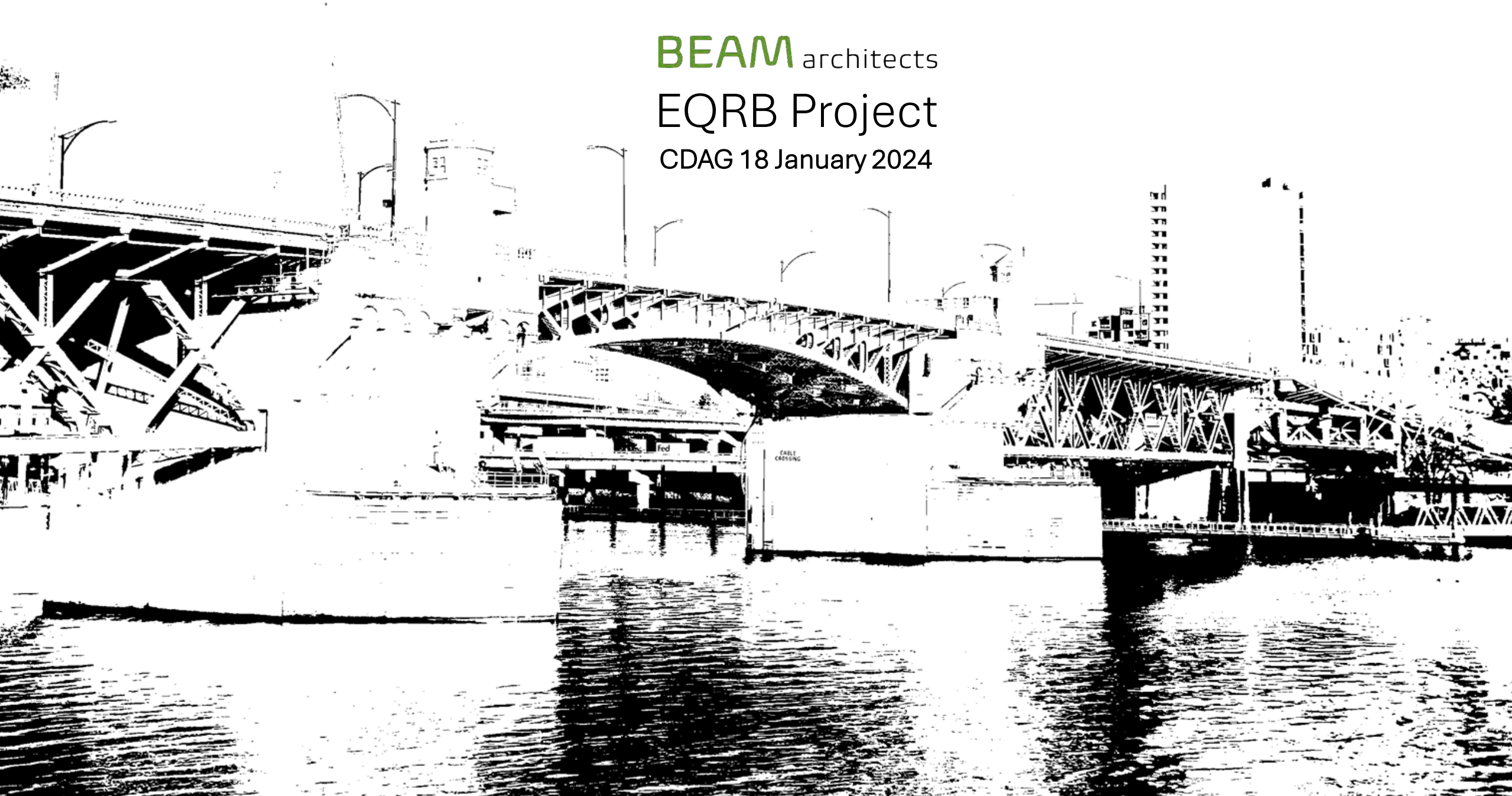
BEAM architects

EQRB Project

CDAG 18 January 2024




Keith Brownlie
RIBA RIAS AIA Intl’Assoc. NCARB
James Marks
RIBA RIAS AIA Intl’Assoc. NCARB

Bridges are architecture
Bridges are not buildings
Firmitas Utilitas Venustas

“Burnside Bridge was the first Willamette River bridge in Portland designed with input from an architect, a result of the early 20th century City Beautiful Movement that called for adding architectural ornamentation to engineering designs.”

multco.us/bridges/burnside-bridge

Gateshead Millennium Bridge

Koolangka Bridge

Ulleval Stadium Bridge


Newark Bay Bridge


Baakenhafen Bridge


New Danube Bridge


Folehavn Bridge


Fossvogur Bridge


Gota Alv Bridge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Westgate Bridge


Fitzroy River Crossing


I-395 Bridge


Long Beach International Gateway


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Frederick Douglass Memorial Bridge


Dvorecky Most


Mumbai Trans Harbor Link

How to design a bridge:

ty gravity geotechnics **Constraints** cost constructability obsta

n viewpoints cityscape **Context** culture history connections e

e typology form detail **Composition** materiality user experie

Constraints
Context
Composition

Constraints

Context

Typologies

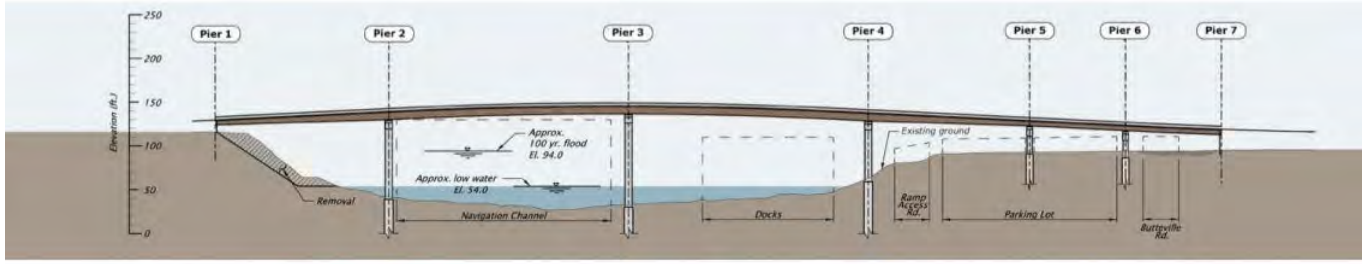
01 Beam / Girder

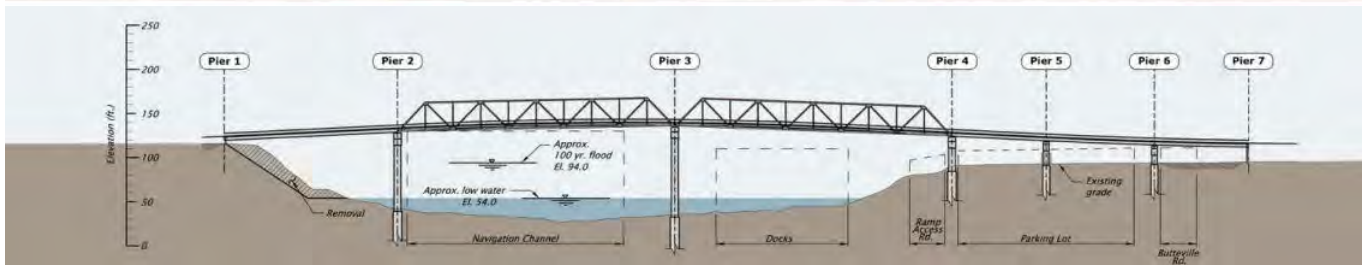
02 Truss

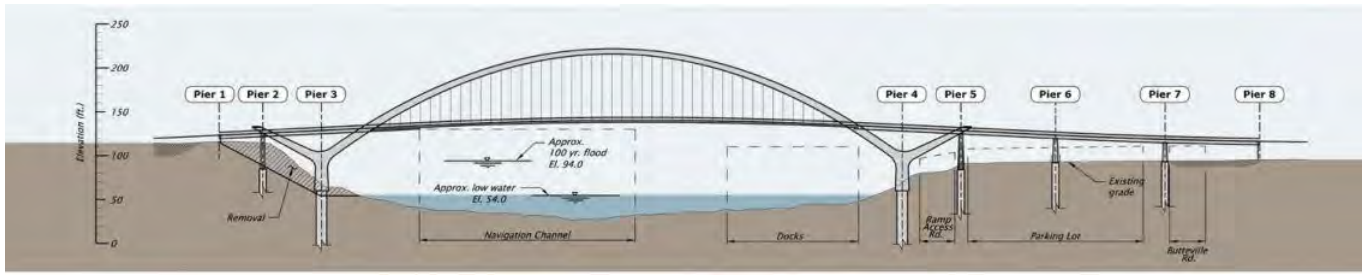
03 Arch

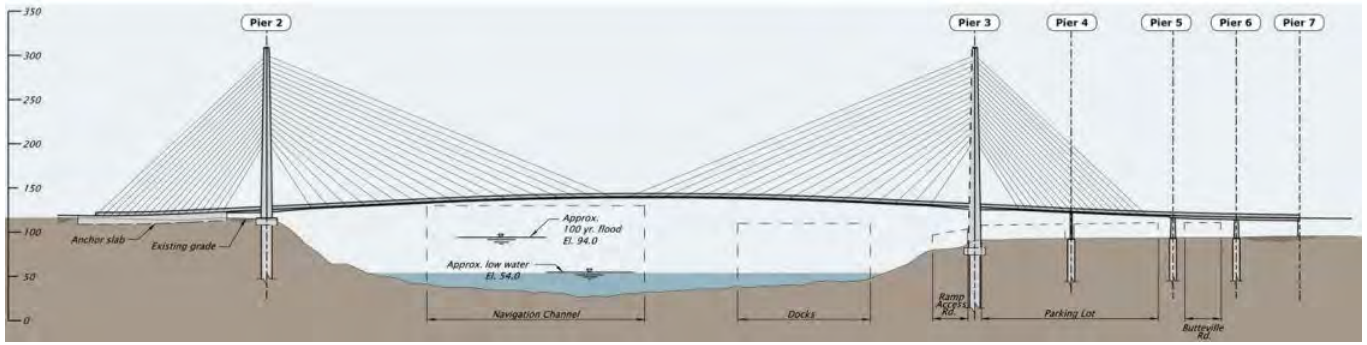
04 Cable Stayed

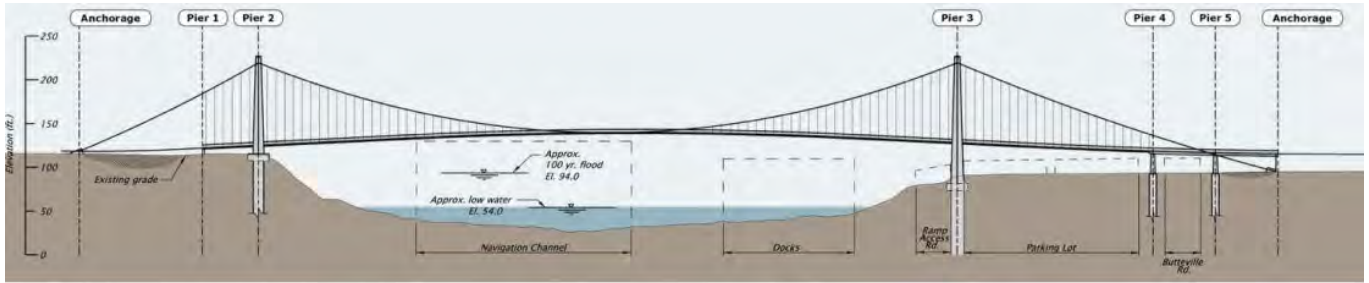
05 Suspension

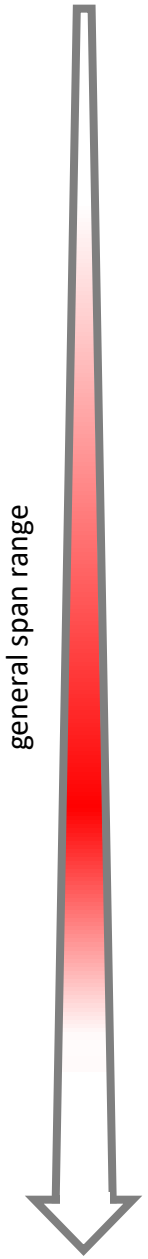












01 Beam/Girder Bridges

Marquam Bridge Approaches

Korda Lake Viaduct, London UK

Gordie Howe International Bridge, Detroit MI

Greenline Viaduct, Calgary AB

Fossvogur Bridge, Reykjavik ISL

02 Truss Bridges

Broadway Bridge

Living Bridge, Limerick IRE

Nine Elms Bridge, London UK

Taxiway Overbridge, London UK

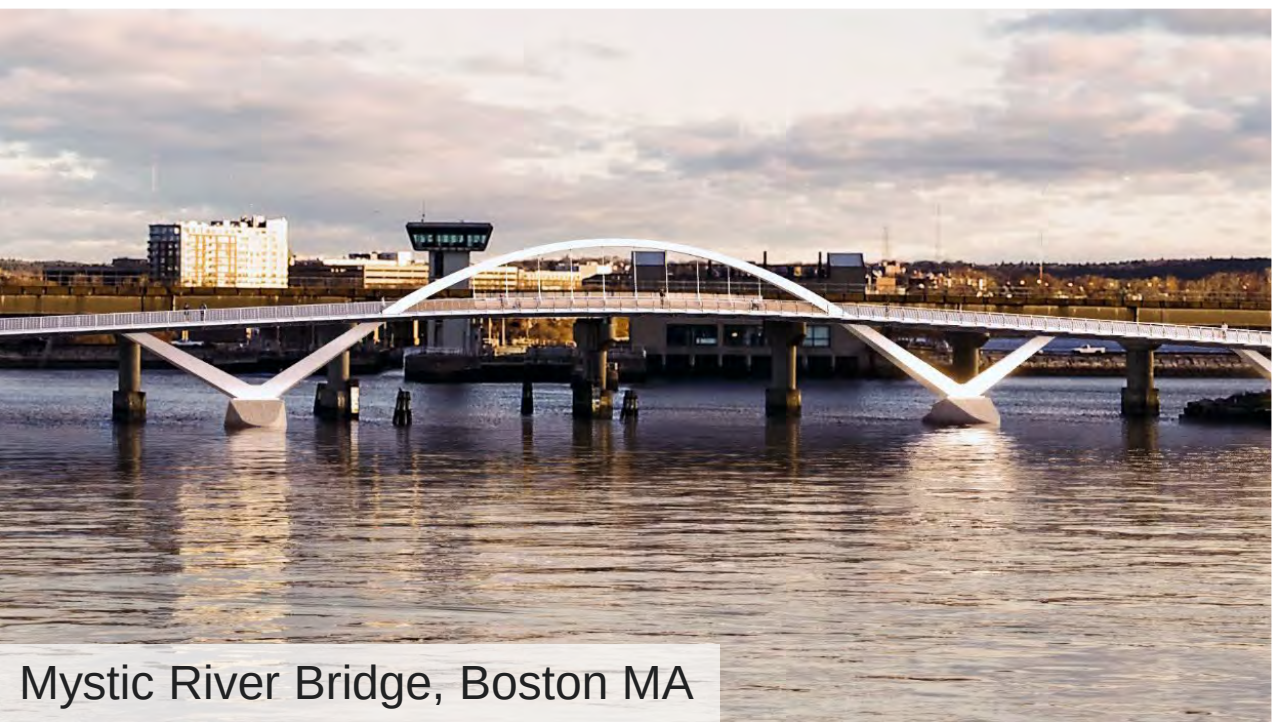
Forthside Bridge, Stirling UK

03 Arch Bridges

Fremont Bridge

Frederick Douglass Bridge, Washington DC

Waaban Crossing, Kingston ON



Mystic River Bridge, Boston MA

Bow River Bridge, Calgary AB

03 Cable Stayed Bridges

Tilikum Crossing

Mario M.Cuomo Bridge, NY

Manama Fourth Crossing, Bahrain

Hoddle Street Interchange, Melbourne AUS

Media City Bridge, Salford UK

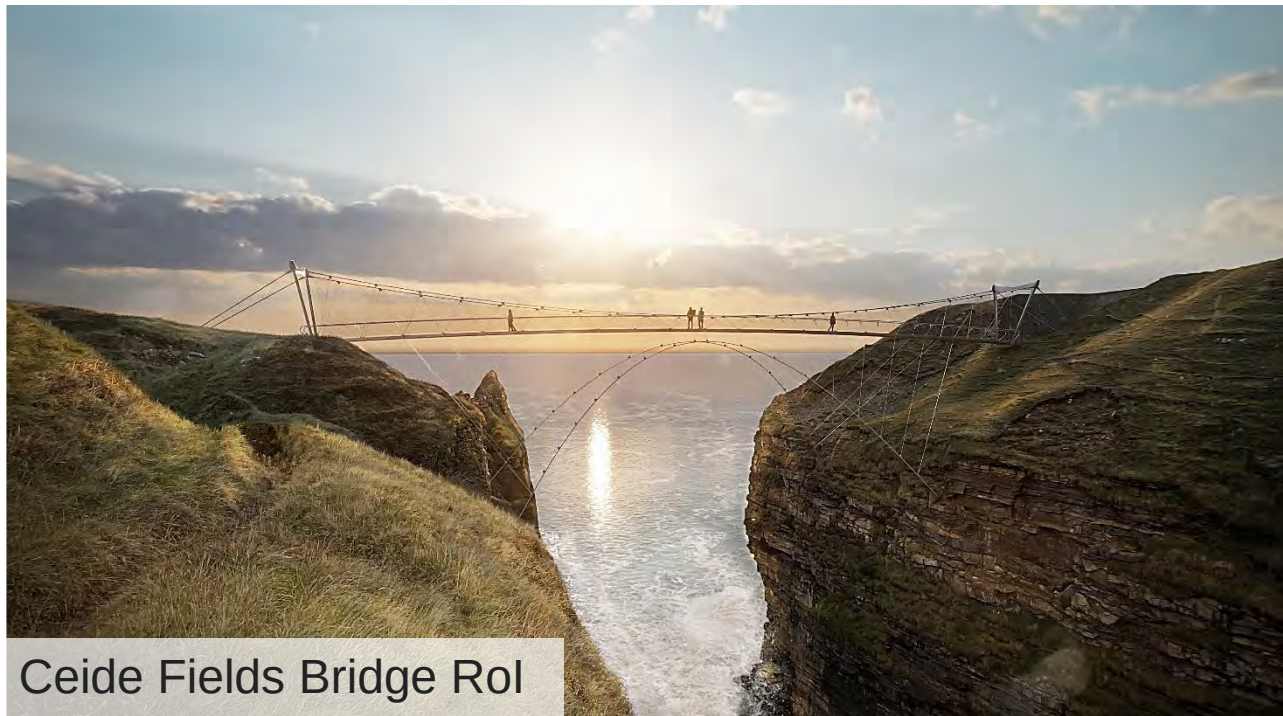
03 Suspension Bridges

St. Johns Bridge

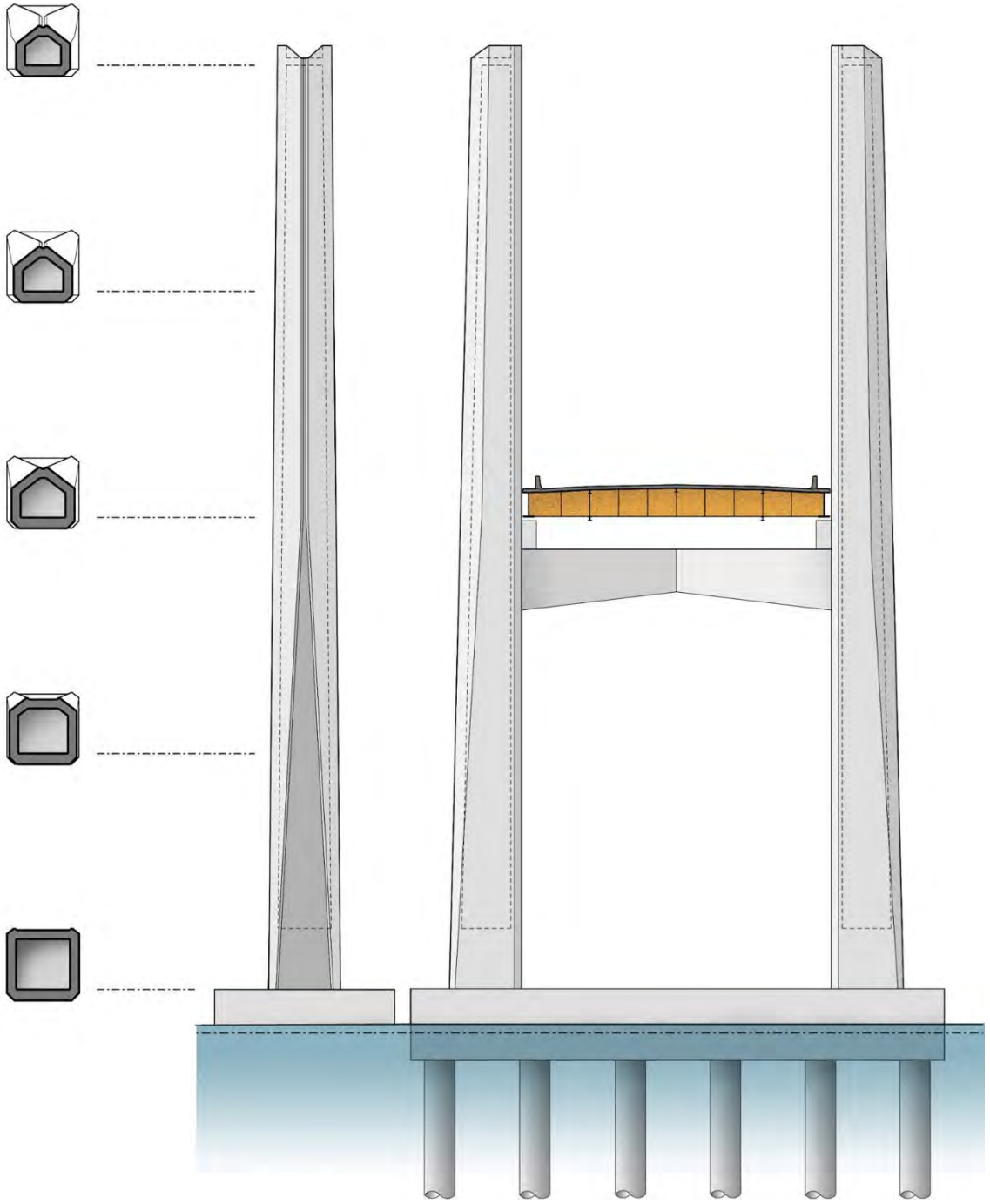
Ijburg Bridge, Amsterdam NL

Metsovitikos Bridge, GR

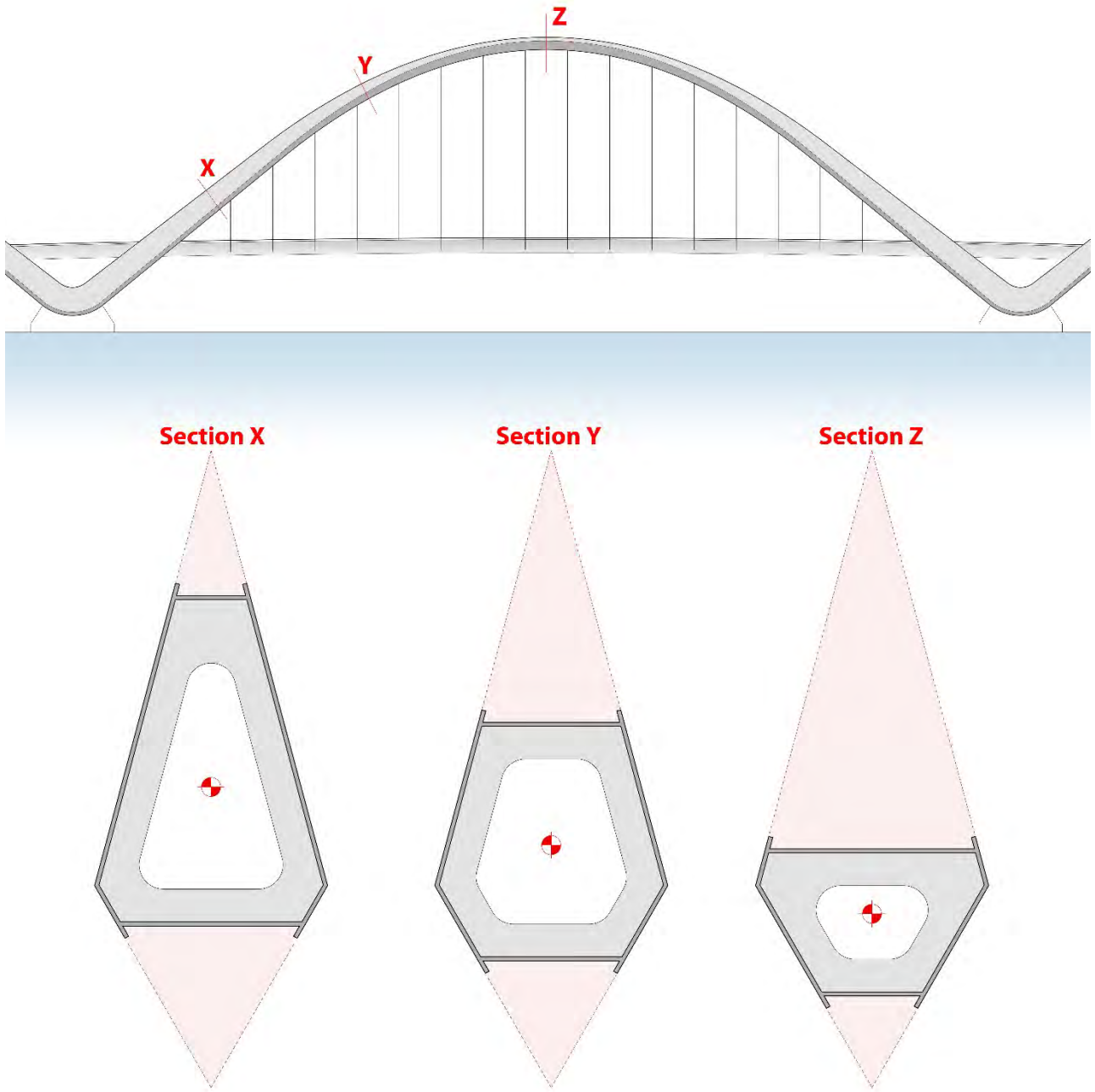
Peace Bridge, Derry NI



Ceide Fields Bridge RoI



Newark Bay Bridge Replacement



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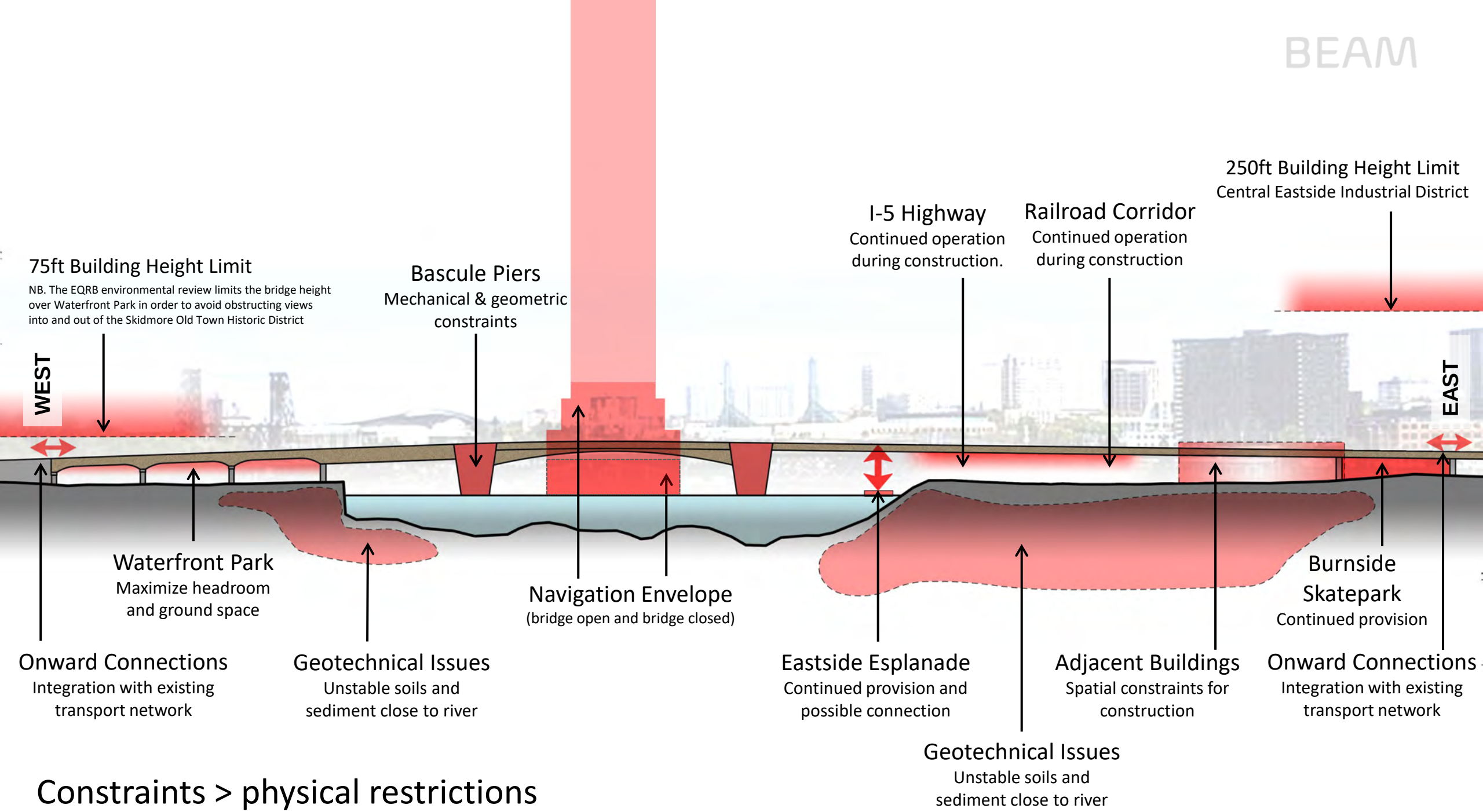
Frederick Douglass Memorial Bridge

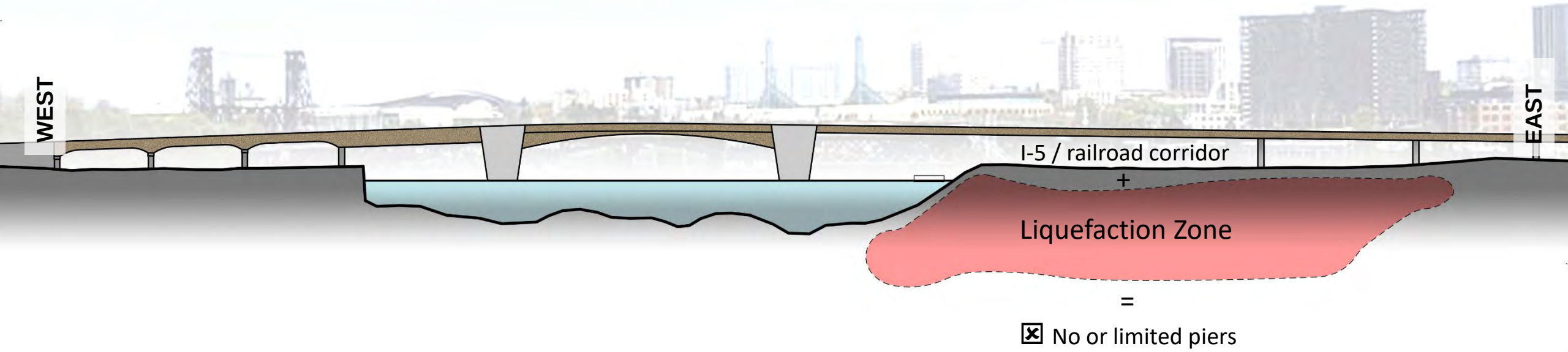
Context

Constraints

Composition



Constraints > physical restrictions



Constraints > span length opportunities

Short Span

Medium Span

Long Span

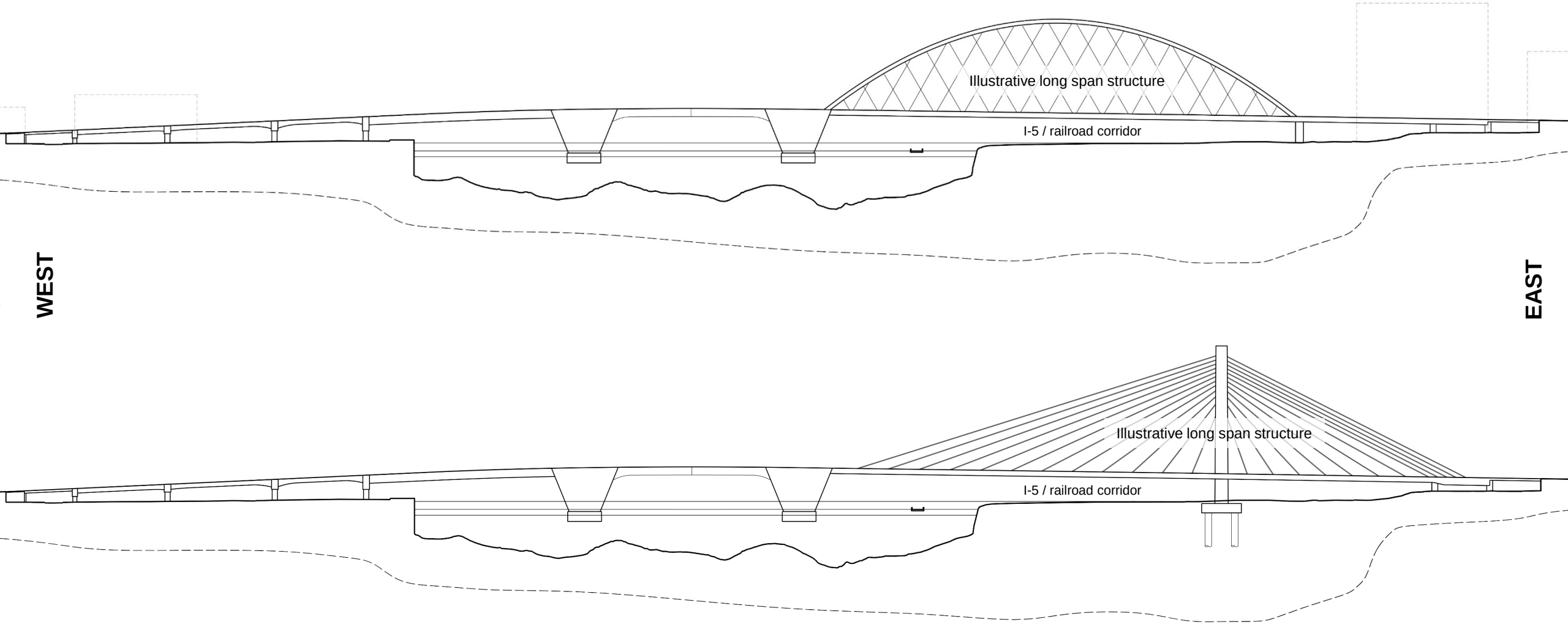
Constraints > span length opportunities

BEAM

Short Span
$

Medium Span
$$

Long Span
$$$

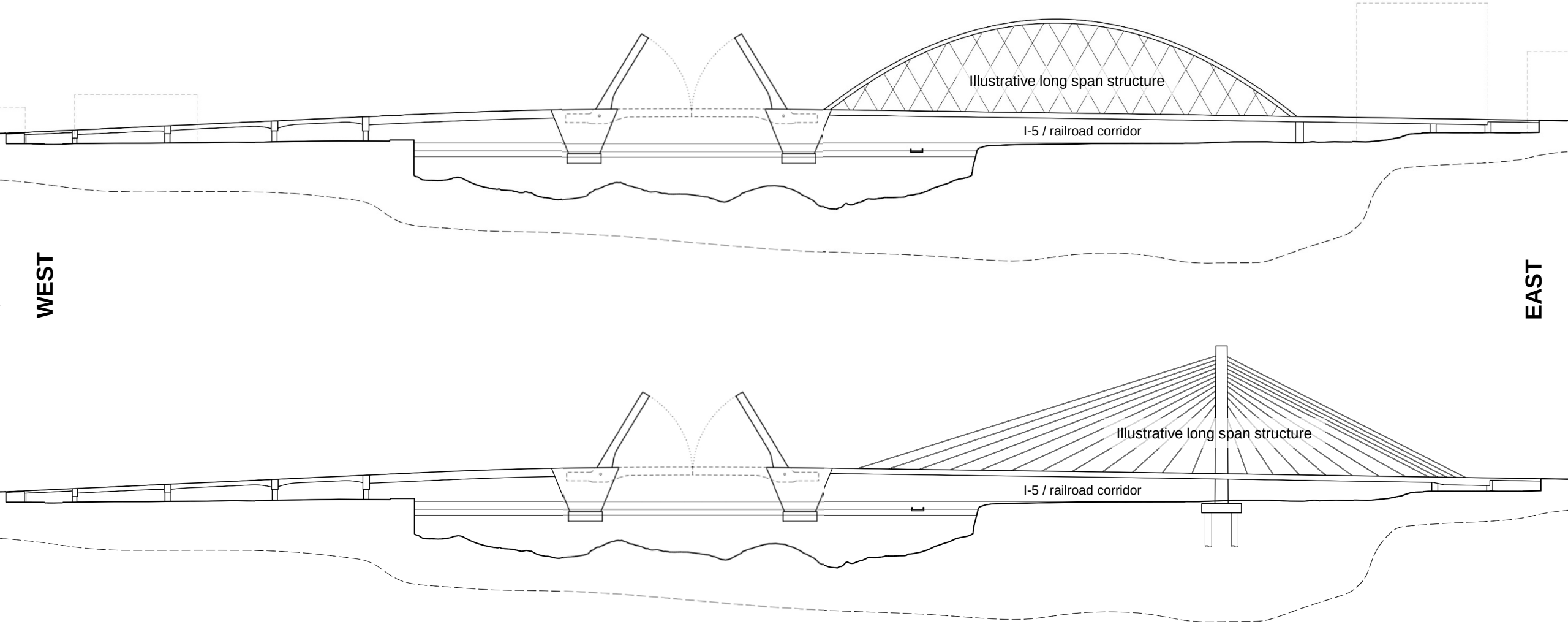


BEAM

Short Span
$

Opening Span
$$$

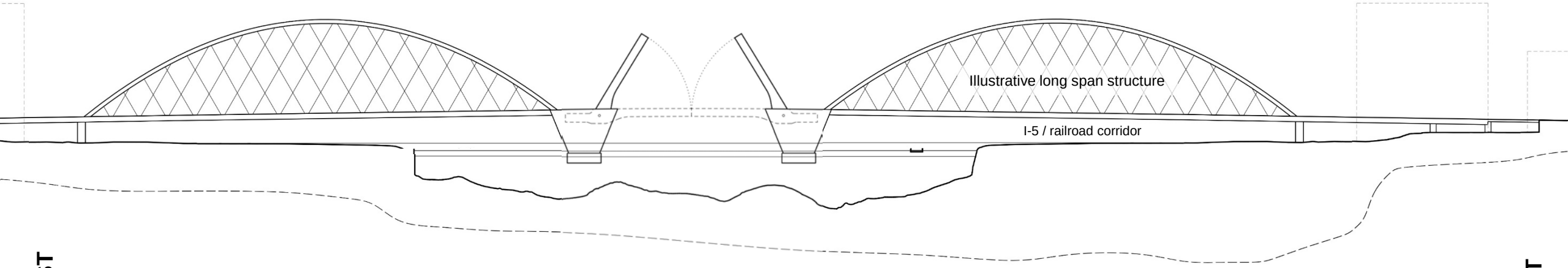
Long Span
$$$



Long Span
$$$

Opening Span

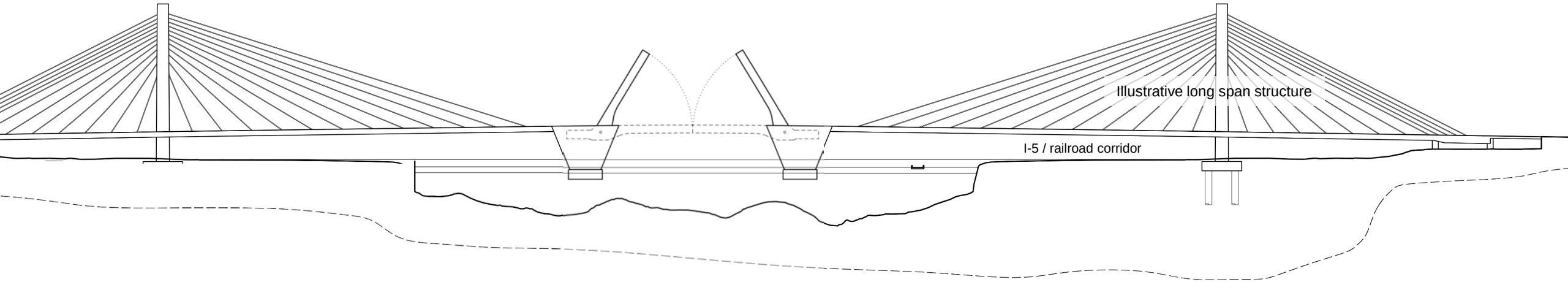
Long Span
$$$



WEST

NB. Structure on west violates EQRB NEPA requirements for bridge height

EAST



Context

Constraints

Composition

Original Burnside Bridge 1892-1924 (32 YEARS)
Swing Truss Bridge

Current Burnside Bridge 1926- c2026 (100 YEARS)
Bascule/Truss Bridge

Replacement Bridge c2030- c2150 (120 YEARS +)
Seismically Resilient Bridge

Engineer: **Hedrick** & Kremers

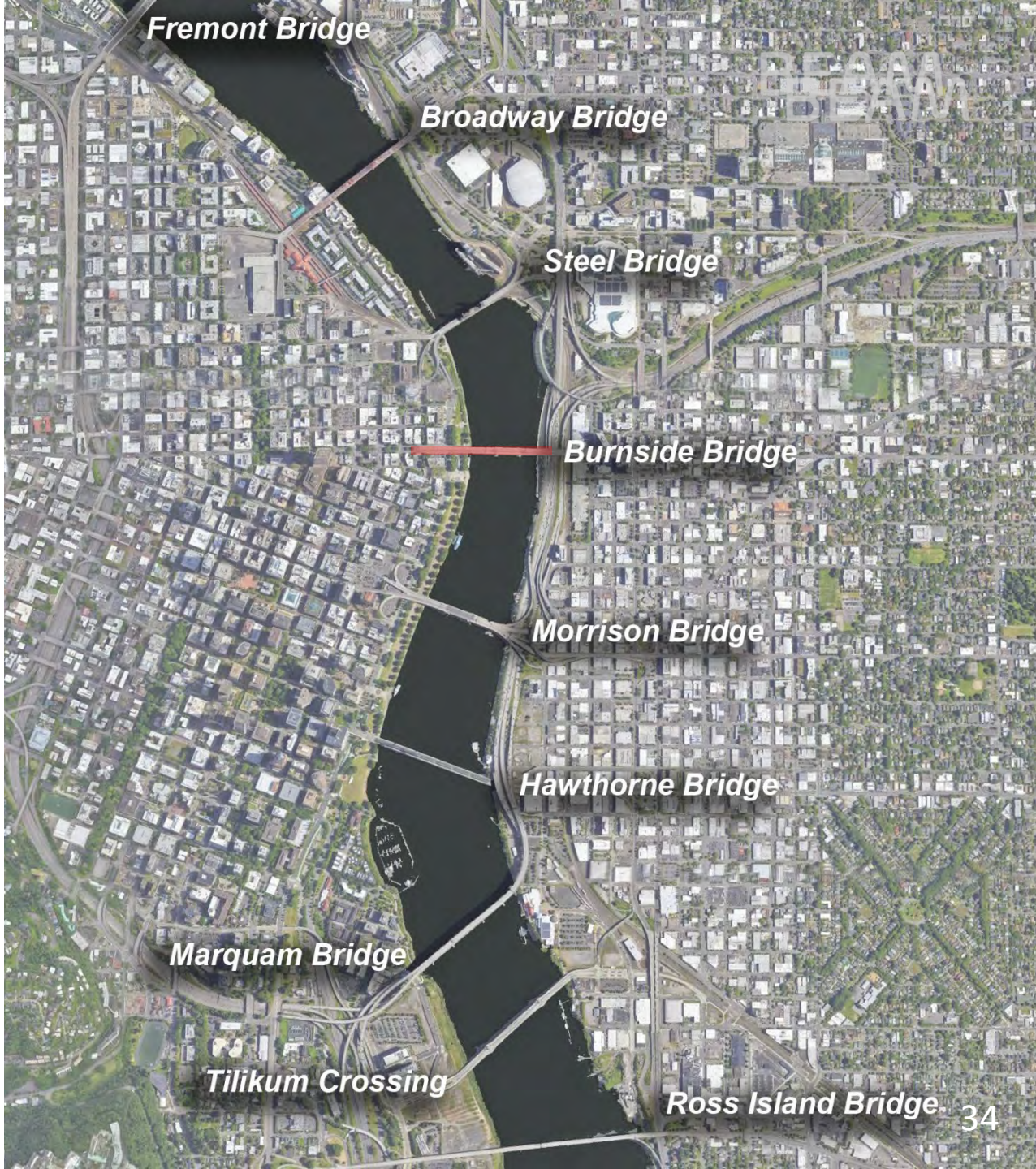
Final Bridge Design: Gustav **Lindenthal**
(Queensboro Bridge, Hells Gate Bridge)

Bascule Bridge Design: Joseph **Strauss**
(Lewis & Clark Bridge, Golden Gate Bridge)

"**Lindenthal** told the board that there were four conditions to ensure a bridge was appropriate and adequate. They were location, traffic capacity, structural character and for a city bridge the architectural features, in the order named."

Historic Structures, August 2017

Portland, ‘Bridge City’



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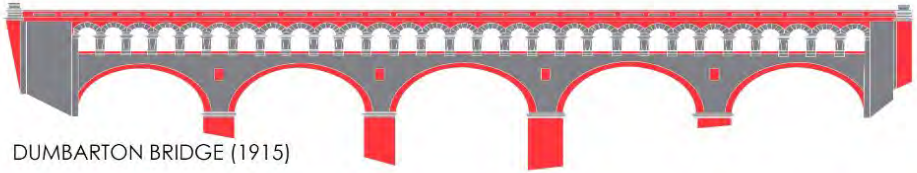
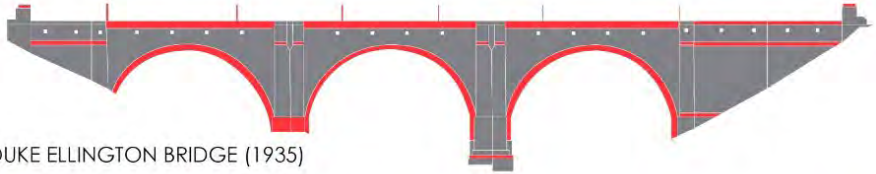
WILLIAM HOWARD TAFT BRIDGE (1907)



DUMBARTON BRIDGE (1915)

ARLINGTON MEMORIAL BRIDGE (1932)

FRANCIS SCOTT KEY BRIDGE (1933)



DUKE ELLINGTON BRIDGE (1935)

JOHN PHILLIP SOUSA BRIDGE (1941)

WOODROW WILSON MEMORIAL BRIDGE (2009)

FREDERICK DOUGLASS MEMORIAL BRIDGE (2021)

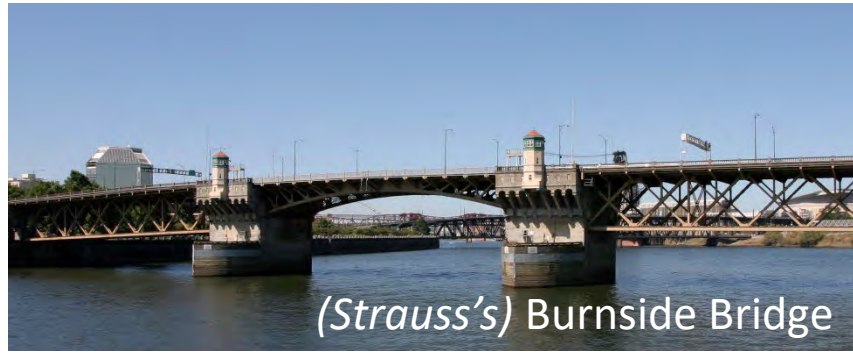

St John’s Bridge


Burlington Northern Railroad Bridge


Fremont Bridge

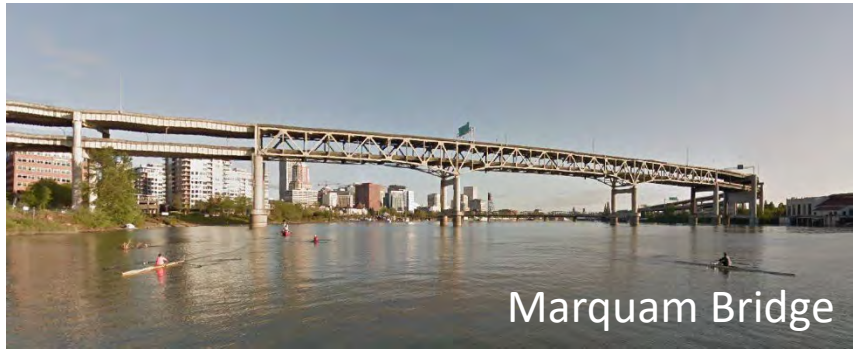

Broadway Bridge


Steel Bridge

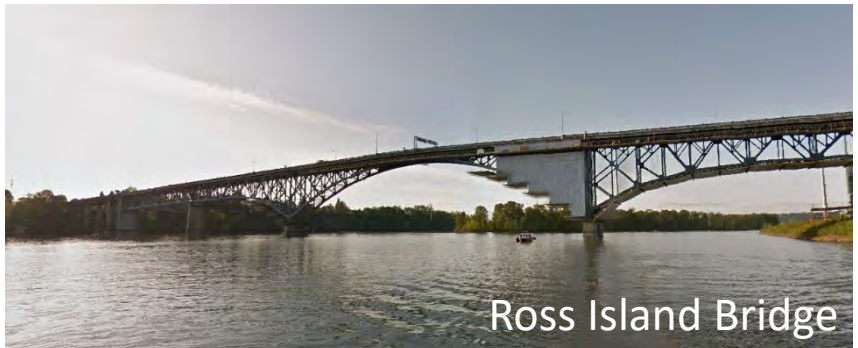

(Strauss’s) Burnside Bridge


Morrison Bridge


Hawthorn Bridge


Marquam Bridge


Tilikum Crossing


Ross Island Bridge


Sellwood Bridge


St John’s Bridge


Burlington Northern Railroad Bridge


Fremont Bridge


Broadway Bridge


Steel Bridge

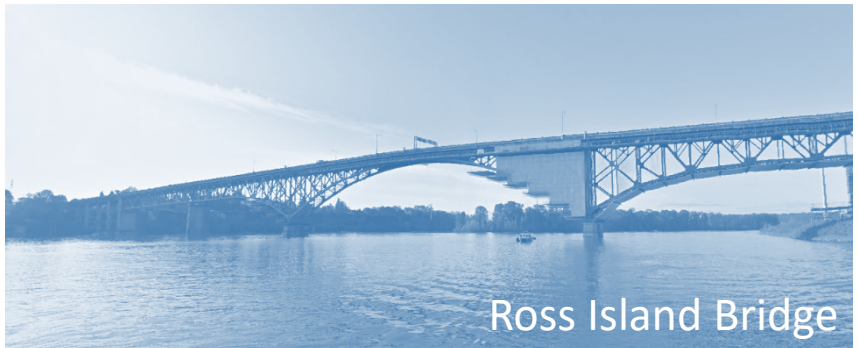

(Strauss’s) Burnside Bridge


Morrison Bridge

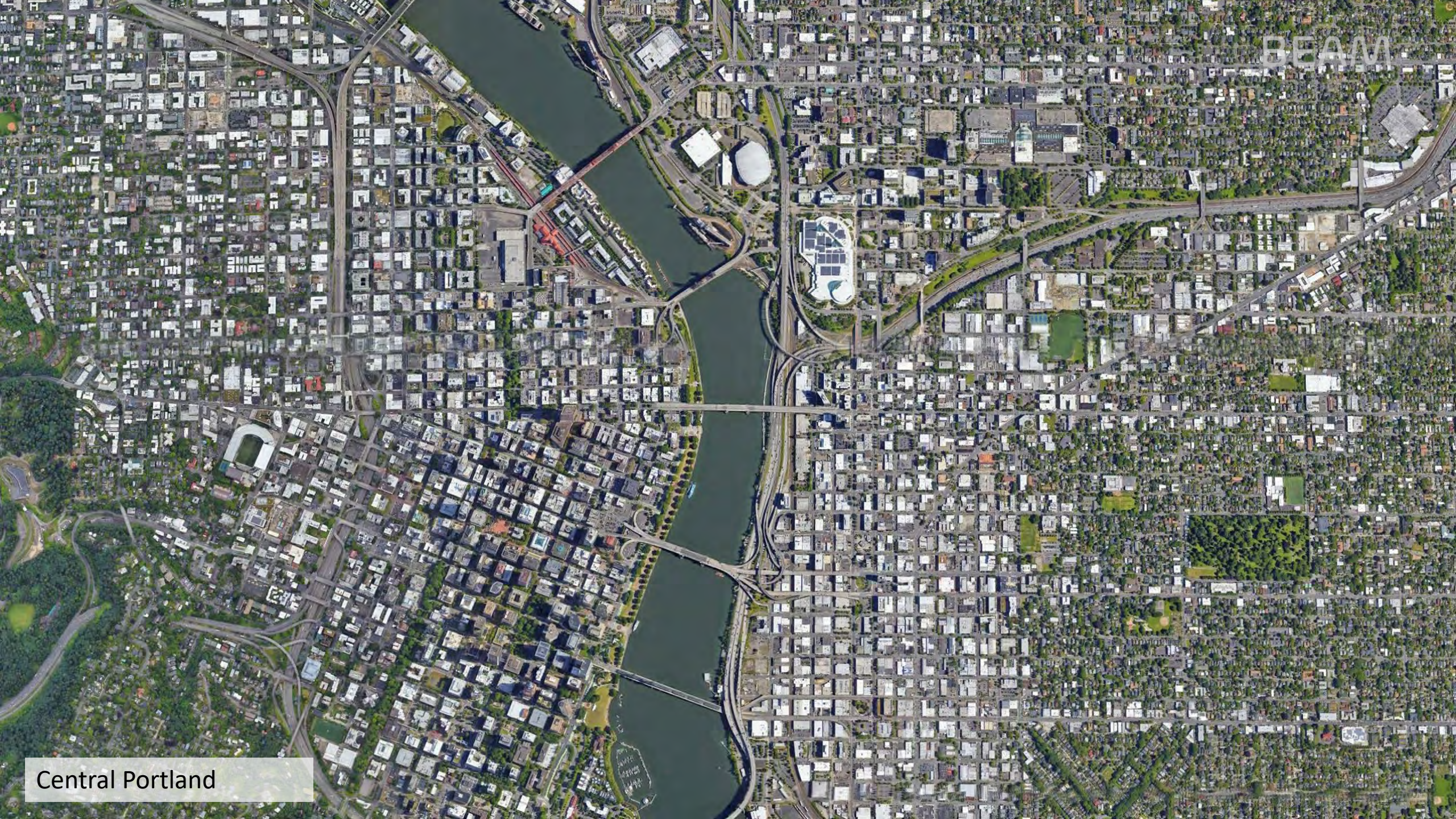

Hawthorn Bridge


Marquam Bridge


Tilikum Crossing

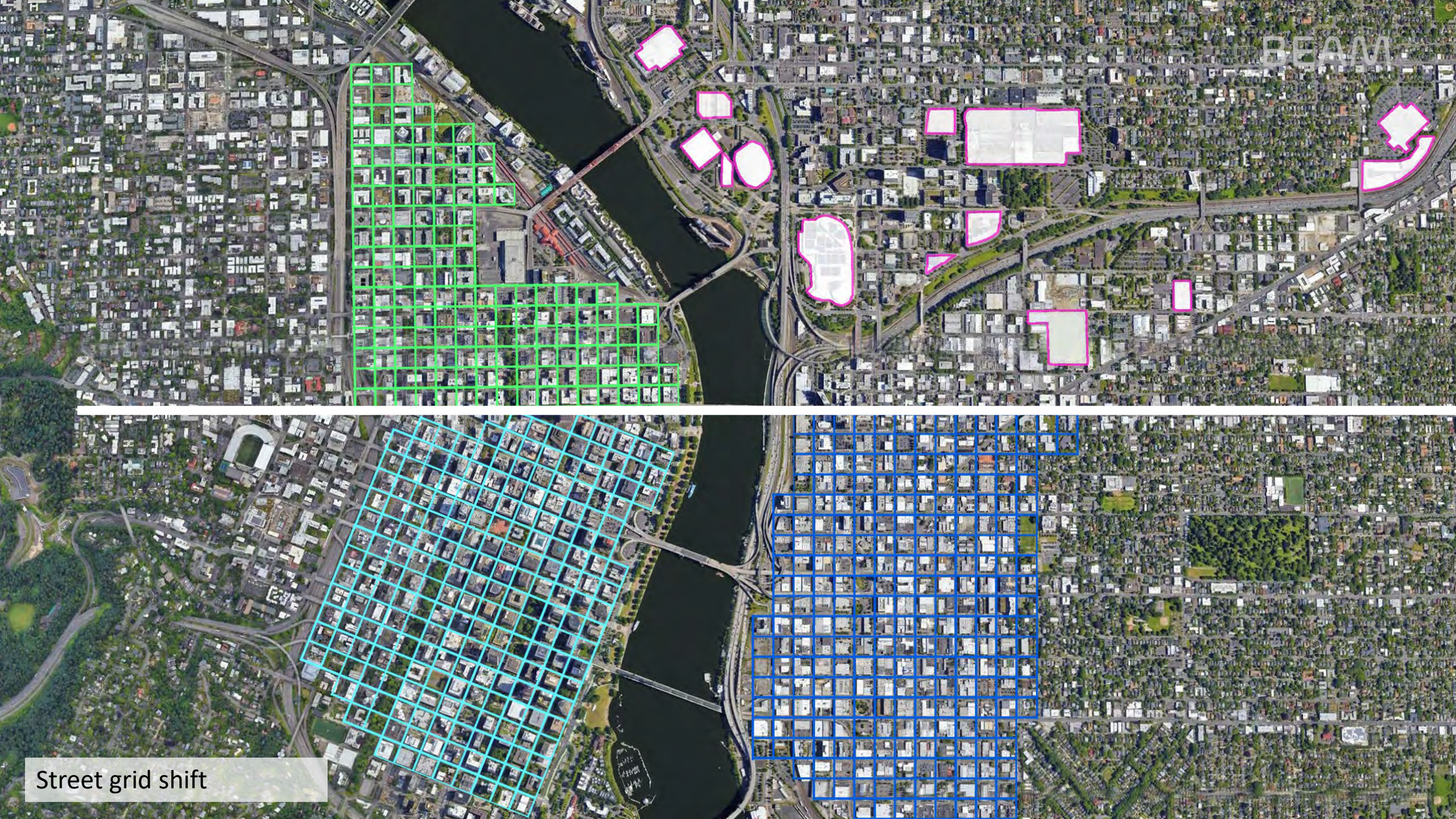

Ross Island Bridge

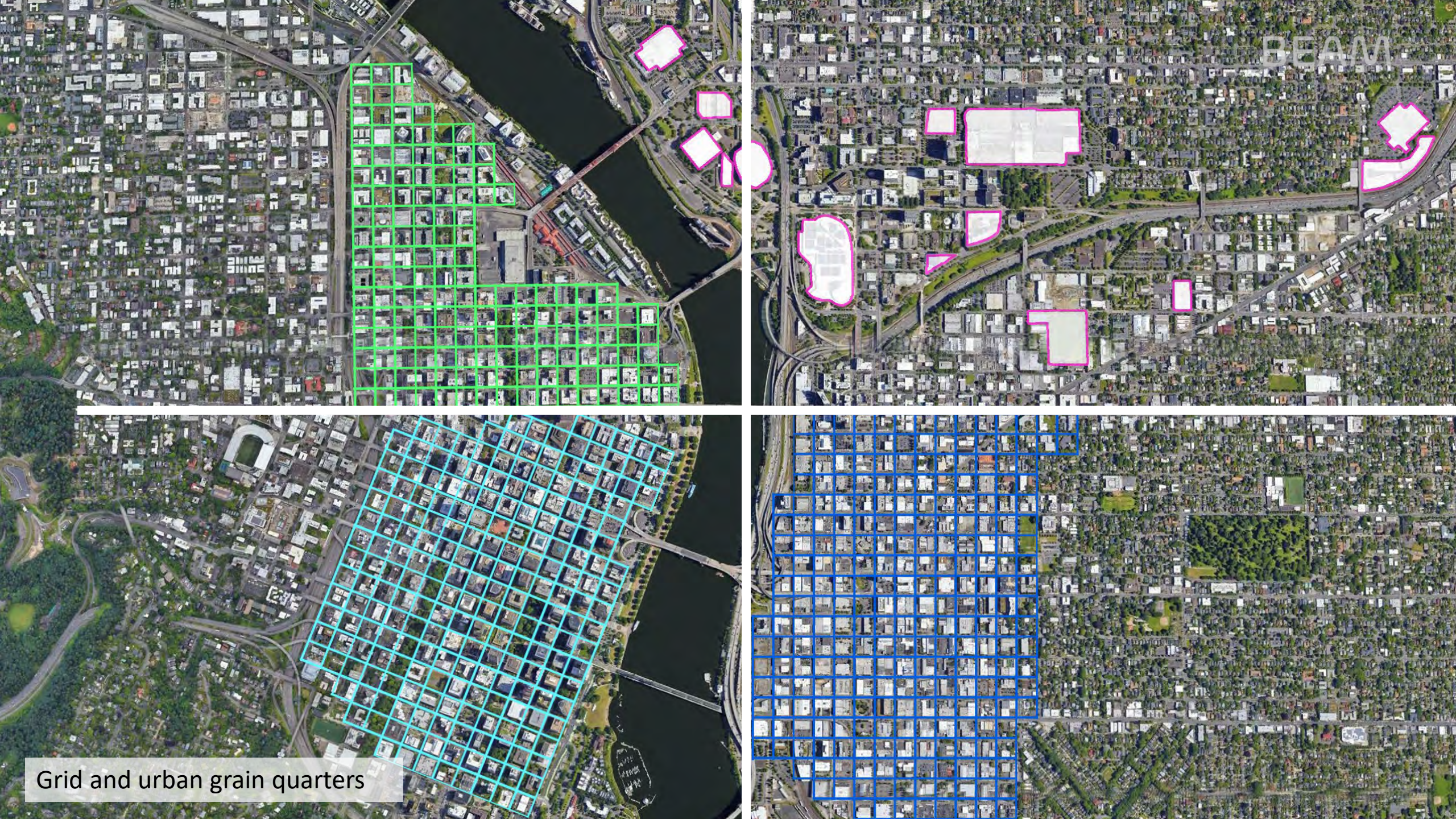

Sellwood Bridge



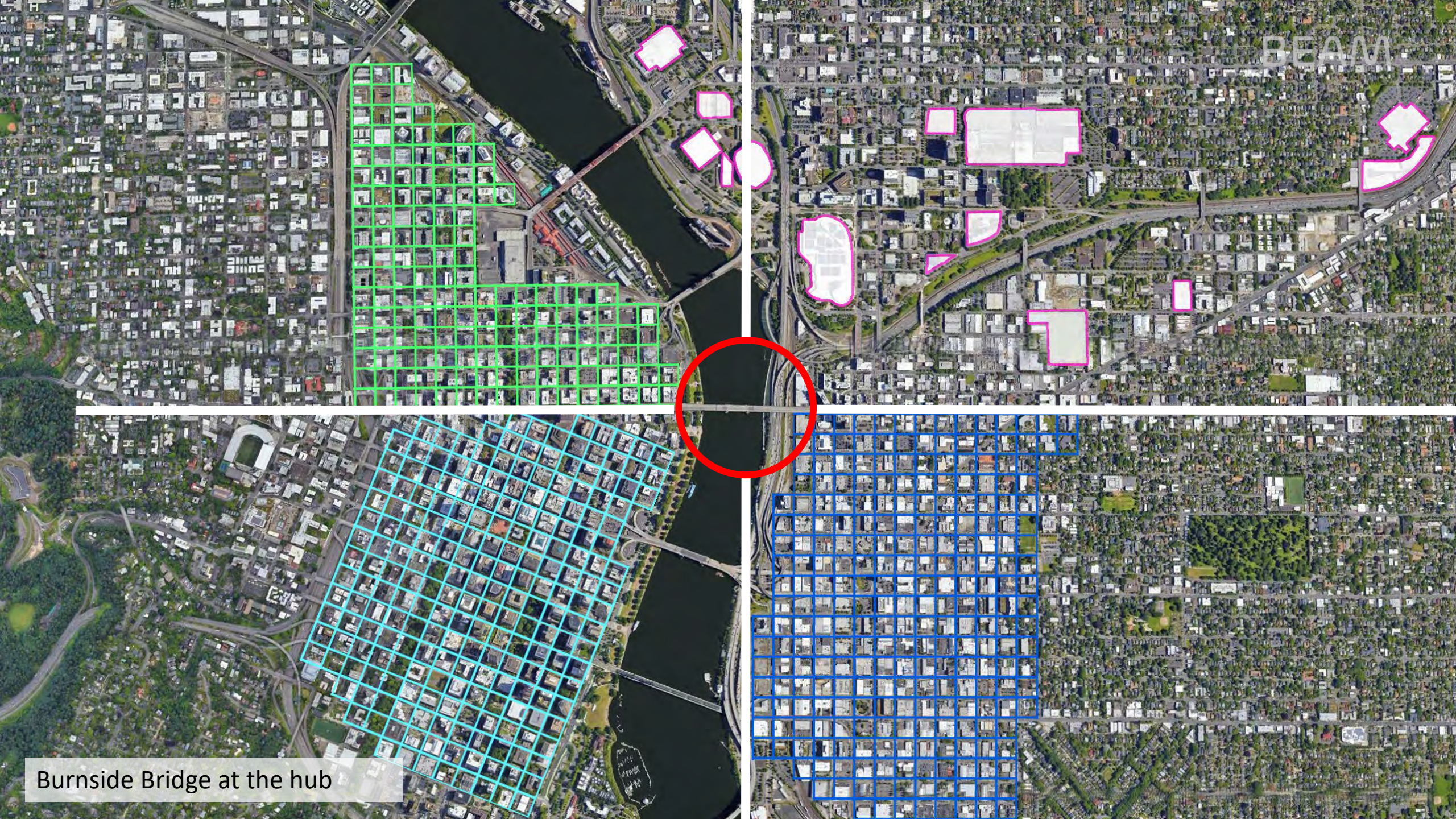
Central Portland

The long Burnside St axis

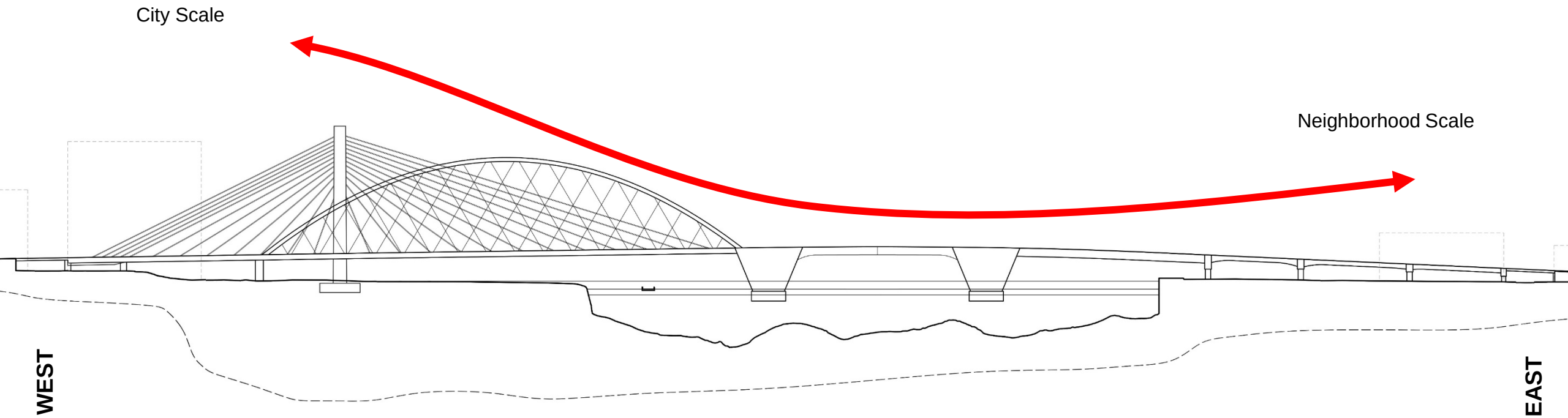

Street grid shift



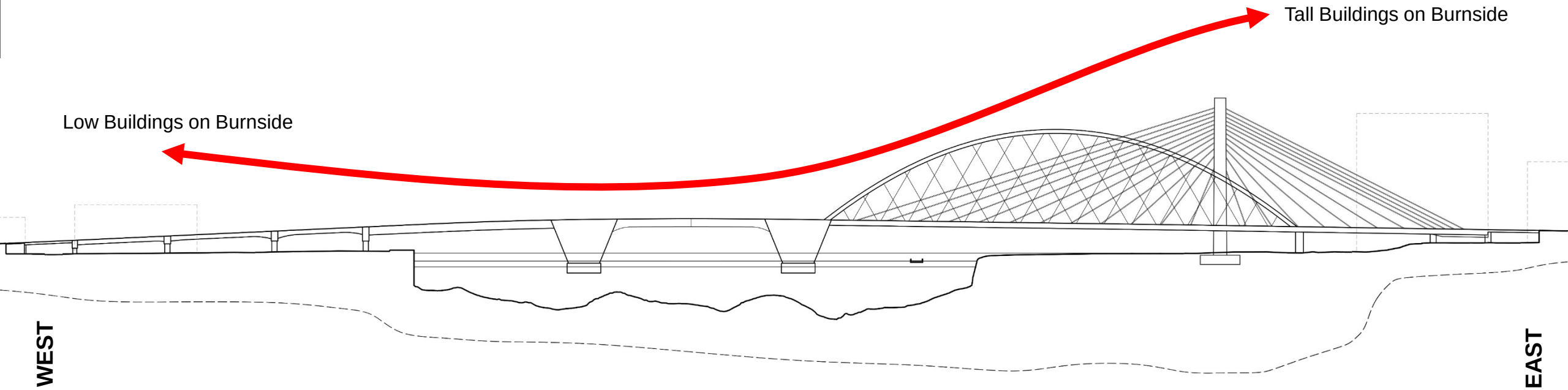
Grid and urban grain quarters


Burnside Bridge at the hub

Burnside Bridge Districts



East-west scale differential (City)



East-west scale differential (Burnside)

Implications of scale

Convenient bridge iconography

The unsellable T-shirt

View axes from bridge mid-spans

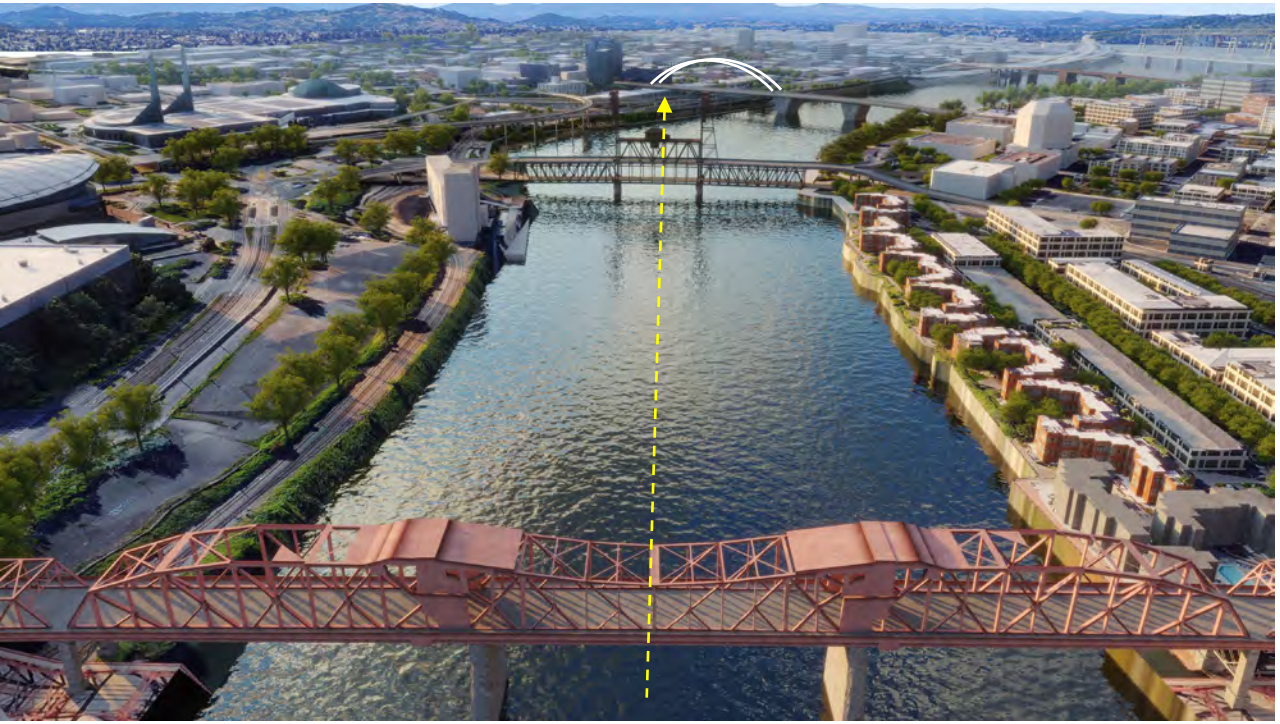
Bridge structures as part of urban tapestry

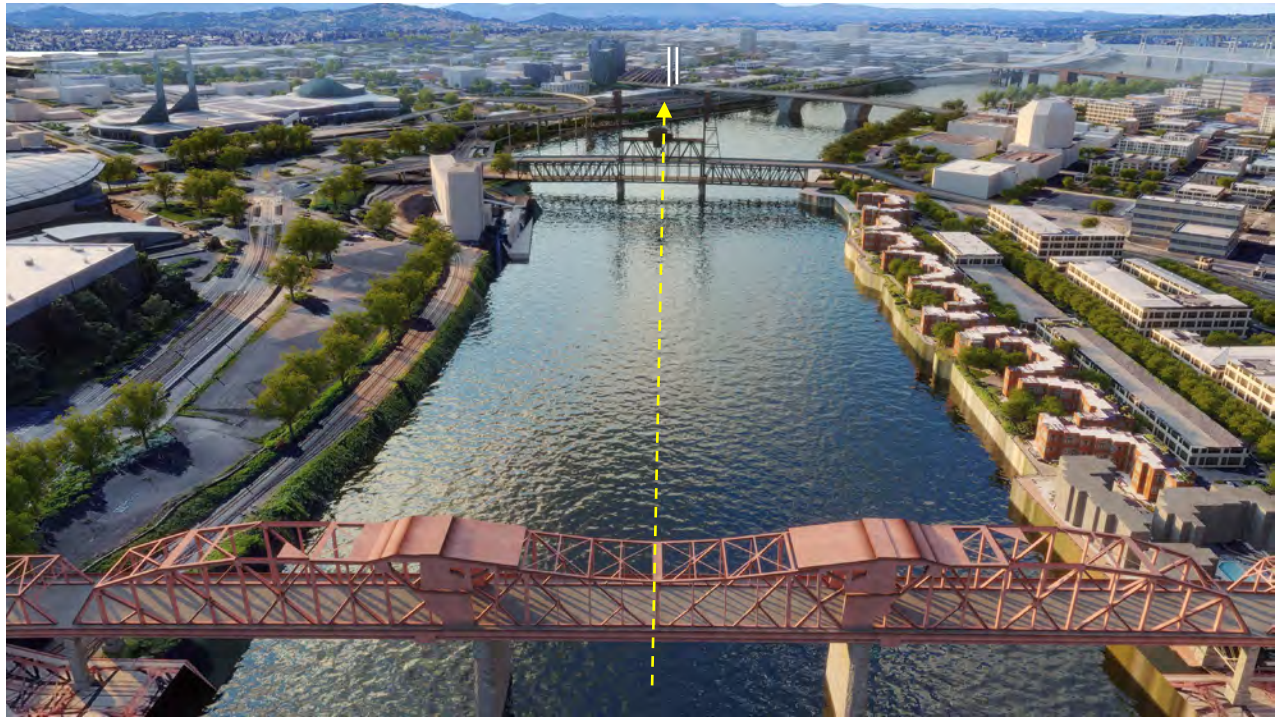
River view axis northwards

River view axis northwards

base case arch bridge and cable-stayed bridge comparison

River view axis southwards





River view axis southwards

base case arch bridge and cable-stayed bridge comparison

I-5 corridor view axis northwards

I-5 corridor view axis northwards

base case arch bridge and cable-stayed bridge comparison

I-5 corridor view axis southwards

I-5 corridor view axis southwards

base case arch bridge and cable-stayed bridge comparison

Burnside St. view axis westwards

BEAM architects

Visual conversation with the Big Pink

Burnside St. view axis eastwards

Burnside St. view axis eastwards –addressing the gap


Q
A