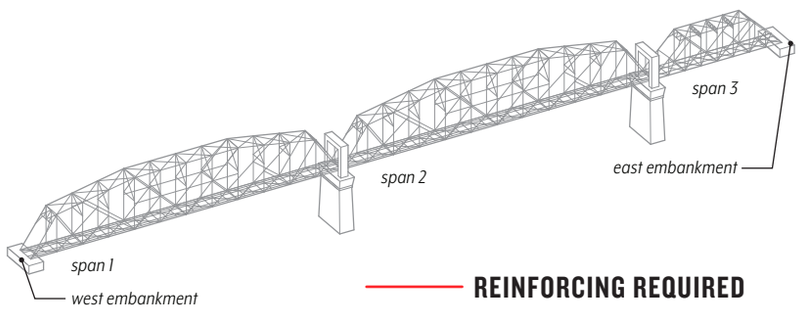


8.
APPENDIX

additional design concepts


10'-0"
TRAIL
0'
25'
50'
100'
200'

DESIGN CONCEPT
SIMPLE TRAIL WITHOUT OBSERVATION



PROS

Bare-minimum approach, most affordable of all options, works well as a Phase 1 for numerous design concepts, leaves bridge in most pristine state, no structural gymnastics.

CONS

All space on bridge is active trail, no place for pedestrians and cyclists to break off and enjoy views, no resting space in a 733' span could be problematic.

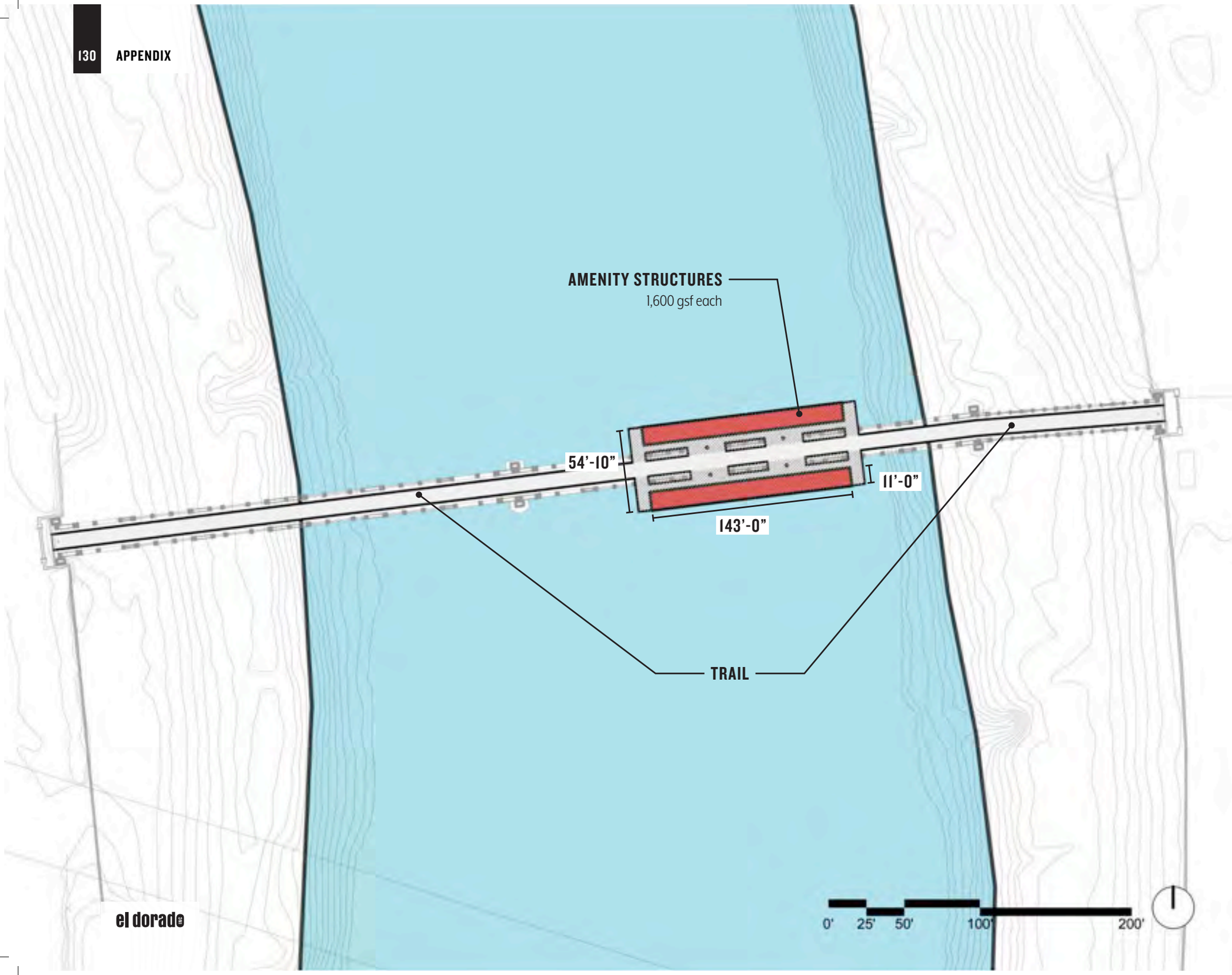
PROGRAMMABLE SPACE:

0 gsf

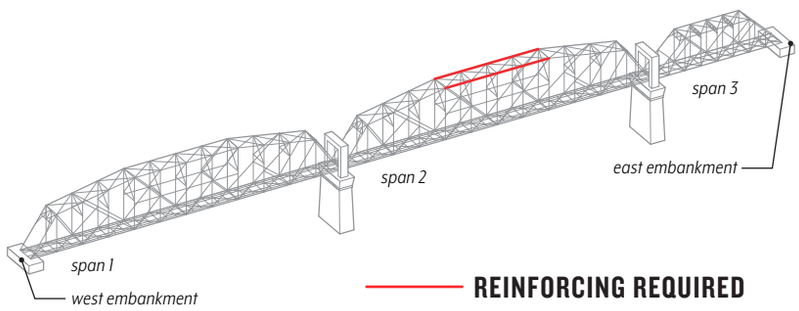
REASON FOR NOT GOING FORWARD

Even in Phase 1, the design team suggests that a passive space on the bridge is critical for numerous reasons. Most of all, a place to break off and enjoy views of the Kansas River is a necessity.

Adding an observation deck to the bridge is a marginal cost in the context of the entire project. The benefits of this passive space greatly outweighed the cost ramifications, so it was suggested that a passive space is necessary even in the first phase of the project.


AMENITY STRUCTURES
1,600 gsf each
54'-10"
11'-0"
143'-0"
TRAIL
0'
25'
50'
100'
200'

DESIGN CONCEPT
SADDLEBAGS



PROS

Middle-tier expense compared to all design concepts, good balance of active and passive space, trail and natural flow of movement are uninterrupted by amenity structure.

CONS

Expensive, new additions compete with elegance of original bridge structure, especially outside of the bridge truss.

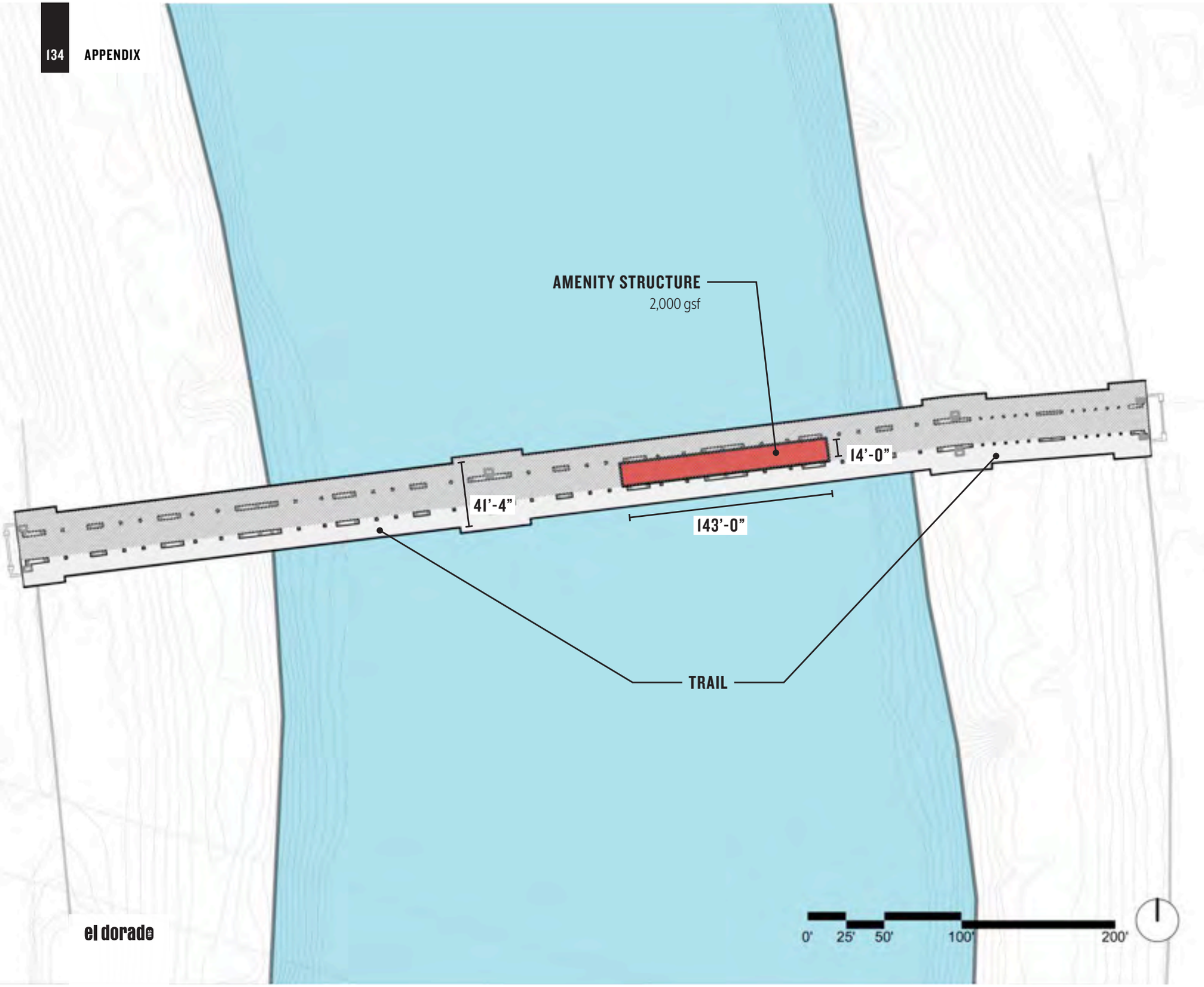
PROGRAMMABLE SPACE:
6,700 gsf

AMENITY STRUCTURE:
3,200 gsf

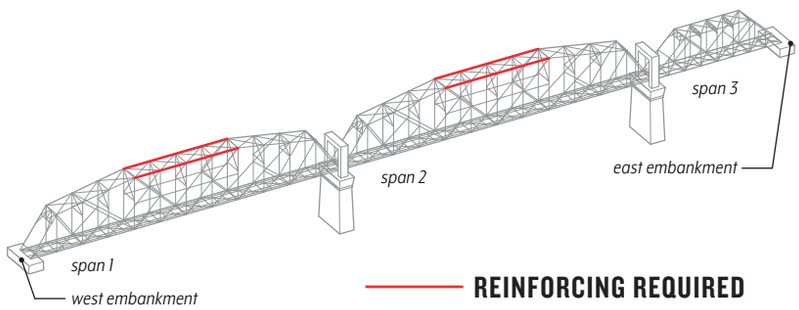
REASON FOR NOT GOING FORWARD

In historic preservation projects, priority should be placed on ideas that have minimal visual interference with the historic structure. Consequently, the design team suggests that throughout all phases of design and construction, the structural spans of the bridge should remain the dominant view of the bridge. Placing amenity structures on the outside of the bridge trusses has great potential to interfere with the elegance of the structural spans.

Activity and movement between the two “saddlebag” amenity structures could also interfere with the free use of the bike/pedestrian trail.


AMENITY STRUCTURE
2,000 gsf
14'-0"
41'-4"
143'-0"
TRAIL
0'
25'
50'
100'
200'

DESIGN CONCEPT
DOUBLE CANTILEVER



PROS

Ample passive and active space on bridge, ample amenity opportunities, ability to add another amenity structure without significant additional infrastructure.

CONS

Expensive, new additions compete with elegance of original bridge structure, especially outside of the bridge truss.

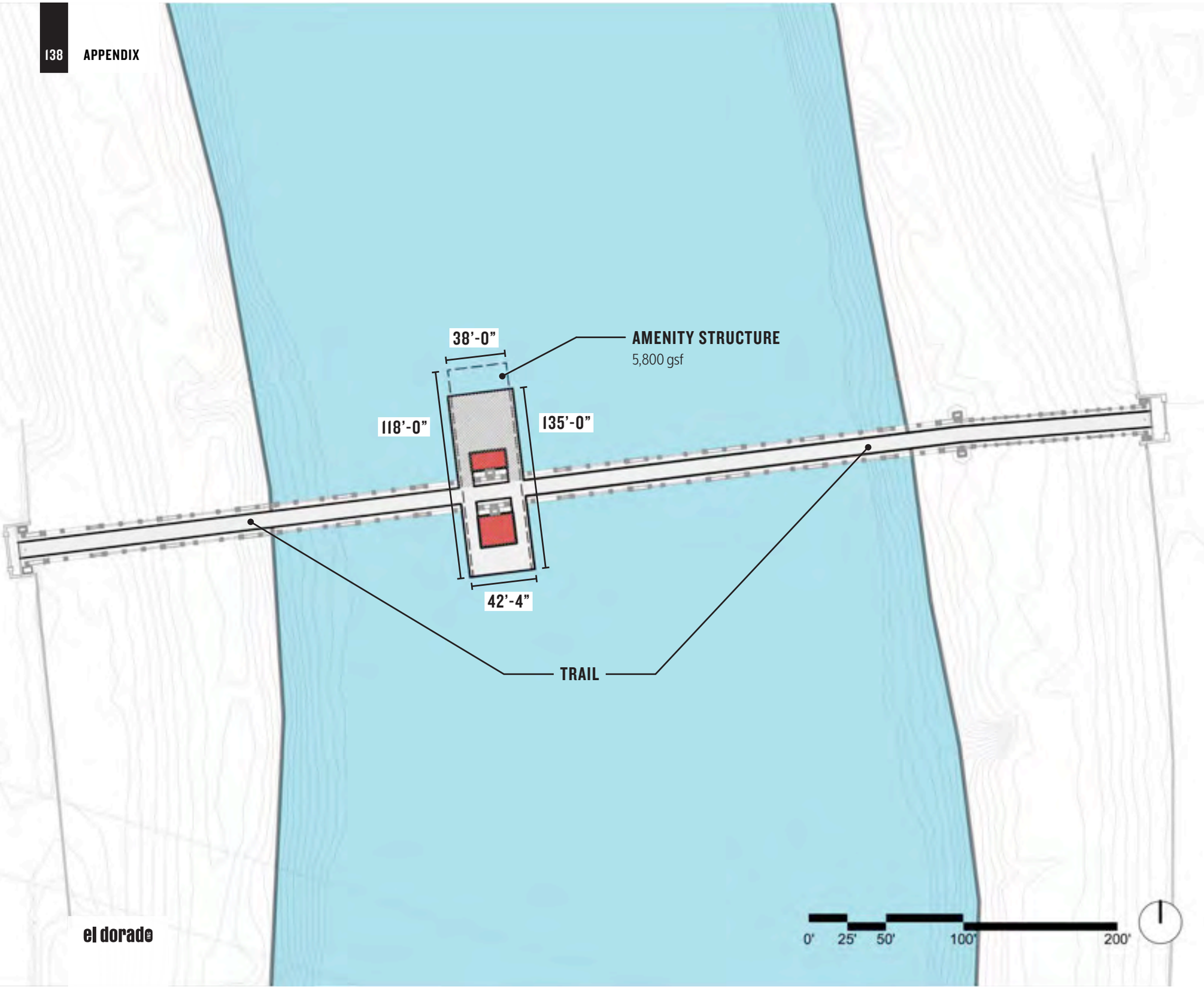
PROGRAMMABLE SPACE:
21,400 gsf

AMENITY STRUCTURE:
2,000 gsf

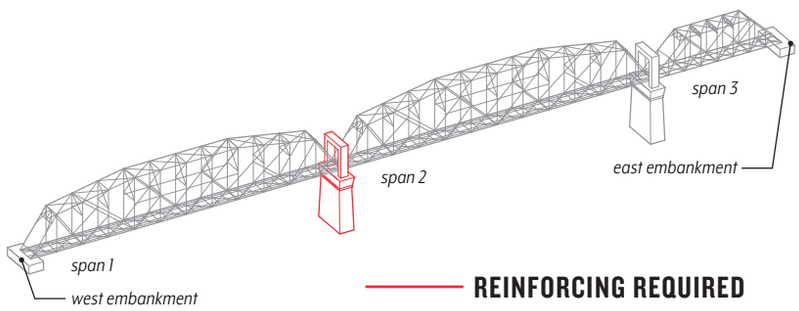
REASON FOR NOT GOING FORWARD

The double cantilever design concept proposes an amenity structure similar in size to the one proposed in Phase 3, but with a 10' trail cantilevered out from each side of the truss. This ensured an unobstructed path of travel regardless of the program on the bridge.

However, to cantilever 10' out on both sides of the bridge trusses is expensive and unnecessary providing the structure and program on the bridge is carefully located. This concept also interferes with the elegance of the structural spans.


38'-0"
AMENITY STRUCTURE
5,800 gsf
118'-0"
135'-0"
42'-4"
TRAIL
0'
25'
50'
100'
200'

DESIGN CONCEPT
ELEVATED AMENITY



PROS

Ample passive and active space on bridge, ample amenity opportunities, trail and natural flow of movement is uninterrupted by amenity structure.

CONS

Most expensive of all concepts, requires numerous structural modifications to bridge and substructure, required parking for large amenity structure could be problematic, difficult to phase.

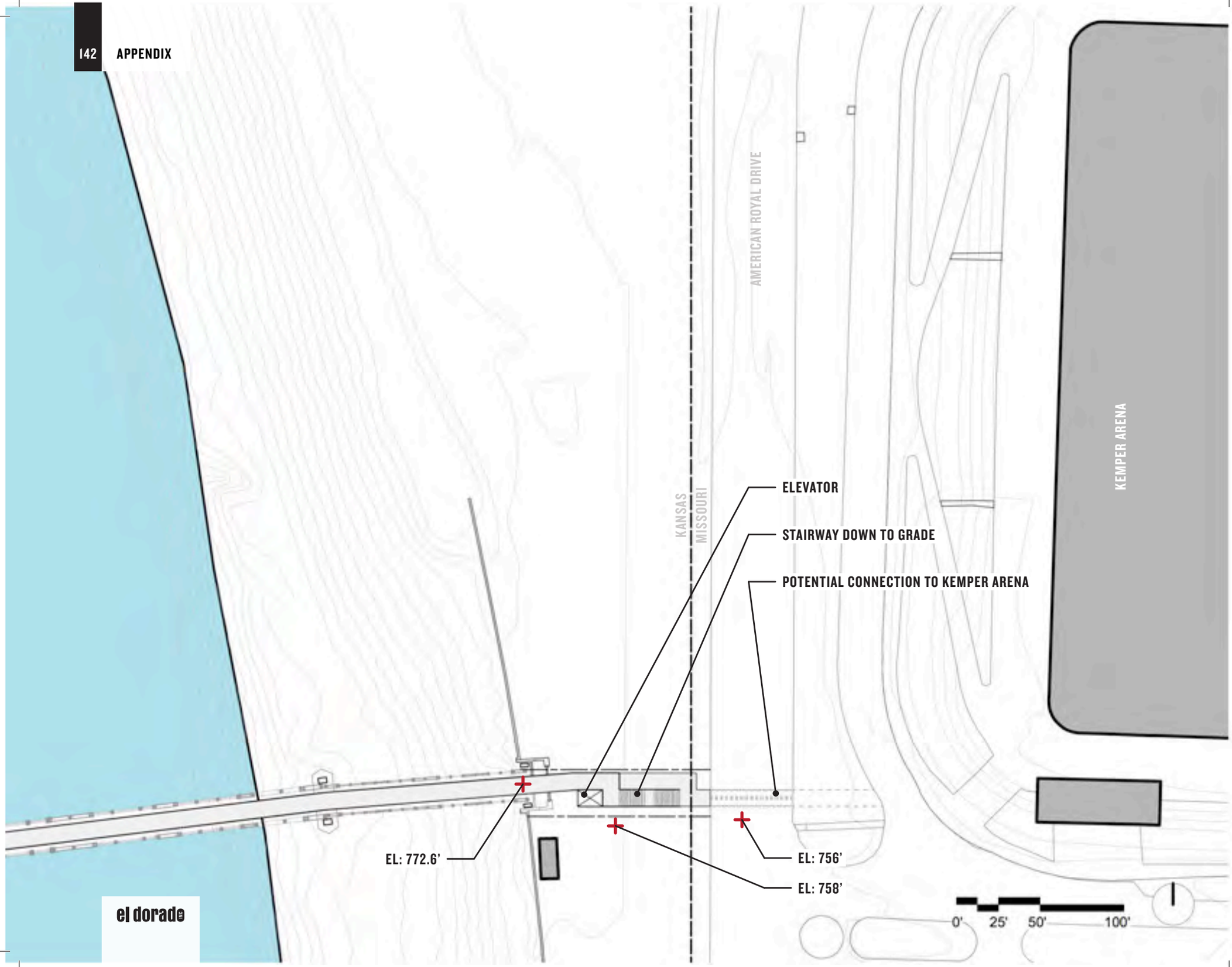
PROGRAMMABLE SPACE:
7,800 gsf

AMENITY STRUCTURE:
5,800 gsf

REASON FOR NOT GOING FORWARD

To elevate a 5,800 gsf structure above one of the piers would be extremely expensive, and would likely be cost prohibitive.

While not in direct conflict with the structural spans in the way other concepts are, the mass is out of proportion with the bridge and would become the primary focal point of the structure. If a space this large is necessary for a profitable development, the design team suggests that a structure on the shore, looking towards the bridge is much more appropriate and likely much cheaper.


AMERICAN ROYAL DRIVE
KANSAS
MISSOURI
KEMPER ARENA
ELEVATOR
STAIRWAY DOWN TO GRADE
POTENTIAL CONNECTION TO KEMPER ARENA
EL: 772.6'
EL: 756'
EL: 758'
0'
25'
50'
100'

OFF-STRUCTURE DESIGN CONCEPT CONSTRAINED

PROS

Most compact option, all contained on KCMO property.

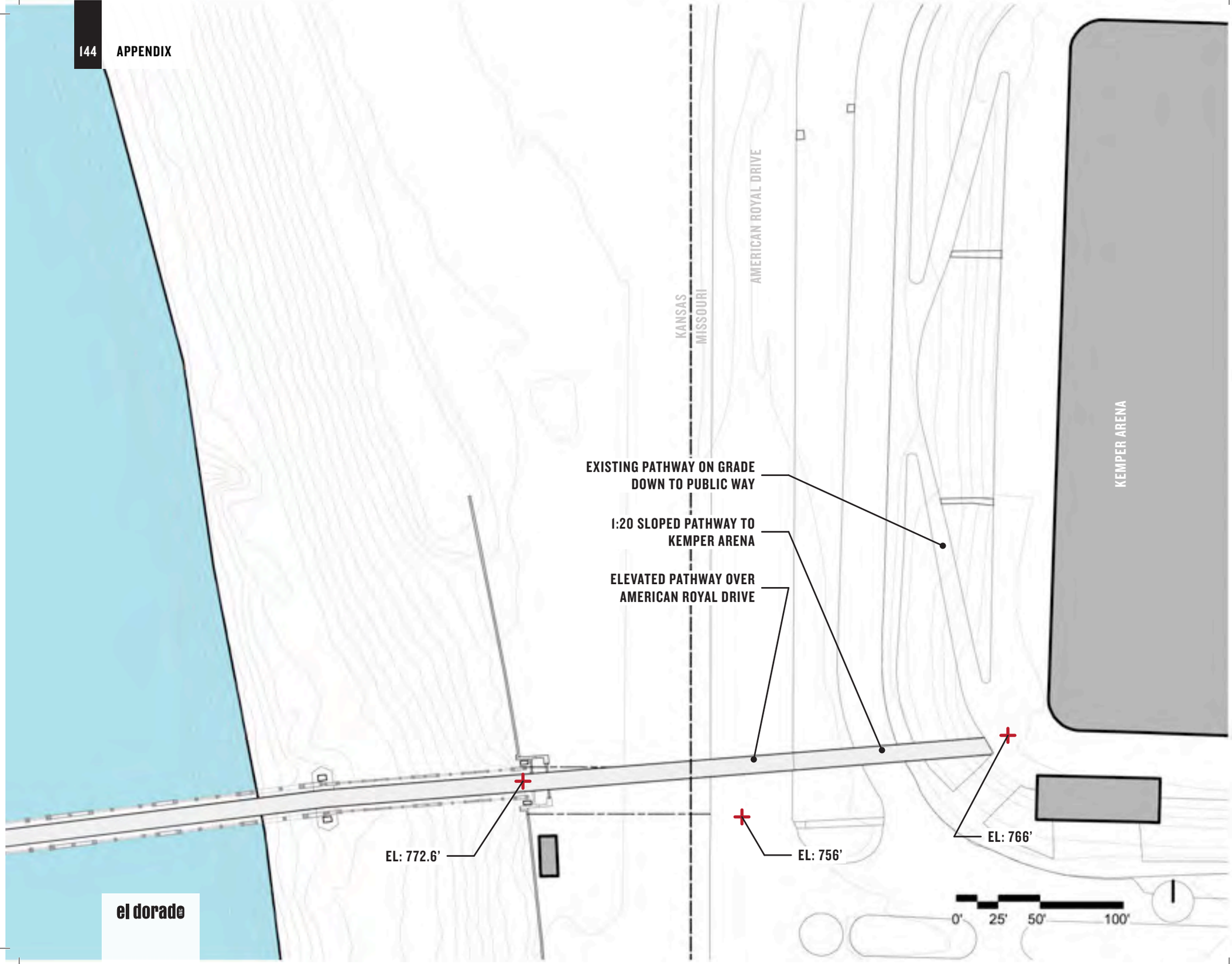
CONS

Added expense of elevator, maintenance of elevator, safety perceptions.

REASON FOR NOT GOING FORWARD

While not as large of an issue for pedestrians, requiring cyclists to use either a staircase or elevator is not conducive to the natural flow of movement on a cycling trail. A ramp or incline that cyclists can utilize without dismounting is the ideal approach.

In addition, the design team strongly suggests that an elevator should be avoided due to both up-front and maintenance costs and safety perceptions.


KANSAS
MISSOURI
AMERICAN ROYAL DRIVE
KEMPER ARENA
EXISTING PATHWAY ON GRADE DOWN TO PUBLIC WAY
1:20 SLOPED PATHWAY TO KEMPER ARENA
ELEVATED PATHWAY OVER AMERICAN ROYAL DRIVE
EL: 772.6'
EL: 756'
EL: 766'
0'
25'
50'
100'

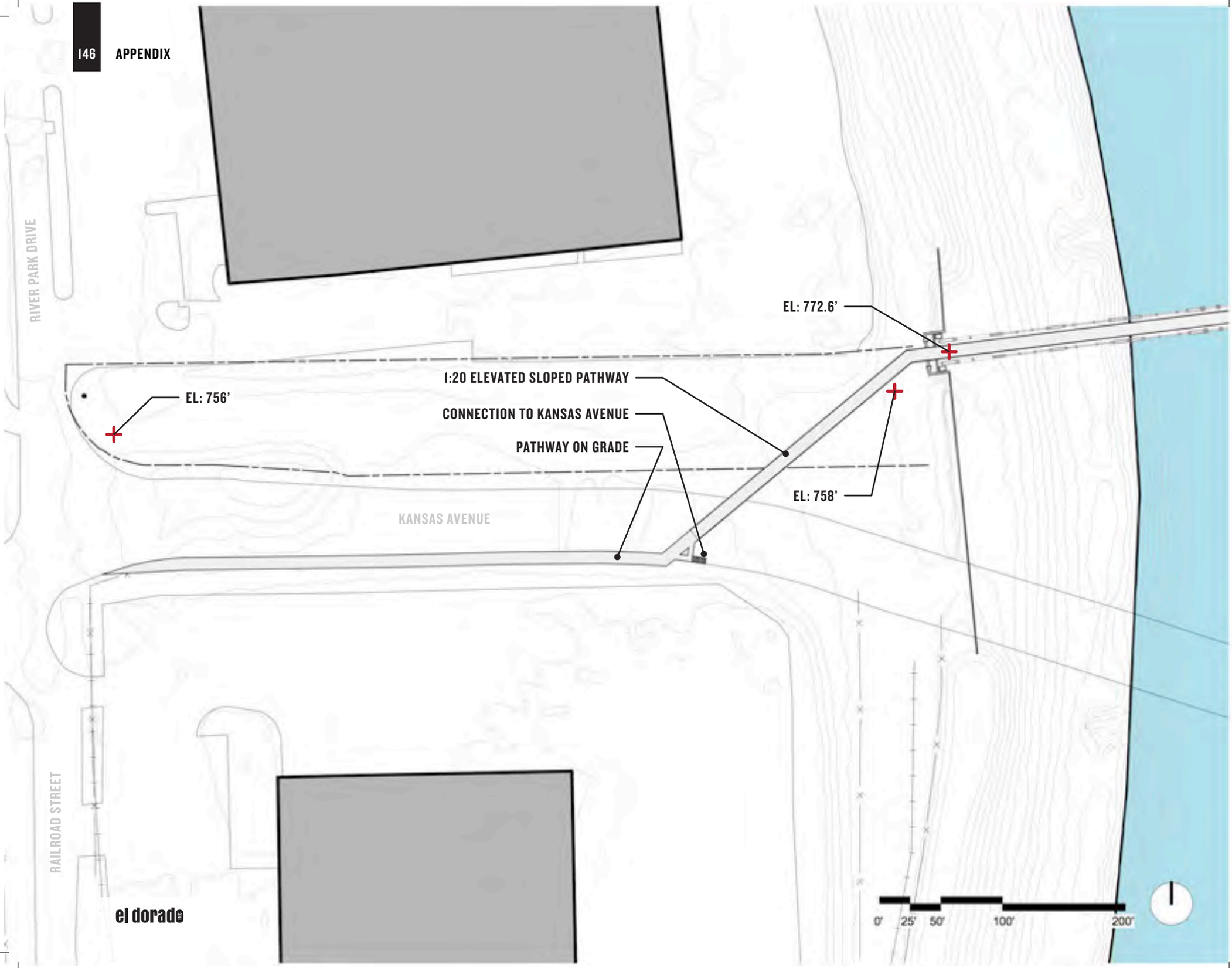
OFF-STRUCTURE DESIGN CONCEPT
BRIDGE TO KEMPER ARENA

PROS
Synergistic connection to future activity center, no navigation of slope near entry to bridge.

CONS
Trailhead connection is on private property, expense and visual heaviness of added bridge.

REASON FOR NOT GOING FORWARD
While the development team and owners of Kemper Arena were receptive to the idea, the current redevelopment plans propose relocating the loading dock to this location.

In addition, as the West Bottoms continues to develop, a direct, easily accessible connection from American Royal Drive rather than one on private property would be able to take advantage of upcoming streetscape improvements and adjacent developments.


RIVER PARK DRIVE
EL: 772.6'
I:20 ELEVATED SLOPED PATHWAY
EL: 756'
CONNECTION TO KANSAS AVENUE
PATHWAY ON GRADE
EL: 758'
KANSAS AVENUE
RAILROAD STREET
0'
25'
50'
100'
200'

OFF-STRUCTURE DESIGN CONCEPT UNDER THE BRIDGE

PROS

Good connectivity to Armourdale, easier to navigate River Park Drive and Kansas Avenue intersection when on the south side.

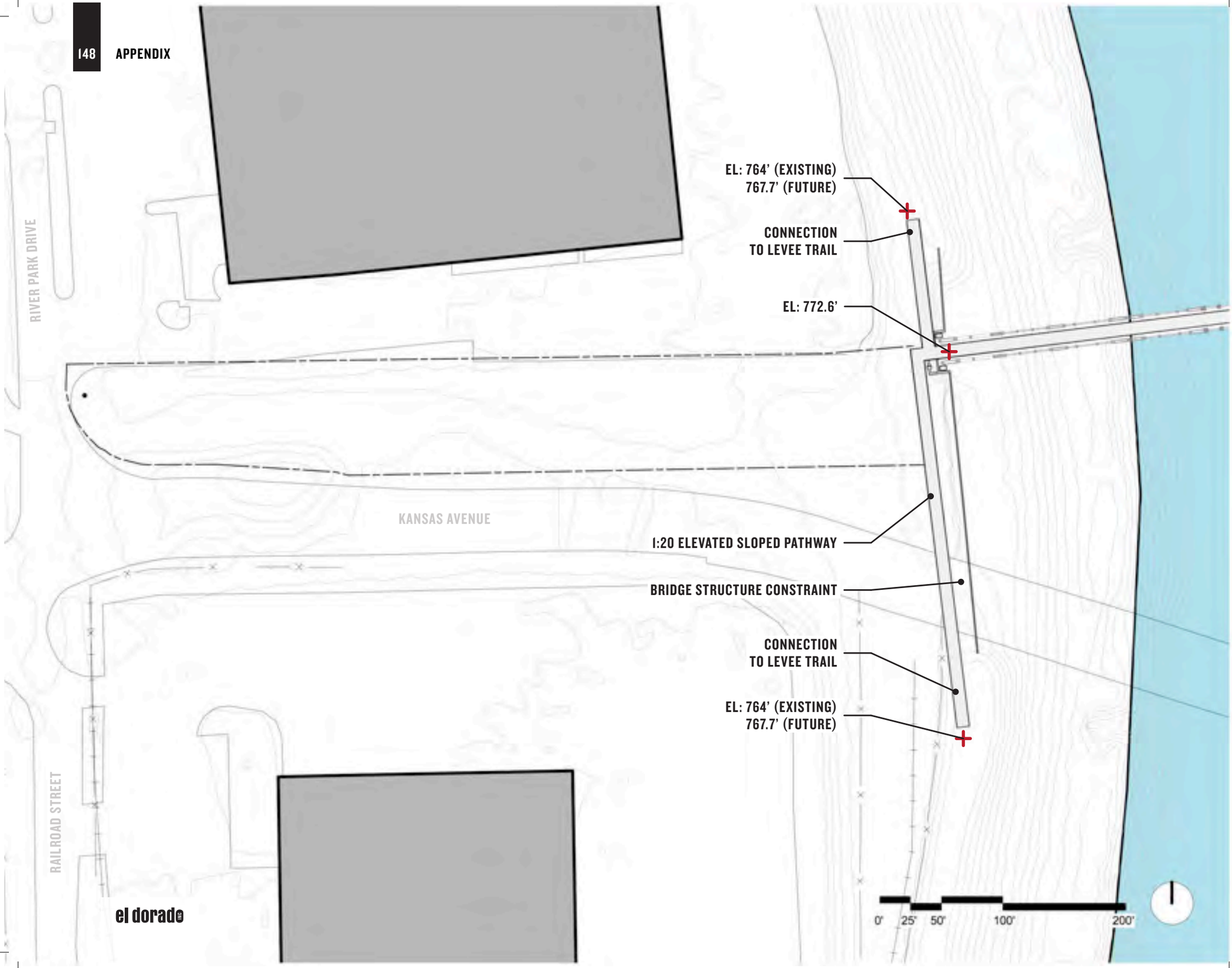
CONS

Safety perceptions under Kansas Avenue Bridge.

REASON FOR NOT GOING FORWARD

The current state of the area below the Kansas Avenue bridge is not conducive to an active pedestrian/bike trail. Even with future improvements, safety perceptions will probably always exist.

Numerous improvements would also need to be made to the staircase and walkway along the Kansas Avenue bridge to make them easily navigable.


EL: 764' (EXISTING)
767.7' (FUTURE)
CONNECTION
TO LEVEE TRAIL
EL: 772.6'
KANSAS AVENUE
1:20 ELEVATED SLOPED PATHWAY
BRIDGE STRUCTURE CONSTRAINT
CONNECTION
TO LEVEE TRAIL
EL: 764' (EXISTING)
767.7' (FUTURE)
RIVER PARK DRIVE
RAILROAD STREET
0'
25'
50'
100'
200'

OFF-STRUCTURE DESIGN CONCEPT TRAIL CONNECTION ONLY

PROS

Most economical of all concepts, strong connectivity to growing trail network.

CONS

Poor connectivity with adjacent neighborhood, accessibility concerns.

REASON FOR NOT GOING FORWARD

This design concept works much better as an option paired with the design team's proposed off-structure concept. If treated as a supplemental option rather than a standalone concept, these connections can be made as the levee trail develops instead of relying on a functional levee trail to complete construction.

If treated as a standalone concept, it provides little to no connection to Armourdale and the surrounding Kansas City, Kansas neighborhoods.

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