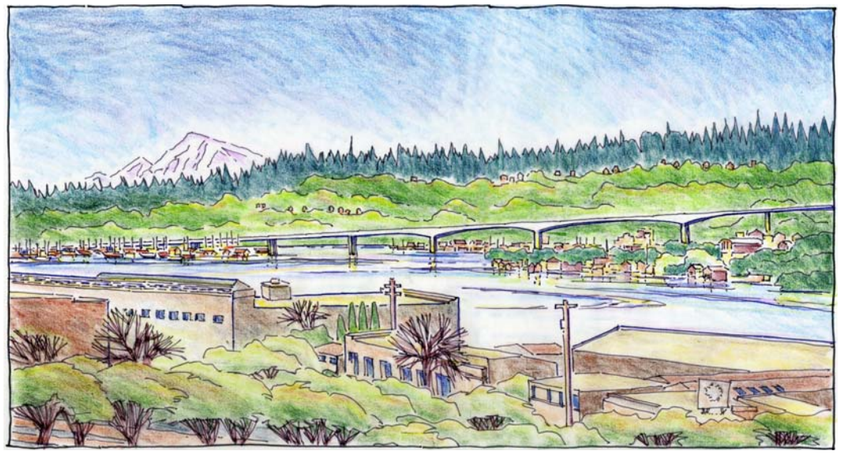
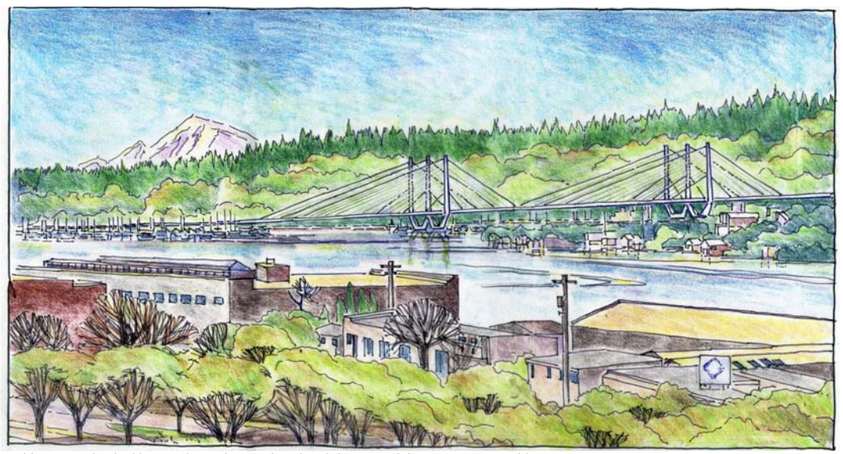
# Portage Bay Bridge - Progress Update



Box girder option looking southeast from University Birdge toward the Portage Bay Bridge



Cable stay option looking southeast from University Birdge toward the Portage Bay Bridge

## Next Steps

### Portage Bay Bridge

General

- Recommend that WSDOT proceed with further technical analysis and design refinements for the box girder and cable stay bridge types both in a shifted alignment to north
- Based on technical reviews and feedback from many sources the extradosed bridge type did not receive comparable public interest or technical support
- Future studies would include other bridge type configurations such as a single tower cable stay structure as suggested by some public interests
- These studies would use criteria including: site conditions, environmental goals and requirements, structural suitability, constructability, cost, architectural character, visual quality and community integration
- Continue working with the Seattle Design Commission in the review of a preferred bridge type and its quality in the City of Seattle
- Continue working with the local communities and stakeholders to identify opportunities to reduce visual impacts, refine the design to better fit its local and city context
- Continue to study safe and effective pedestrian and bicycle connections from Montlake to downtown Seattle and north Capitol Hill

### Underbridge Areas

General

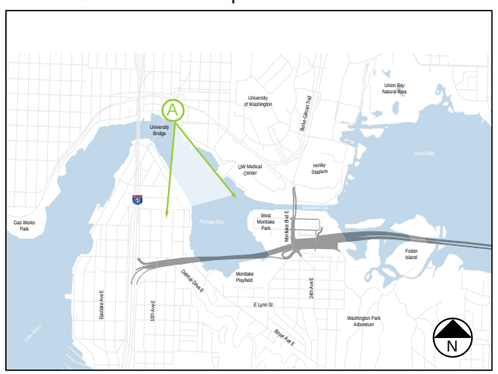
- Recommend that WSDOT continue with design refinements for the underbridge areas with priority for safety, good sightlines and monitoring, clear wayfinding, and general attractive qualities
- The path from Delmar Drive East to Boyer Avenue East will be designed for Americans with Disability Act (ADA) accessibility and connection to transit, and the Everett Street East to Montlake Playfield boardwalk trail
- As identified in the SR 520, I-5 to Medina Final Environmental Impact Statement (FEIS), the Bill Dawson Trail is wider than existing within the right of way, the trail grade is reduced to 5%, and the vertical clearance is increased. The design improves sightlines with a gentler curve at the bridge abutment to reduce conflicts between cyclists and pedestrians. The Montlake undercrossing connection to the regional shared-use path at Montlake lid is straightened and shortened
- Continue working with the public and City of Seattle departments as the design evolves

### Bicycle and Pedestrian Connectivity

General

- Continue to study safe and effective connections from Montlake to downtown Seattle and north Capitol Hill
- The project design vision will include reference to community-based Seattle Neighborhood Greenway planning in the project vicinity
- Continue working with the public and City of Seattle departments as the design evolves

### View Location Map

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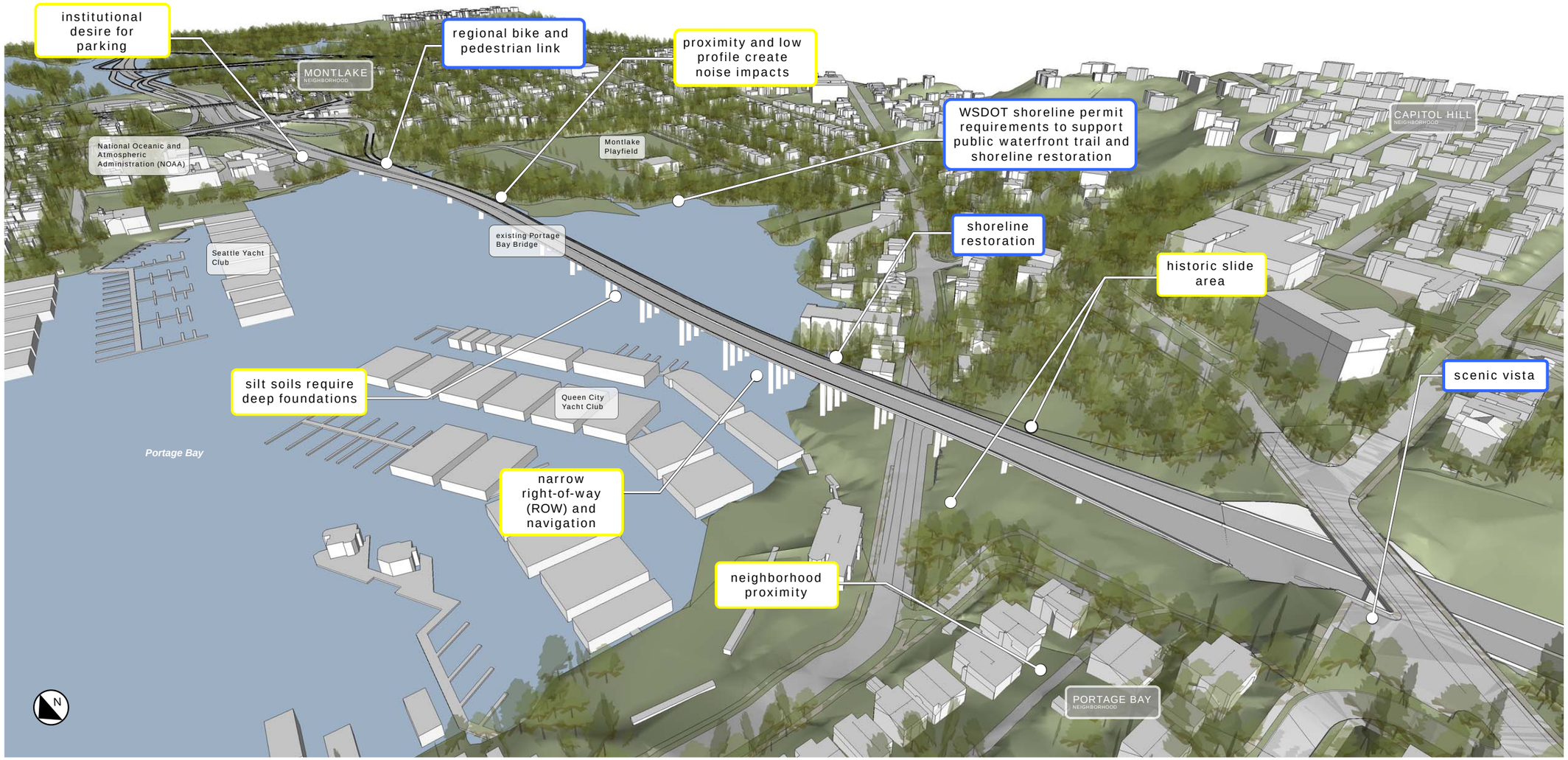
Washington State Department of Transportation

STATE ROUTE 520

# Portage Bay Bridge - Existing Site Conditions and Future Opportunities

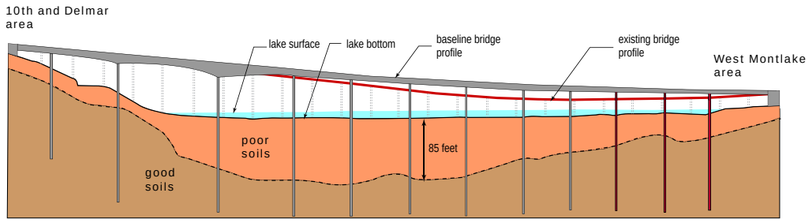
## Description

Portage Bay Bridge area is characterized by its historic residential neighborhoods, active waterways, well-used open spaces and parks, and a high volume of both motorized and non-motorized travel. Considerations for the appropriate bridge size, location and type within this context include 1) building for difficult soil types on land and in Portage Bay itself, 2) preserving and enhancing views, 3) access to safe, efficient and attractive connections for drivers, pedestrians and cyclists, 4) protecting and enhancing the shoreline and green network, and 5) establishing a contextual identity for the bridge.




## SOIL PROFILE

10th and Delmar area




## LEGEND

- Existing site conditions
- Opportunities

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STATE ROUTE 520

# Portage Bay Bridge - Baseline Design

## Description

Portage Bay Bridge connects from the Montlake area to the Roanoke area and the I-5 interchange. For the purposes of environmental analysis, the baseline design was assumed to be constructed as a cast-in-place box girder type bridge with faux arches applied on the west side of the bridge for aesthethic treatment.

### Over

- No overhead structures and no significant architectural character

### Under

- Beam bridge with variable span lengths at the east end
- Box girder bridge at the west end capable of supporting faux arches
- Maximum span length of 300 feet with column rows, most span lengths 160-200 feet, which will populate the waterway

### On

- Medium-thickness bridge deck
- Roadway alignment for six lanes, which includes general purpose lanes and a reversible transit/HOV lane in both eastbound and westbound directions
- Center-planted median
- Westbound managed shoulder for peak evening traffic

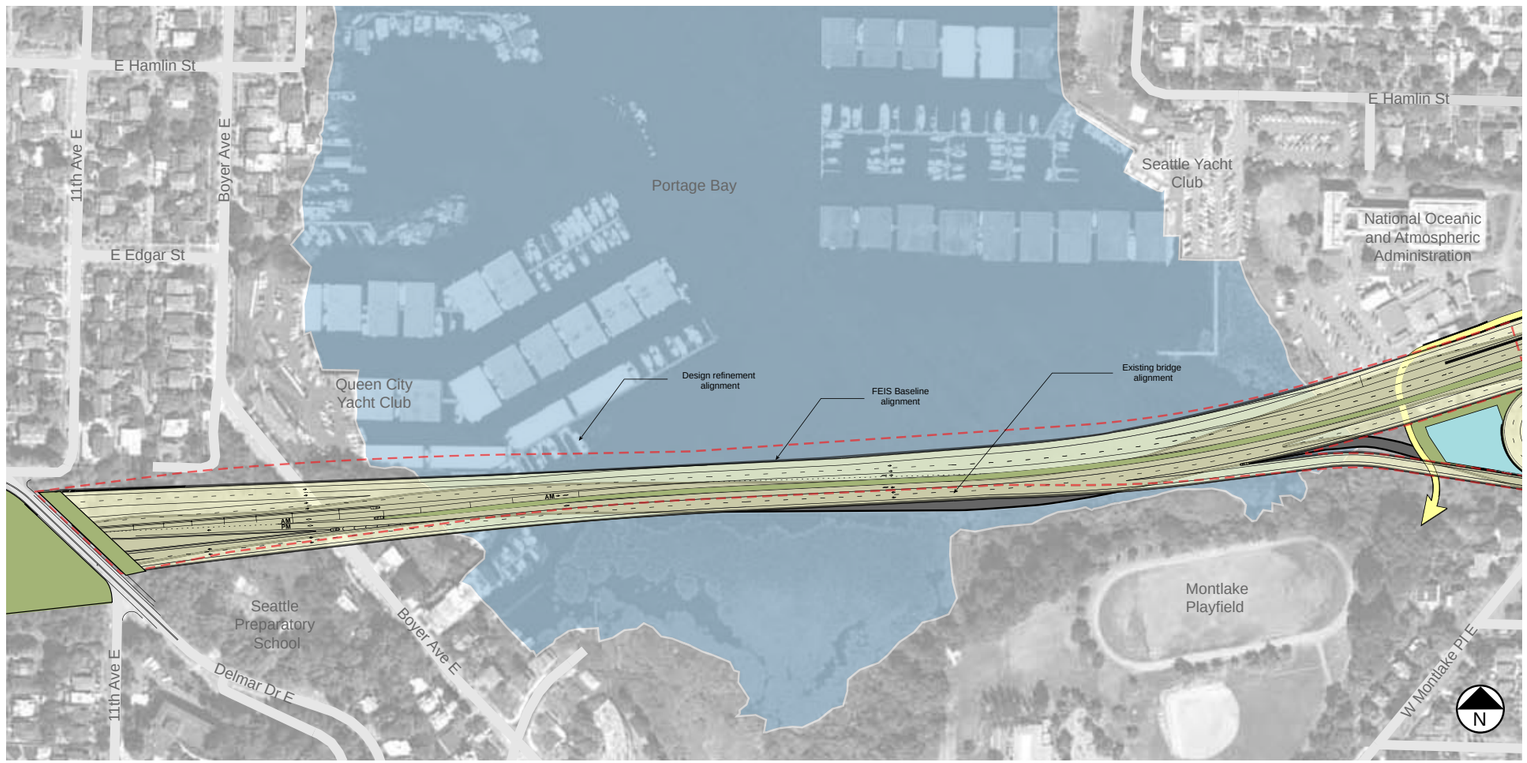
## Function

- Connect the SR 520 mainline facility to the I-5 interchange
- Enhance vehicular and non-motorized connectivity and mobility for neighborhoods and region
- Protect shorelines
- Improve safety of underbridge areas at West Montlake/Bill Dawson Trail and Boyer Avenue East

## Design Goals

- Preserve and enhance views to and from the Portage Bay Bridge
- Seek a narrow bridge width and minimal impacts upon the community and the environment
- Create a contextually appropriate signature bridge structure
- Reduce visual impacts and barriers to drivers, bicyclists and pedestrians

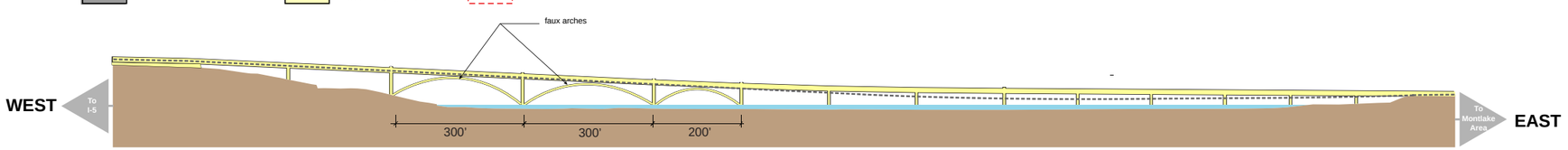
### Baseline Bridge Alignment




Existing bridge alignment

FEIS Baseline alignment

Design refinement alignment

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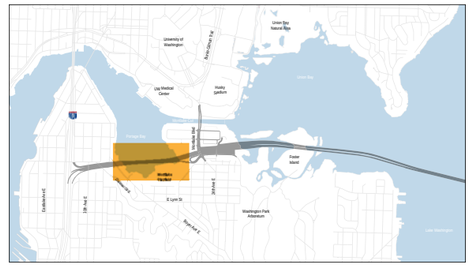

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STATE ROUTE 520

# Portage Bay Bridge - Box Girder Option

## Description

The box girder bridge design option maintains the roadway operations of the baseline while the alignment is shifted slightly to the north to ease constructability issues.

### Over

- No structure above bridge deck

### Under

- Box girder bridge at the west end with a maximum span length of 360 feet
- More structure under bridge

### On

- Thicker bridge deck with segmental construction
- Beam bridge to the east with variable span lengths
- Modified planted median

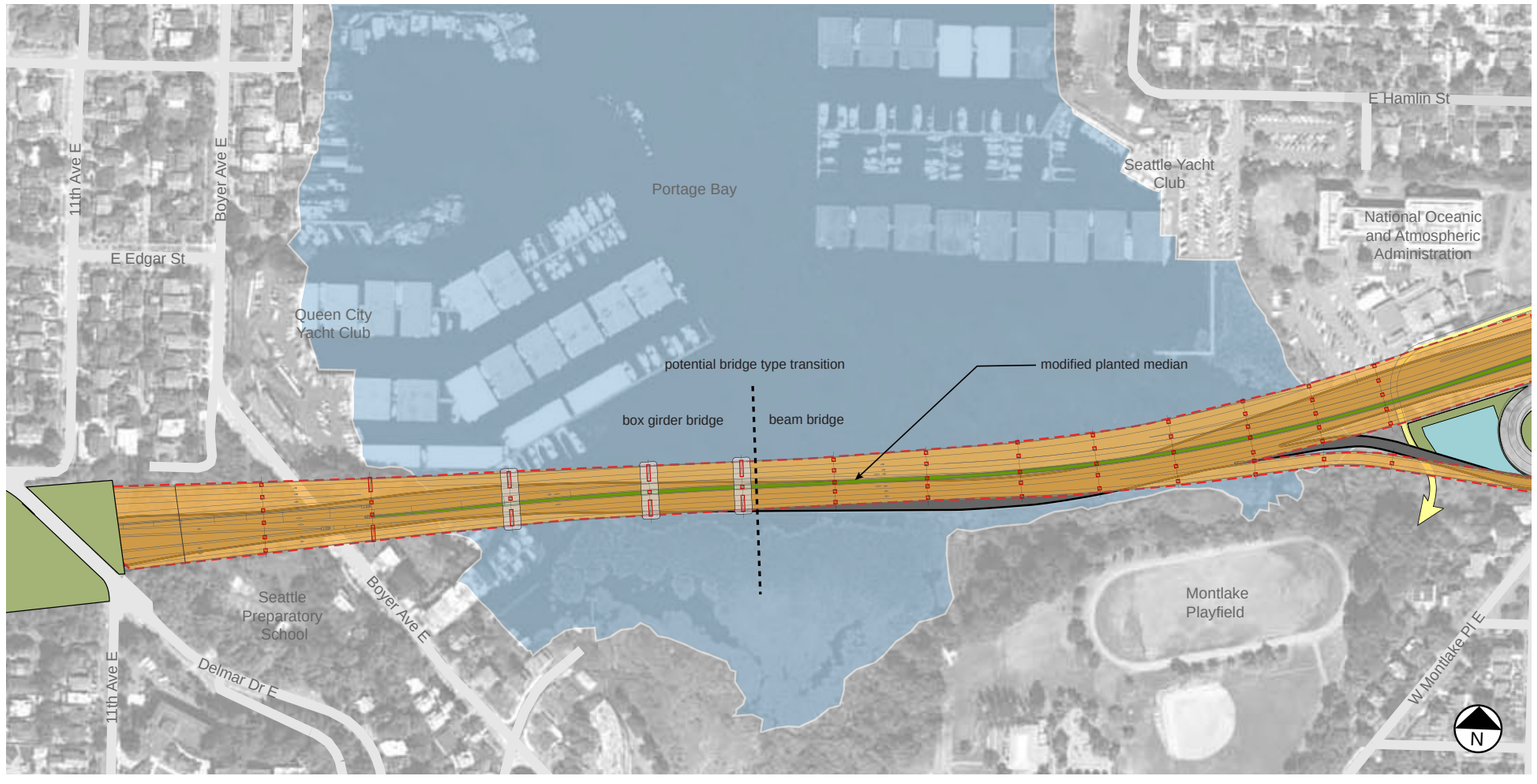
## Benefits

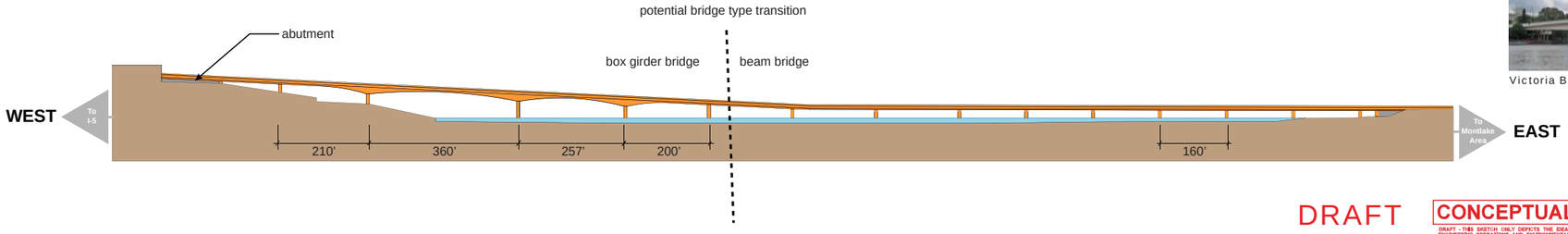
- Cost-efficient structure with moderate span lengths
- Variable depth at the columns provides curvilinear form

## Considerations

- Moderate span lengths create operational and construction impacts on west-end of bridge
- More in-water and hillside foundations in poor soils because more spans are required

### Bridge Footprint

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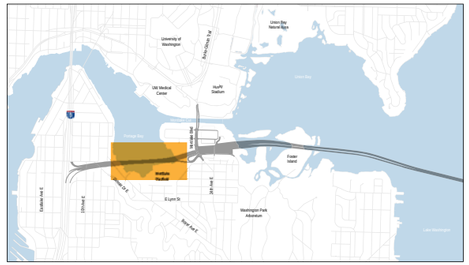

## Precedents

Folsom Dam Bridge Folsom, California

Queensborough Bridge Vancouver, BC

Victoria Bridge Queensland, Australia

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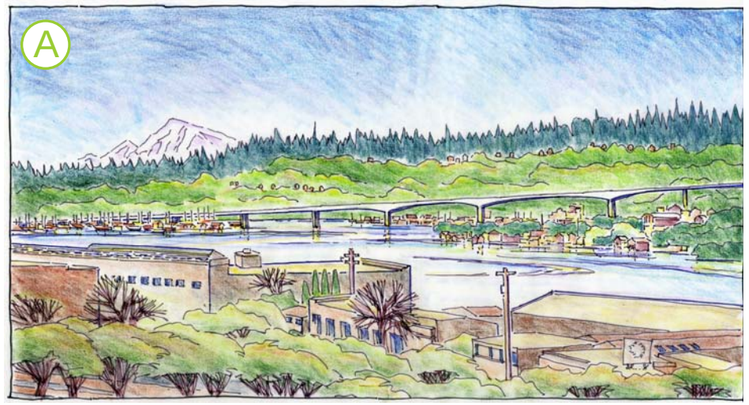
STATE ROUTE 520

# Portage Bay Bridge Views from Public Locations - Box Girder Option

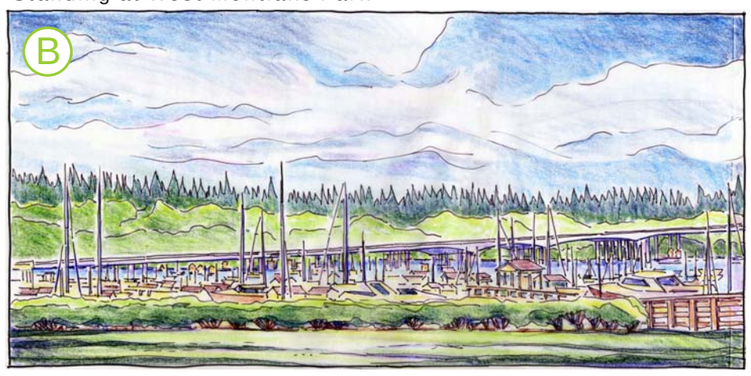
## Montlake Neighborhood and Mt. Rainier from University Bridge




### Existing View

Looking southeast from University Bridge

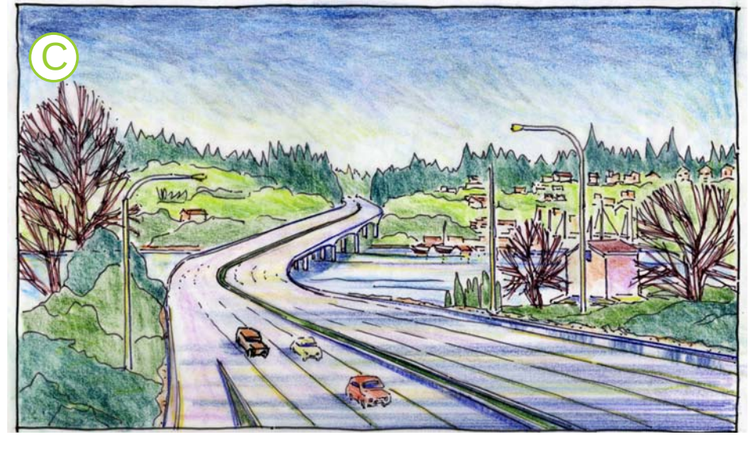
## Standing at West Montlake Park




### Existing View

Looking southwest from West Montlake Park

## Roanoke Neighborhood and Bridge from Montlake Boulevard E




### Existing View

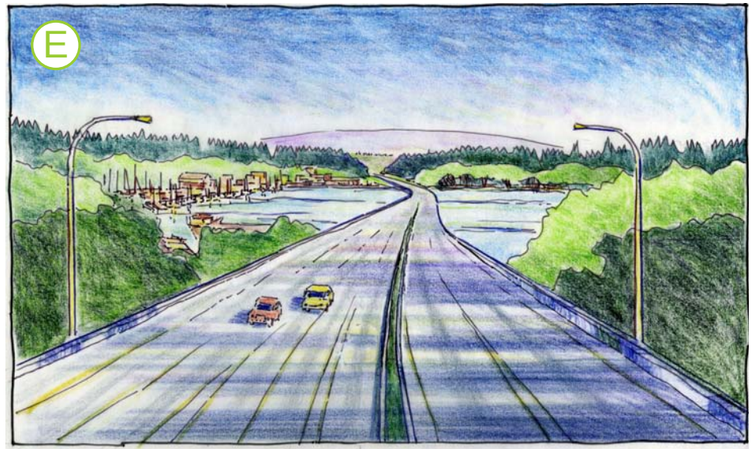
Looking west from Montlake Boulevard East

## Portage Bay and Roanoke Neighborhood from Montlake Playfield


### Existing View

Looking northwest from Montlake Playfield

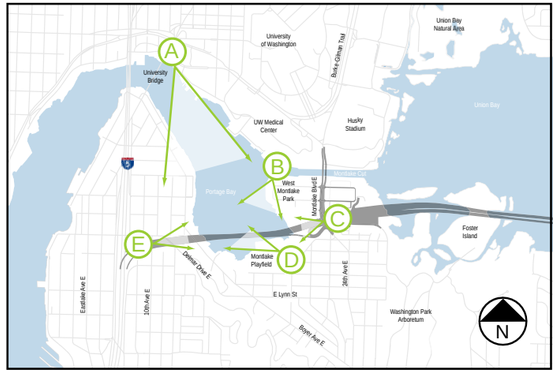
## Cascade Mountains and Montlake Neighborhood from Delmar Dr E




### Existing View

Looking east from Delmar Drive East

## View Location Map

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SR 520

# Portage Bay Bridge - Extradosed Option

## Description

The Extradosed bridge design option maintains the roadway operations of the baseline while being shifted slightly to the north to ease constructability issues.

### Over

- Two sets of lower height towers (approximately 65 feet above bridge deck) at west end of bridge

### Under

- One hillside foundation south of Boyer Street with a main span of 700 feet minimizing impact on the Queen City Yacht Club's operations
- Longer span reduces in-water foundations and allows improved visibility and water access
- Gap of 15 feet between bridge structures reduces scale of structure from below and allows light and air flow

### On

- Thick segmental beam bridge deck supported by cable stays reduces height of towers
- Eastern bridge type may consider a beam type to match the depth of the extradosed beam deck

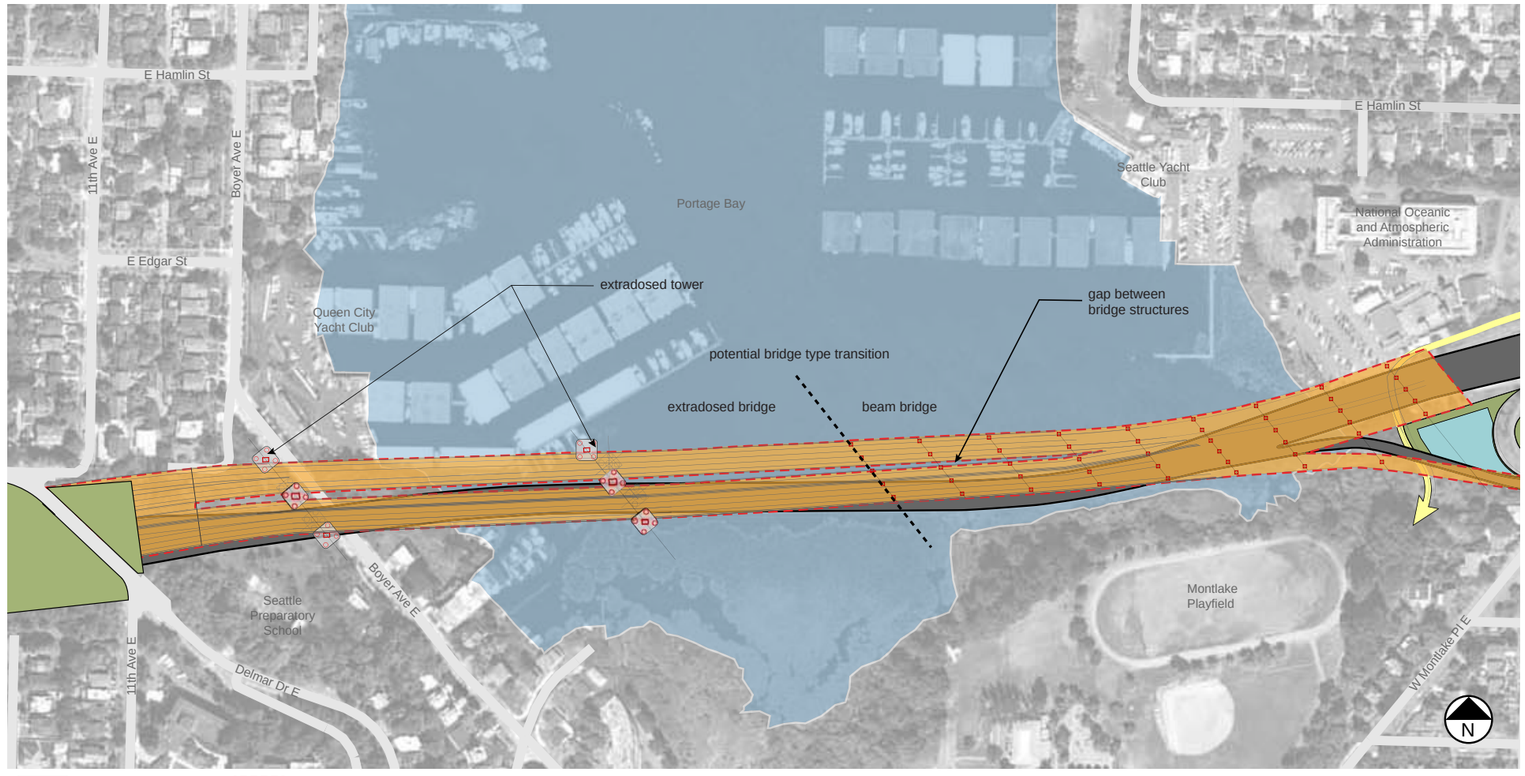
## Benefits

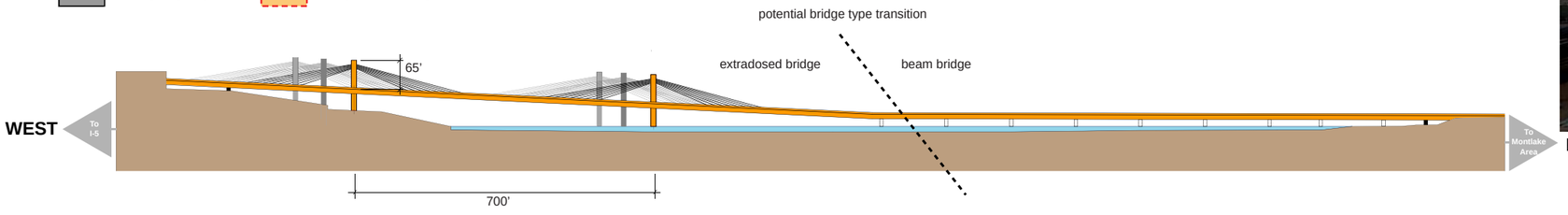
- Unique design concept, which would be a signature bridge at Portage Bay
- Hybrid structure combining elements of box girder and cable stay allows shorter support towers and a moderate scale above the deck

## Considerations

- More weight from the deck beam will require larger foundations
- Higher design complexity needs to stay within the budget

### Bridge Footprint

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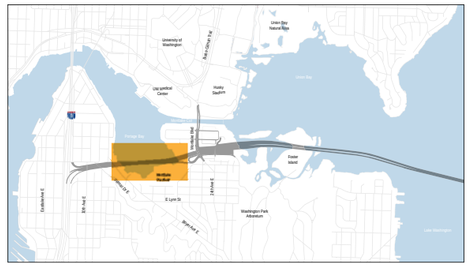

## Precedents

Pearl Harbor Memorial Bridge New Haven, Connecticut

Nivedita Setu Kolkata, India


Sixth Street Bridge Los Angeles, California (MacDonald Architects)

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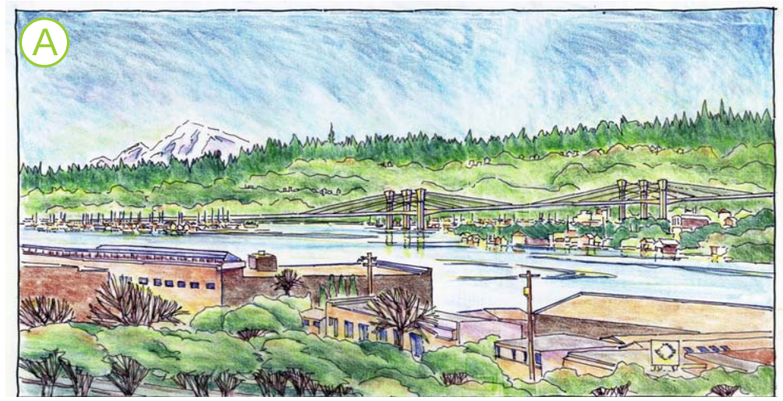
# Portage Bay Bridge Views from Public Locations - Extradosed Option

## Montlake Neighborhood and Mt. Rainier from University Bridge




### Existing View

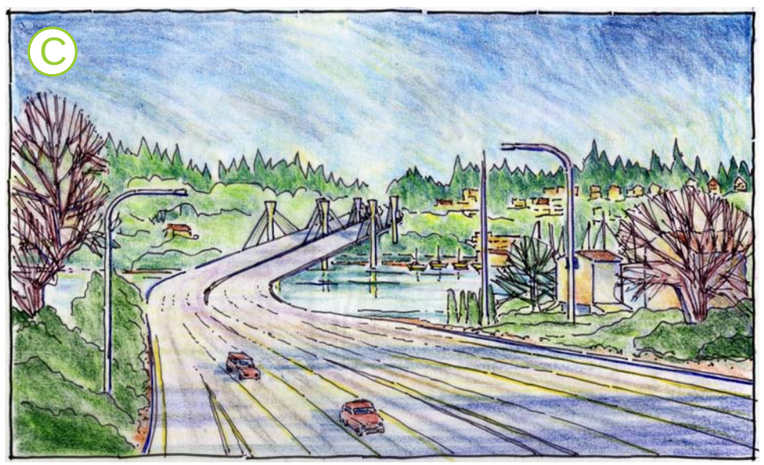
Looking southeast from University Bridge

## Standing at West Montlake Park


### Existing View

Looking southwest from West Montlake Park

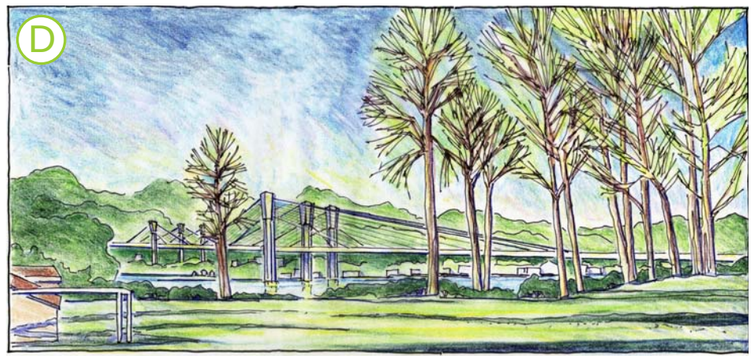
## Roanoke Neighborhood and Bridge from Montlake Boulevard East




### Existing View

Looking west from Montlake Boulevard East

## Portage Bay and Roanoke Neighborhood from Montlake Playfield




### Existing View

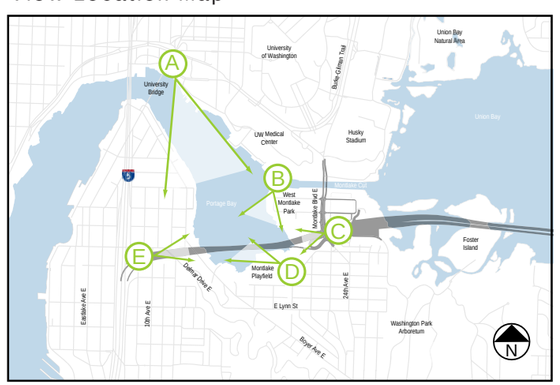
Looking northwest from Montlake Playfield

## Cascade Mountains and Montlake Neighborhood from Delmar Dr East


### Existing View

Looking east from Delmar Drive East

## View Location Map

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STATE ROUTE 520

# Portage Bay Bridge - Cable Stay Option

## Description

The Cable Stay bridge design option maintains the roadway operations of the baseline while being shifted slightly to the north to ease constructability issues.

### Over

- Two sets of moderate height cable stay towers (approximately 180 feet tall) at west end of bridge

### Under

- One hillside foundation west of Boyer Avenue East with main span of 800 feet minimizing impacts on Queen City Yacht Club operations
- Longer span reduces in-water foundations and allows improved visibility and water access across Portage Bay
- Gap of 15 feet between bridge structures reduces scale of structure from below and allows light and air flow

### On

- Thin, light bridge deck supported by cable stays
- Eastern bridge type beam bridge with common span lengths

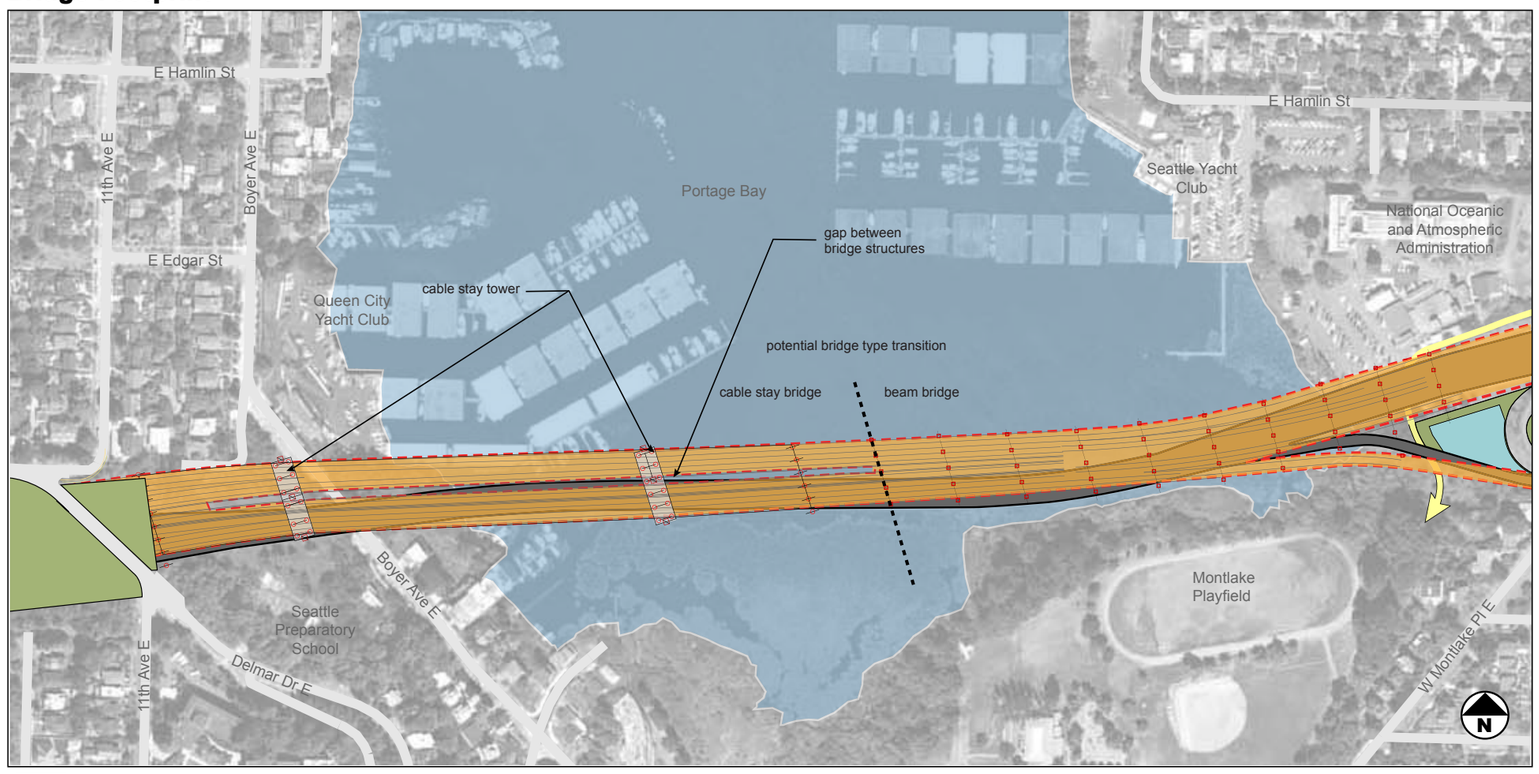
## Benefits

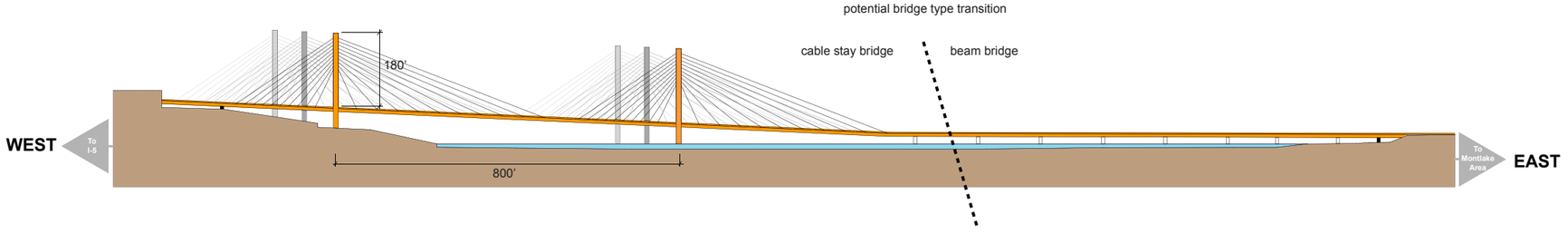
- Provides a regional signature bridge at Portage Bay
- Represents a modern design with lightness and transparency
- The long span opens the bay below for access and visibility
- Less material and less in-water work

## Considerations

- Higher design complexity needs to stay within the budget
- The towers must have rational and beautiful design

### Bridge Footprint

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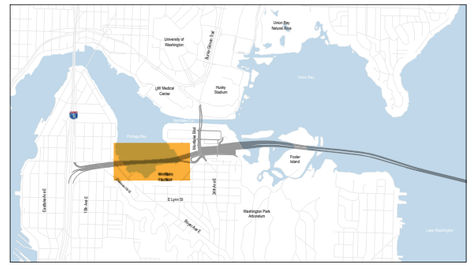

## Precedents



**Anzac Bridge** Sydney, Australia

**Erasmus Bridge** Rotterdam, Netherlands

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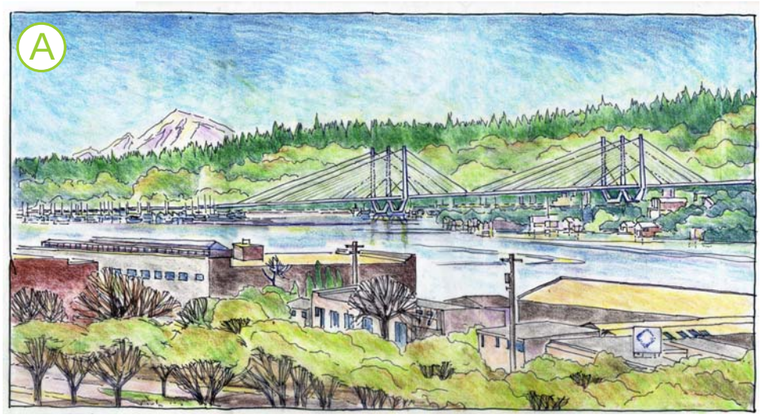
# Portage Bay Bridge Views from Public Locations - Cable Stay Option

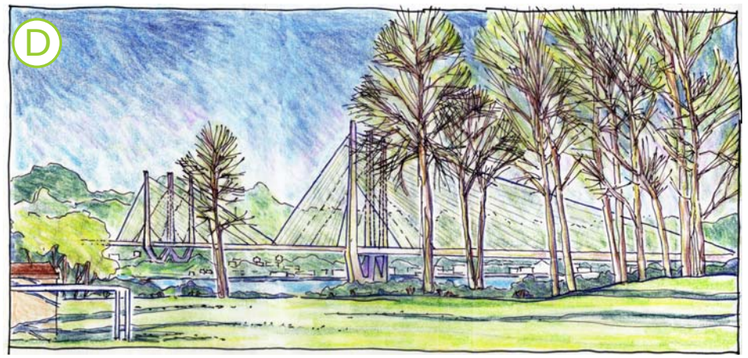
## Montlake Neighborhood and Mt. Rainier from University Bridge




### Existing View

Looking southeast from University Bridge

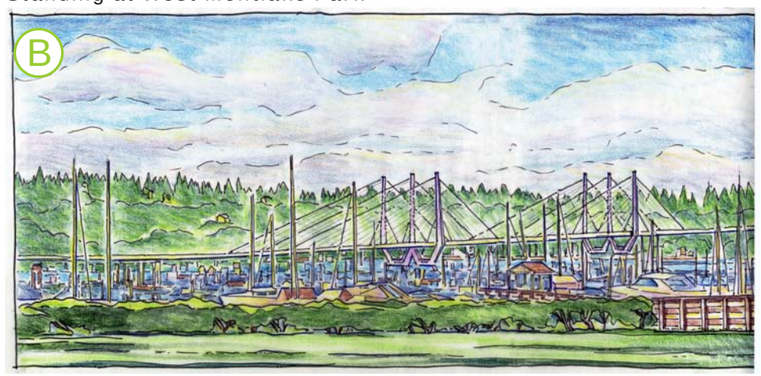
## Portage Bay and Roanoke Neighborhood from Montlake Playfield




### Existing View

Looking northwest from Montlake Playfield

## Standing at West Montlake Park




### Existing View

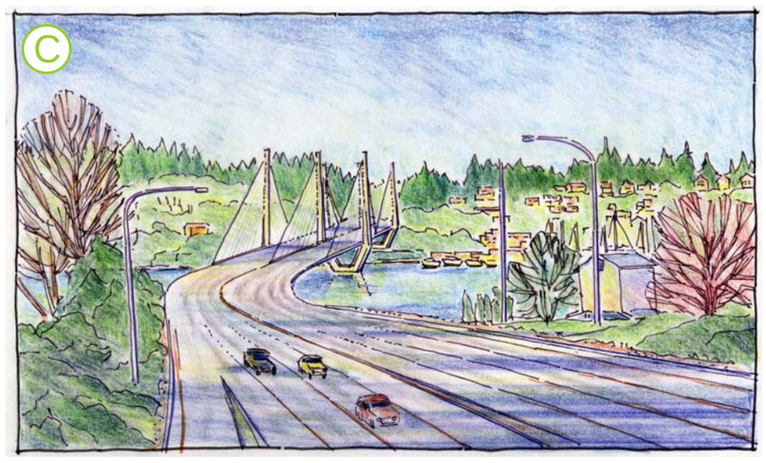
Looking southwest from West Montlake Park

## Cascade Mountains and Montlake Neighborhood from 10th Ave E


### Existing View

Looking east from 10th Avenue East

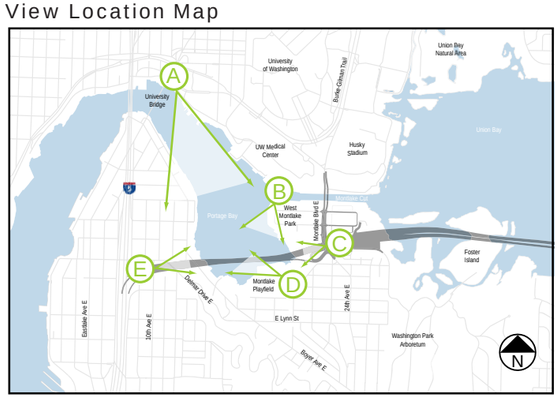
## Roanoke Neighborhood and Bridge from Montlake Boulevard E




### Existing View

Looking west from Montlake Boulevard E

## View Location Map

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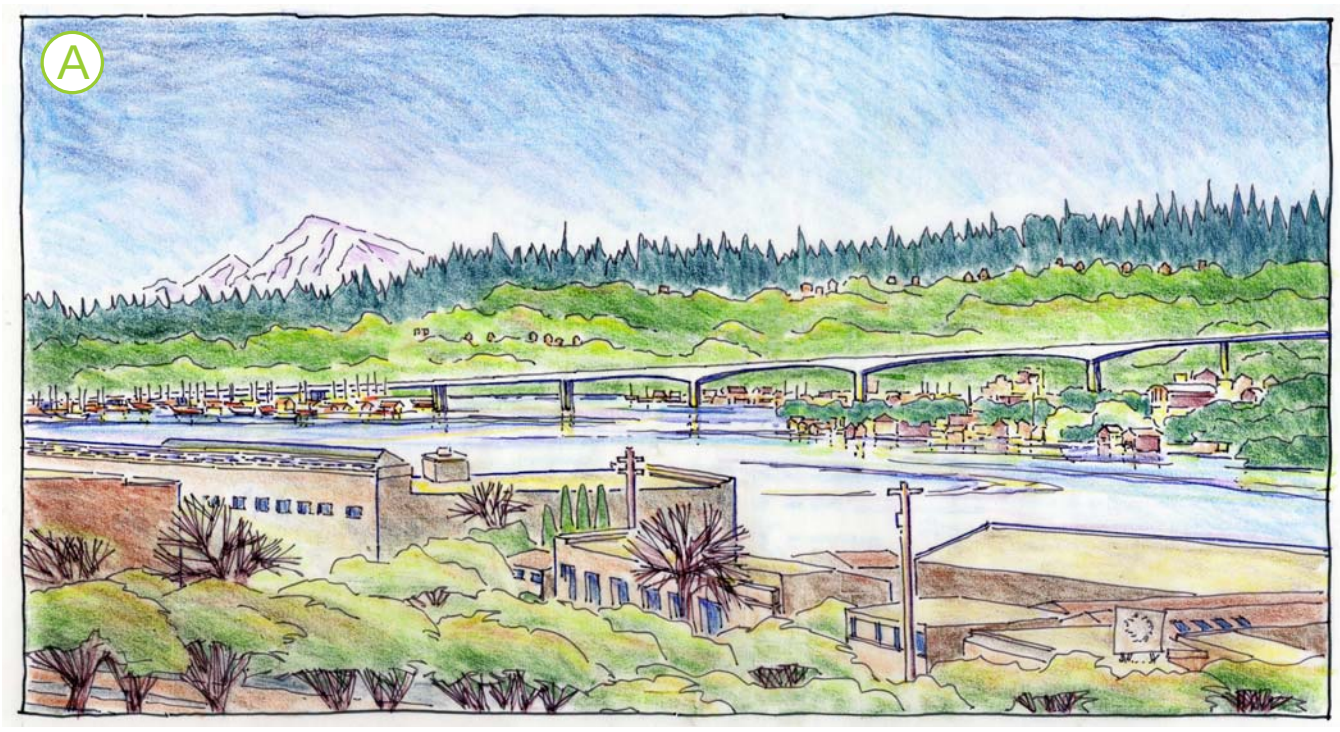
STATE ROUTE 520

# Portage Bay Bridge - Comparing Bridge Options from One View

## Montlake Neighborhood and Mt. Rainier from University Bridge

### Box Girder

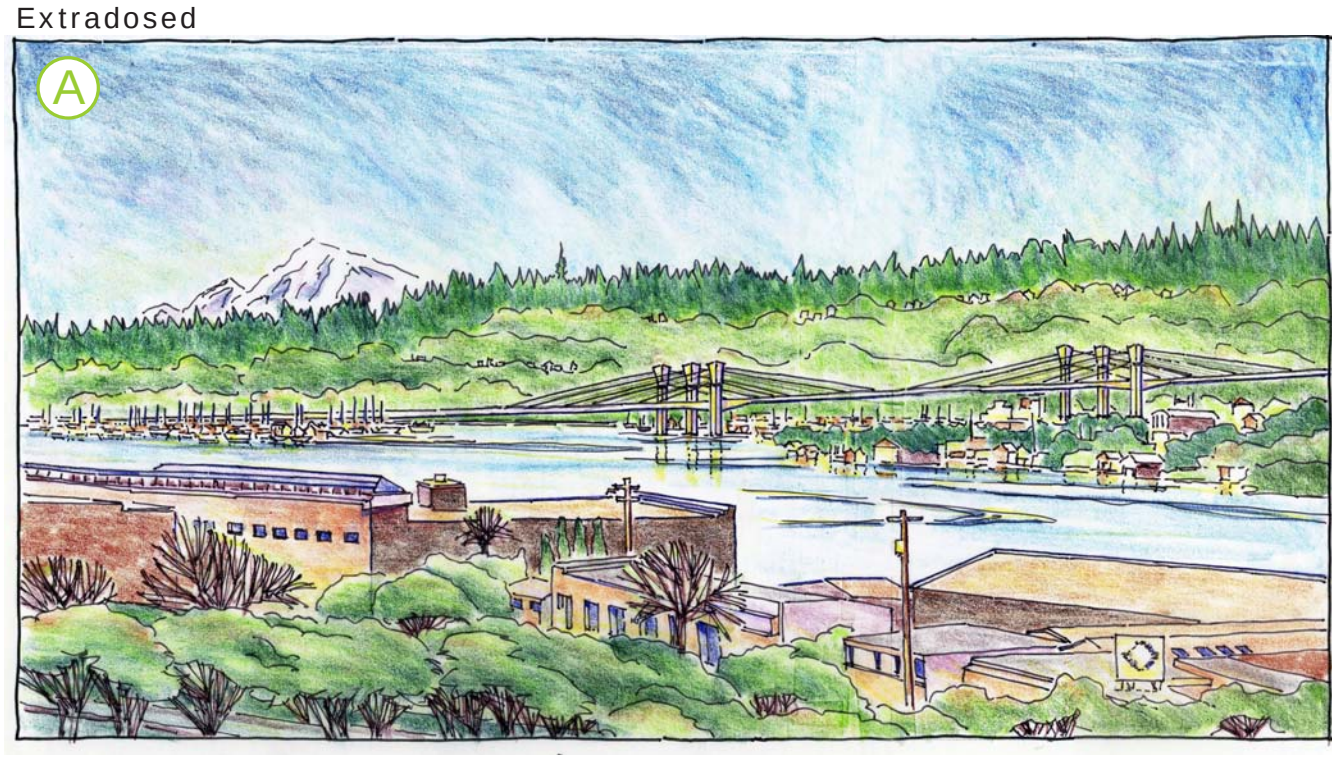



### Existing View

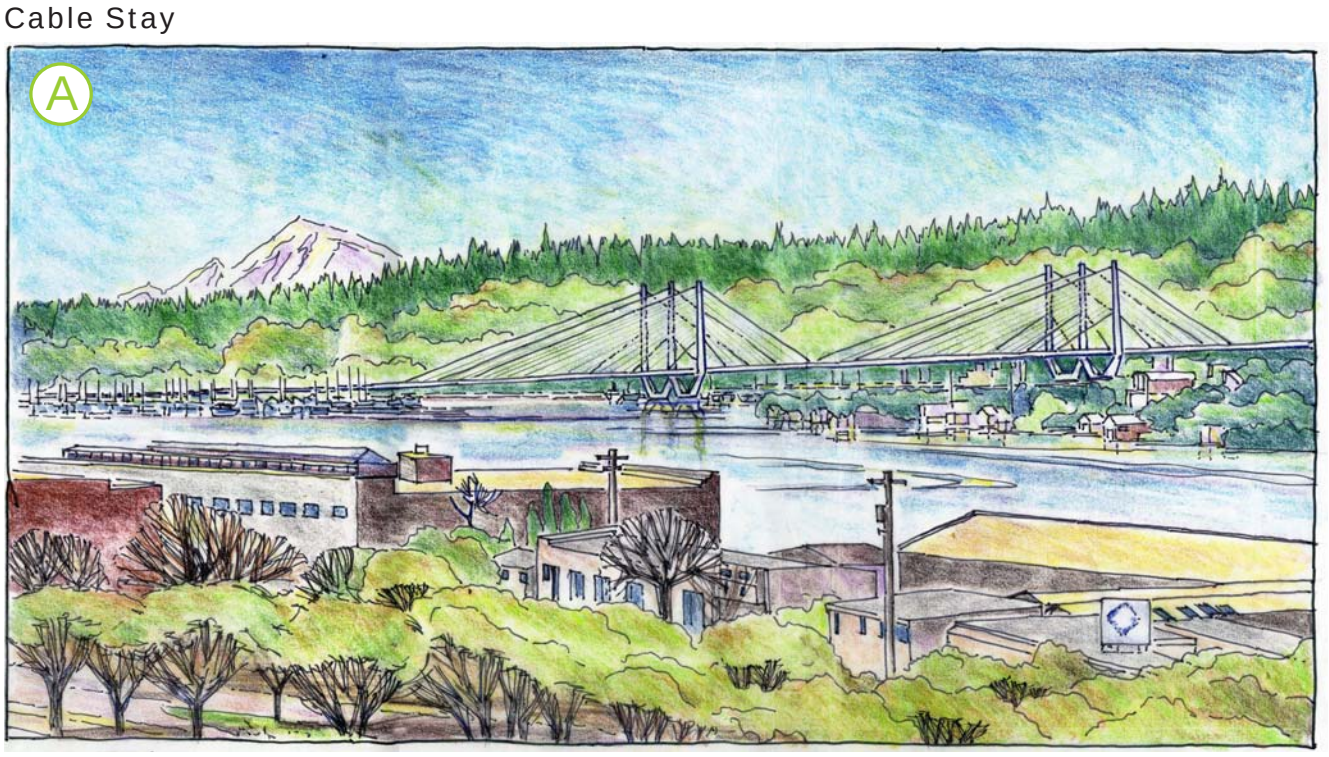
Existing view from University Bridge looking southeast toward Portage Bay Bridge

### View Location Map


### Extradosed




### Cable Stay

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STATE ROUTE 520

# Portage Bay Bridge West Underbridge Area - Preferred Option

## Description

This option for improving safety and usability of the underbridge area between Delmar Drive East and Boyer Avenue East proposes a ramp/path from Delmar Drive East to Boyer Avenue East to improve access and an area for recreation to help activate the area. SR 520 Program commitments are to:

- If affected by construction, replace the existing stairway north of the bridge to 11th Avenue East
- Provide Americans with Disabilities Act (ADA) access from Delmar Drive East or 11th Avenue East to Roanoke Avenue East or Boyer Avenue East

## Design Goals

- Manage underbridge areas to be safe, maintainable and useable as a community asset, if possible
- Provide useable, efficient connections between neighborhoods and to downtown Seattle
- Minimize impacts to adjacent properties

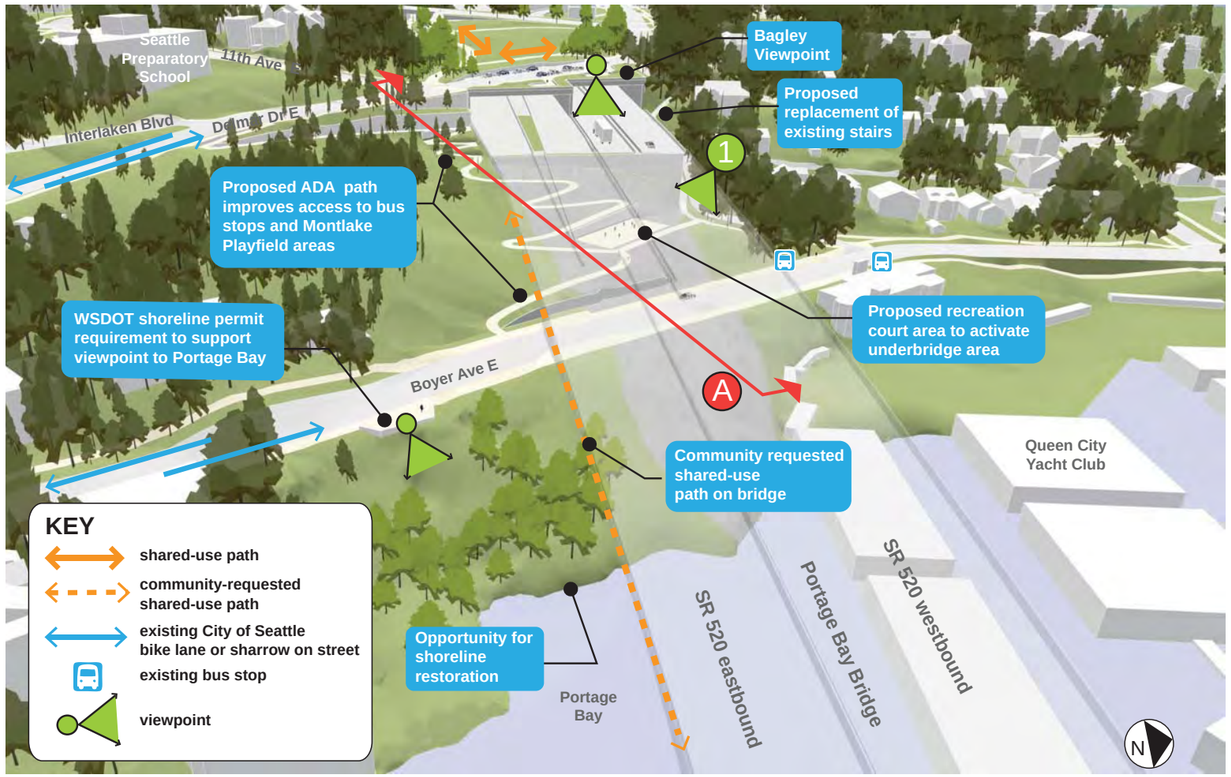
## Considerations

- Steep slopes and unstable soils require study for construction
- Structure shades the area and requires further study to determine where sufficient sunlight and rain will fall to allow for planting
- Minimize or avoid effects to school and park property

## Benefits

- Connections and activity in underbridge areas improves safety by implementing Crime Prevention Through Environmental Design (CPTED) principles
- Increases community connectivity

## Birdseye View




## Perspective 1 view south underbridge

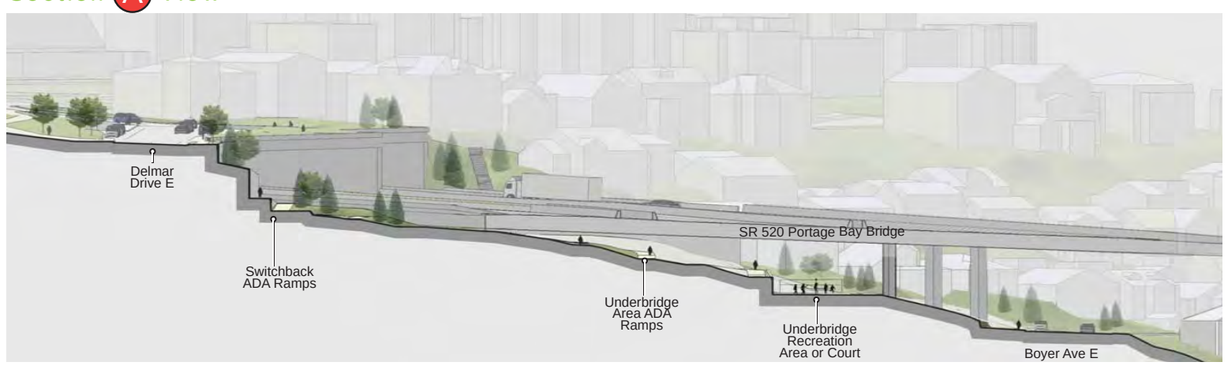
A new pedestrian path and volleyball court under the bridge connects Boyer Avenue East with Delmar Drive East to activate the underbridge area to make it feel safer with opportunities for providing additional lighting, planting at edges, hardscape and wayfnding

## Precedents

Mission Creek Park Underbridge volleyball, basketball and paths San Francisco, CA

I-35 Bridge Underbridge paths and limestone ballast surface treatment Minneapolis, MN

## Section A View




## Existing Conditions

Underbridge area looking northwest from Boyer Avenue East

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July 2012

Washington State Department of Transportation

STATE ROUTE 520

# Portage Bay Bridge East Underbridge Area - West Montlake to Shoreline

## Description

An overview of existing conditions and exploration of options for treatment or possible uses of the underbridge area and options for making pedestrian connections between Montlake Boulevard and the Bill Dawson Trail to Montlake Playfield.

## Design Goals

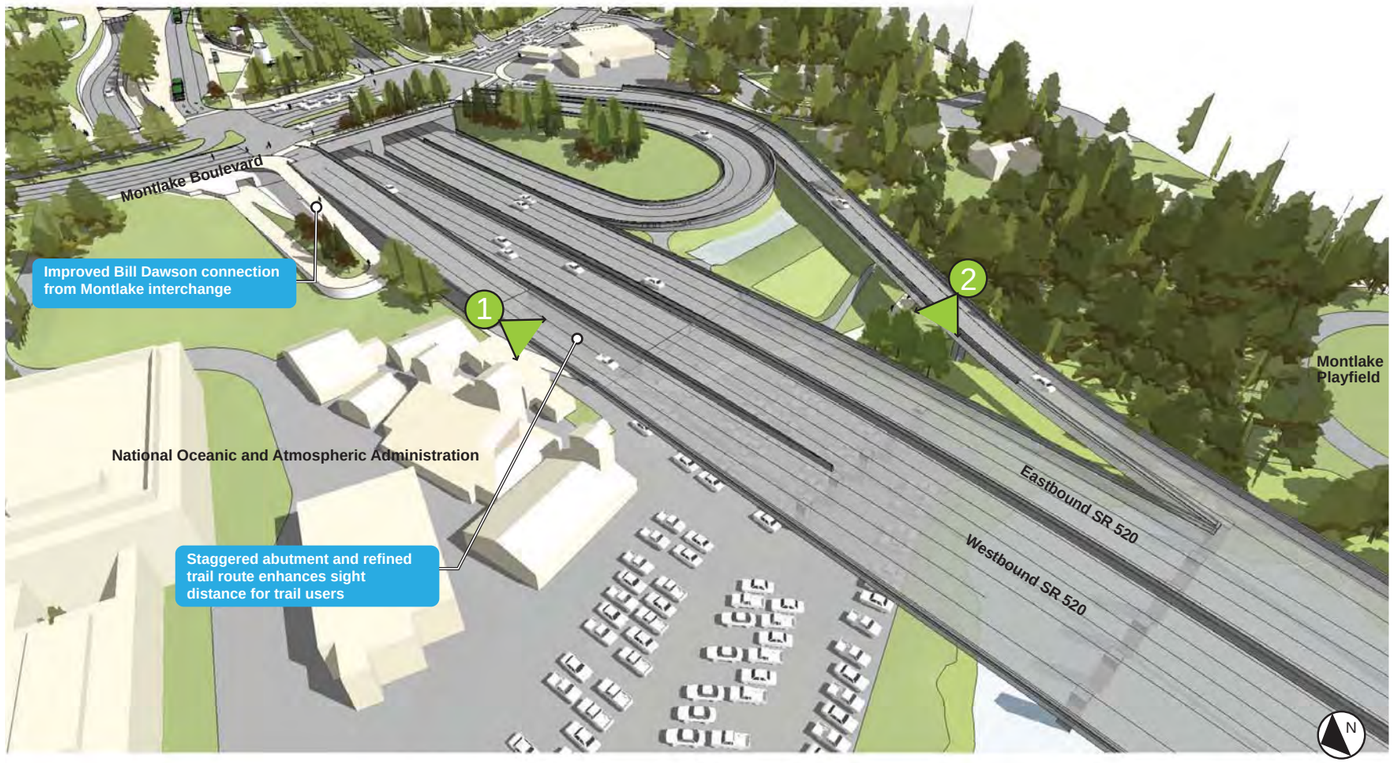
- Provide a safe connection to Montlake Playfield and Bill Dawson Trail from the SR 520 regional shared use path
- Manage under bridge areas to be safe, maintainable and usable as a community asset

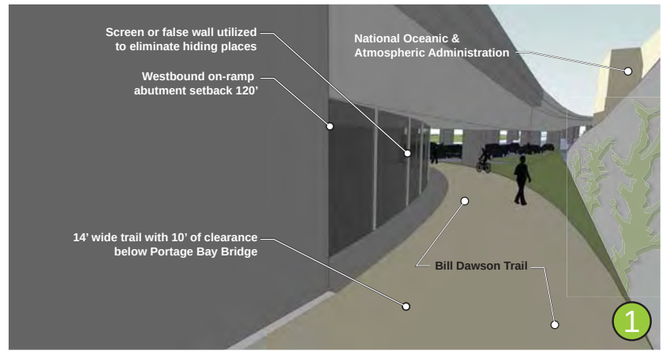
## Benefits

- Improved sight distance for trail users
- Stepped abutment allows for trail to meet design standards for trail width and turning radius

## Next Steps

- Continue to refine trail alignment to improve sightlines and user safety.
- Define a common design approach for the look and feel of underbridge areas.

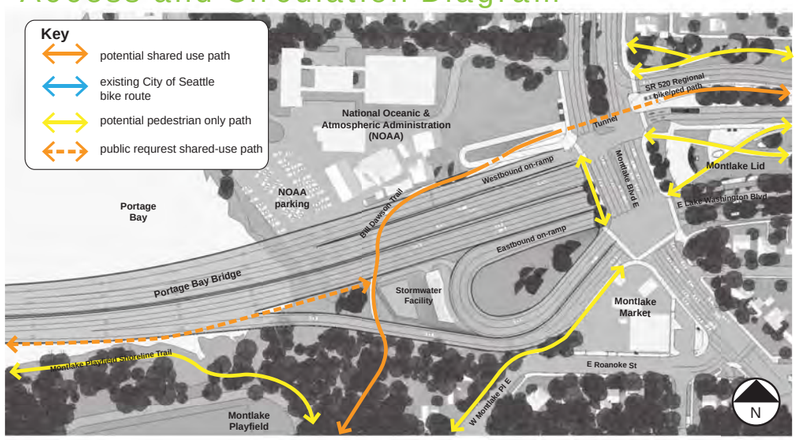


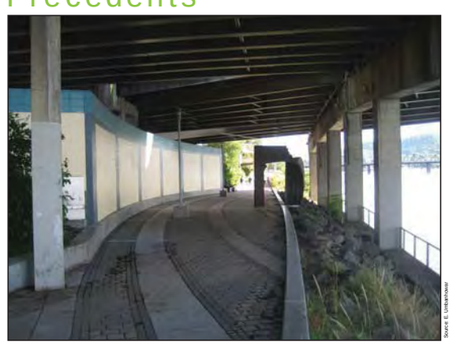

*Looking west along the Bill Dawson Trail near the Portage Bay Bridge abutment*


*Looking north along the Bill Dawson Trail south of SR 520*

## Access and Circulation Diagram




## Precedents



East Bank Esplanade Portland OR

Buffalo Bayou Promenade Houston TX

DRAFT
May 2012

CONCEPTUAL
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Washington State Department of Transportation

STATE ROUTE 520

# Portage Bay Bridge East Underbridge Area - Preferred Option

## Description

An overview of existing conditions and exploration of options for treatment or possible uses of the underbridge area and options for making pedestrian connections between Montlake Boulevard and the Bill Dawson Trail to Montlake Playfield.

## Design Goals

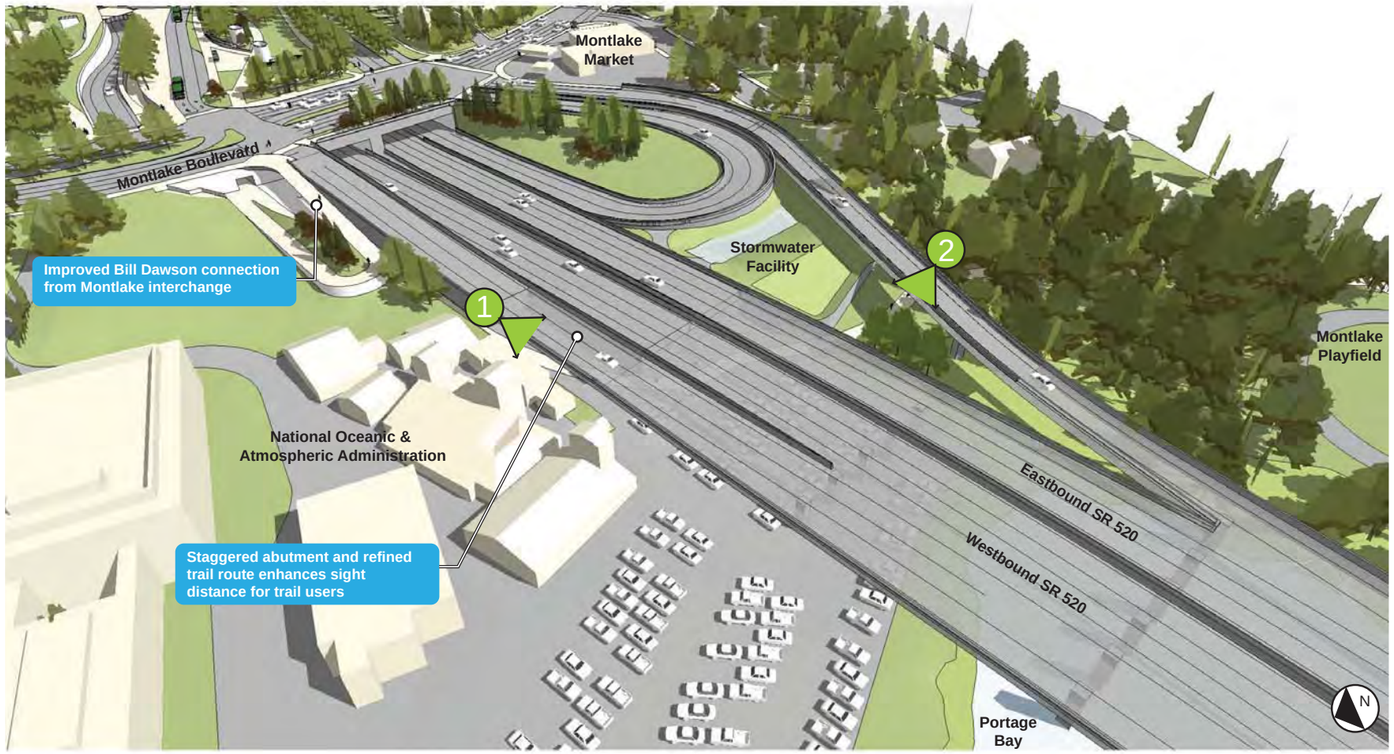
- Provide a safe connection to Montlake Playfield and Bill Dawson Trail from the SR 520 regional shared-use path
- Manage under bridge areas to be safe, maintainable and usable as a community asset

## Benefits

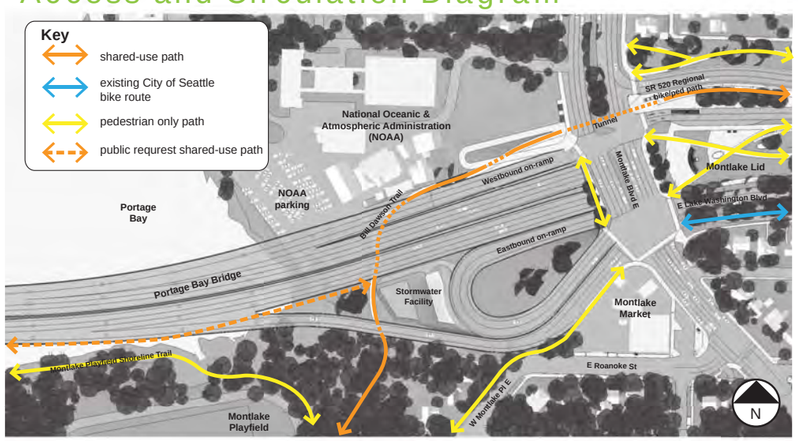
- Improved sight distance for trail users
- Stepped abutment allows for trail to meet design standards for trail width and turning radius

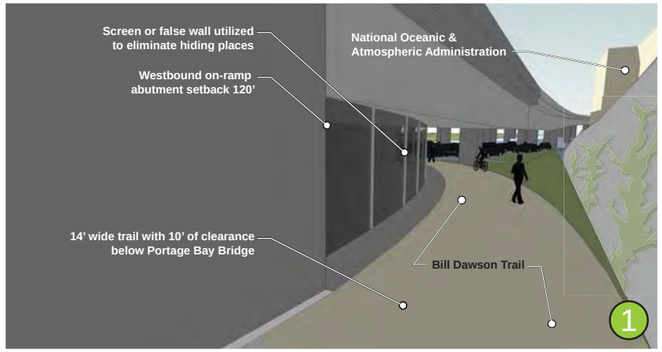
## Next Steps

- Continue to refine trail alignment to improve sightlines and user safety
- Define a common design approach for the look and feel of underbridge areas

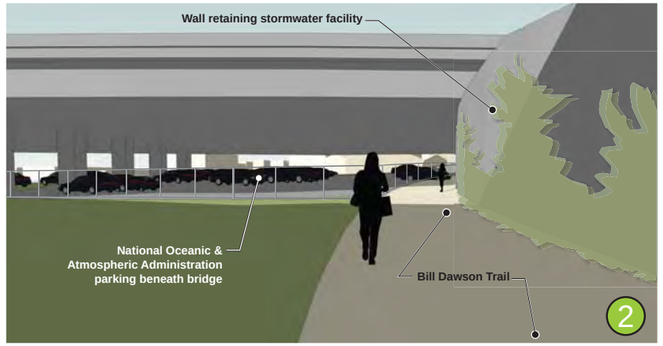



## Access and Circulation Diagram




*Looking west along the Bill Dawson Trail near the Portage Bay Bridge abutment*




*Looking north along the Bill Dawson Trail south of SR 520*

## Precedents

East Bank Esplanade Portland, OR

Buffalo Bayou Promenade Houston, TX

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May 2012

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Washington State Department of Transportation

STATE ROUTE 520