



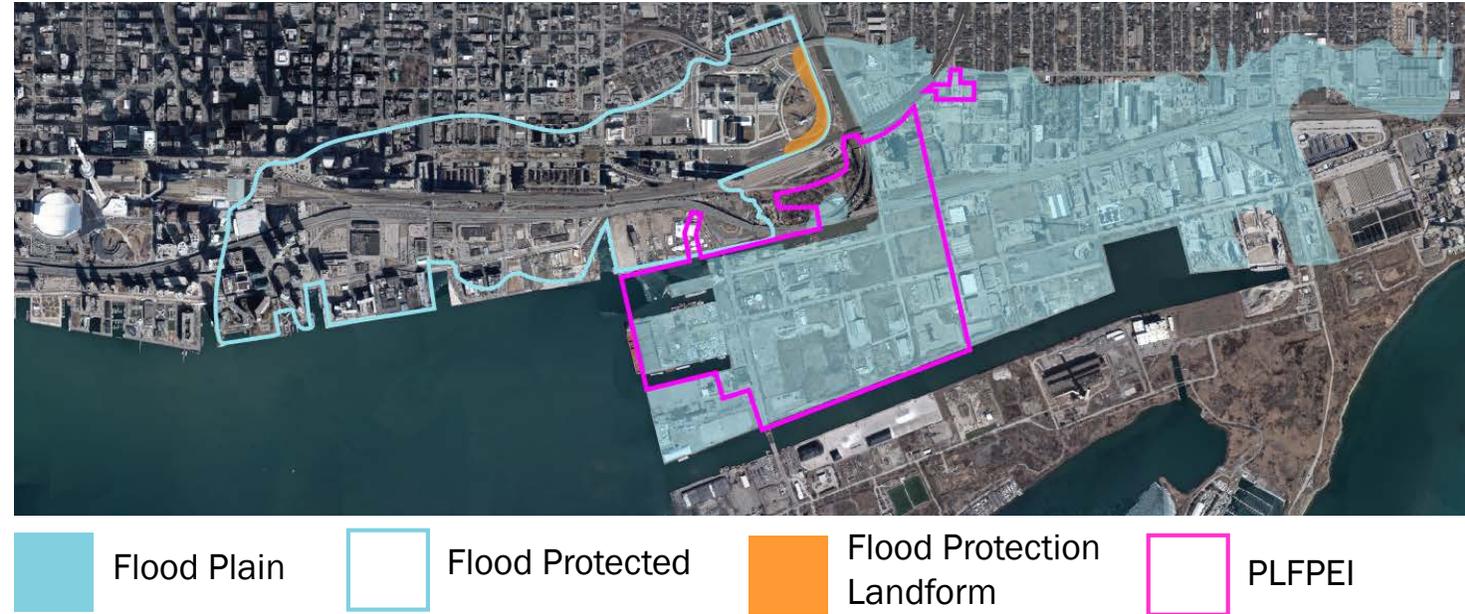
# Port Lands Flood Protection and Enabling Infrastructure: Bridges and Roads (Cherry Street)

Detailed Design

November 21, 2018

# Project Description and Background

- 290 hectares of southeastern downtown Toronto are at risk of flooding from the Don River watershed
- The Port Lands Flood Protection and Enabling Infrastructure Project is a comprehensive solution to flood protection
- The presentation will focus on:
  - PLFP Bridges
  - PLFP Roads - Cherry Street only



# What are we building?

- A** Cherry Street Stormwater and Lakefilling
- B** Polson Slip Naturalization
- C** Flood Protection - River Valley
- D** Don Greenway (Spillway & Wetland)
- E** Don Roadway Valley Wall Feature
- F** East Harbour Flood Protection Land Form
- G** Sediment and Debris Management Area
- H** Flow Control Weirs
- I** Eastern Avenue Flood Protection
- J** Villiers Island Grading
- K** Keating Channel Modifications
- L** Promontory Park South
- M** River Park
- N** Lake Shore Road and Rail Bridge Modifications
- O** Cherry Street Bridge North
- P** Cherry Street Bridge South
- Q** Commissioners Street Bridge
- R** Old Cherry Street Bridge Demolition
- S** Site Wide Municipal Infrastructure
- T** Don Roadway
- U** Hydro One Integration
- V** Commissioners Street
- W** Cherry Street Re-alignment

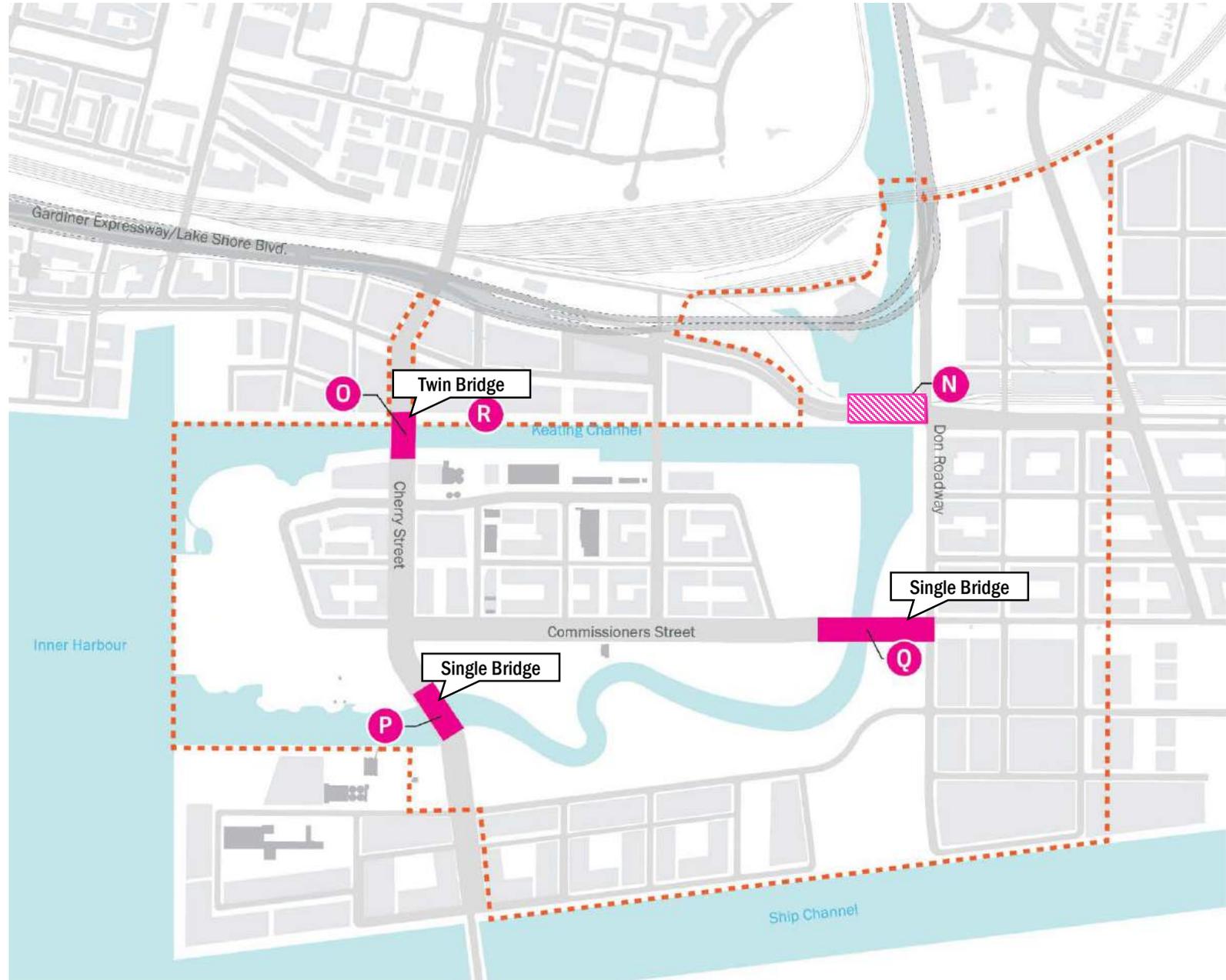
-  Port Lands Flood Protection and Enabling Infrastructure Boundary
-  Earthworks/Flood Protection
-  Parks
-  Bridges & Structures
-  Roads and Municipal Infrastructure



# Bridges and Structures

- A Cherry Street Stormwater and Lakefilling
- B Polson Slip Naturalization
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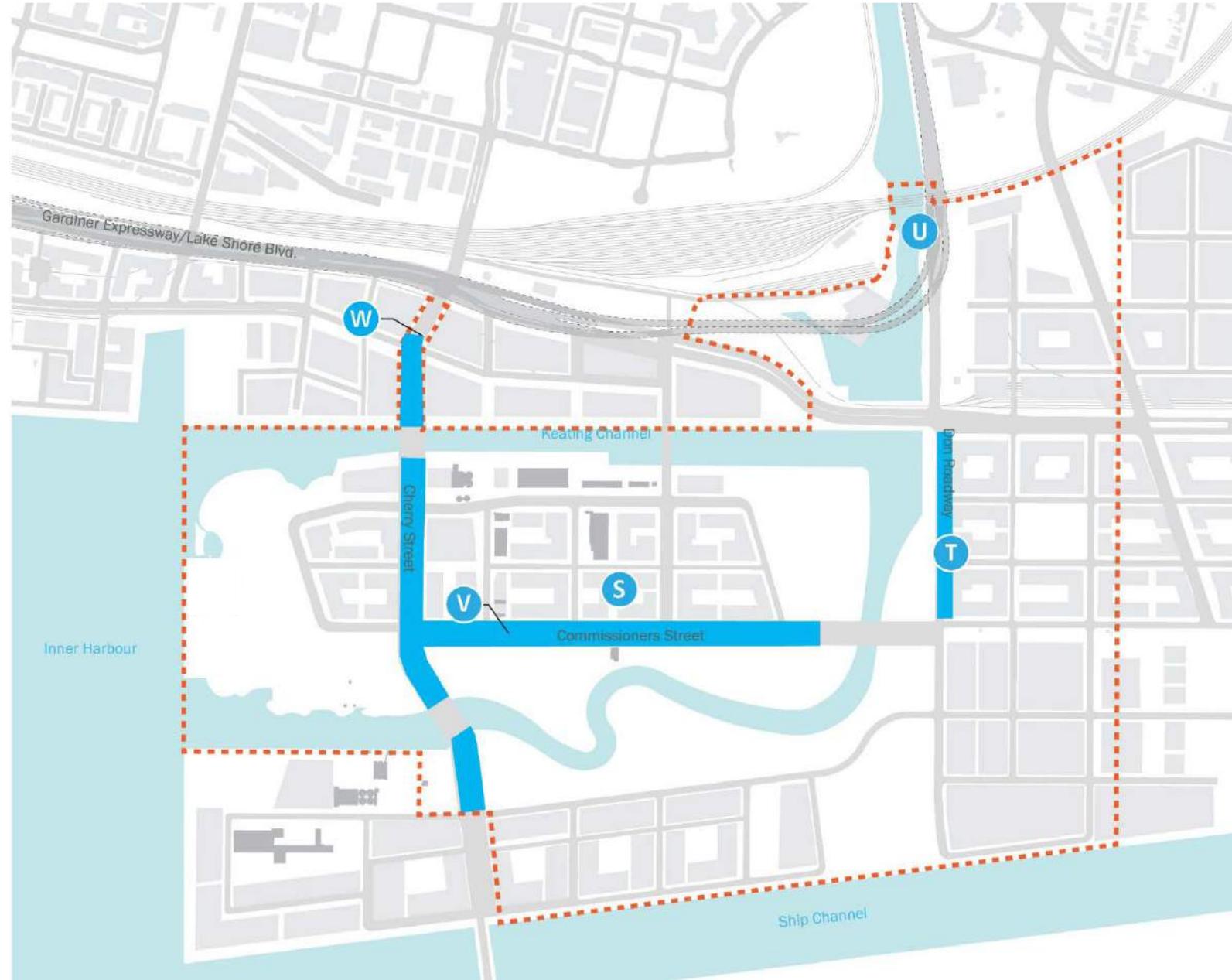
- Port Lands Flood Protection and Enabling Infrastructure Boundary
- Earthworks/Flood Protection
- Parks
- Bridges & Structures
- Roads and Municipal Infrastructure



# Roads and Municipal Services

- A Cherry Street Stormwater and Lakefilling
- B Polson Slip Naturalization
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- Port Lands Flood Protection and Enabling Infrastructure Boundary
- Earthworks/Flood Protection
- Parks
- Bridges & Structures
- Roads and Municipal Infrastructure



# Team Structure

## Parks, Flood Protection & River Valley

- All flood protection elements
- Park and wetland design
- Integration of all four streams

MVVA

## Roads and Municipal Infrastructure

- Public realm design
  - Cherry Street
  - Don Roadway
  - Commissioners Street
- All municipal services

WSP with DTAH

## Bridges

- Cherry Street North Bridge
- Cherry Street South Bridge
- Commissioners Street Bridge
- Lake Shore Bridge
- Integration with roads and municipal services

Entuitive with Grimshaw & SBP

## Environmental

- Environmental permits
- Baseline environmental information and modeling
- Soil and groundwater remediation and risk management design
- Environmental monitoring plans

Jacobs (CH2M)

# Policy Context – Central Waterfront Secondary Plan

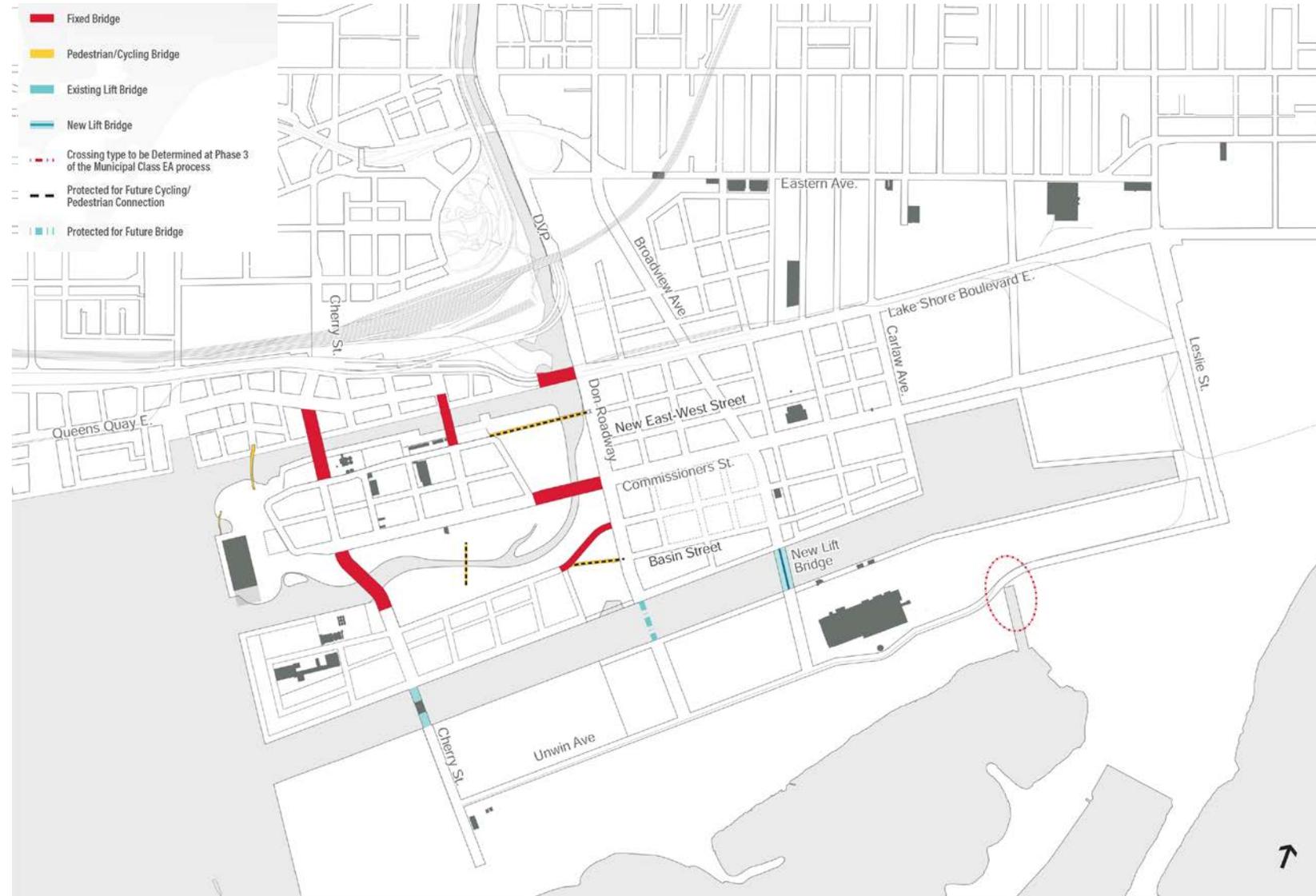
C21\_The mouth of the Don River will be rerouted through lands south of the rail corridor. This will improve the ecological function of the river, provide flood protection for the Port Lands and East Bayfront and attract new wildlife to the area. The renaturalized mouth of the river will also become a key open space and recreational link to the Don Valley, West Don Lands, Port Lands and waterfront park system. This enhanced river setting will provide a gateway to the new urban communities in the Port Lands. Pedestrian and cyclist's bridges over the river mouth will be designed as signature entrances of beauty and inspiration

(P28) Lakefilling will be considered only for stabilizing shorelines, improving open spaces, creating trail connections, preventing siltation and improving natural habitats and is subject to Provincial and Federal Environmental Assessment processes. Consideration will be given to the impact of such lakefilling on recreational uses.

D22\_OPENING UP THE PORT LANDS TO URBAN DEVELOPMENT - The vast Port Lands, an area more than 14 times the size of London's Canary Wharf, will be cleaned up and opened to a range of urban development opportunities. The Port Lands will become Toronto's springboard to the future, a place for wealth creation, originality and creativity in all aspects of living, working and having fun. The Port Lands will be transformed into a number of new urban districts set amid the hustle and bustle of Toronto's port activities. An enticing environment conducive to the creation of an international Centre for Creativity and Innovation for knowledge-based industries, film and new media activities will be nurtured. It will be a part of the city where "green" industries can be incubated and thrive. The new Port districts will be supported by a rich infrastructure of recreational, cultural and tourist amenities.

# Port Lands Framework Plan: Bridges

- Bridges will be important elements of the overall transportation system, providing connection across the Port Lands' many utilitarian and naturalized waterways.
- The bridges will reflect appropriate levels of utility and design excellence to complement the unique characteristics and qualities of the accompanying river and park system.
- Space will be provided to accommodate dedicated higher order transit lanes on Cherry Street and Commissioners Street and within the new bridge across the river at Cherry Street.



# Port Lands Framework Plan - Roads

### Complete Street Principles



**Transit Prioritization** through the use of dedicated transit rights-of-ways will improve the reliability of transit routes and convenience for passengers.



**Bicycle Lanes + Cycle Tracks** provided on all major streets will create a well-connected, robust and safe cycling network enabling active transportation as a primary means of moving in and through the area.



**Accommodation of Goods Movement** to ensure the continued economic vitality of live-industry. Critical goods movement corridors will be designed with suitable conditions for truck access balanced with other complete street objectives.



**Permeable Surfaces** for roadways and sidewalks will reduce flooding, preserve capacity in storm drains and sewers where provided and add visual interest in the overall street design.



**Pedestrian + Cycling Amenities** are important elements to be considered in the design of streets and encourage people to be on our streets. Benches, bike rings, pedestrian-scaled lighting, weather protection, garbage and recycling receptacles and public art, among others, will be provided.



**Minimum Lane Widths** will assist in making streets safer and more pedestrian friendly. Narrower pavement widths contribute to safer vehicle speeds.



**Wide Sidewalks** with unobstructed, accessible pedestrian clearways will encourage walking and contribute to the overall vibrancy of in the Port Lands and South of Eastern public realm.



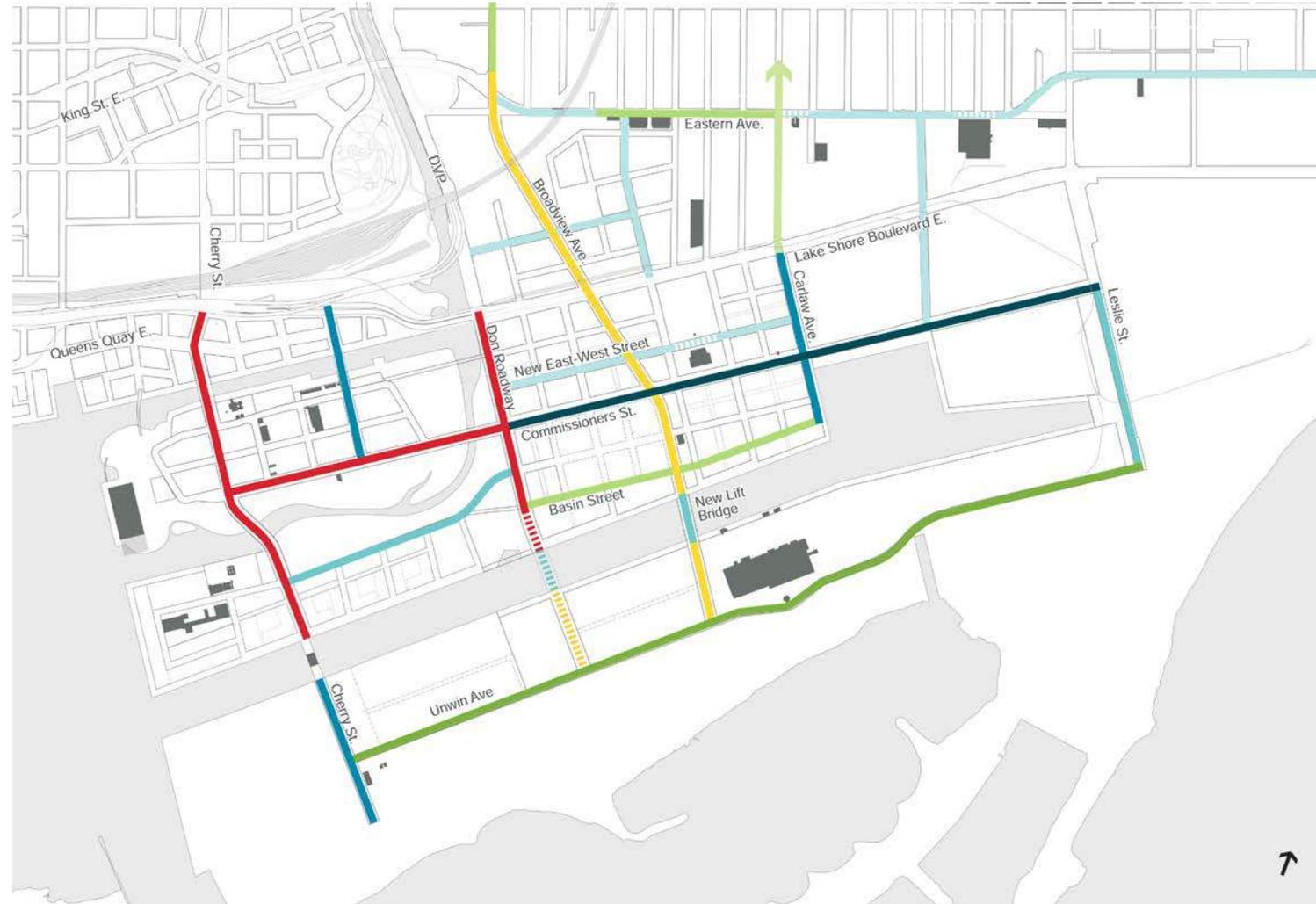
**Water as a Community Resource** and other greenscape elements will divert stormwater and allow for infiltration while also improving air quality, providing habitat and adding visual interest to an area. Streets celebrate and embrace stormwater as a valuable resource and provide access for LIFE!



**Street Trees** with adequate room to grow and high-quality soil conditions provide shade, beauty and wildlife habitat. They also reduce air pollution and energy consumption.



**Innovative Features** such as the port / industrial / infrastructural qualities of the study area will contribute to the character of the area. Other features like electric vehicle charging stations, bicycle and car sharing stations and renewable energy features will contribute to a sustainable future for the area.



## Recap

### Roads – September 26:

- The streets require a stronger identity, whether it be through planting or materials.
- Recapture the industrial heritage of the site back into the revised road design
- Ensure that the pedestrian and bicycle lanes have adequate separation
- Consider making pedestrian connections into the river valley at the termination of each north-south street
- The left hand turning lane on Commissioners requires further thinking. Ensure that the configuration is straightforward.

### Bridges – July 25:

- Overall the Panel felt that this project is on the right track
- The design of the balustrades requires further refinement to maximize transparency while maintaining cohesiveness with the rest of the bridge design.
- Ensure that safety concerns are addressed, specifically with kids climbing on the arches.
- The design of the fins requires further thinking. They should be less prominent.
- Ensure that there are adequate ways of getting down to the river from the bridge level.
- Provide further detail on how the landscape relates to the bridges.
- Refine the piers and the treatment of the visible underside of the bridge

# Areas for Panel Consideration

## Bridges:

- The revised balustrade design
- The revised lighting strategy
- The proposed colour options
- The underside of the bridges

## Cherry Street:

- Consideration of the design team's effort to make visible the management of water within the streetscape
- Clarification of the planting scheme and what it seeks to achieve
- Strengthening of the individual identity of Cherry Street through materials and plant palette

DESIGN REVIEW PANEL  
21ST NOVEMBER 2018



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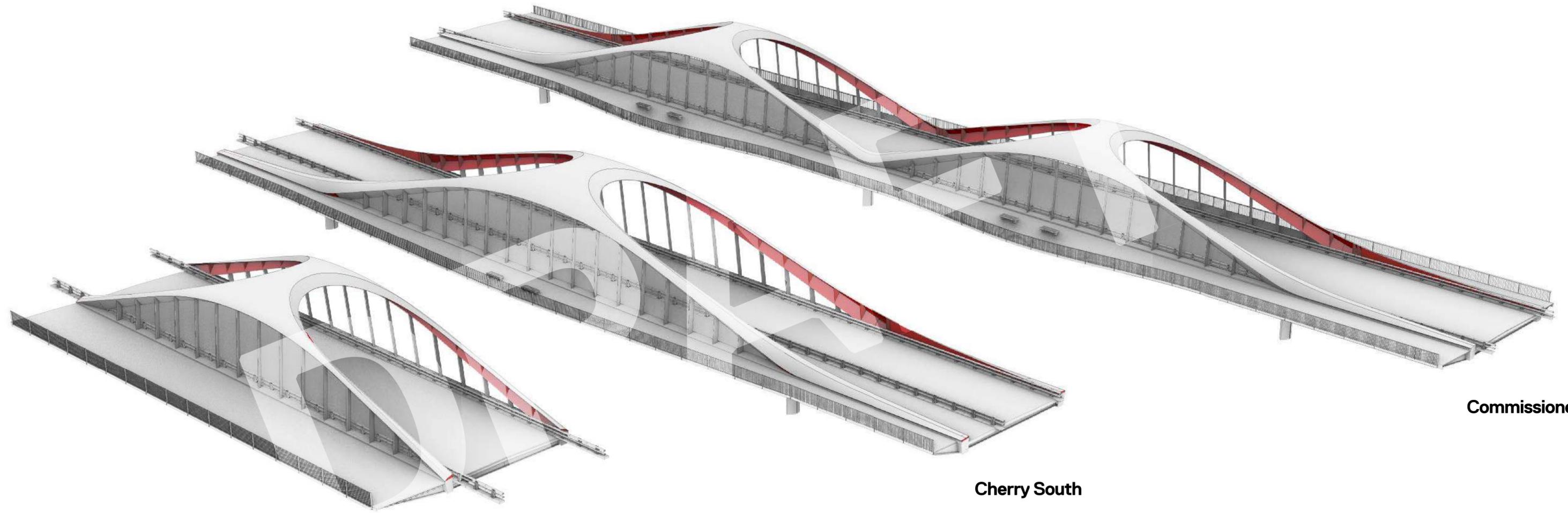
—Port Lands  
Bridges.

# Design Review Panel

## Feedback and Areas of Focus

- Overall the Panel felt that the bridges were on the right track
- Further develop the approach to the balustrades, refining the design to maximize transparency while maintaining cohesiveness with the rest of the bridge design
- Ensure that safety concerns are addressed, specifically with kids climbing on the arches
- Explore the potential refinement of the hanger design to ensure they are less prominent
- Investigate the opportunities to better connect the bridge and the park landscape
- Elaborate on how the bridges integrate into the landscape
- Focus on refining the piers and the explore different treatment options for the underside of the bridge

# Design Update Family of Bridges



**Cherry North**

**Cherry South**

**Commissioners**

# Design Update Family of Bridges



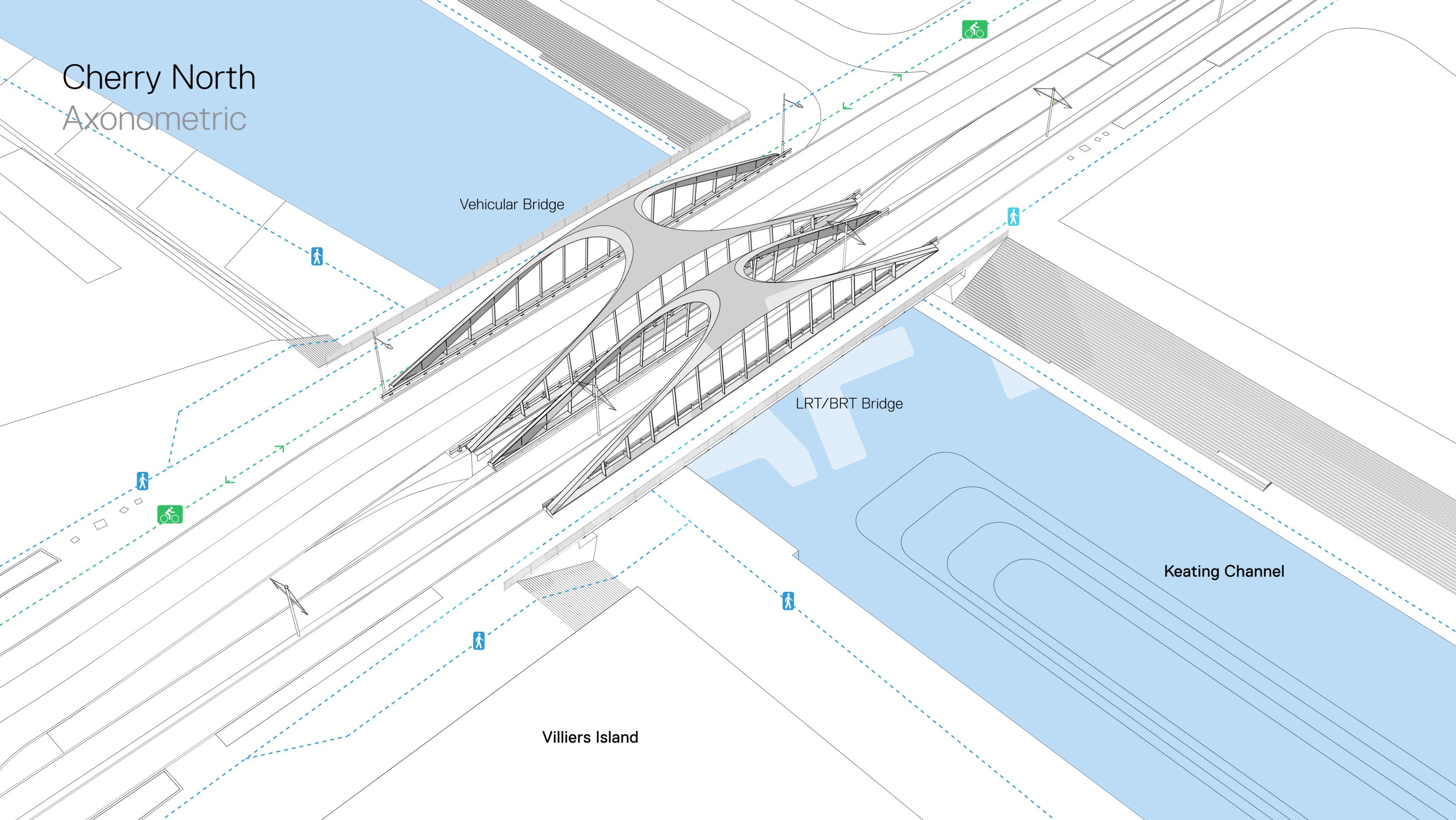
- 1. Cherry North
- 2. Cherry South
- 3. Commissioners

# Cherry North Bridge





# Cherry North Axonometric



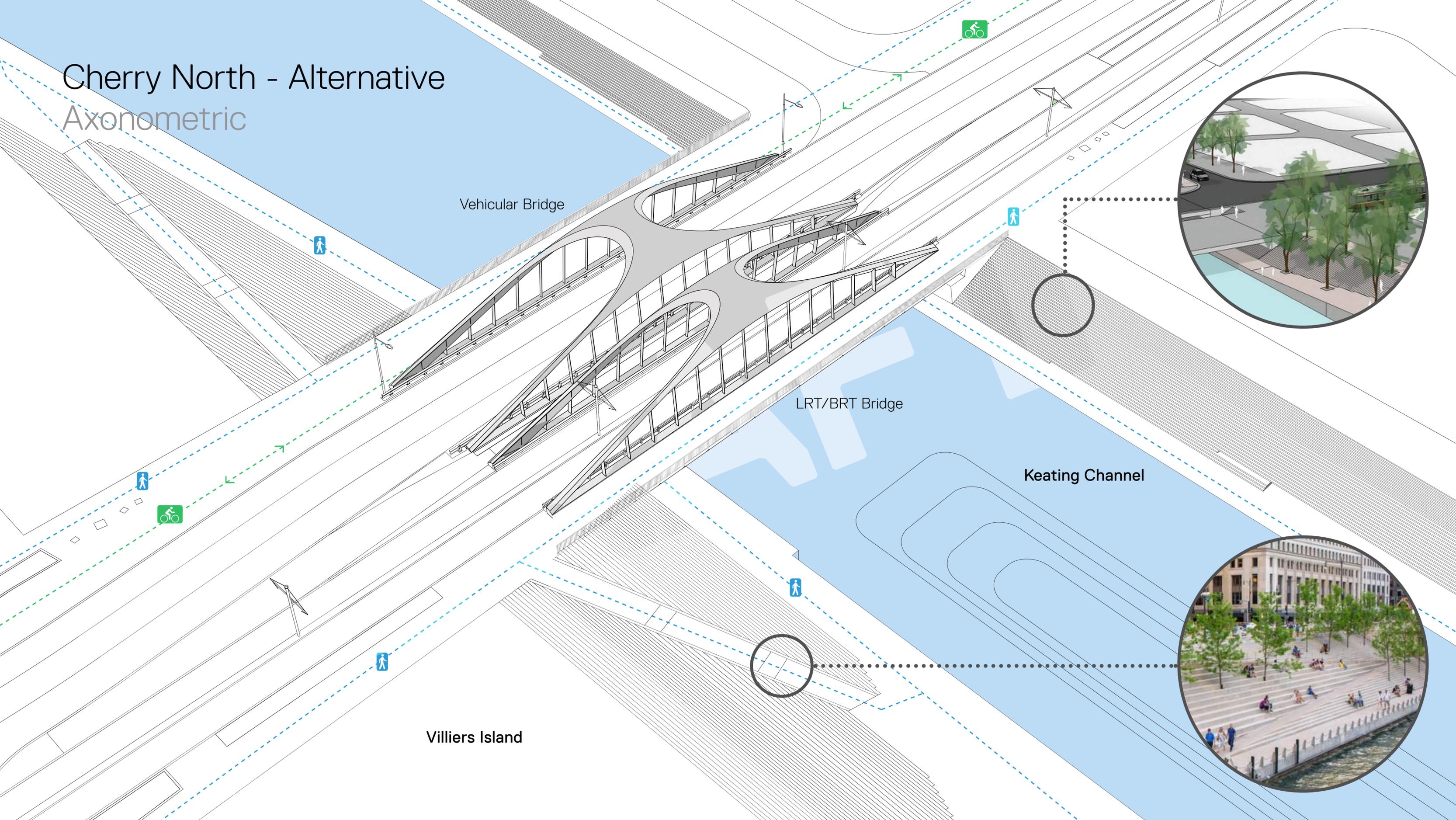
Vehicular Bridge

LRT/BRT Bridge

Keating Channel

Villiers Island

# Cherry North - Alternative Axonometric

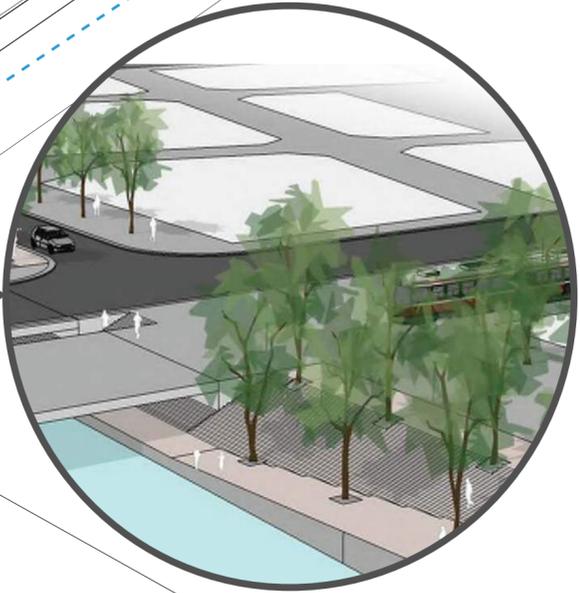


Vehicular Bridge

LRT/BRT Bridge

Keating Channel

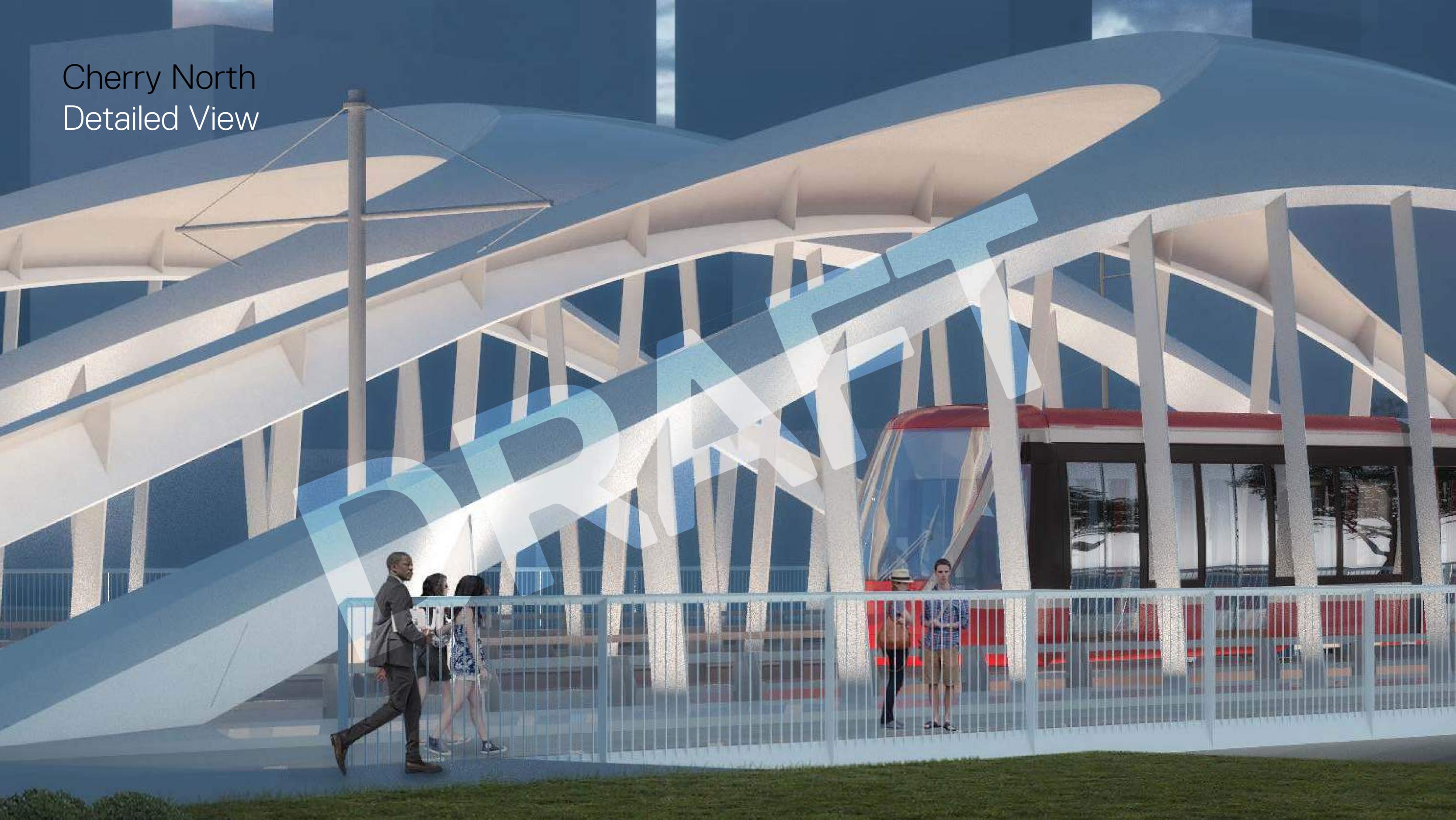
Villiers Island



Cherry North  
View from Keating Channel Promenade



Cherry North  
Detailed View

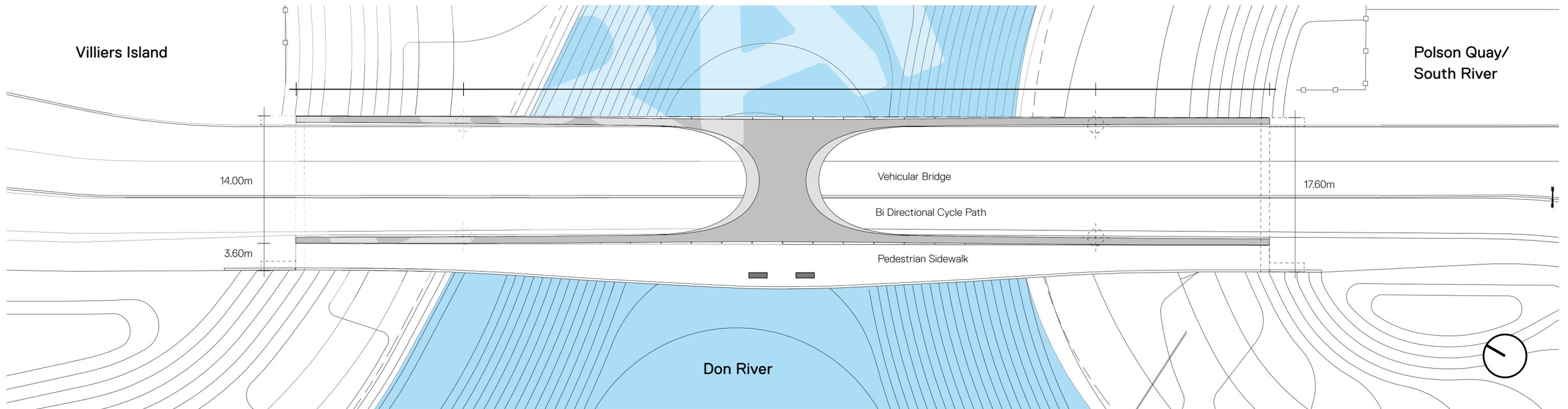
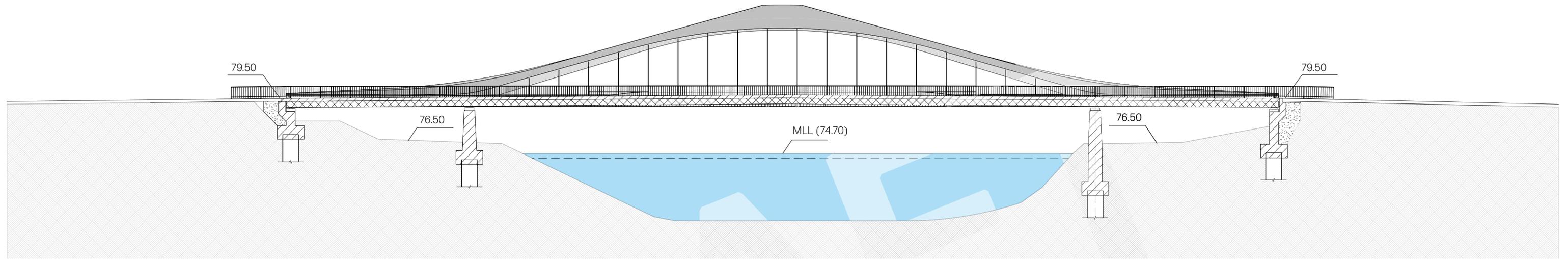


# Cherry South Bridge

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# Cherry South Plan & Elevation



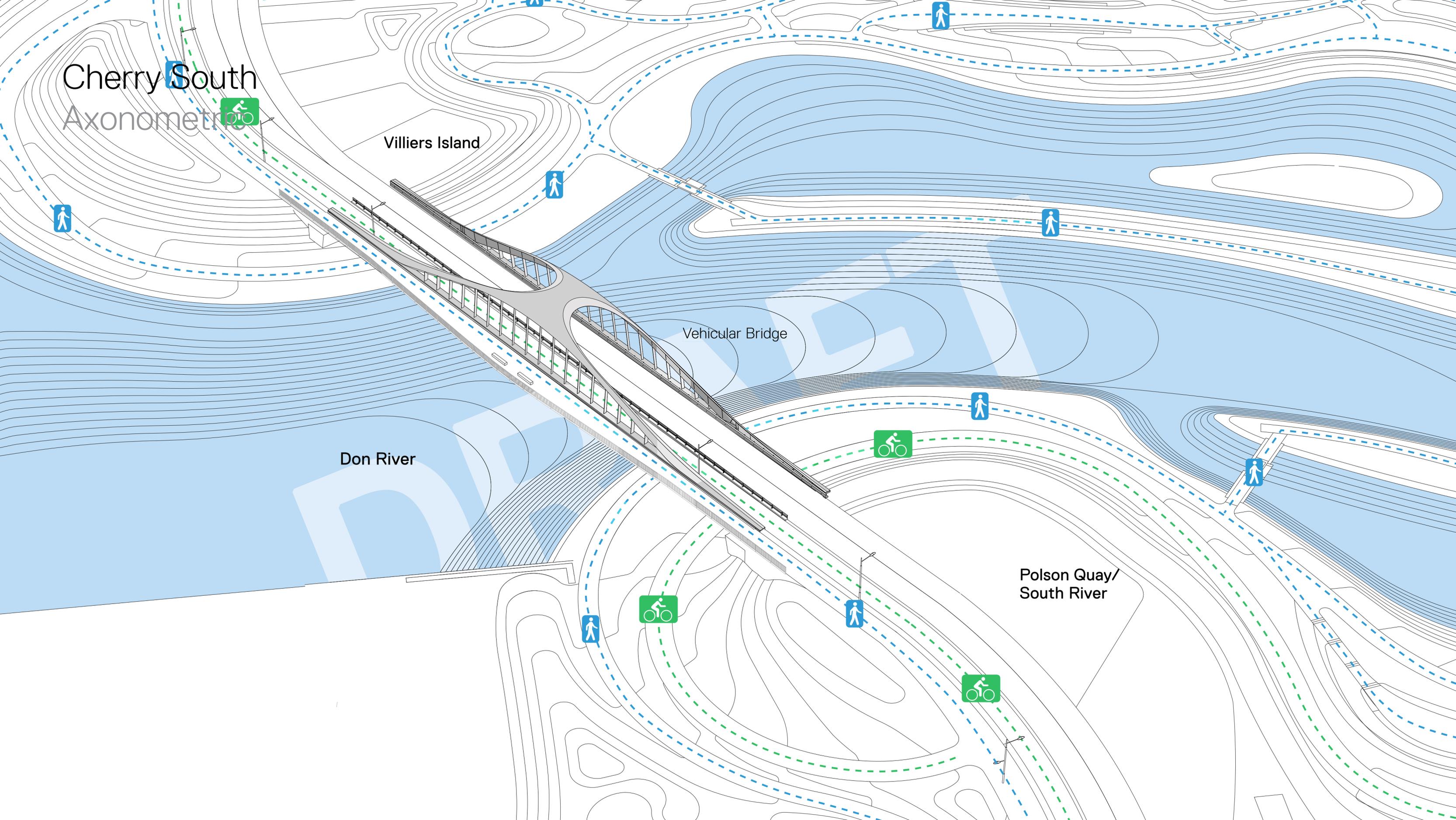
# Cherry South Axonometric

Villiers Island

Vehicular Bridge

Don River

Polson Quay/  
South River



Cherry South  
View from River Valley Park



Cherry South  
Detailed View

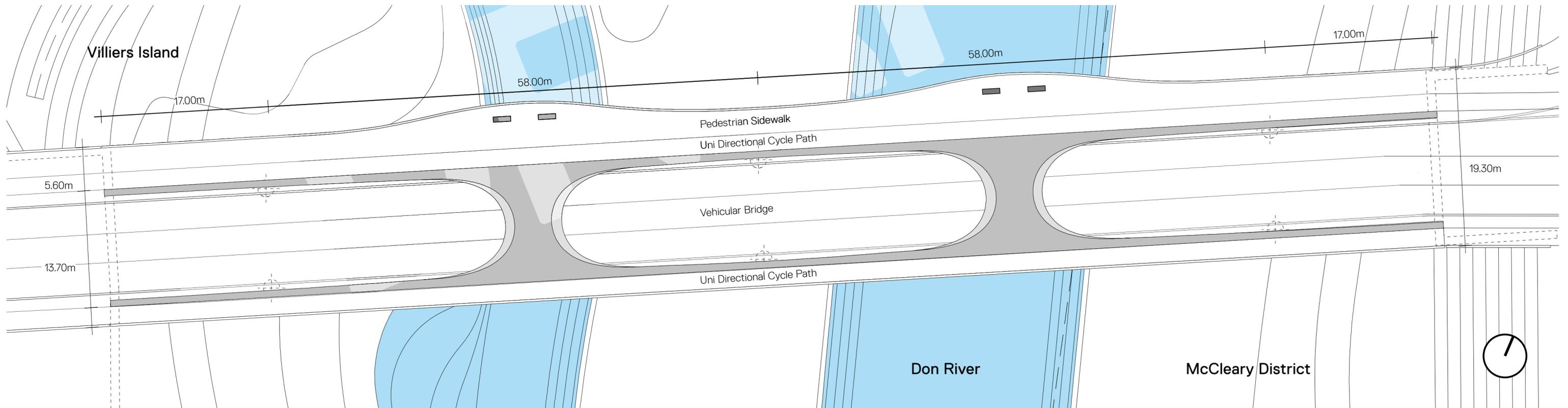
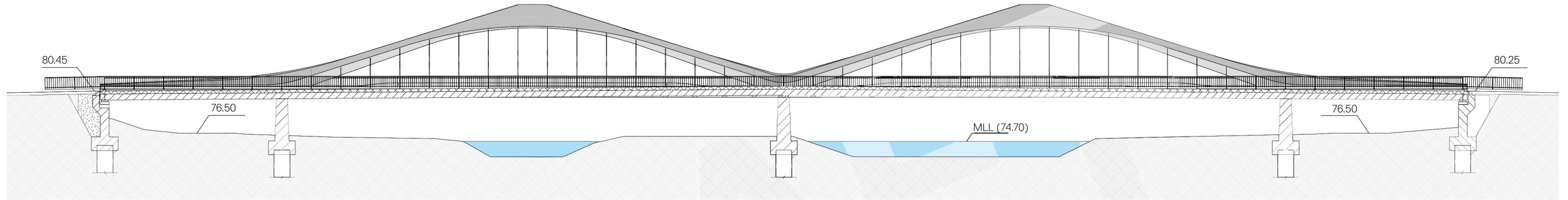


# Commissioners Bridge

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# Commissioners Plan & Elevation



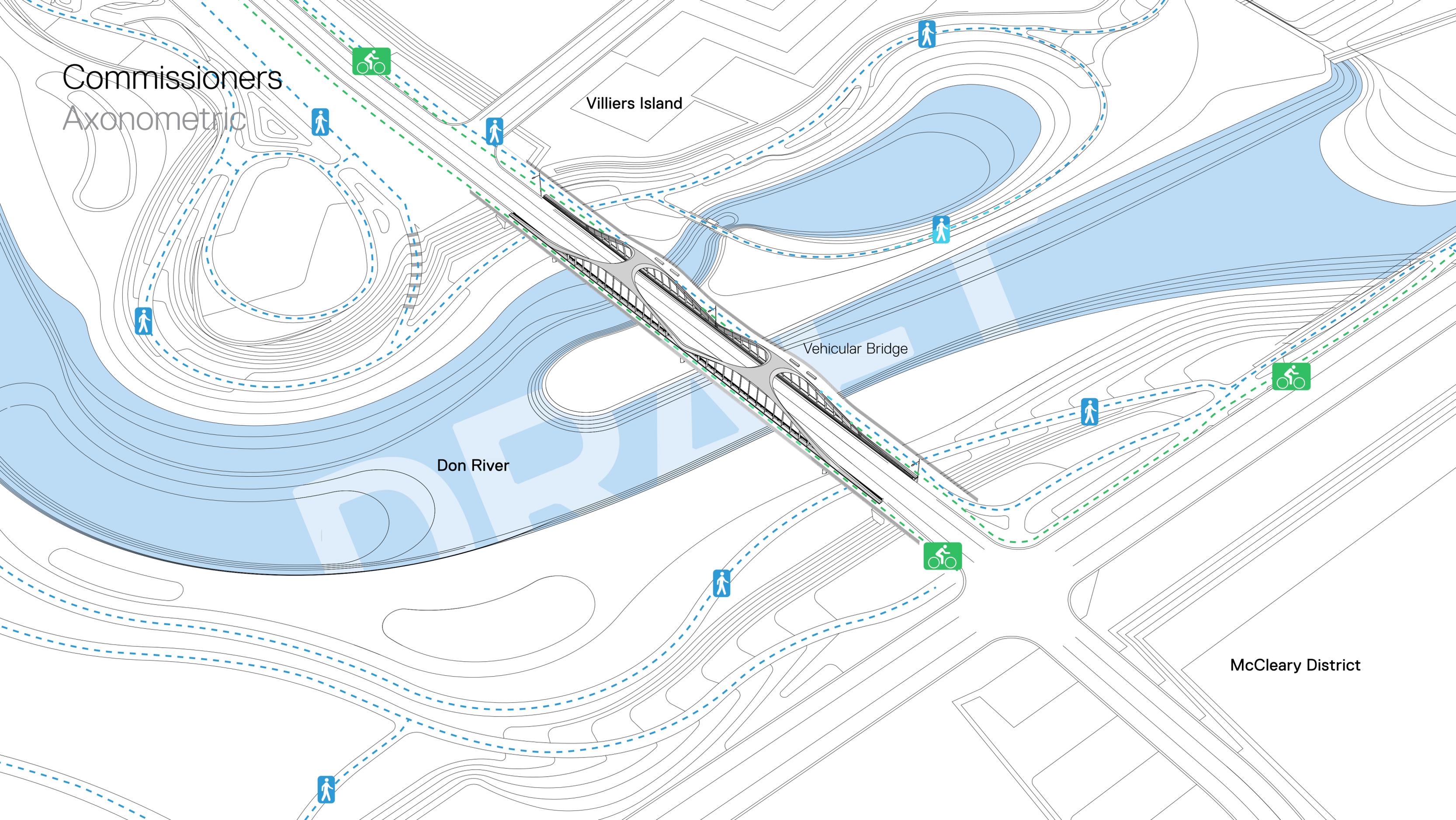
# Commissioners Axonometric

Villiers Island

Vehicular Bridge

Don River

McCleary District



Commissioners  
View from River Valley Park



Cherry South  
Detailed View



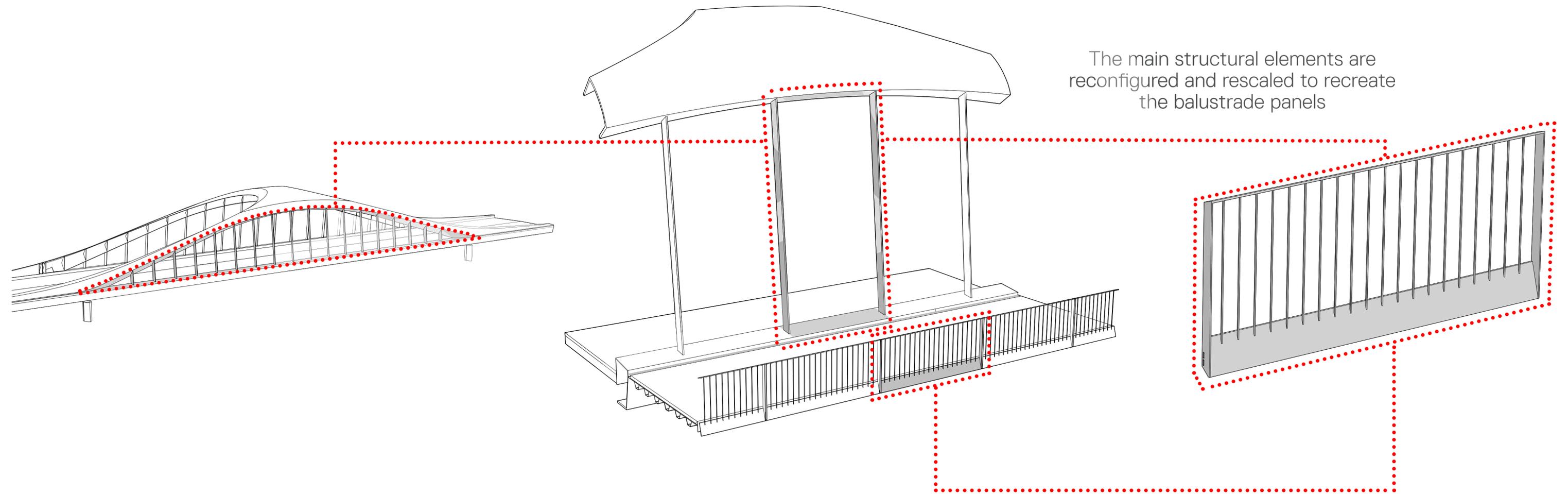


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**Design Details**

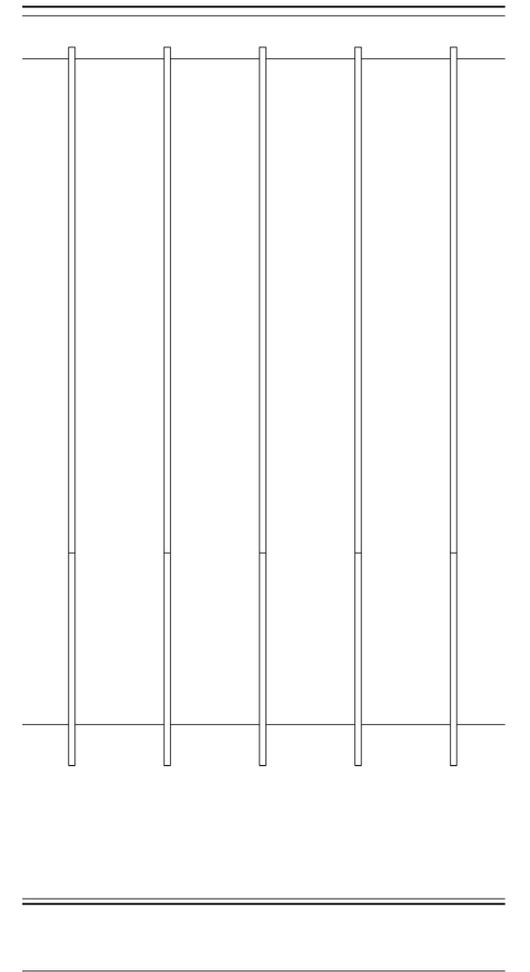
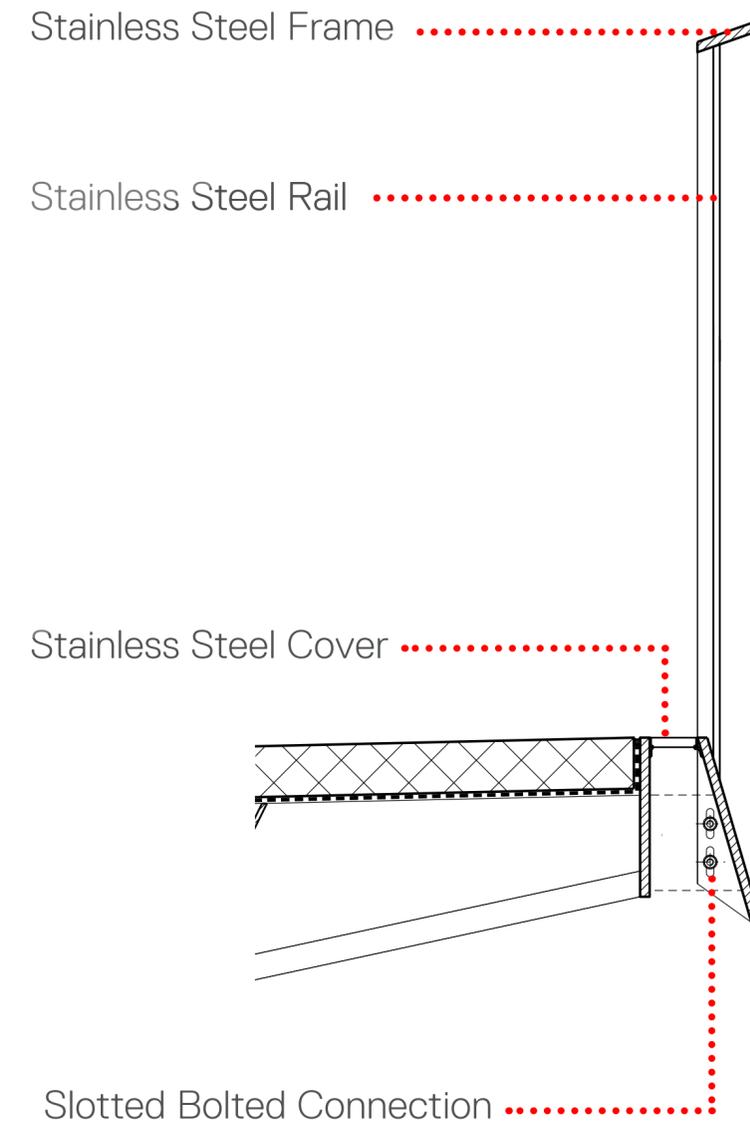
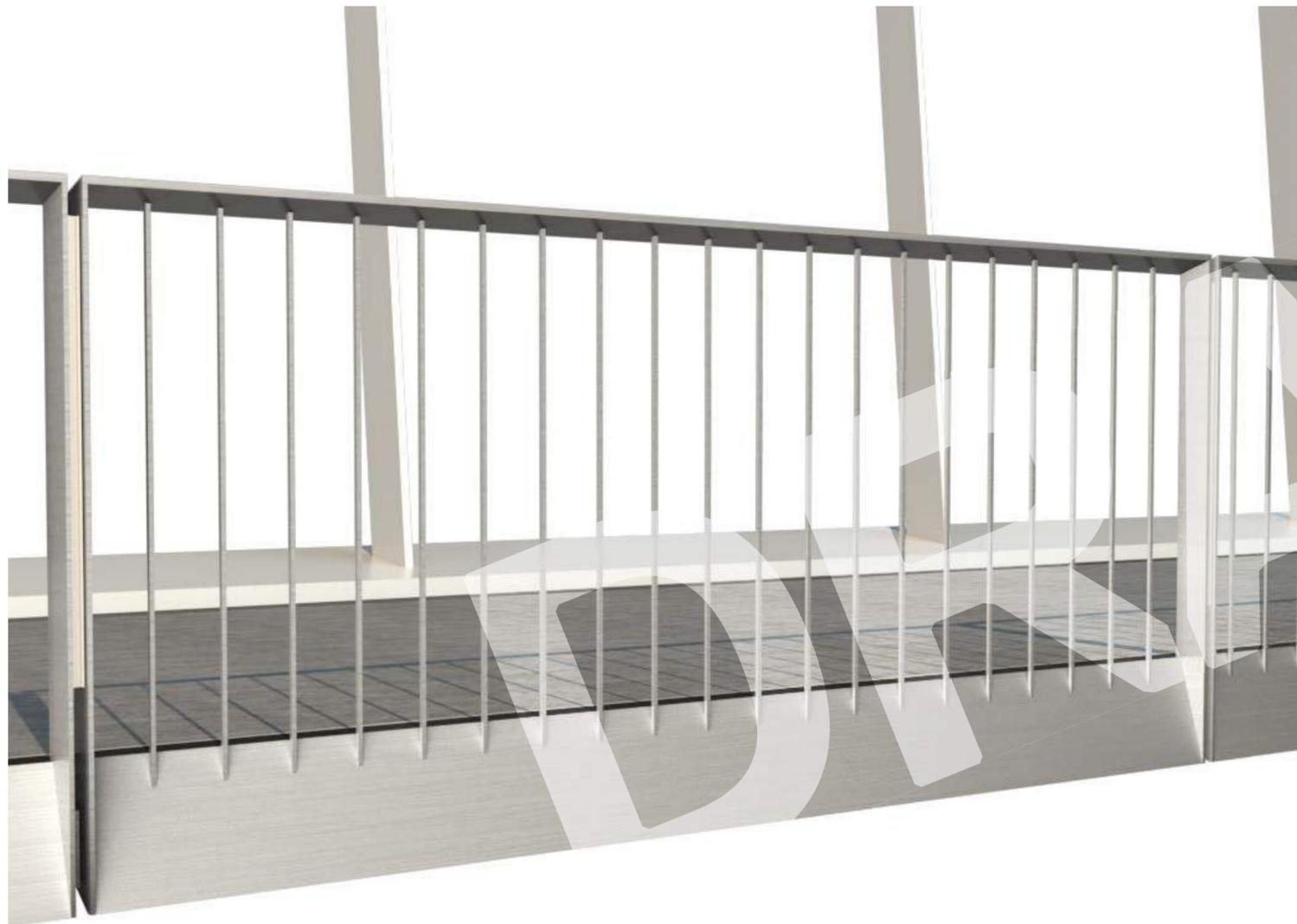
# Balustrade

## Design Approach



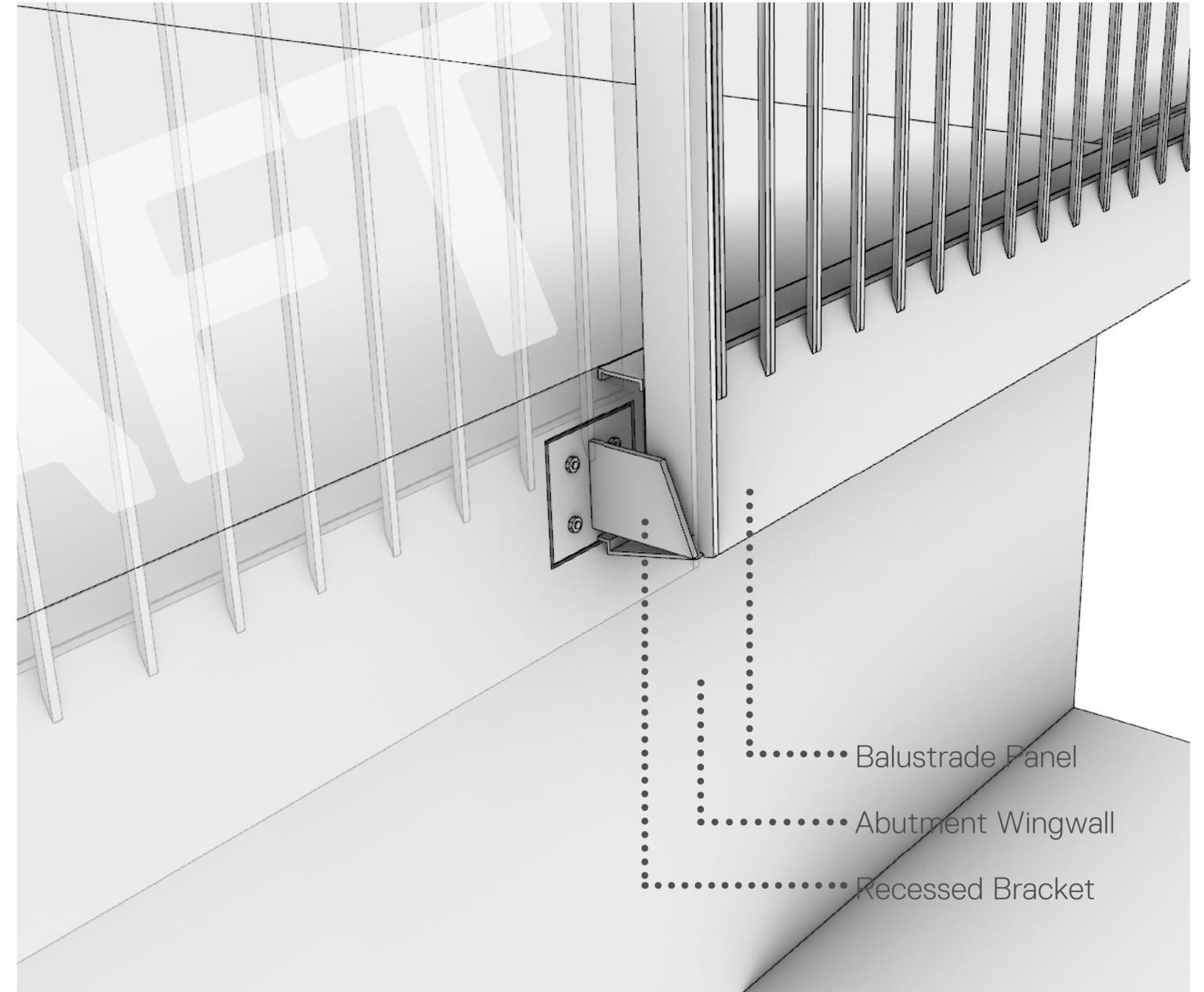
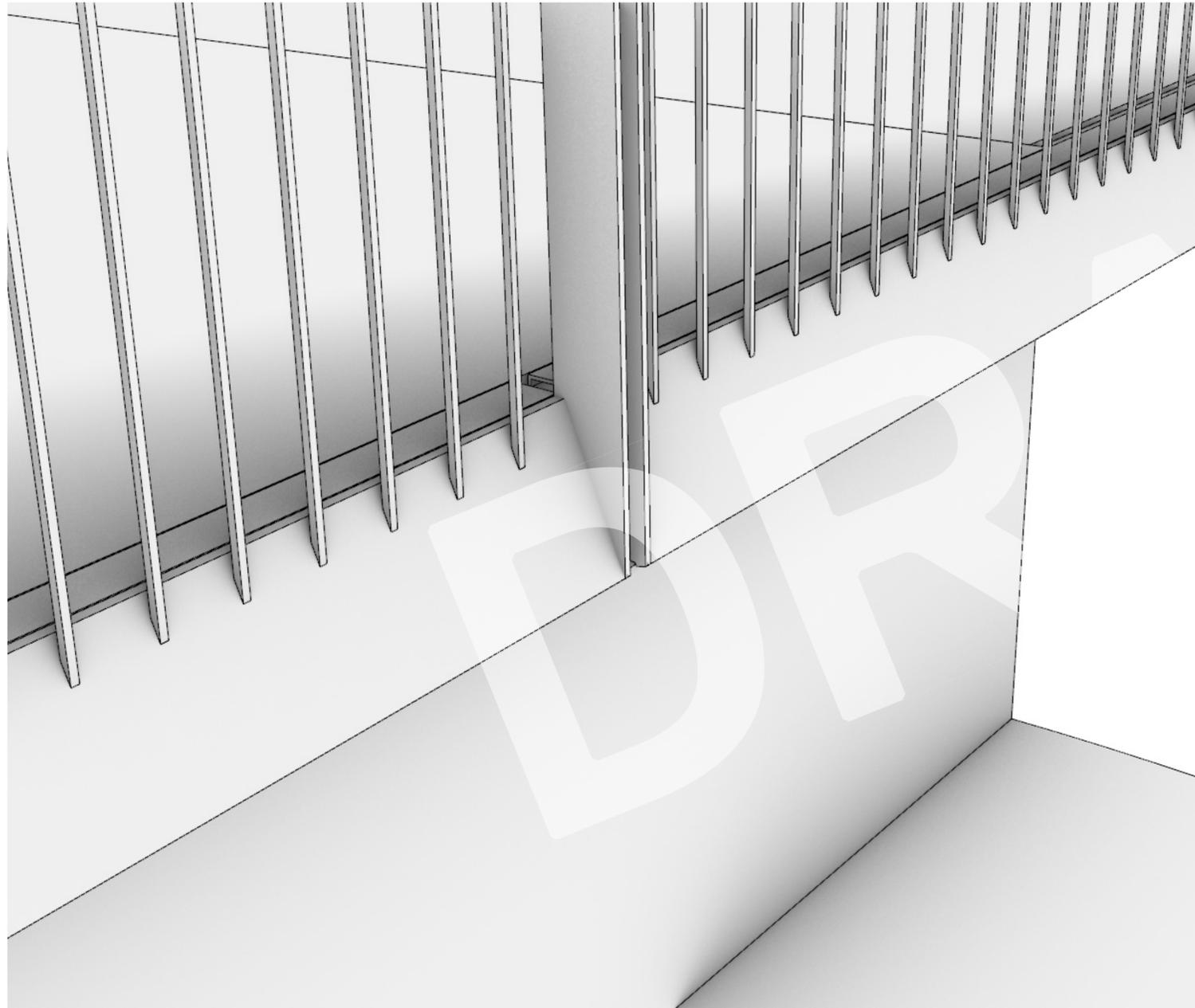
# Balustrade

## Design Details



# Balustrade

## Design Details - Abutments



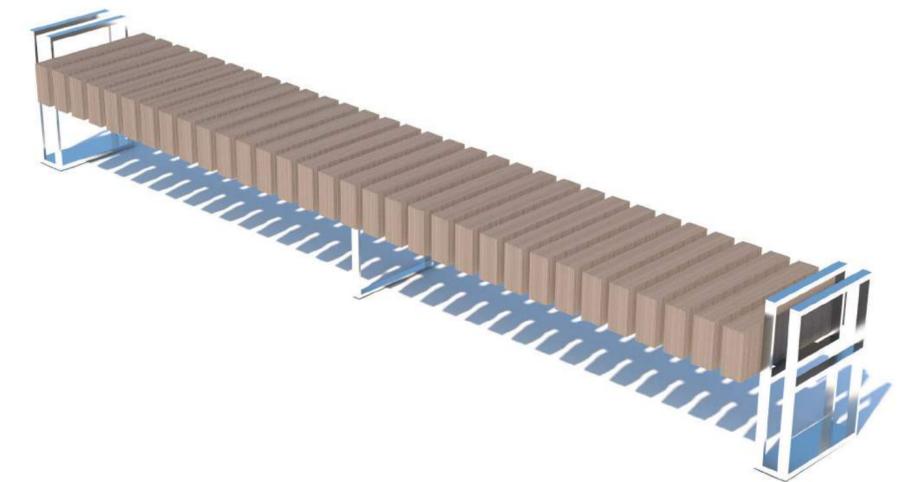
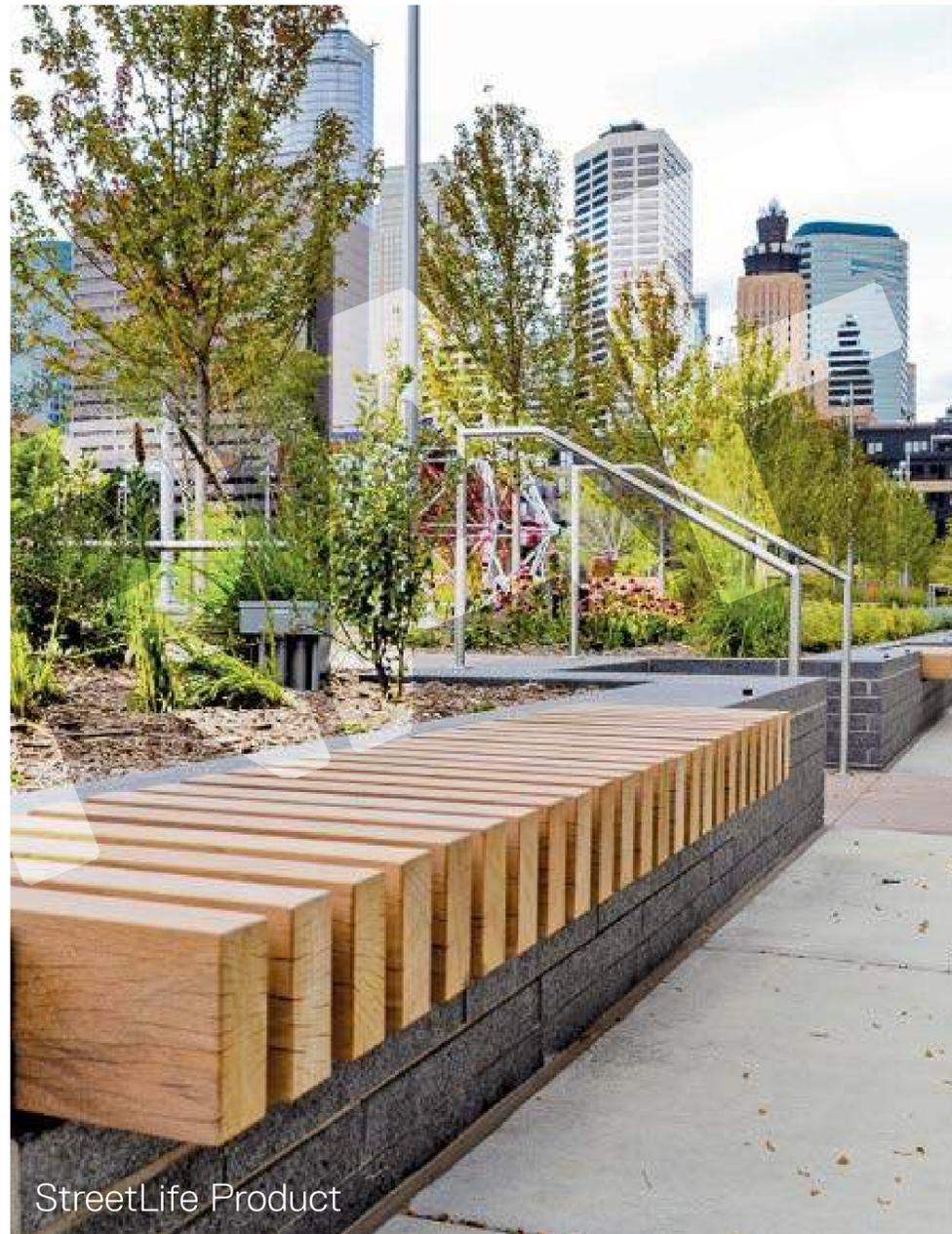
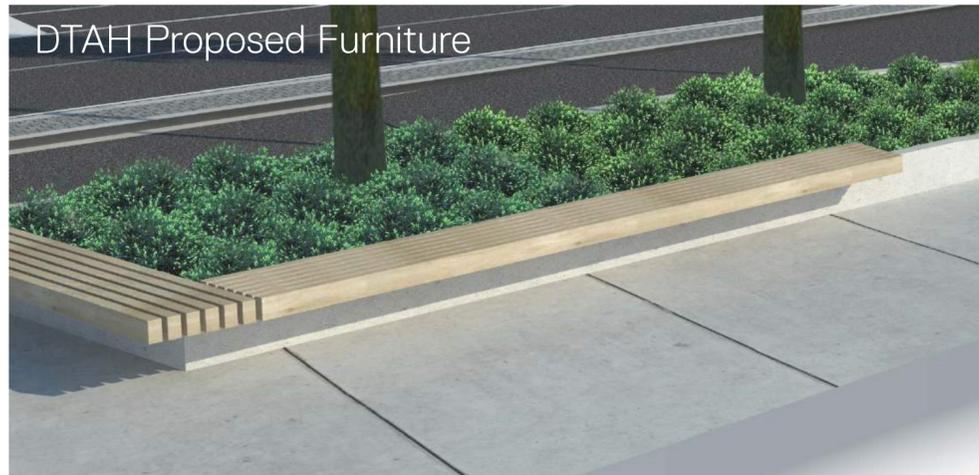
# Balustrade

## Design Details



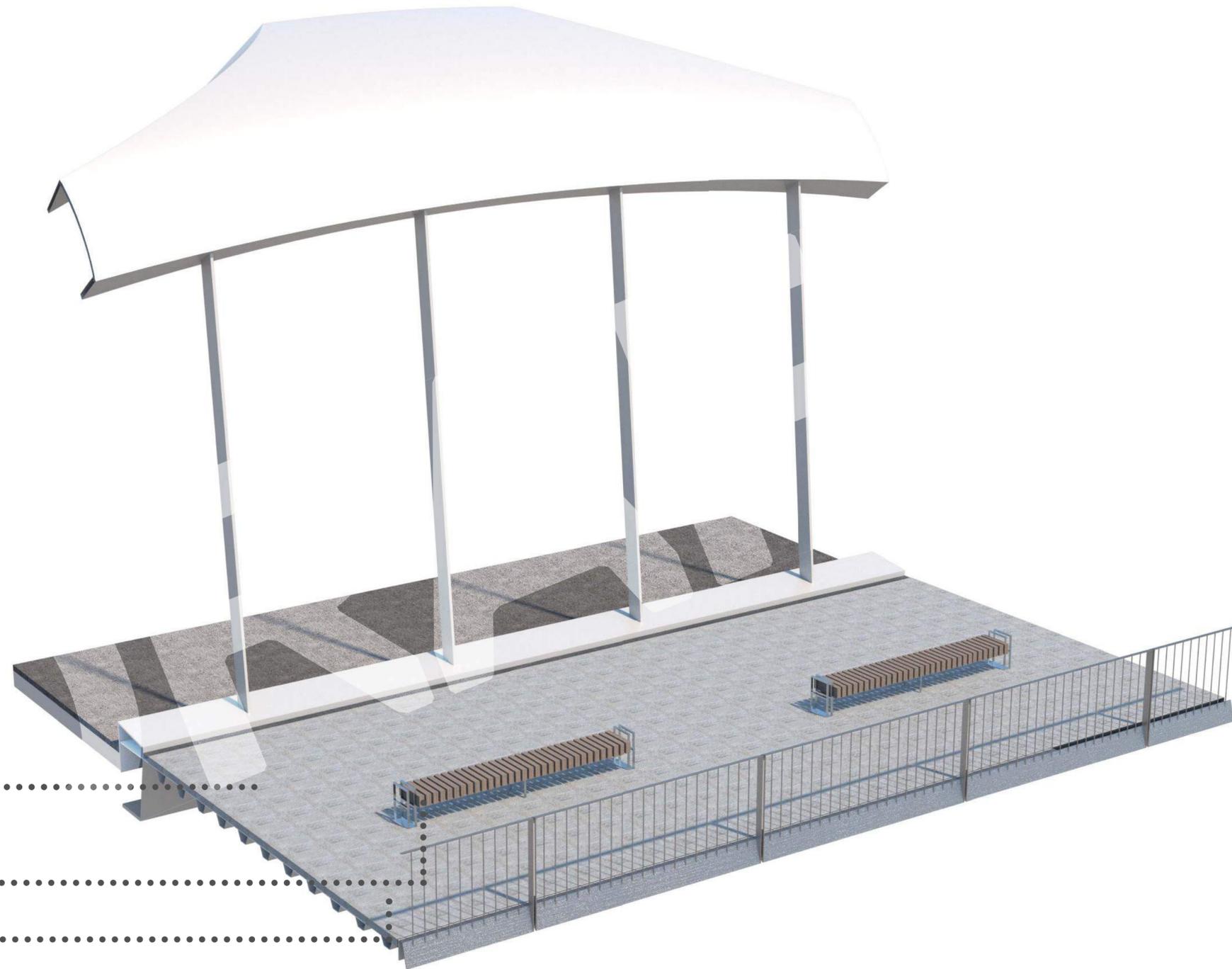
# Furniture

## Design Approach - Existing/Proposed Inventory



StreetLife 'Crosswire' with custom stainless steel supports

# Furniture Design Approach

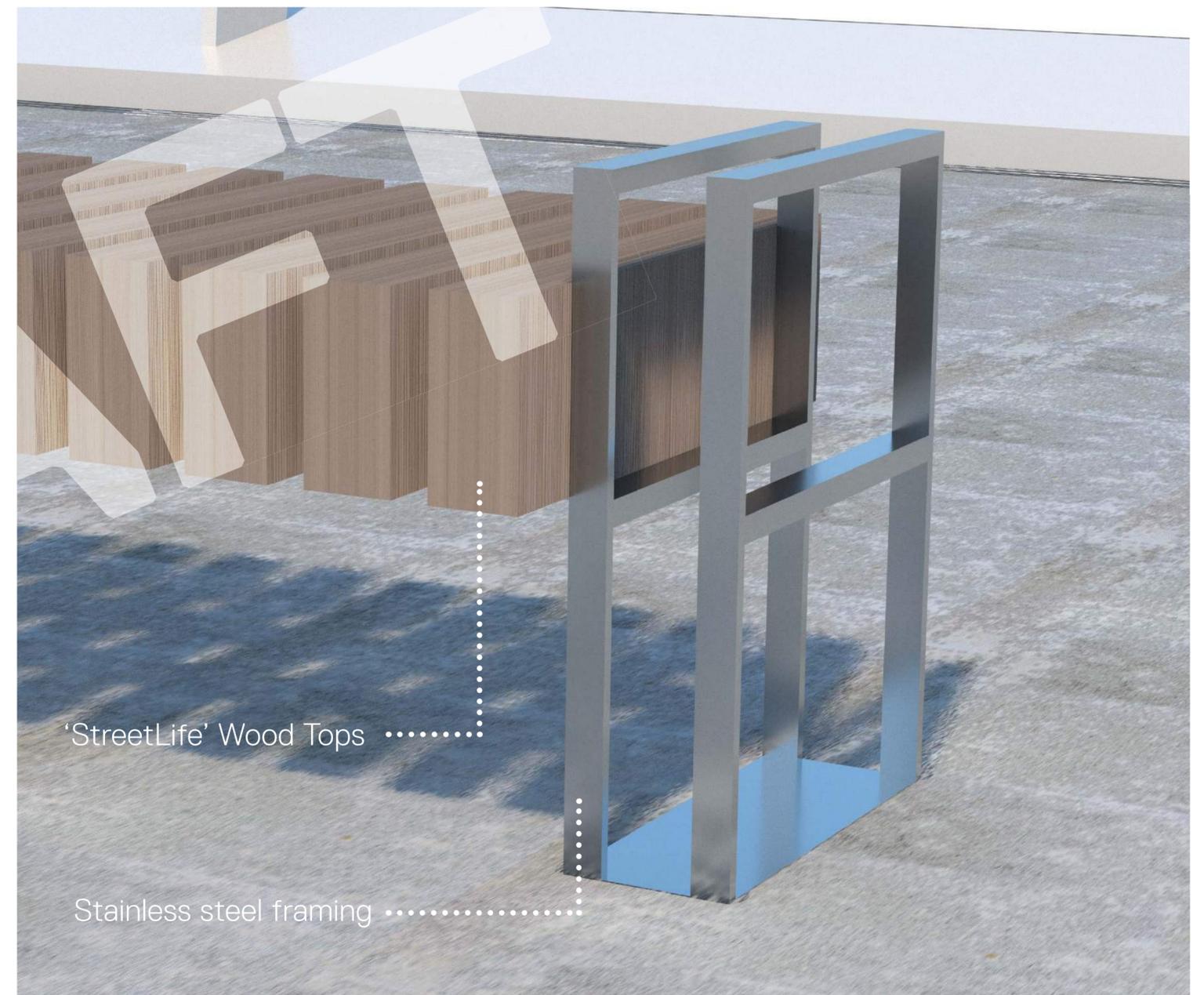
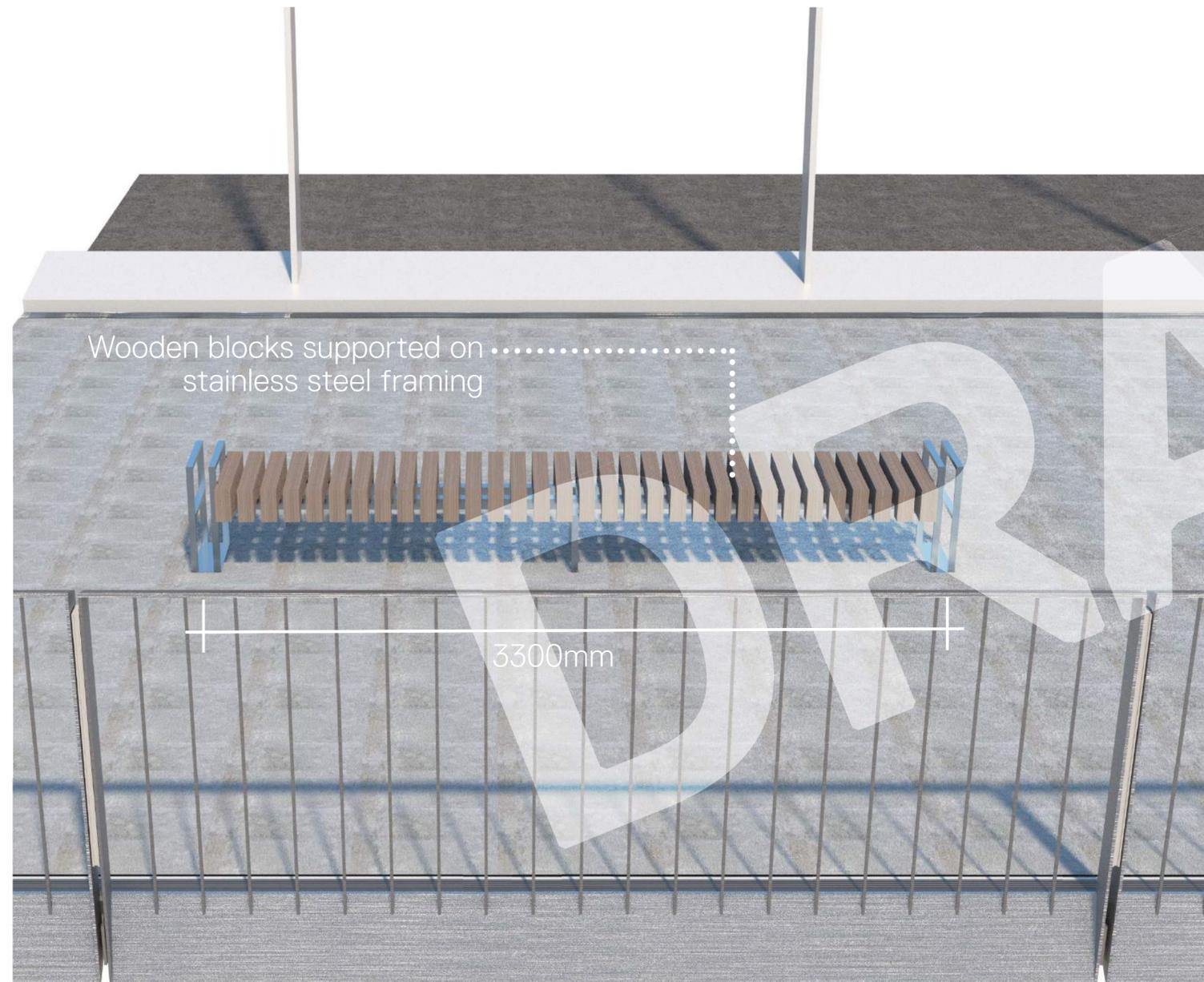


Pedestrian Path  
(Fast) .....

Furniture .....

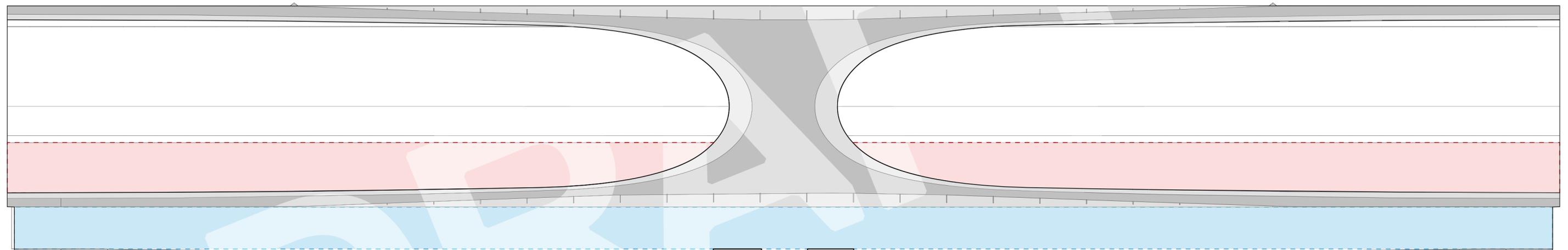
Pedestrian Zone  
(Slow) .....

# Furniture Design Details



# Furniture

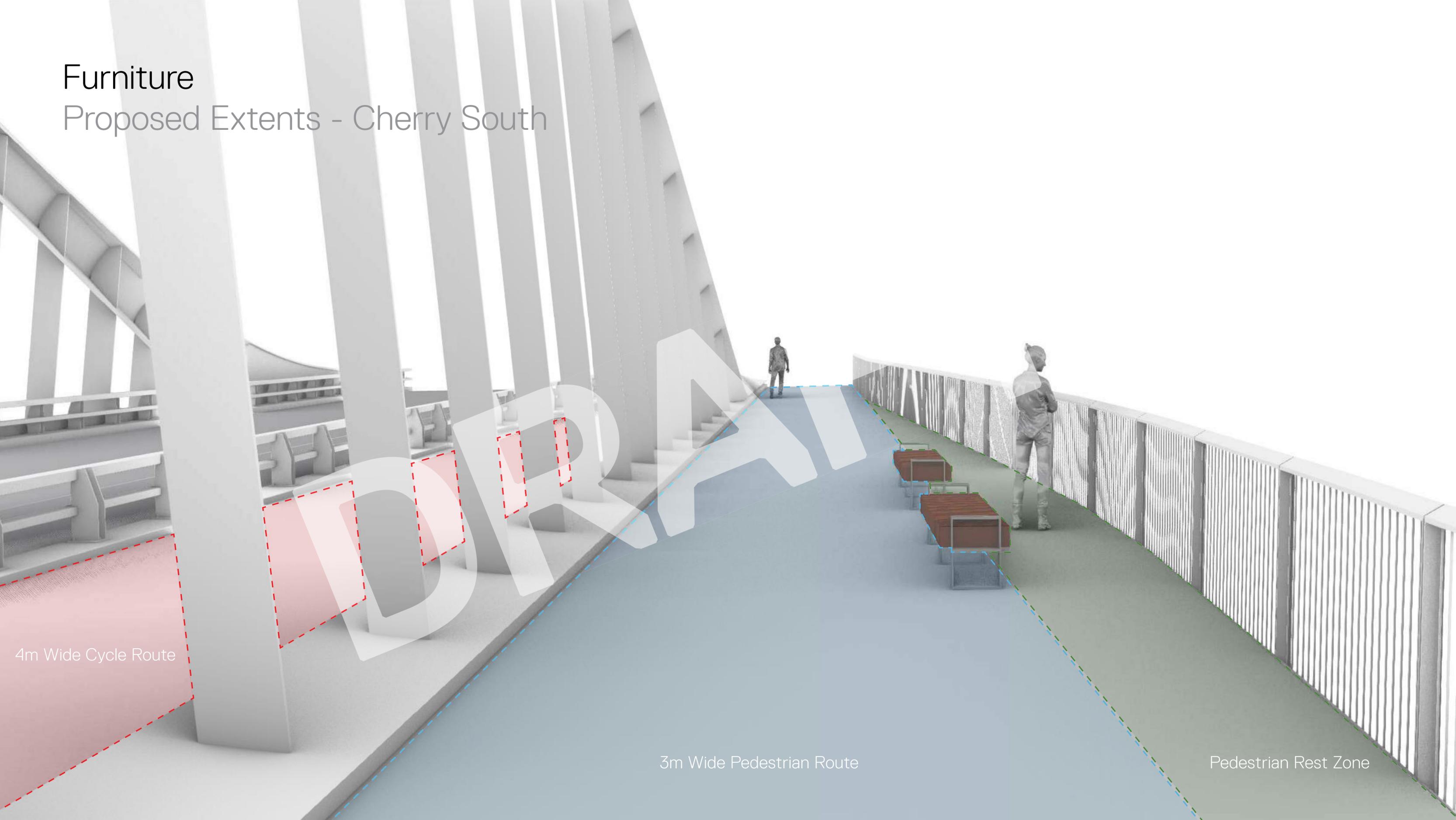
## Proposed Extents - Cherry South



3.3m Bench using 'StreetLife' tops

- 3m Pedestrian Zone
- 4m Cycle Zone
- Pedestrian Rest Zone

# Furniture Proposed Extents - Cherry South



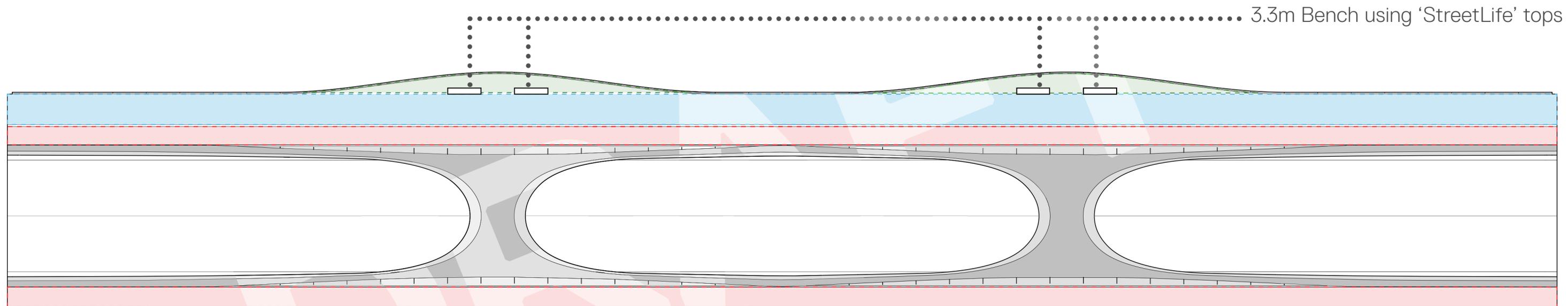
4m Wide Cycle Route

3m Wide Pedestrian Route

Pedestrian Rest Zone

# Furniture

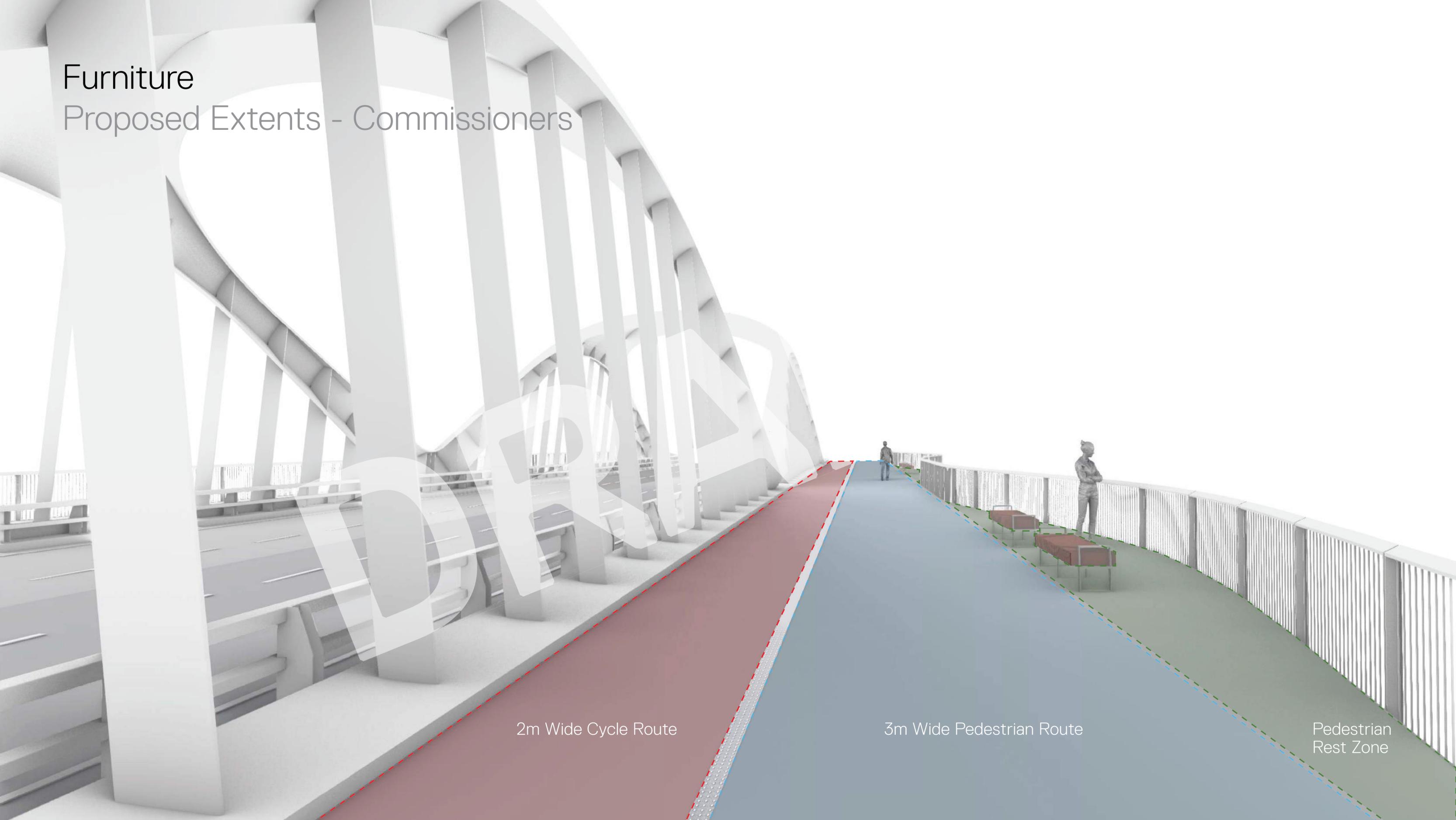
## Proposed Extents - Commissioners



3.3m Bench using 'StreetLife' tops

- 3m Pedestrian Zone
- 2m Cycle Zone
- Pedestrian Rest Zone

# Furniture Proposed Extents - Commissioners

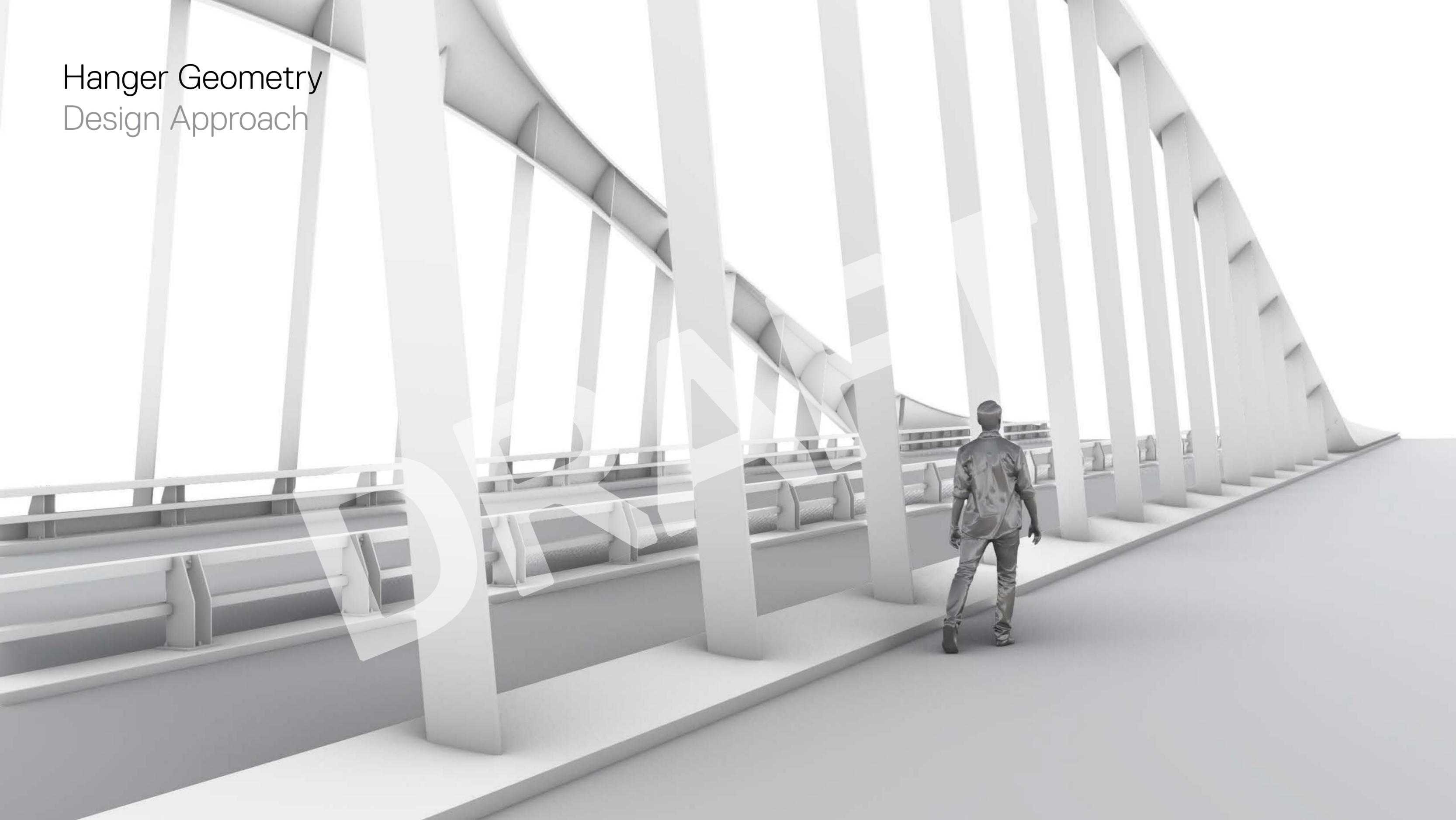


2m Wide Cycle Route

3m Wide Pedestrian Route

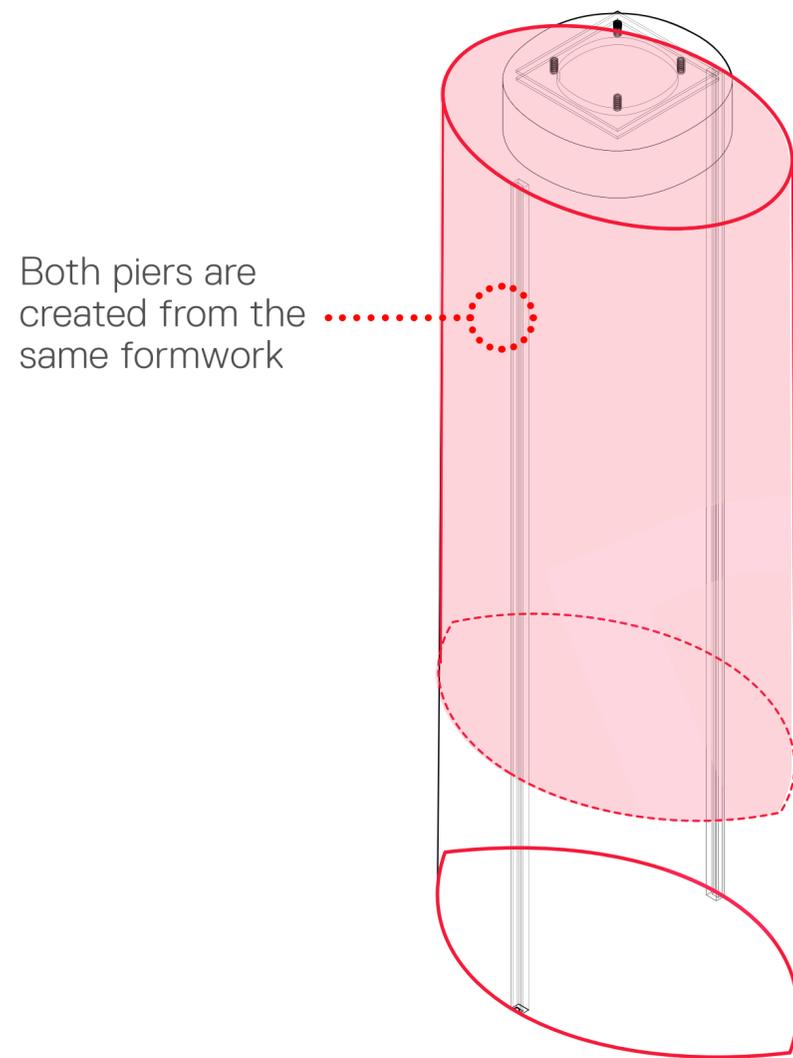
Pedestrian  
Rest Zone

# Hanger Geometry Design Approach



# Piers

## Design Approach

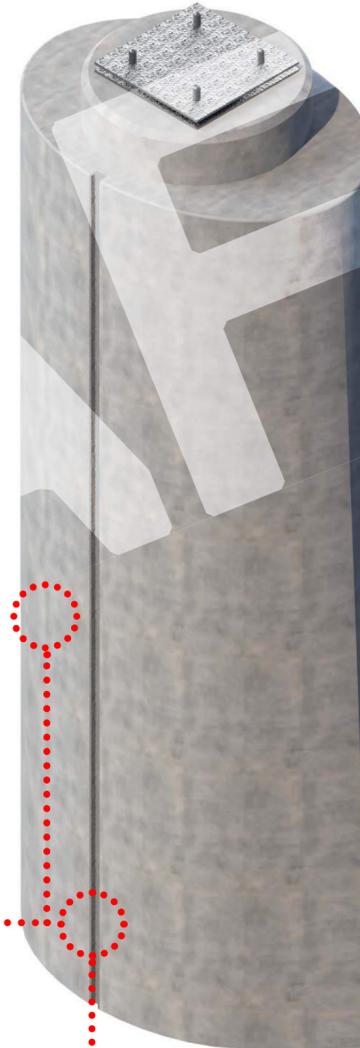


Both piers are created from the same formwork

Cherry South Pier



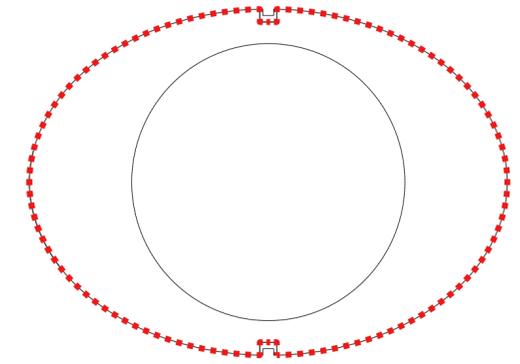
Commissioners Pier



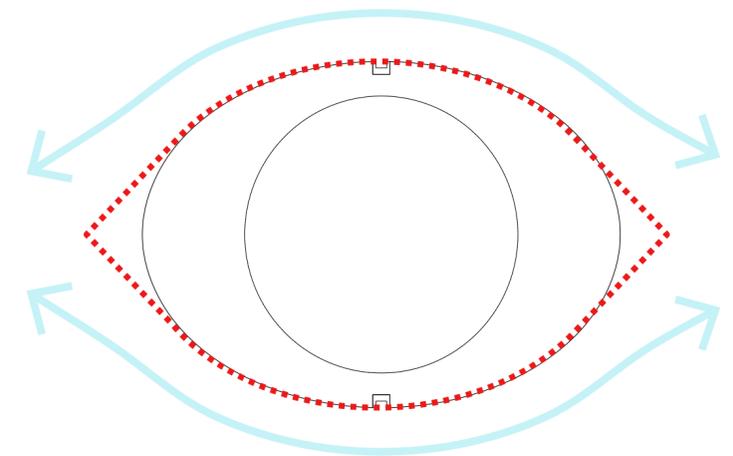
In situ cast concrete

Stainless steel channel

Pier Head Geometry

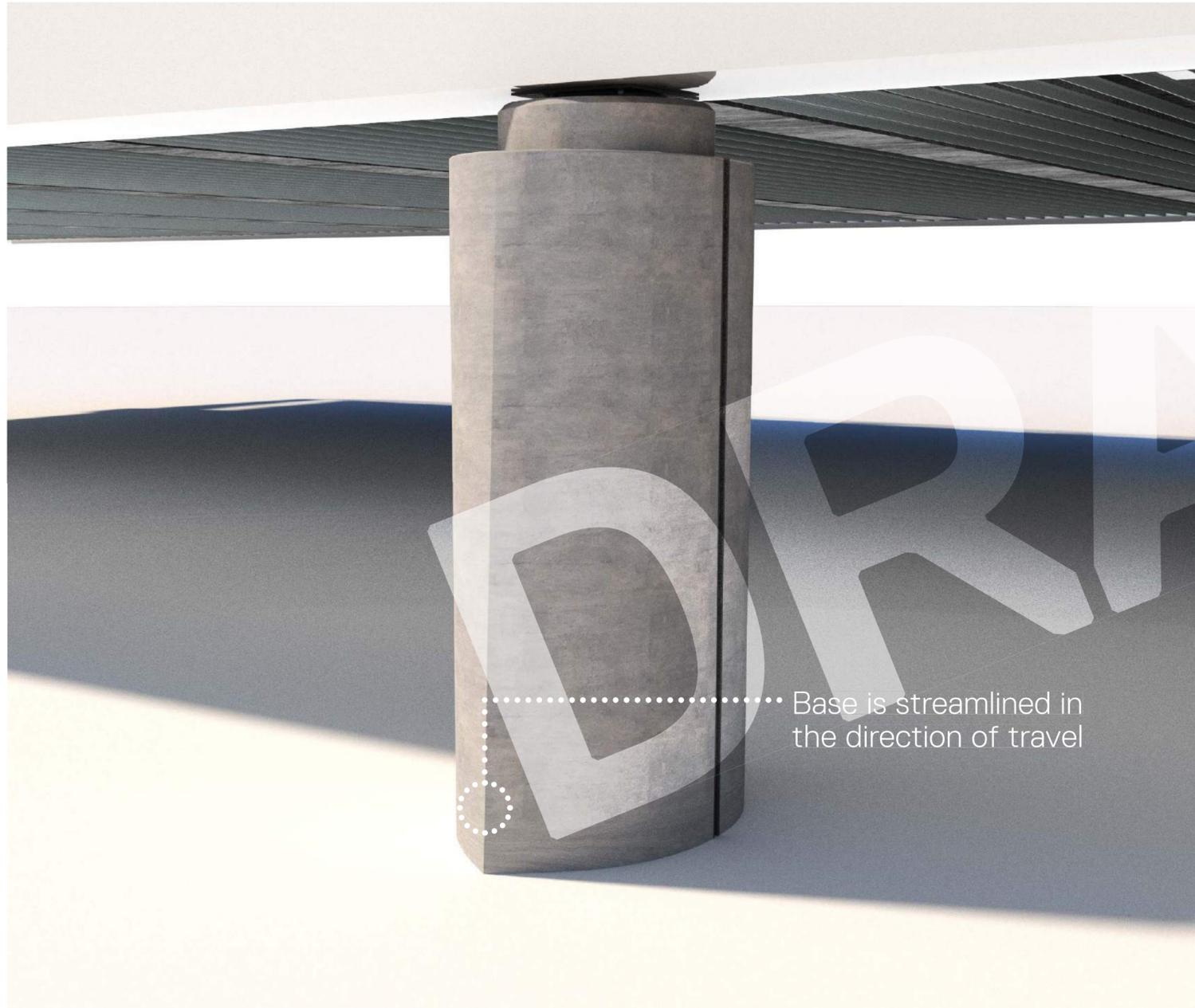


Pier Base Geometry



# Piers

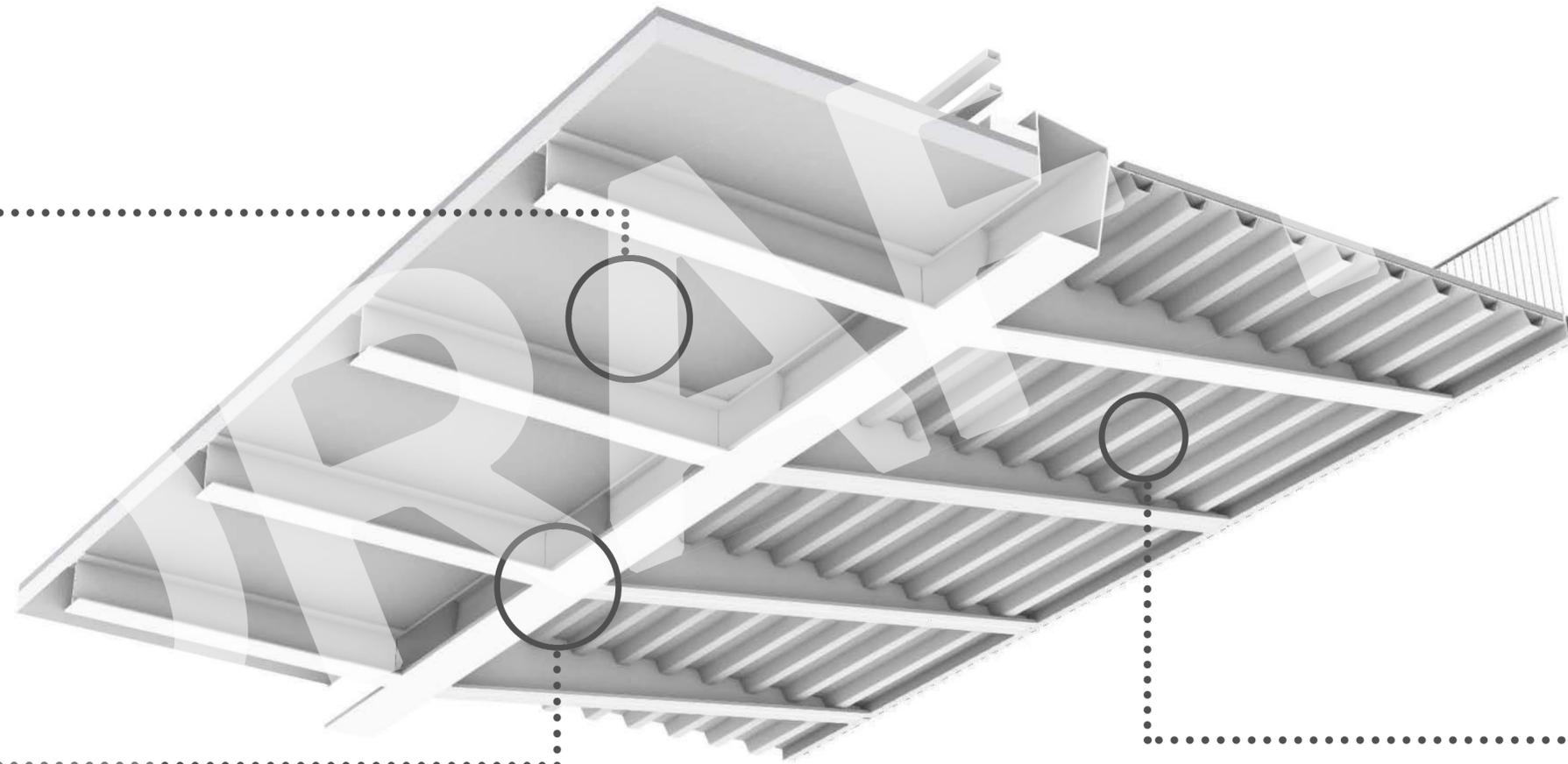
## Design Approach



# Underside Treatment

## Design Approach - Finish

Concrete deck with skim finish and mica infill



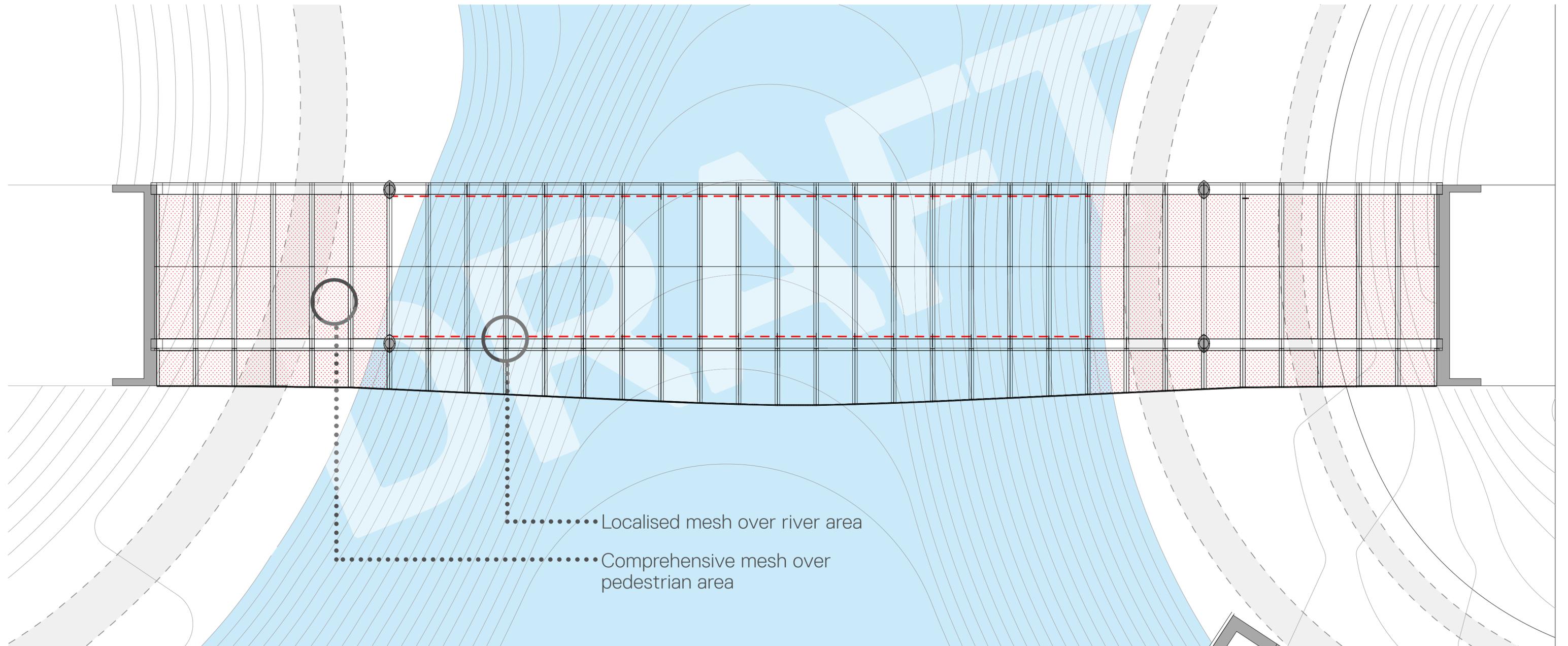
Orthotropic Deck painted gloss RAL9010 (White)



Structural steel painted gloss RAL9010 (White)

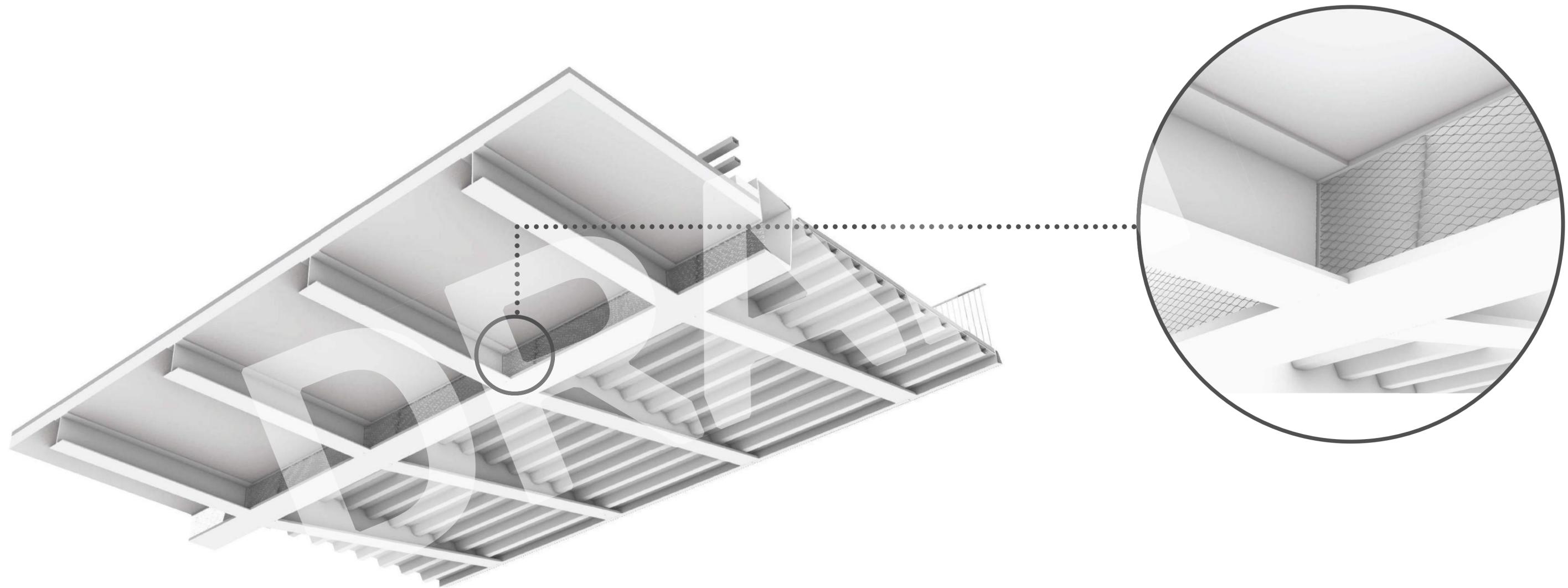
# Underside Treatment

## Design Approach - Bird Deterrents



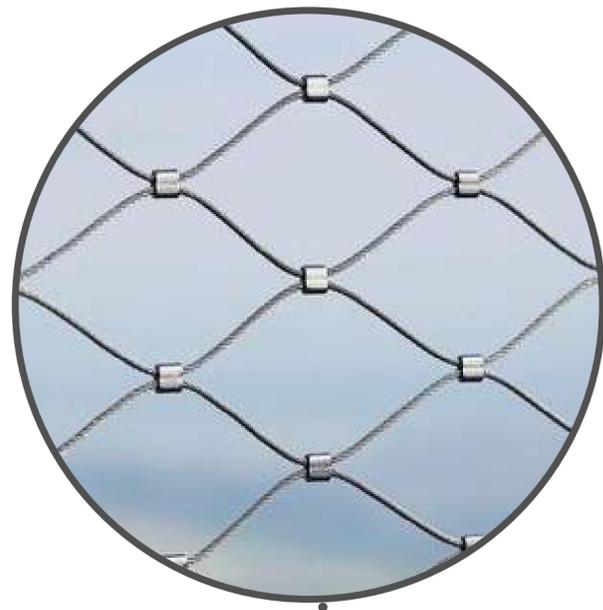
# Underside Treatment

Design Approach - Bird Deterrent over River

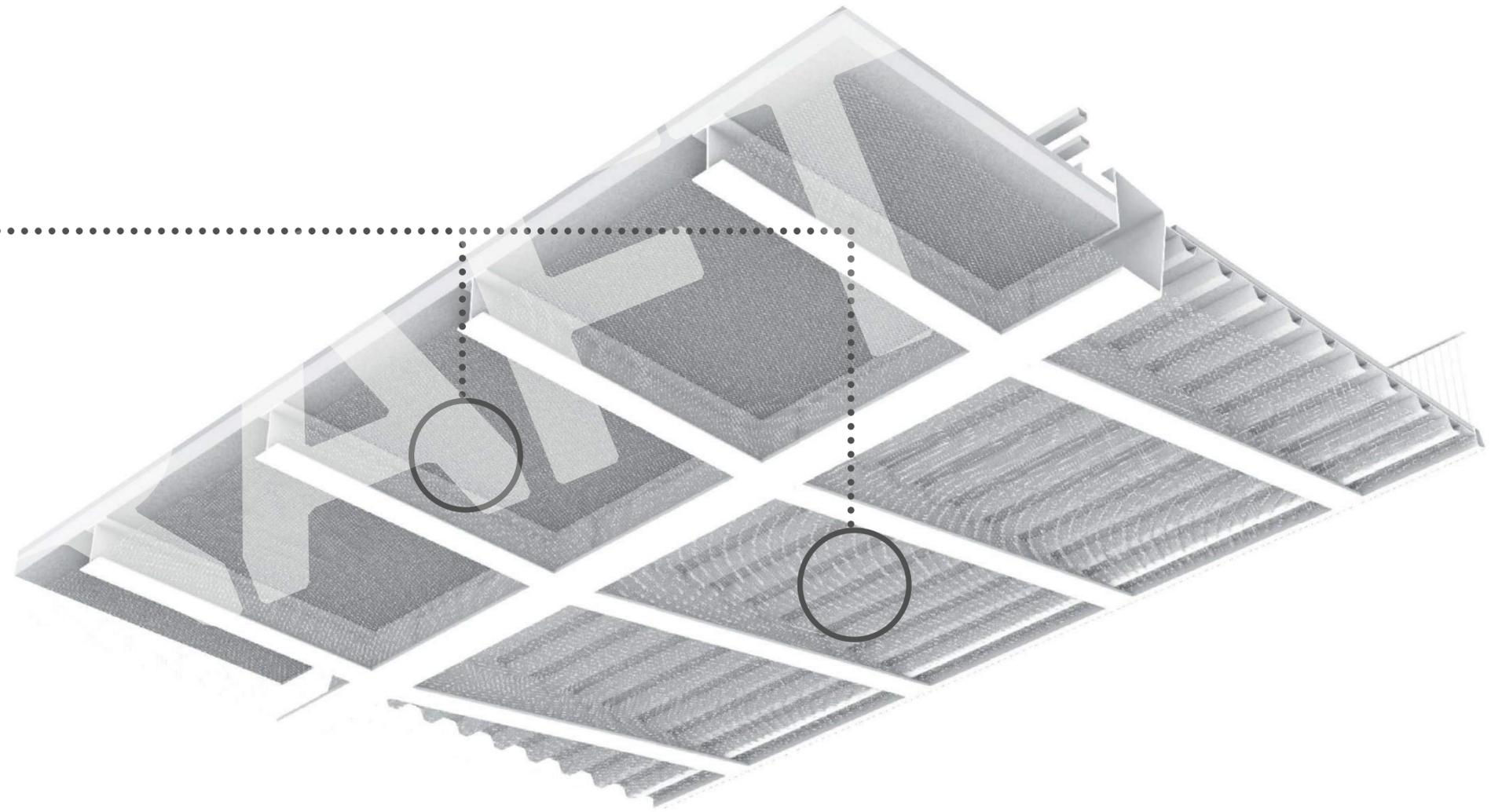


# Underside Treatment

Design Approach - Bird Deterrent over Pedestrian Paths



Jakob Webnet



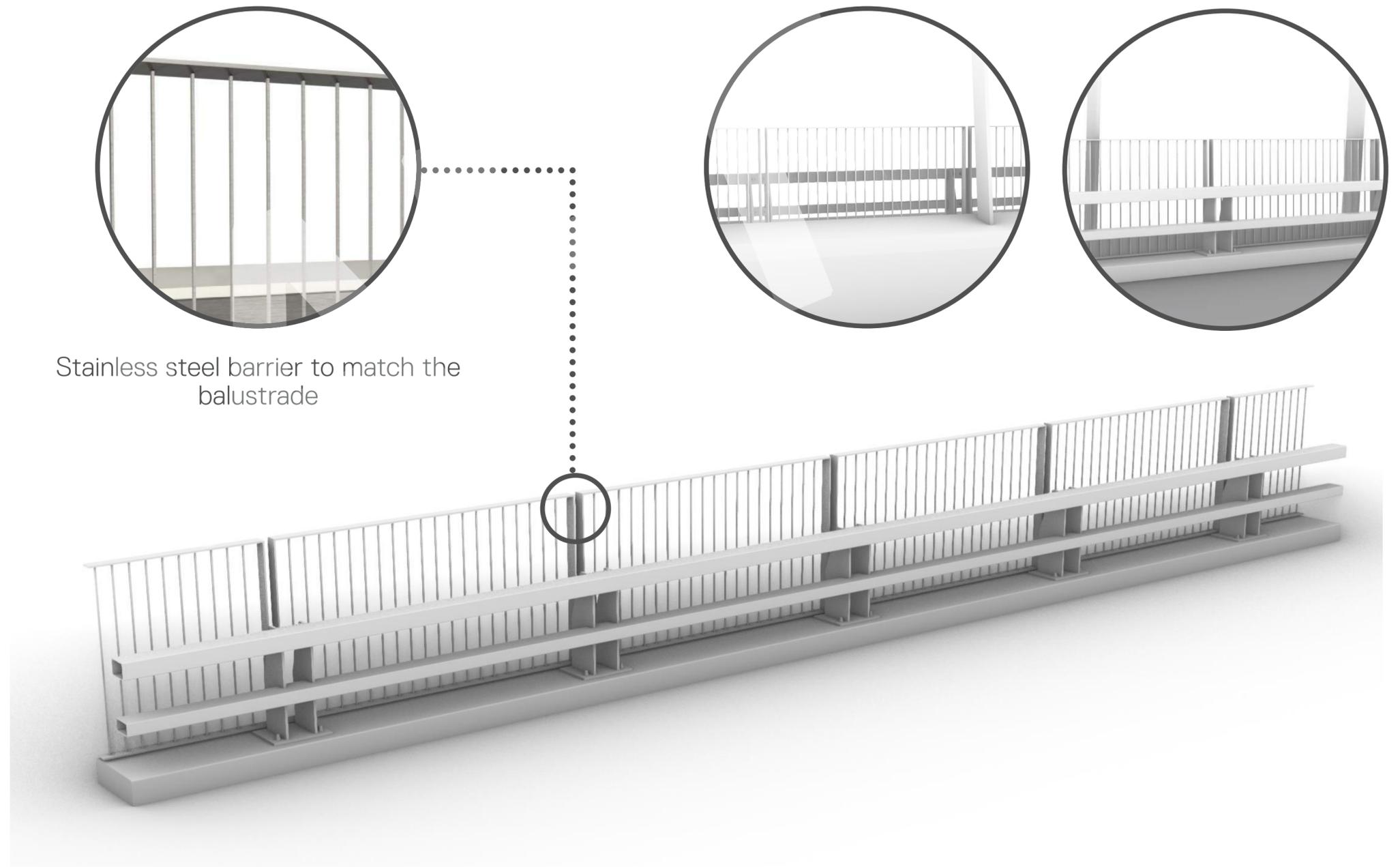
# Bridge to Landscape Transitions

## Typical Conditions - Underbridge



# Vehicular Barriers

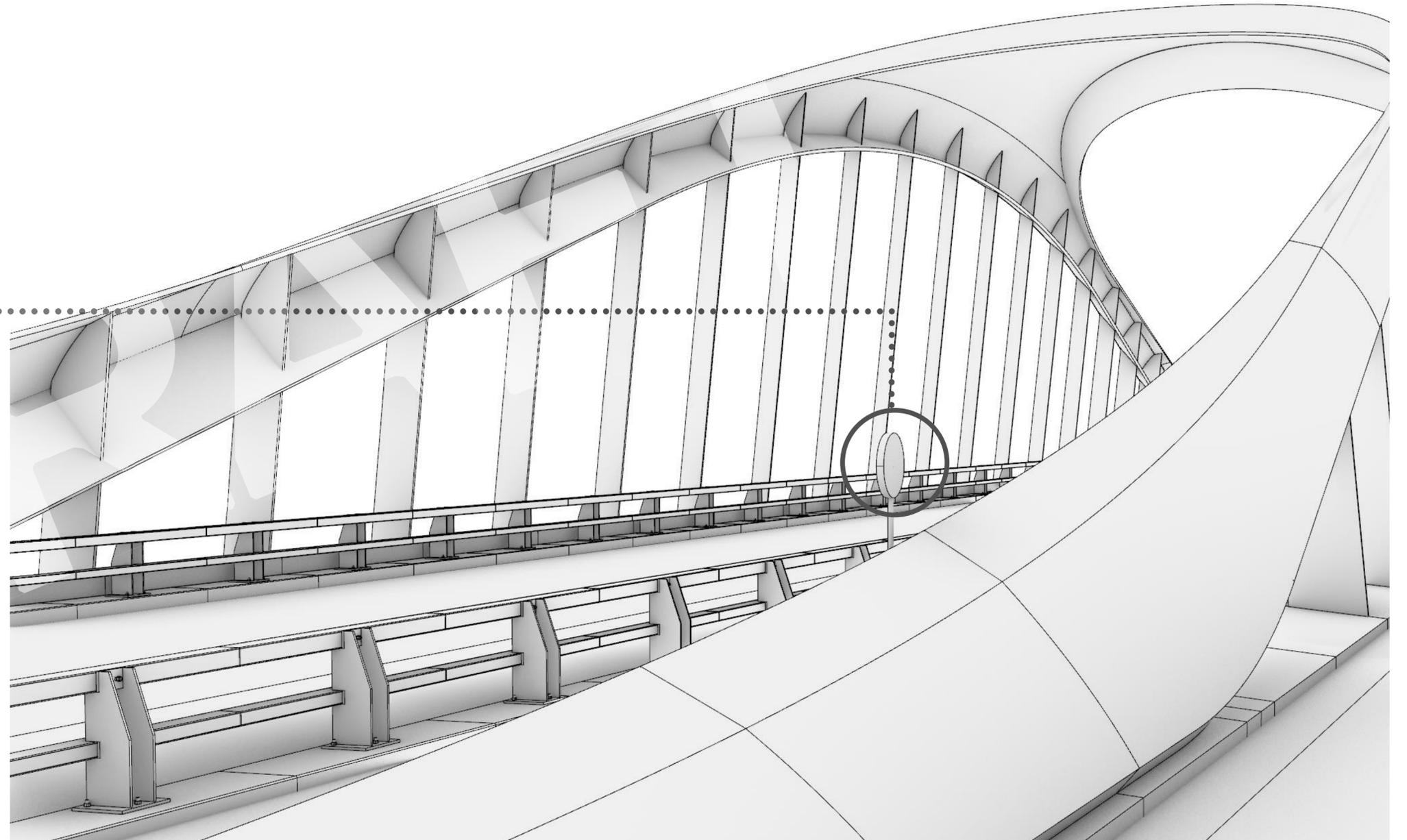
## Design Approach



# Anti Climb Approach Design Approach



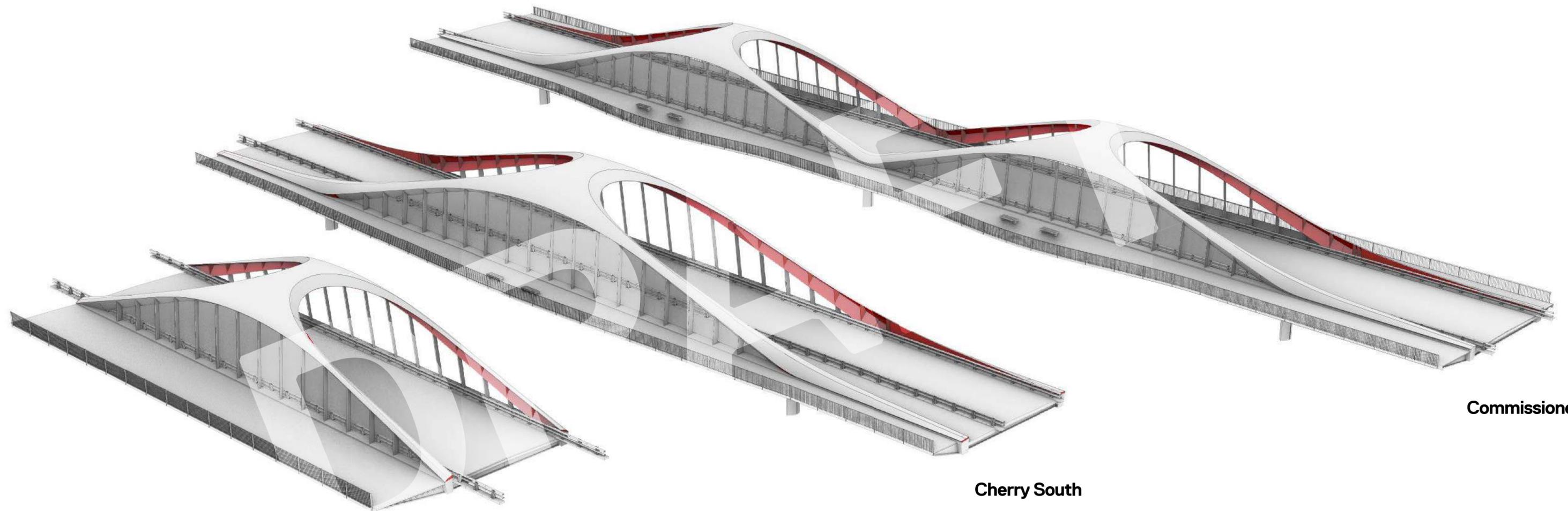
Signage on bracket/  
post



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# Colour Studies

# Colour and Paint Finish Family of Bridges

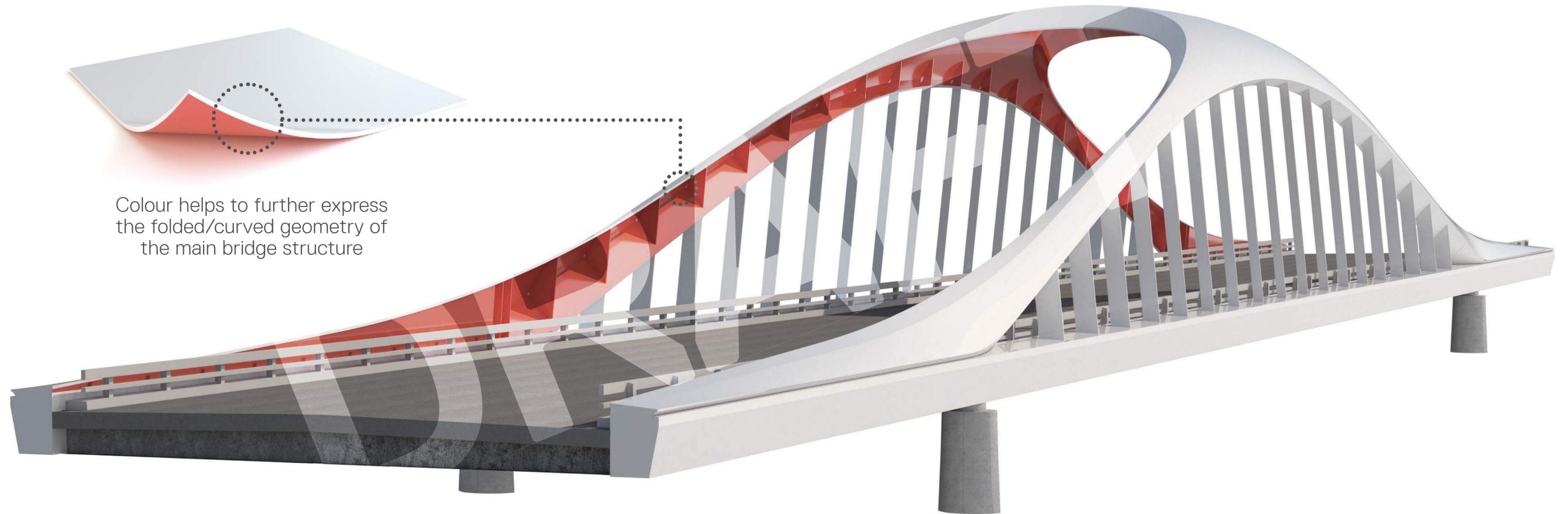


**Cherry North**

**Cherry South**

**Commissioners**

# Colour and Paint Finish Design Approach



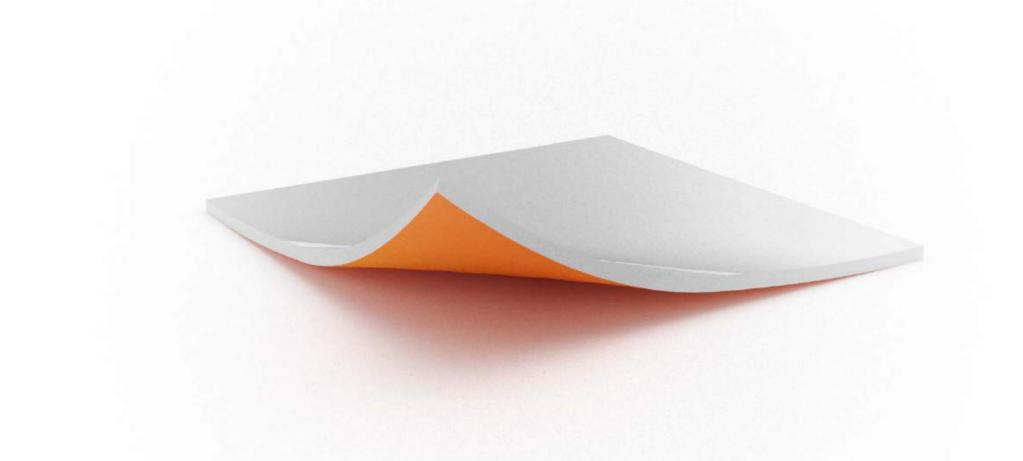
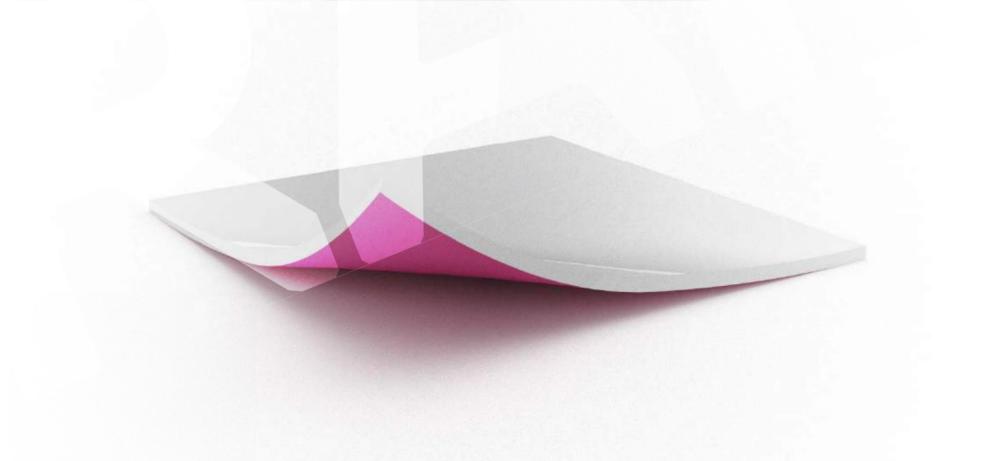
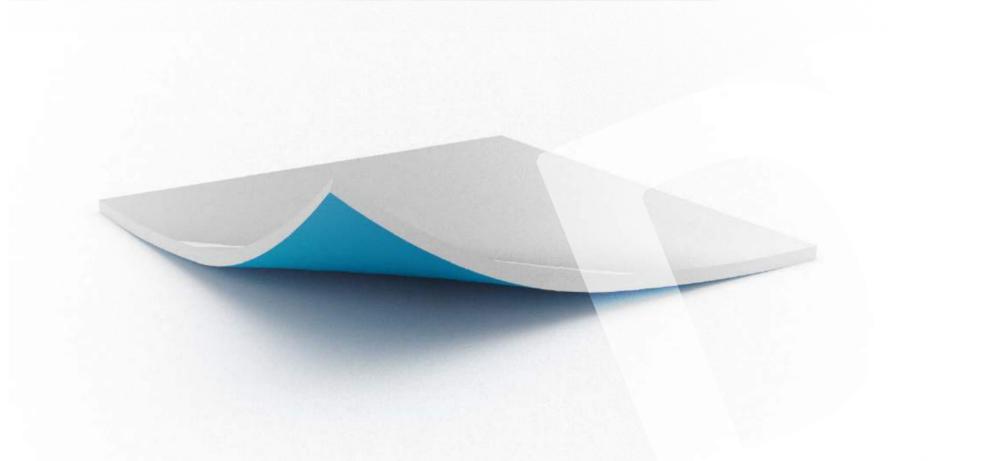
Colour helps to further express  
the folded/curved geometry of  
the main bridge structure

# Colour and Paint Finish Context Colours



# Colour and Paint Finish

## Contrast Sky Colours



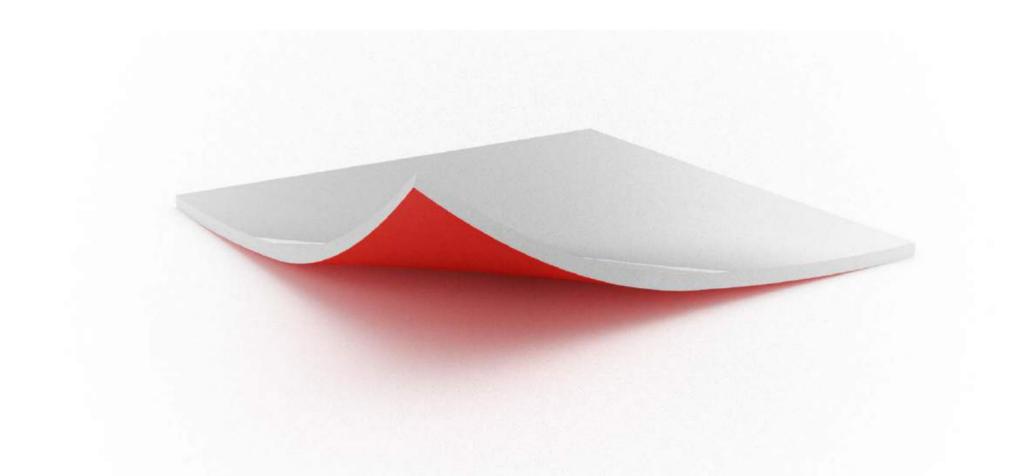
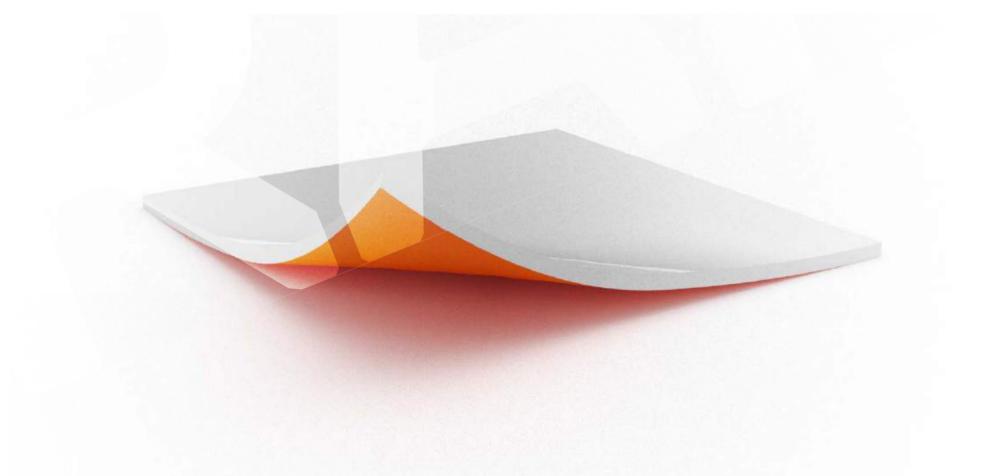
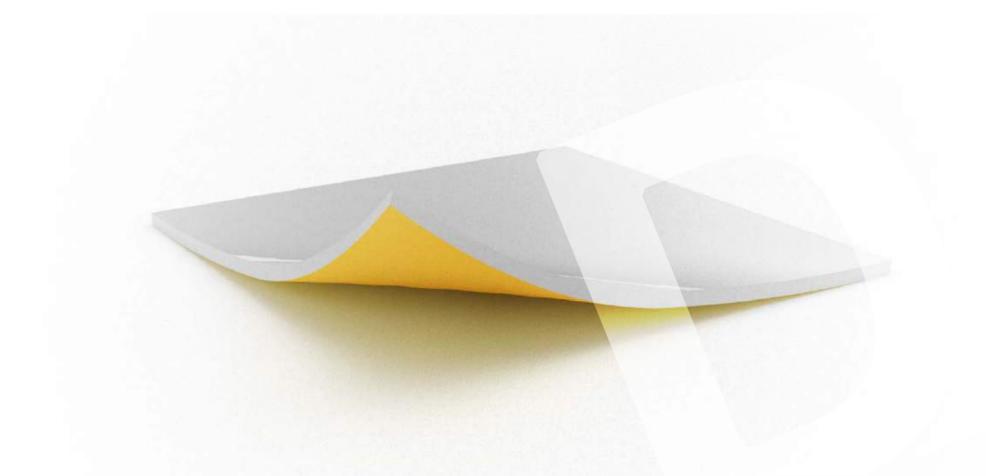
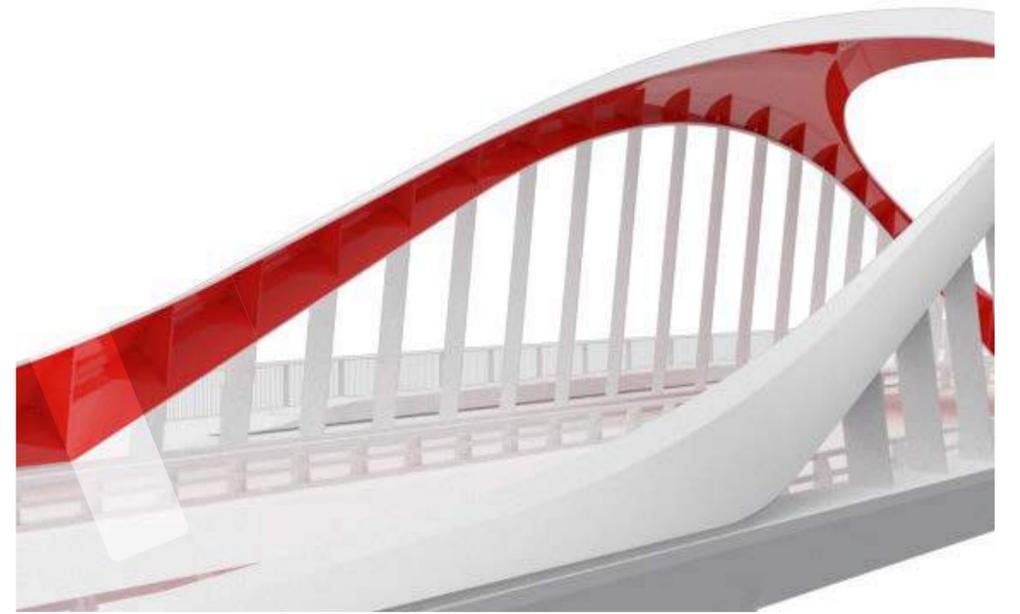
**Comissioners**  
RAL 5012  
Light Blue

**Cherry South**  
RAL 4010  
Telemagenta

**Cherry North**  
RAL 2003  
Pastel Orange

# Colour and Paint Finish

## Complementary Sky Colours



**Comissioners**  
RAL 1023  
Traffic Yellow

**Cherry South**  
RAL 2004  
Pure Orange

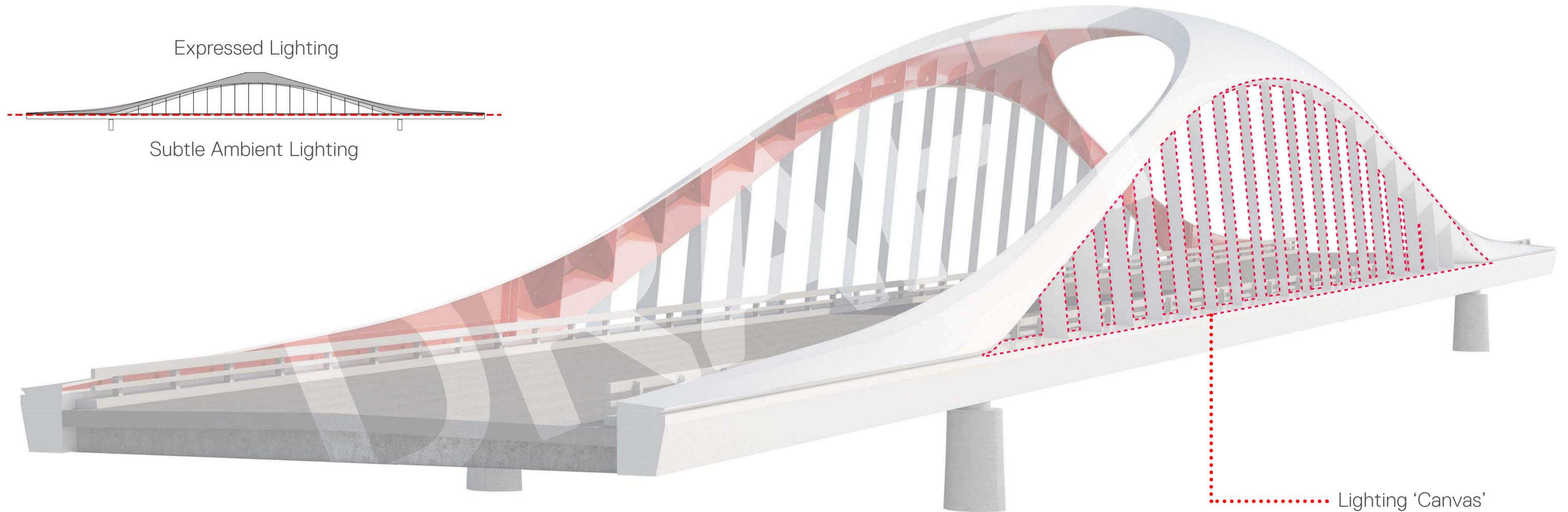
**Cherry North**  
RAL 3028  
Pure Red



# Lighting Approach

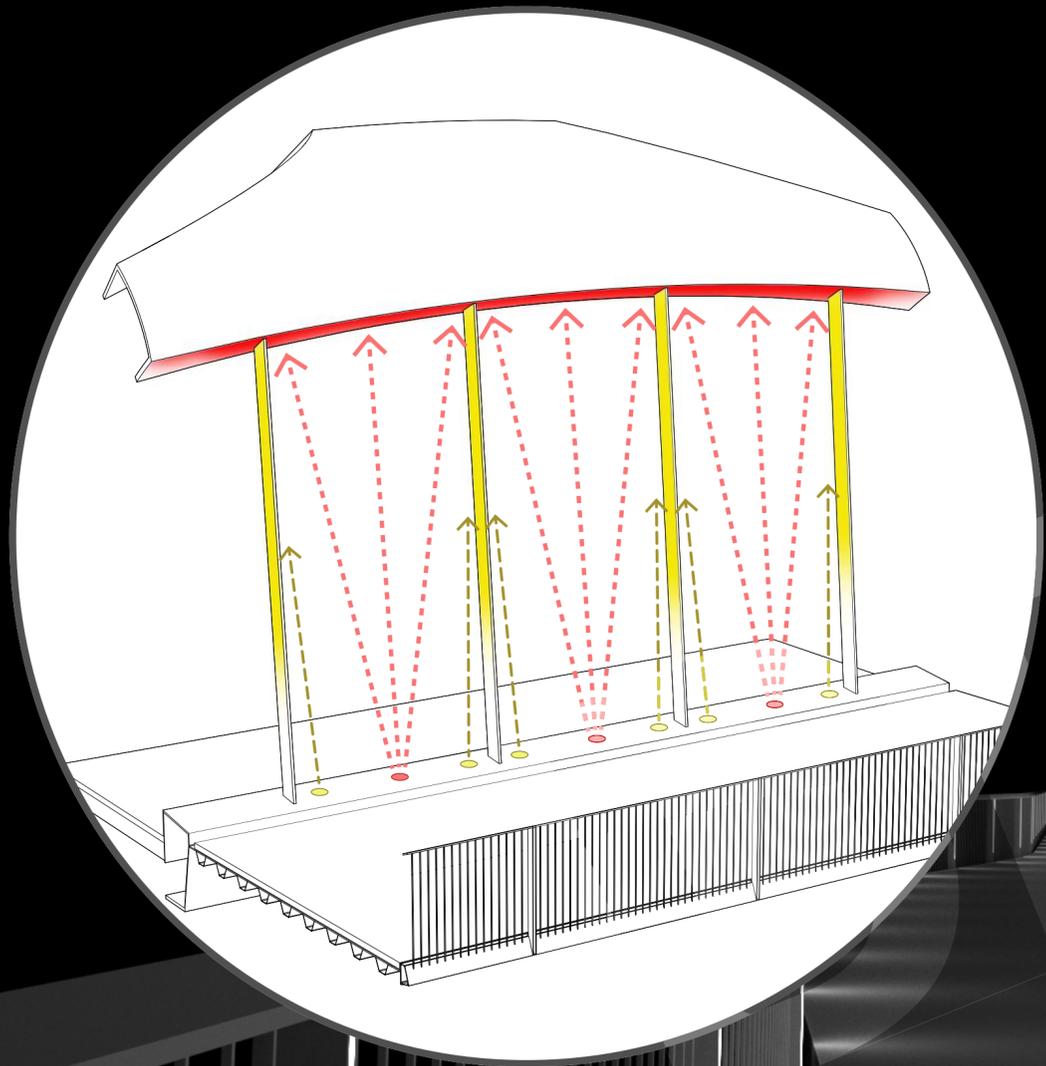
# Lighting Strategy

## Overall Approach to Structural Lighting

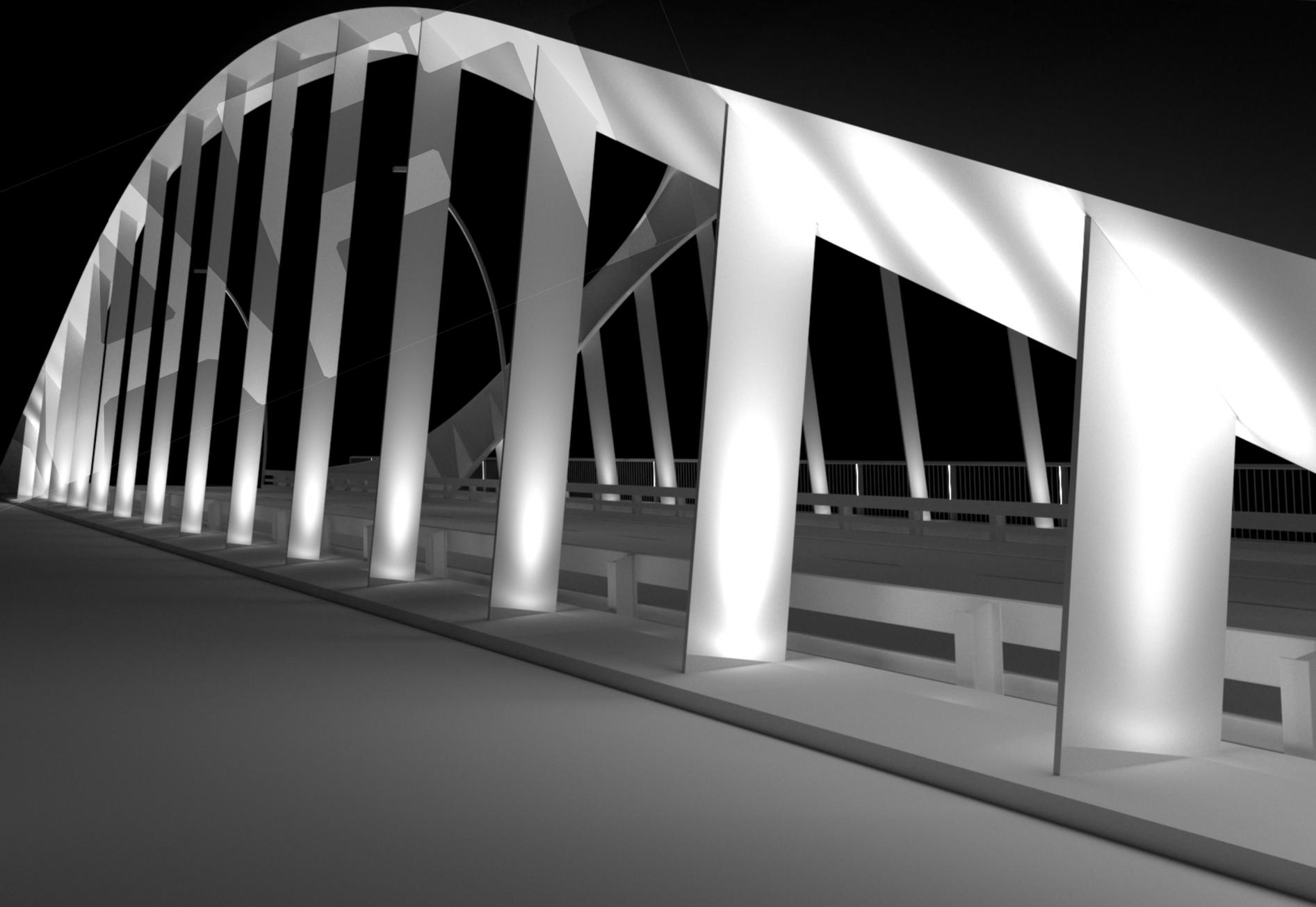


# Lighting Strategy

## Overall Approach

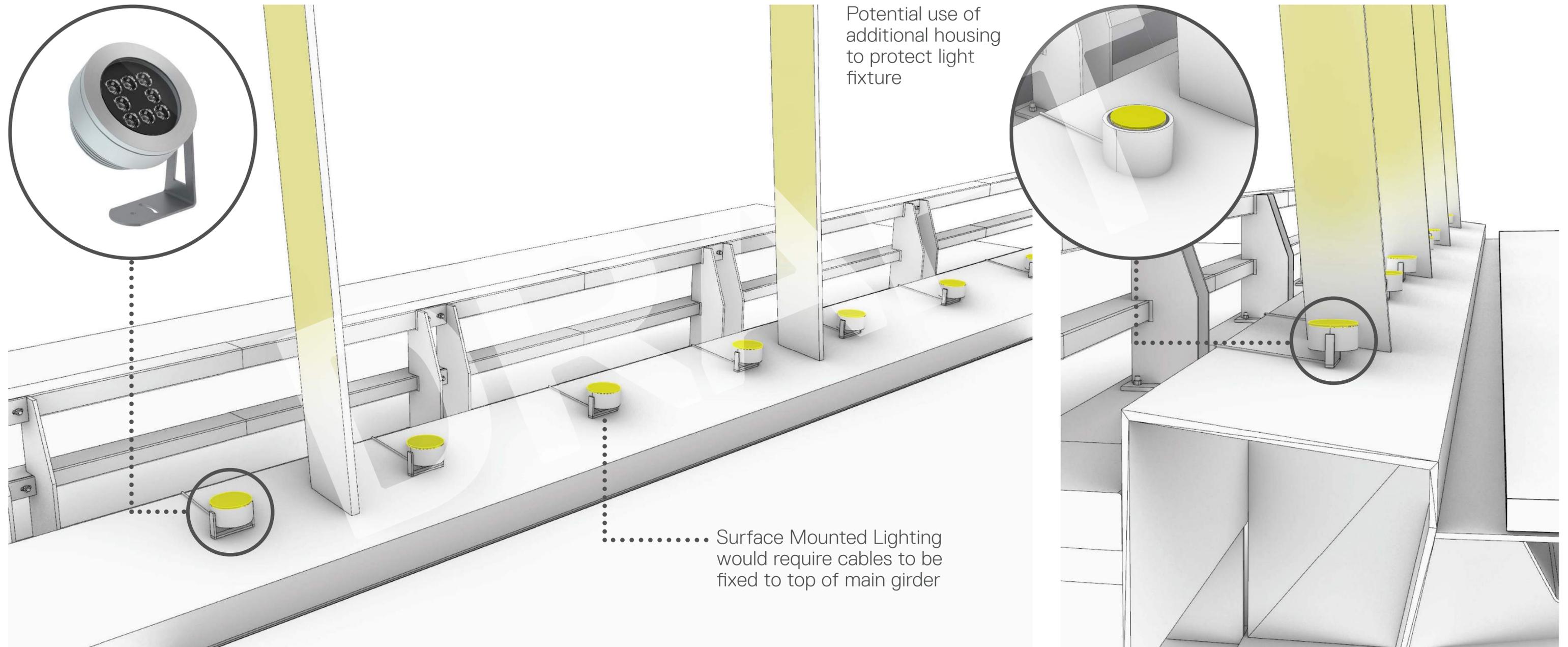


Uplighting from the main girder directly lights both the main structural arch and the hanger



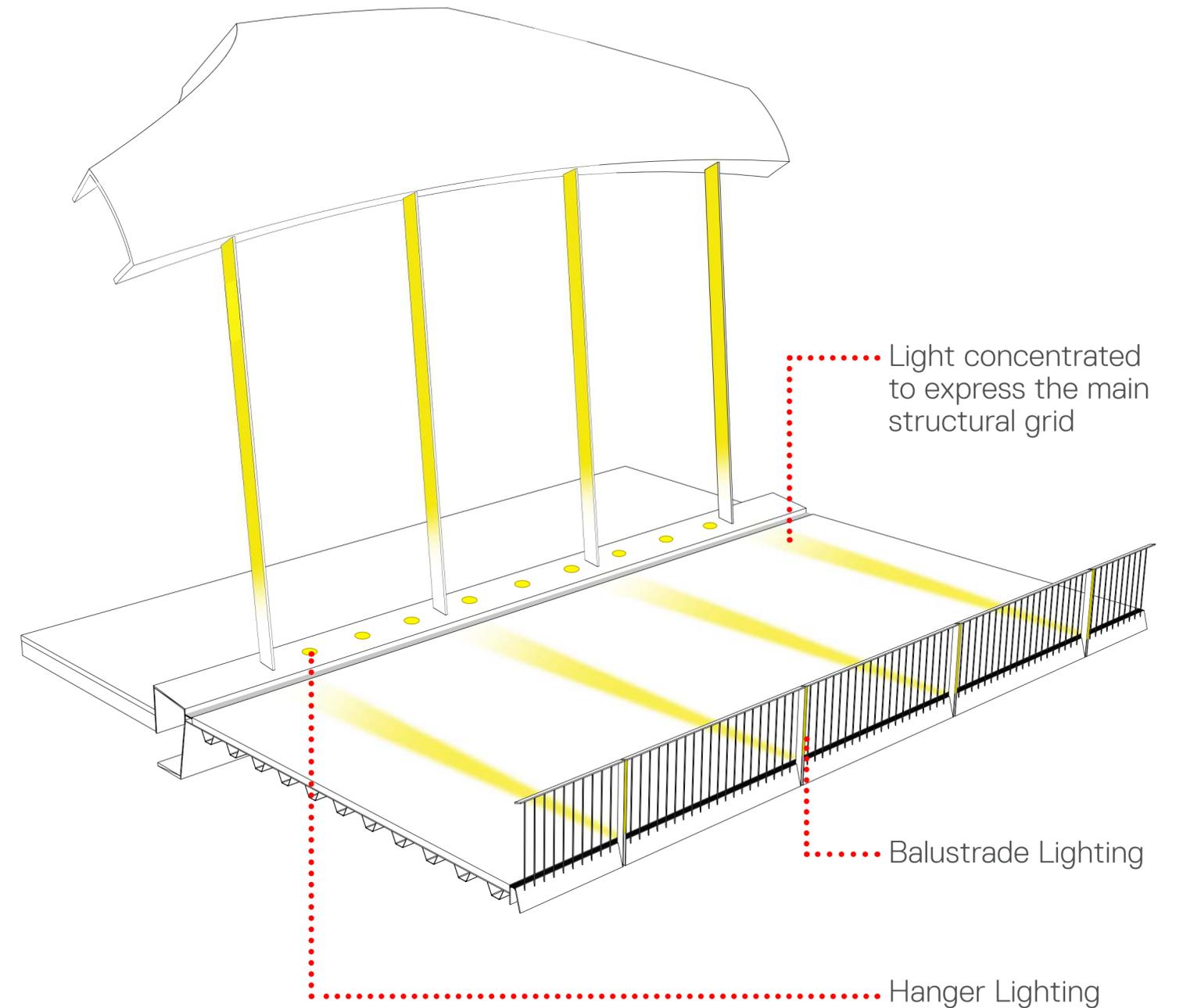
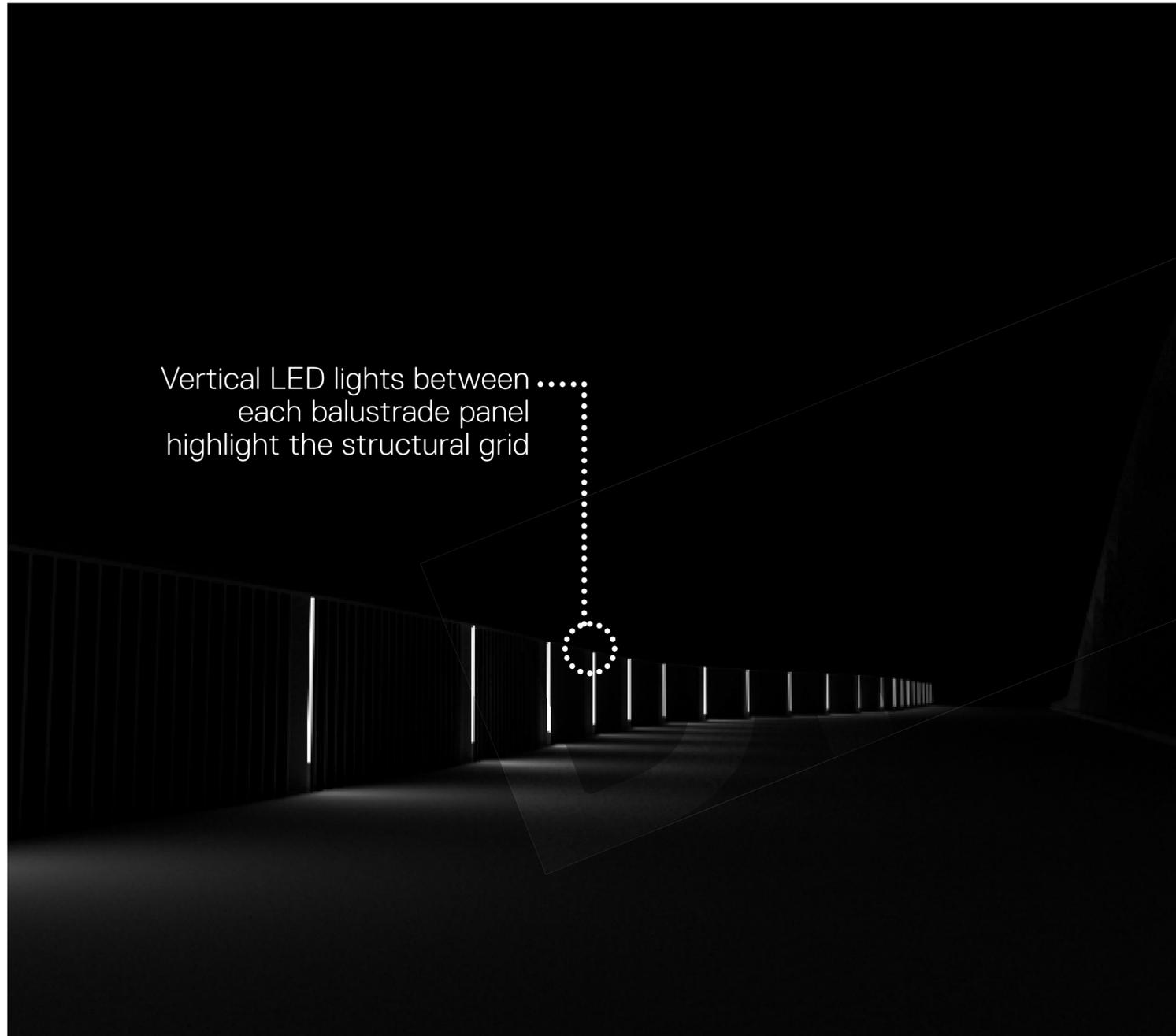
# Lighting Strategy

## Alternative Approach - Surface Mounted to Girder



# Lighting Strategy

## Overall Approach to Pedestrian Lighting

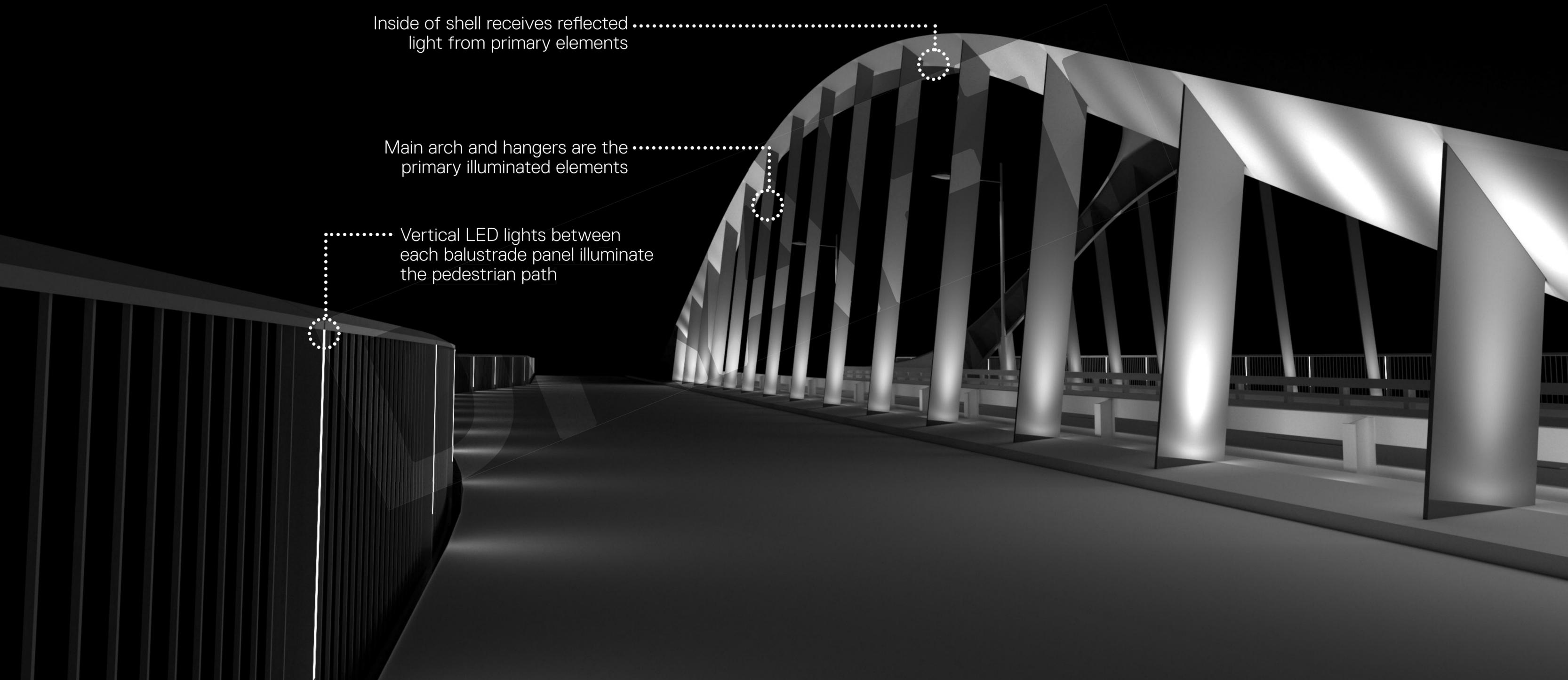


# Lighting Strategy Overall Approach

Inside of shell receives reflected light from primary elements

Main arch and hangers are the primary illuminated elements

Vertical LED lights between each balustrade panel illuminate the pedestrian path



# Lighting Strategy Overall Approach



# Lighting Strategy Overall Approach

