

SR 520 Technical Work Session

Museum of History and Industry

August 19, 2008

Agenda

- Welcome and Meeting Overview
- Overview of SR 520 Construction
- Portage Bay Bridge Construction Approaches
- High Capacity Transit Update
- Health Impact Assessment Update
- Preliminary Drafts Visuals for Alternatives A, K and L
- Next Steps

Overview of Construction

- Key considerations
- Construction sequencing
- Questions and answers

Overview of Construction

- **Key Considerations:**
 - Traffic conditions
 - Staging areas
 - Activities (techniques and methods)
 - Environment; in-water work, noise, light

- **Construction Sequencing:**
 - Alternative A
 - Alternative K
 - Alternative L

Key Considerations: Traffic Conditions

- **Other Area Projects:**
 - I-405 congestion relief projects
 - Sound Transit Husky Stadium Light Rail Station
 - Alaskan Way Viaduct
 - Other local projects and developments
- **520 Project Construction:**
 - Peak periods
 - Off-peak periods
 - Long term closures
 - Temporary bridges
 - Traffic management

Key Considerations: Staging Areas

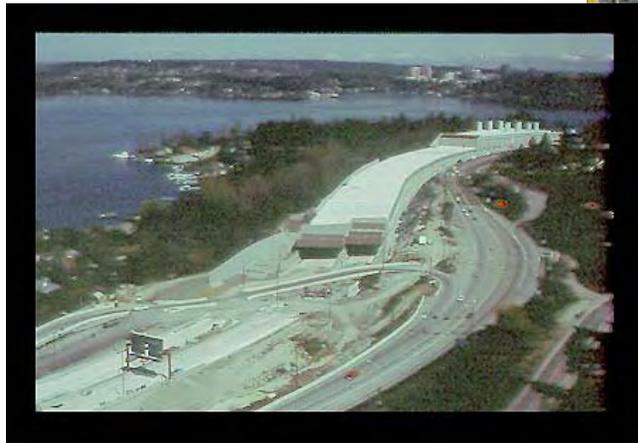
- **Staging areas:**
 - Site access
 - Limited space
 - Water
 - Parks
 - Wetlands
 - Residential
 - Business



Key Considerations: Construction Activities

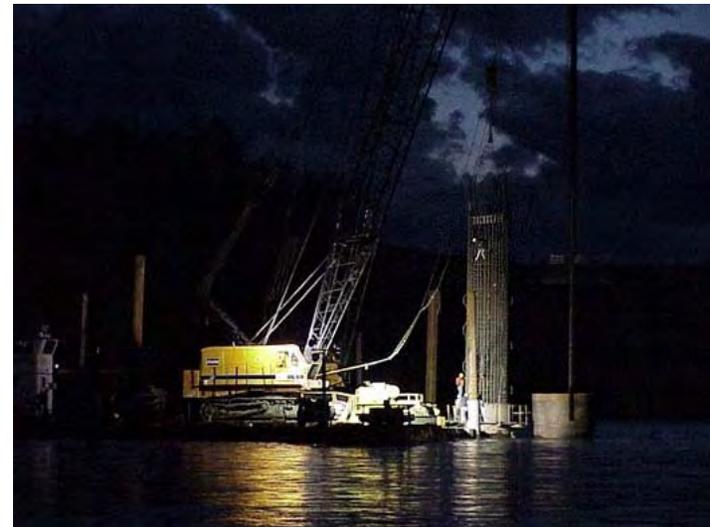
- **Lid and tunnel construction:**
 - Excavation
 - Retaining walls
 - Structure support piers
 - Bridge spans

- **Major bridge construction:**
 - Work bridges and barges
 - Cofferdams
 - Pile driving



Key Considerations: Environment

- **In-water work window**
- **Noise**
- **Lighting**

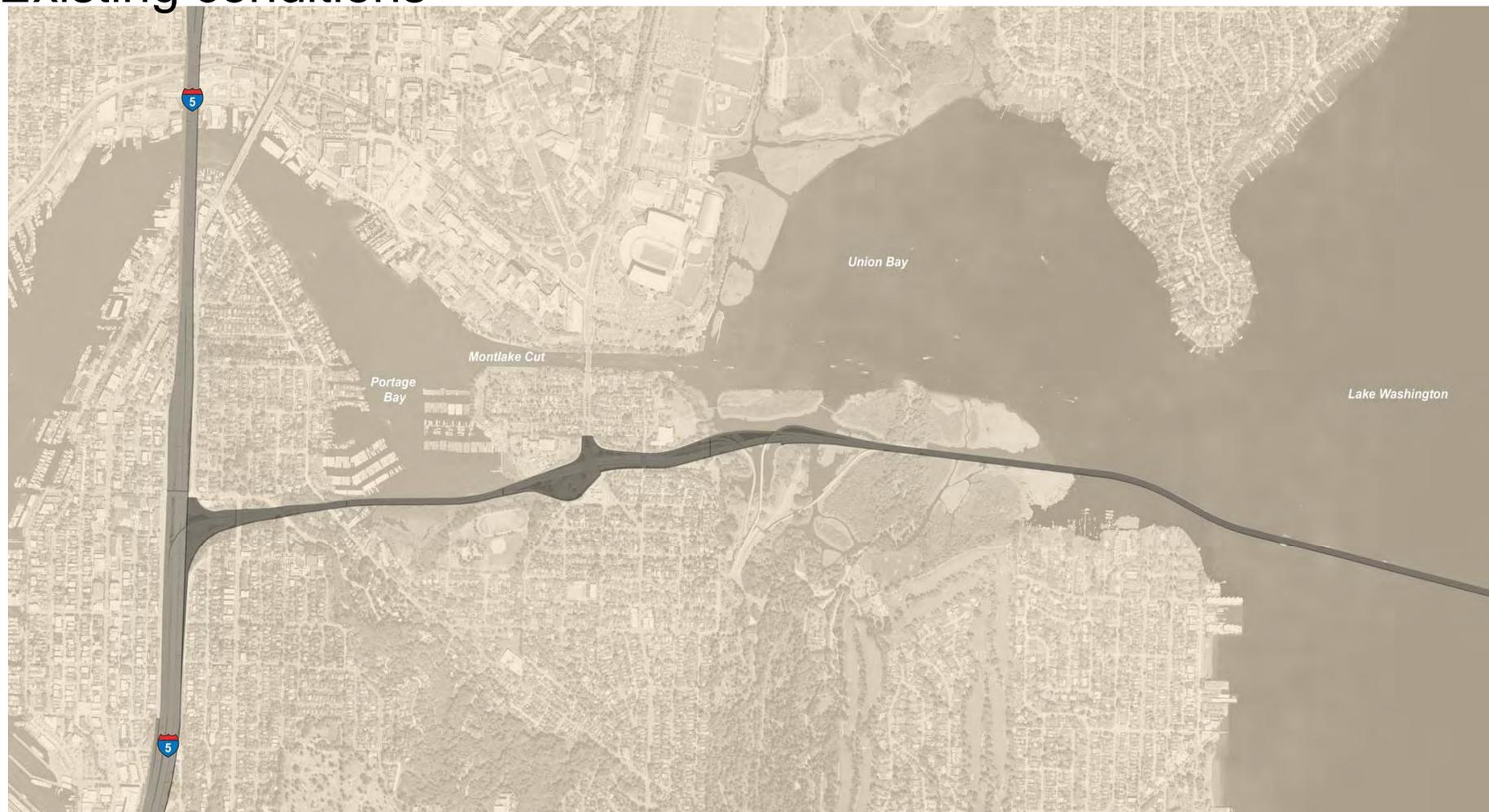


Construction Sequencing

- Alternative A
- Alternative K
- Alternative L

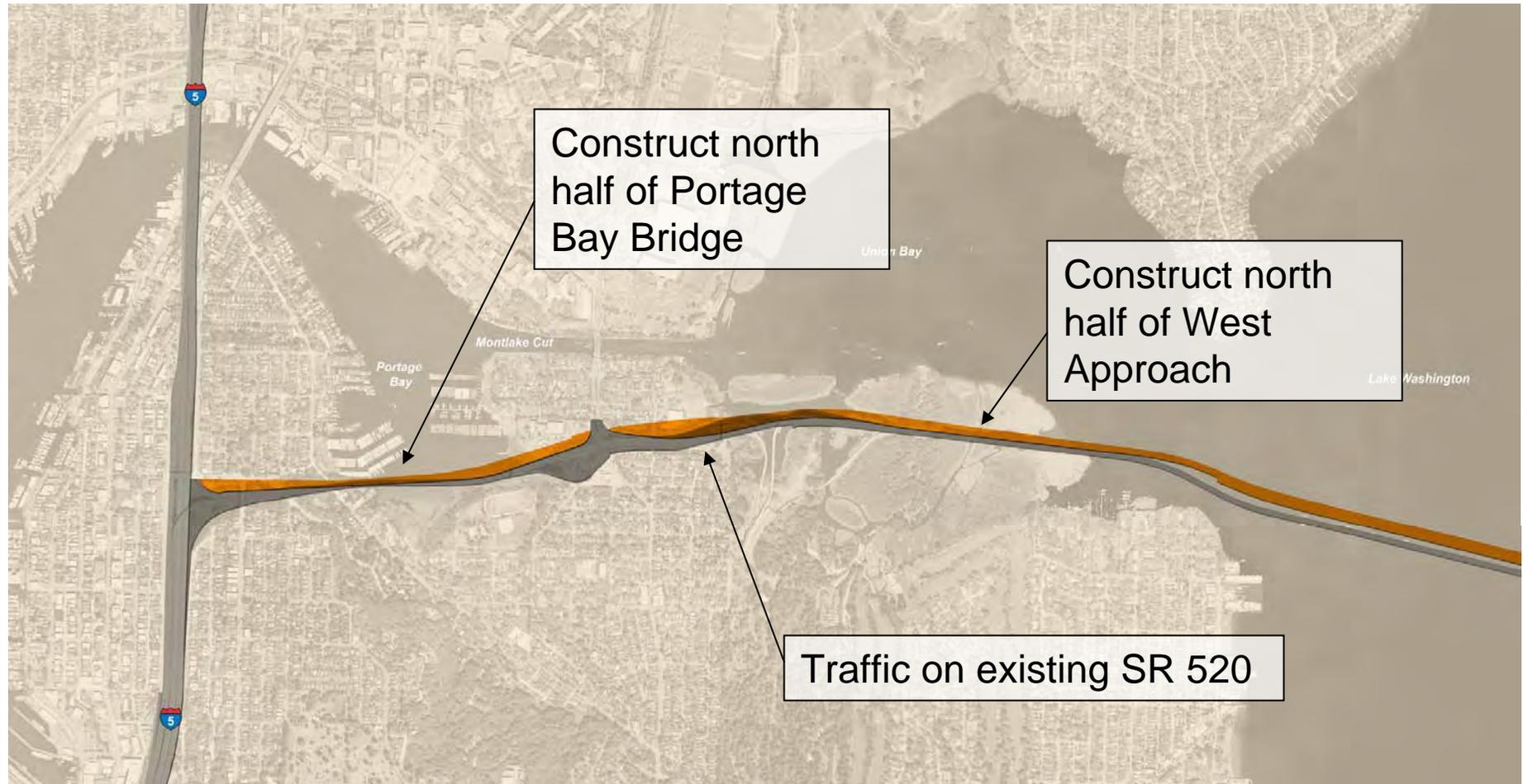
Alternative A: Construction Sequence

Existing conditions



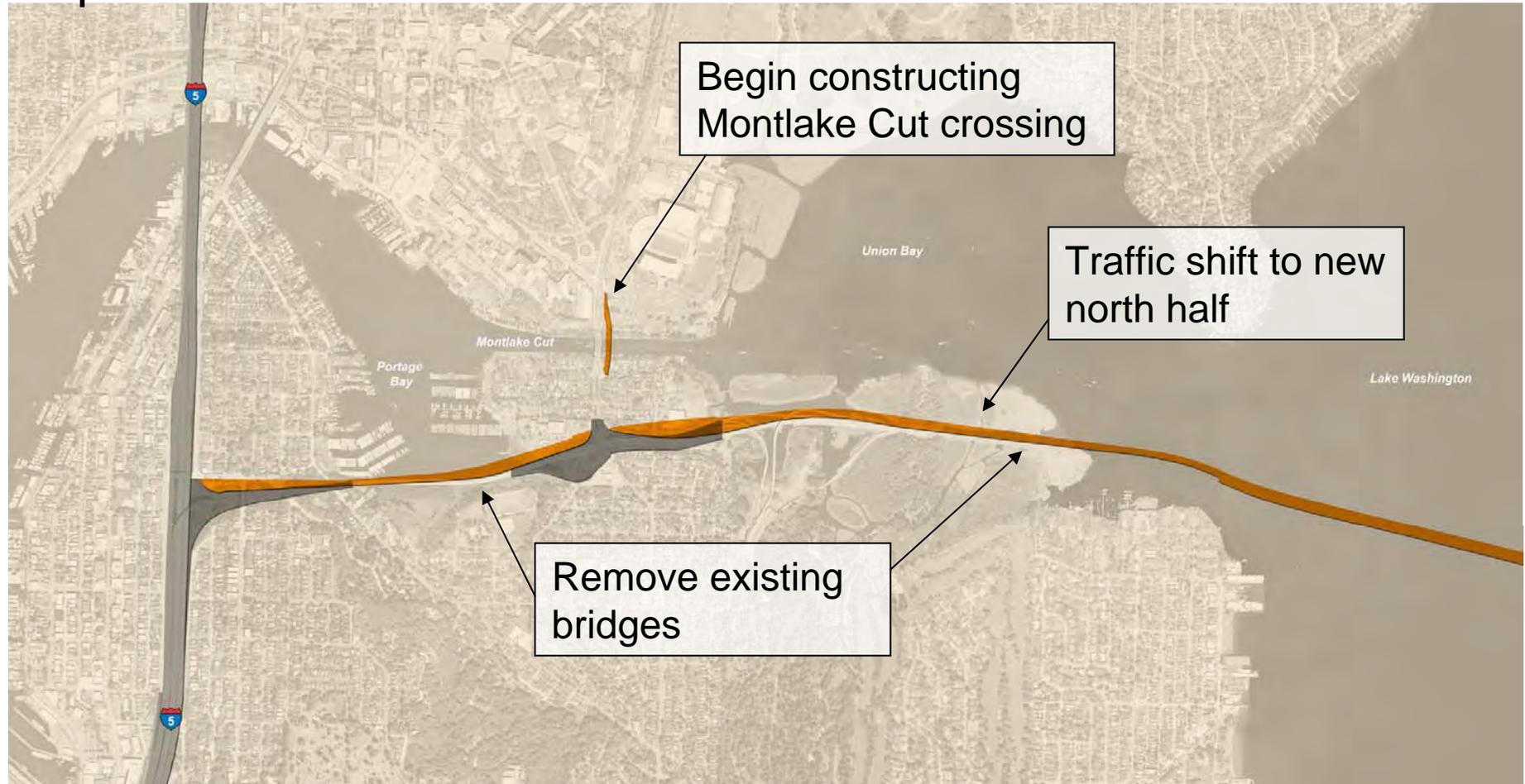
Alternative A

Step 1: Construct north half



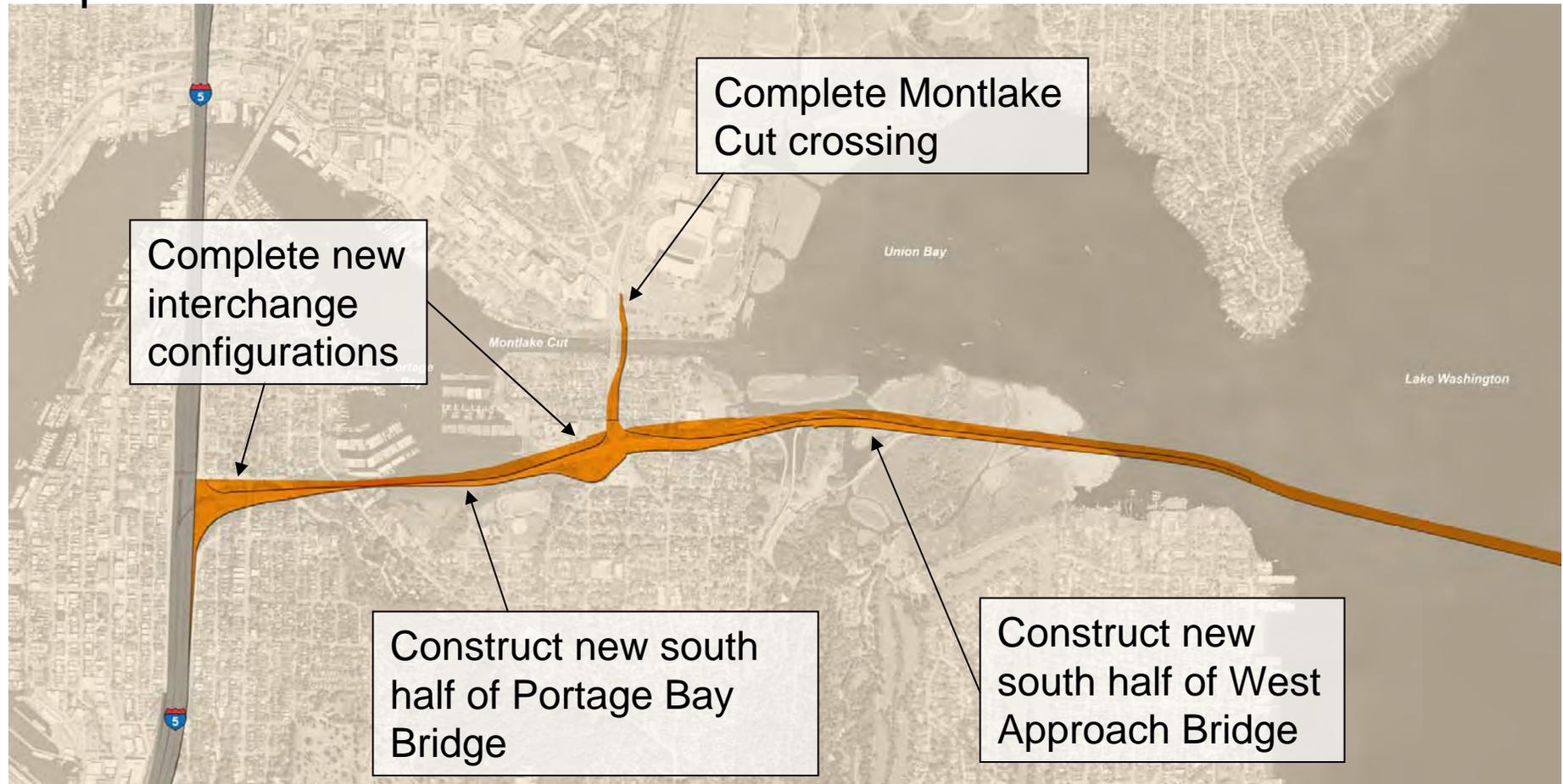
Alternative A

Step 2: Shift traffic



Alternative A

Step 3: Construct south half



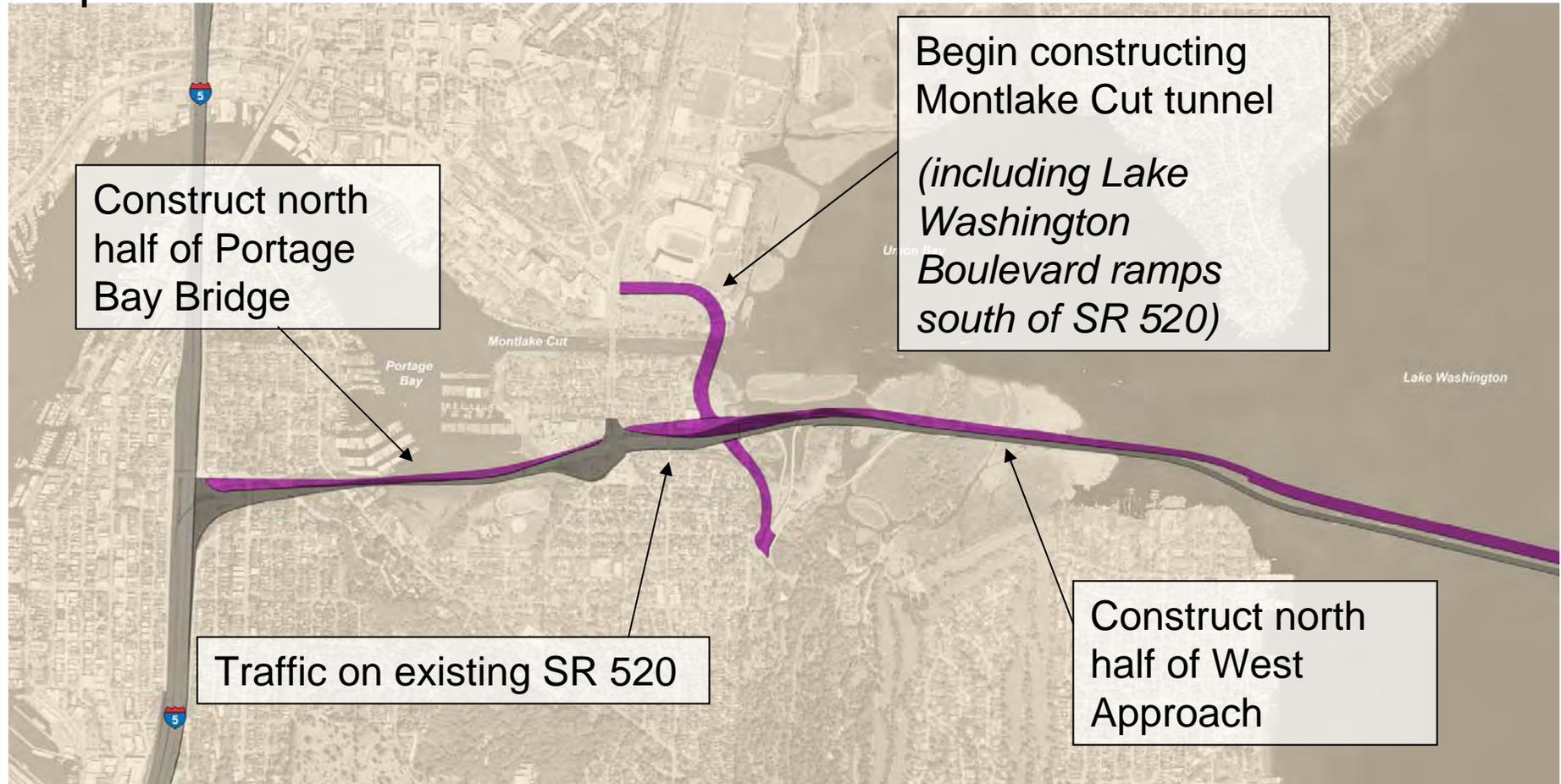
Alternative K: Construction Sequence

Existing conditions



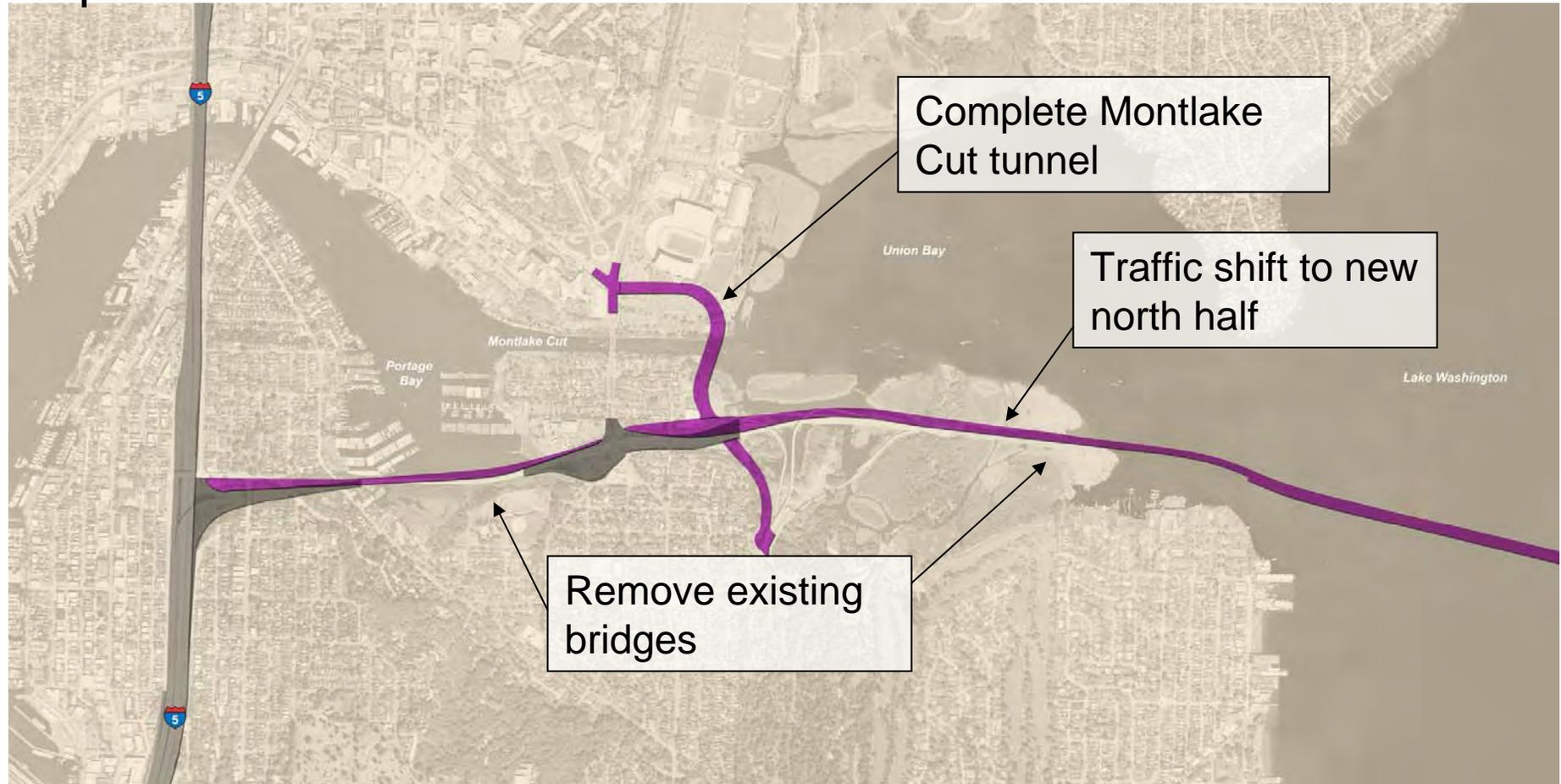
Alternative K

Step 1: Construct north half and tunnel



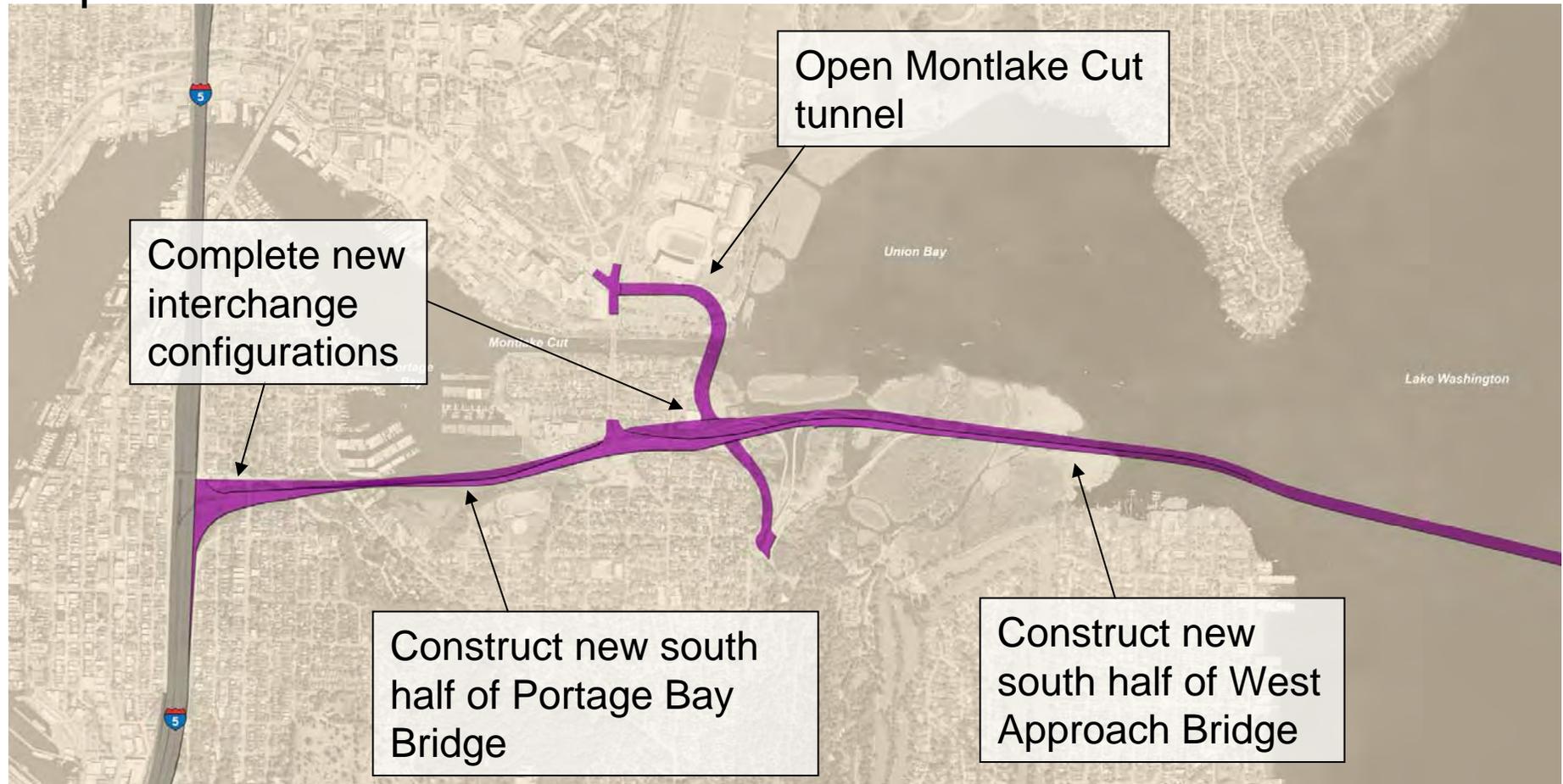
Alternative K

Step 2: Shift traffic



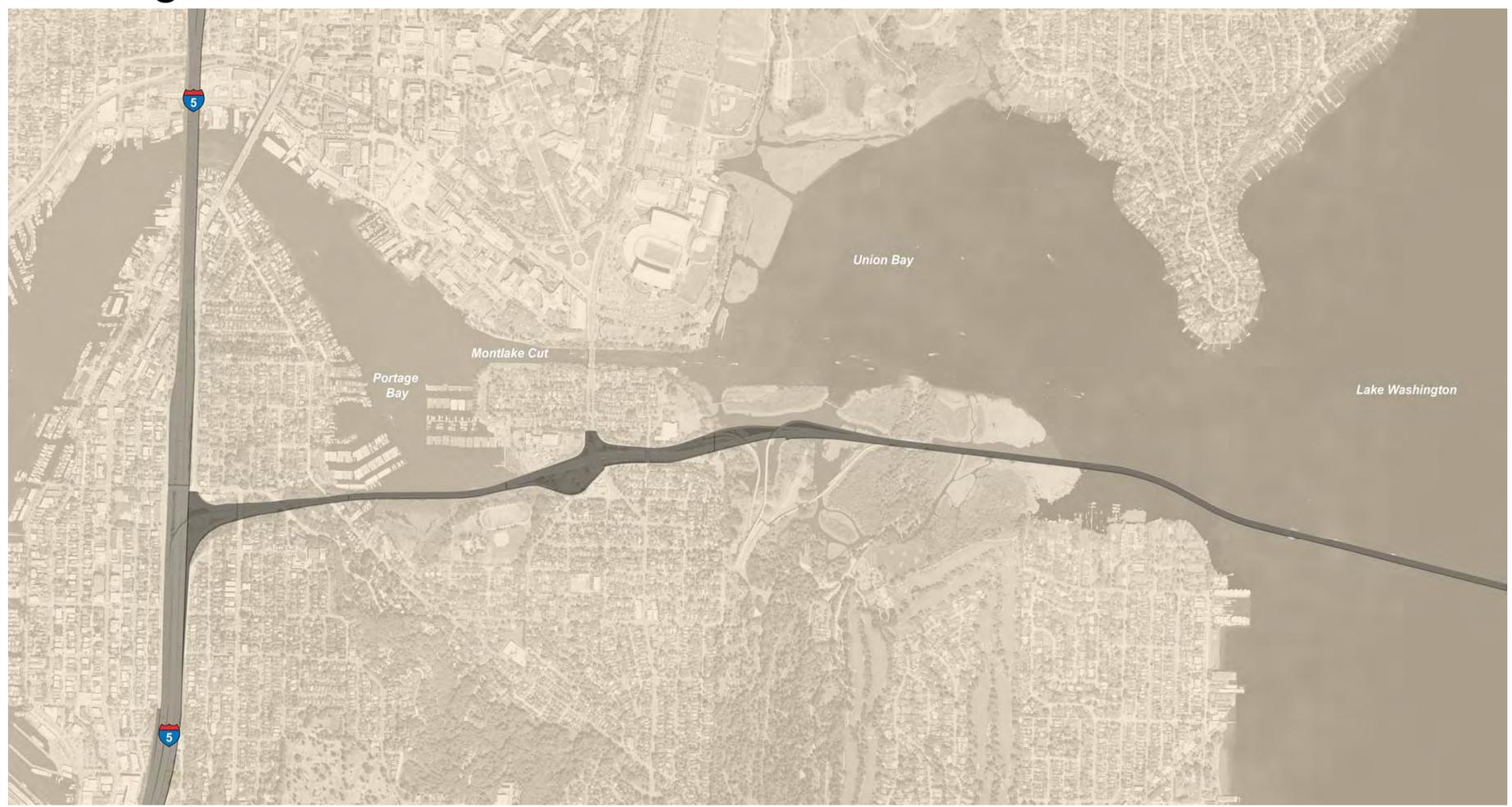
Alternative K

Step 3: Construct south half



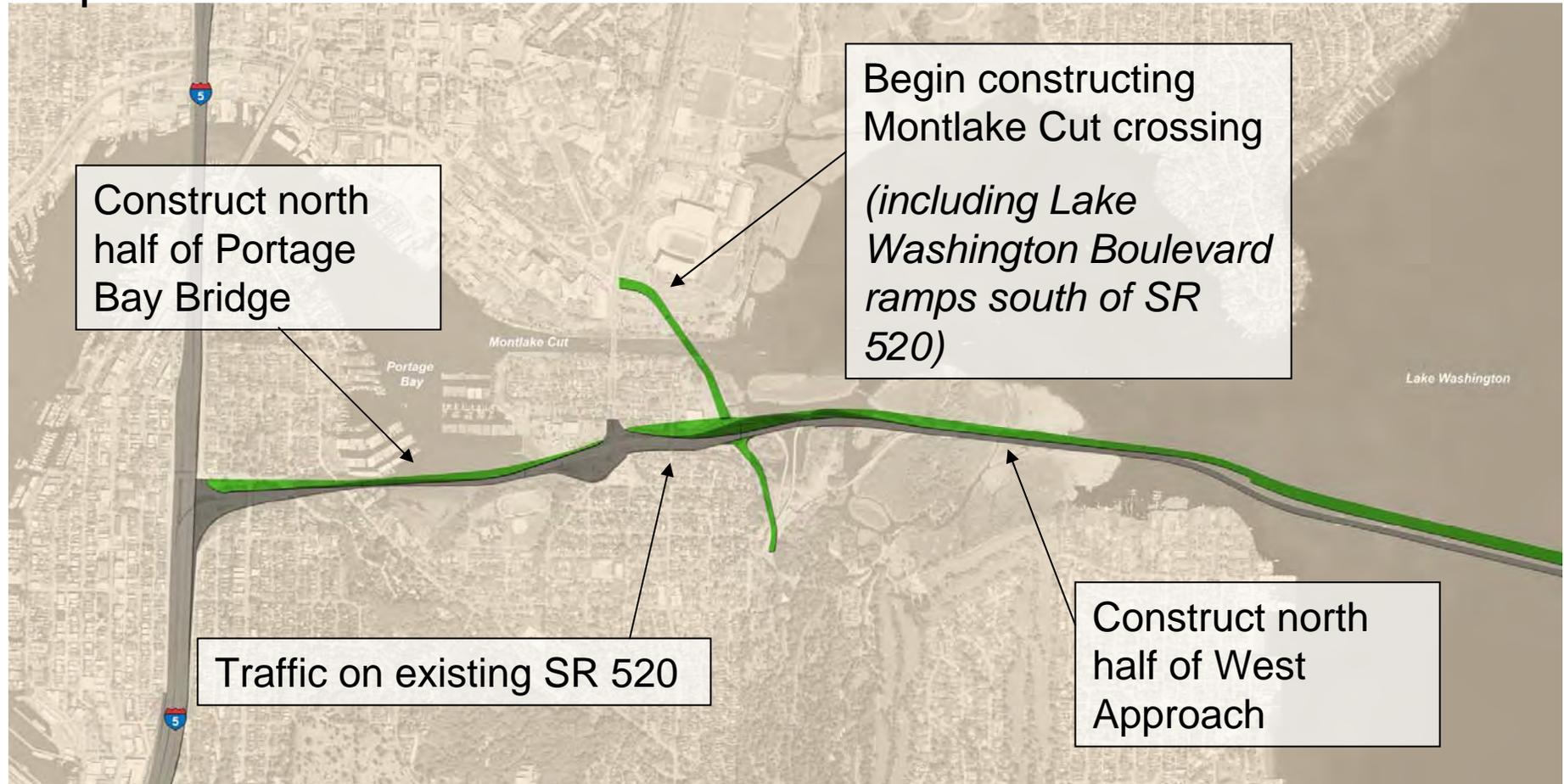
Alternative L: Construction Sequence

Existing conditions



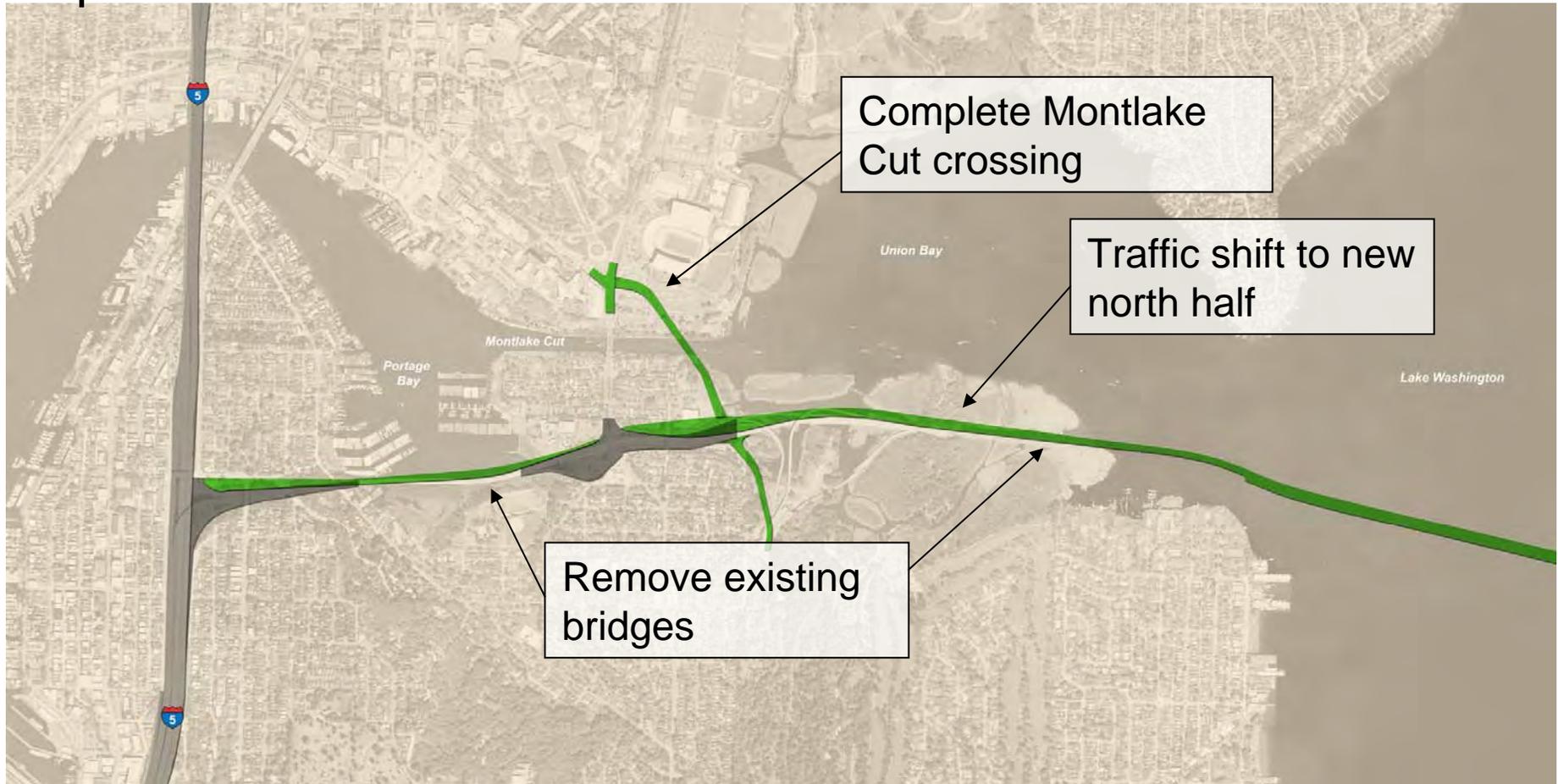
Alternative L

Step 1: Construct north half



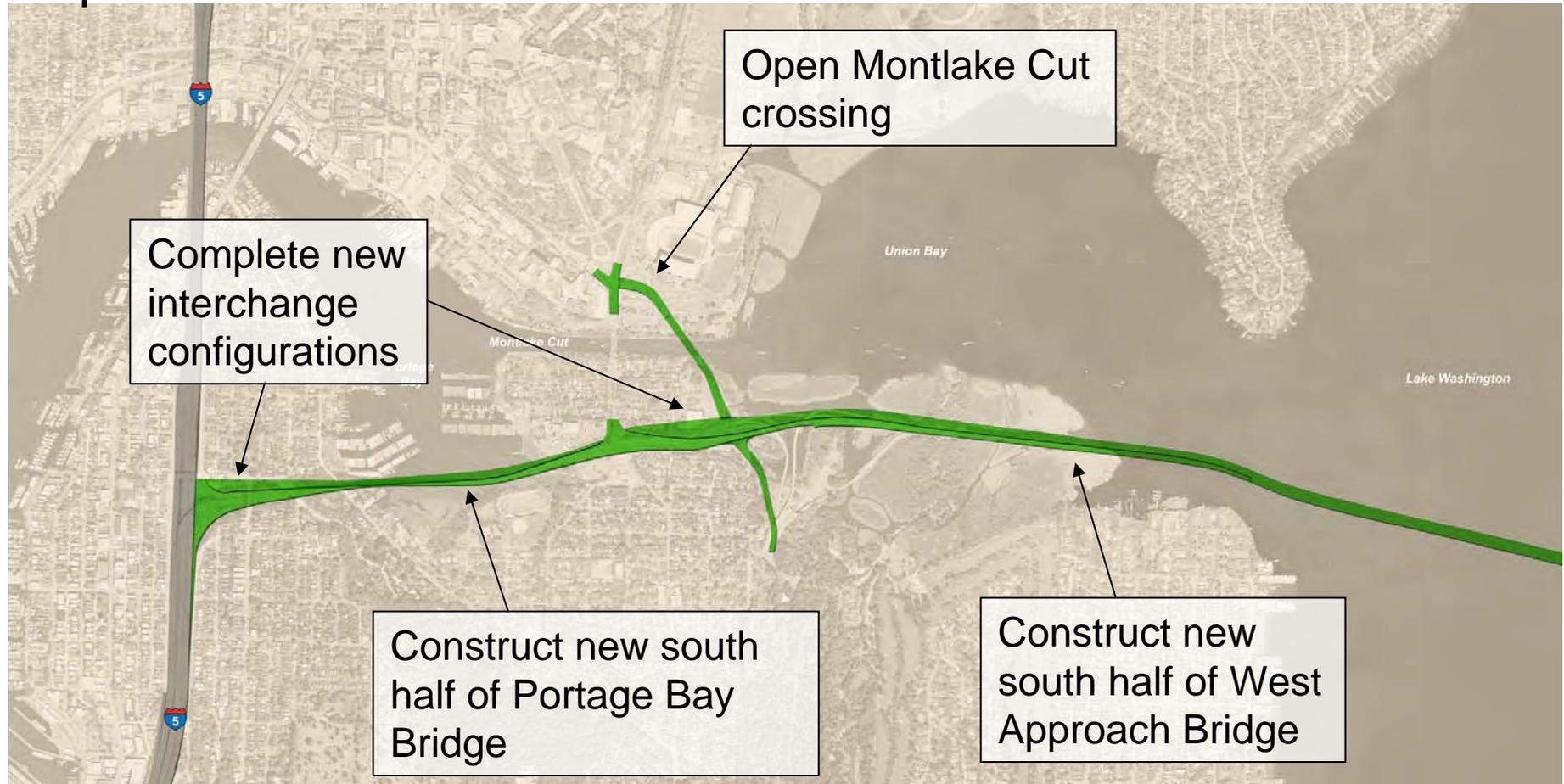
Alternative L

Step 2: Shift traffic



Alternative L

Step 3: Construct south half



Questions

Portage Bay Bridge Construction Approaches

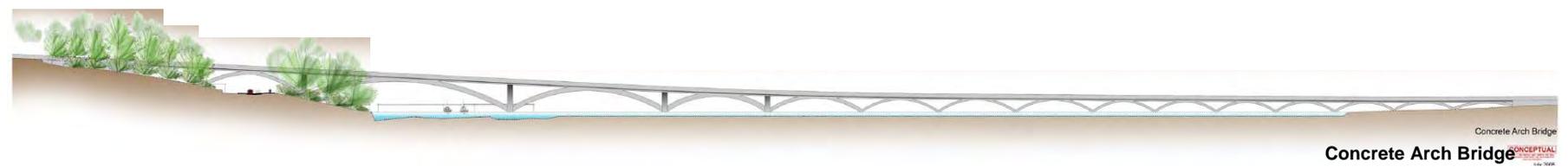
- Overview of considerations
- Question and answers
- Feedback on construction issues to address in project impact plan

Note: The photographs in this presentation are provided as examples of construction activities that may be similar to Portage Bay construction approaches.

These photographs may not accurately represent the nature or scale of effects for constructing the SR 520 Bridge Replacement and HOV Project.

Portage Bay Bridge Construction Approaches

Arch Bridge Type



- Most expensive bridge type.
- Pier construction requires cofferdams.
- Requires temporary shoring/falsework to build arch.
- Difficult to build in stages (must build in halves).

Bridge Alternatives

Haunched Concrete Girder Bridge:

- ▶ Least expensive bridge type
- ▶ Required 2 shoring towers each span to construct
- ▶ Circular columns minimize footprint in water
- ▶ Precast girders diminish disruptions at site
- ▶ Easy to build in stages



Constant Depth Concrete Box Girder Bridge:

- ▶ Economical bridge type
- ▶ Piers foundations require cofferdams to construct
- ▶ Superstructure can be built without work bridge
- ▶ Precast box segments diminish disruptions at site
- ▶ Can be built in stages



Haunched Concrete Box Girder Bridge:

- ▶ More expensive bridge type
- ▶ Piers foundations require cofferdams to construct
- ▶ Superstructure can be built without work bridge
- ▶ Can be CIP or precast superstructure
- ▶ Able to achieve longer spans
- ▶ Difficult to build in stages



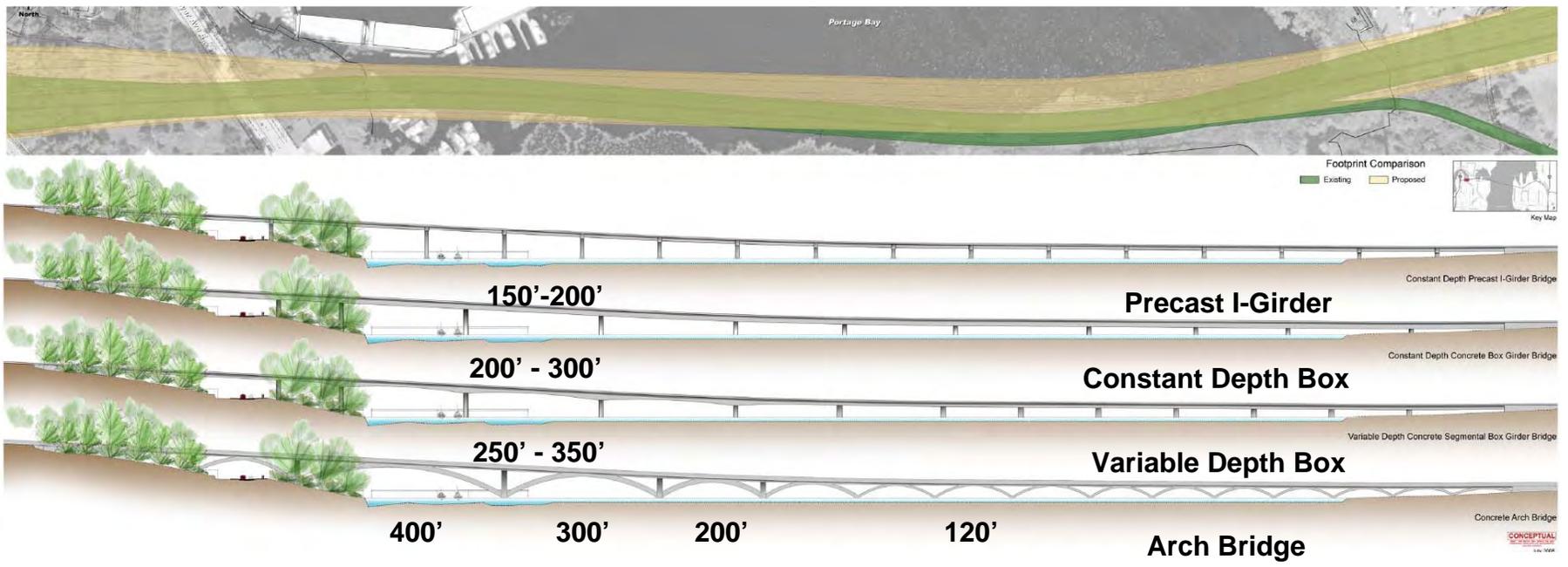
Arch Bridge:

- ▶ Most expensive bridge type
- ▶ Pier foundation require cofferdams to construct
- ▶ Required temporary shoring or falsework to construct
- ▶ More difficult to keep arches under bridge in low profile
- ▶ Difficult to build in stages

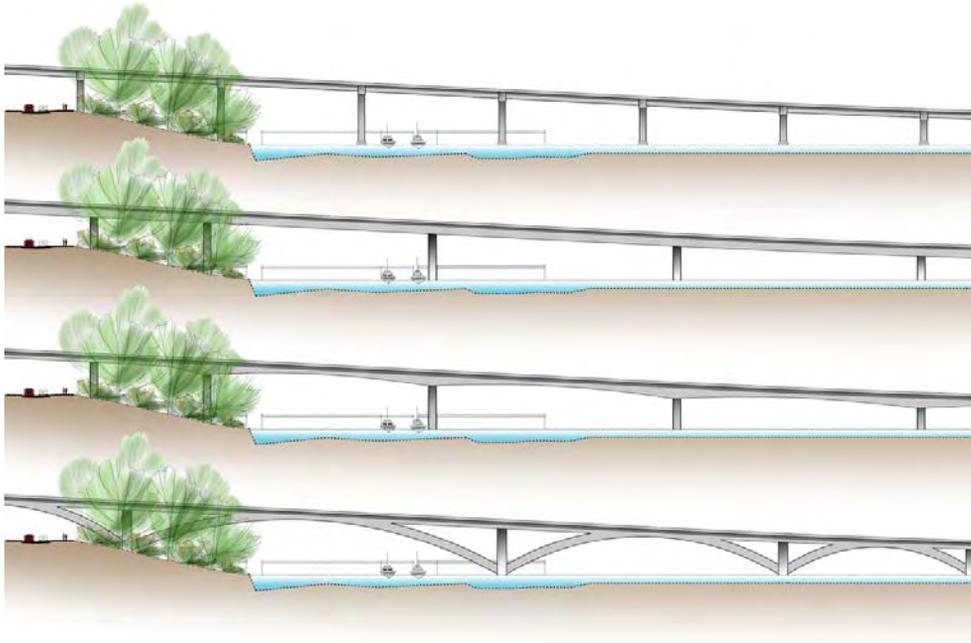


Portage Bay Bridge Type Alternatives

Approximate Span Lengths

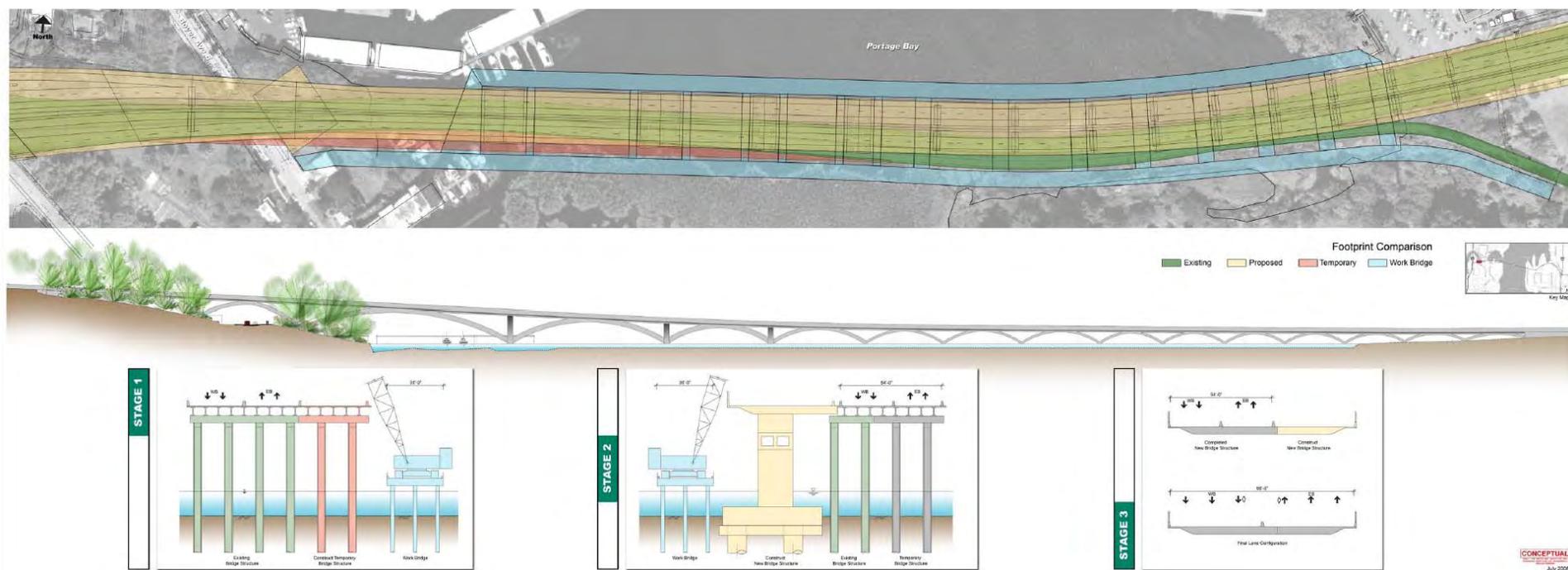


Bridge Alternatives: Cost Comparison



- Precast I–Girder:
Baseline
- Constant Depth Box:
+30%
- Variable Depth Box:
+50%
- Arch Bridge:
+100%

Staging and Construction Issues



- Arch bridge must be built in halves.
- Requires temporary structure (south side) to build north half.

Construction from Work Bridges



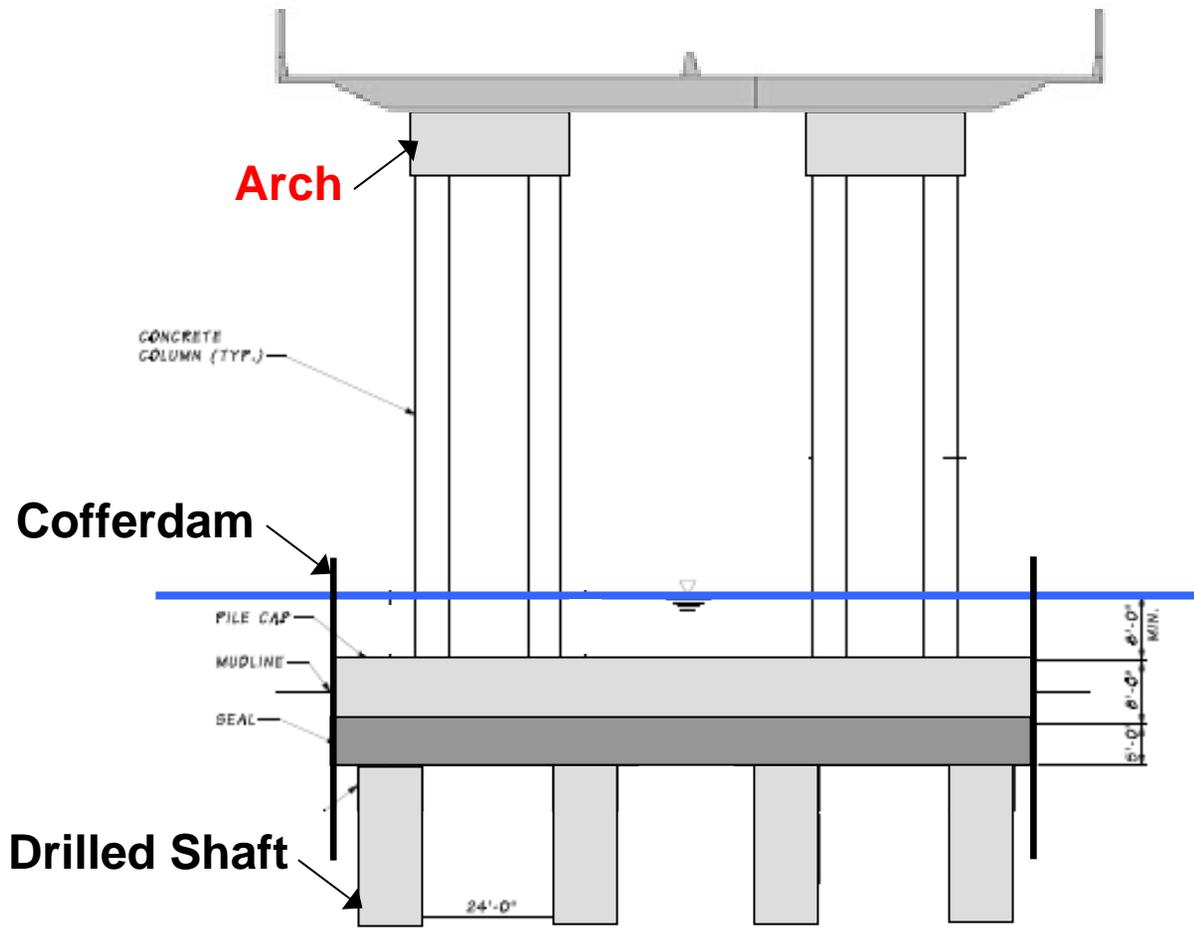
- Approximately 500 piles required for work bridges on both sides.

Construction from Barges



- Shading from barges / limited access on south side of Portage Bay.

Bridge Construction Issues: Arch



Bridge Construction Issues: Arch

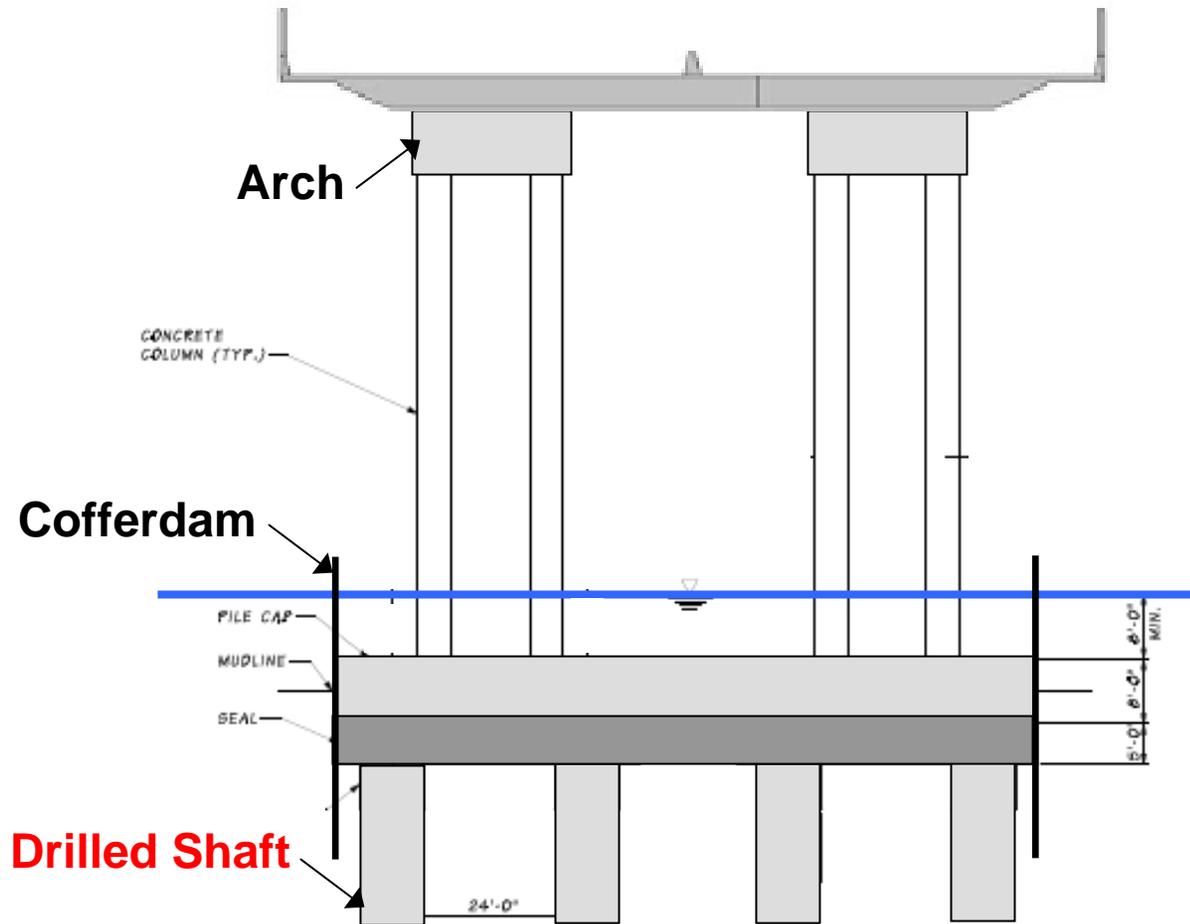


Bridge Construction Issues: Arch



- Temporary supports required for arches.

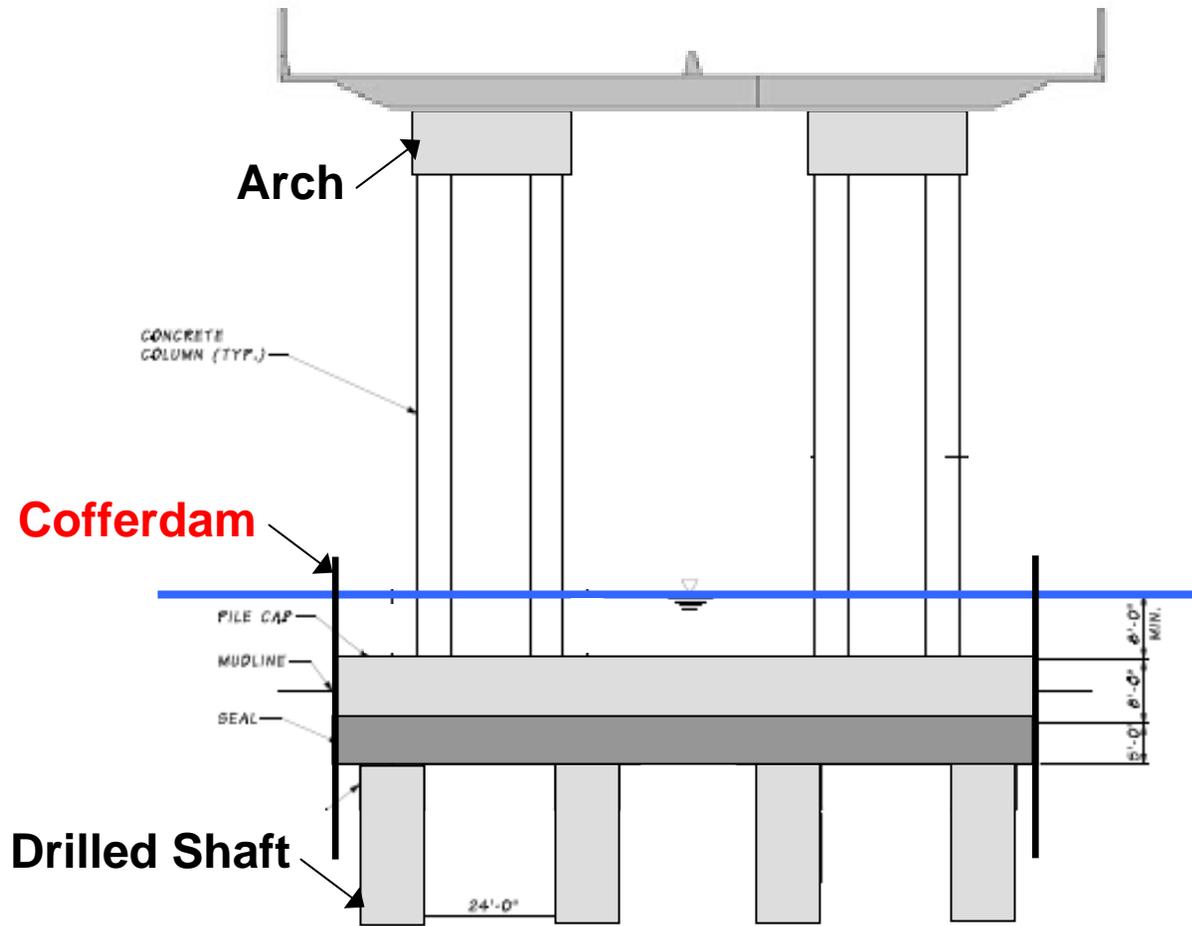
Bridge Construction Issues: Drilled Shafts



Bridge Construction Issues: Drilled Shaft



Bridge Construction Issues: Cofferdam



Bridge Construction Issues: Cofferdam



Bridge Construction Issues: Cofferdam



Bridge Construction Issues: Cofferdam



Questions

High Capacity Transit

- Goals
- Montlake Multimodal Station Agency Workshops
- Future Transit Activity
- What's Next?

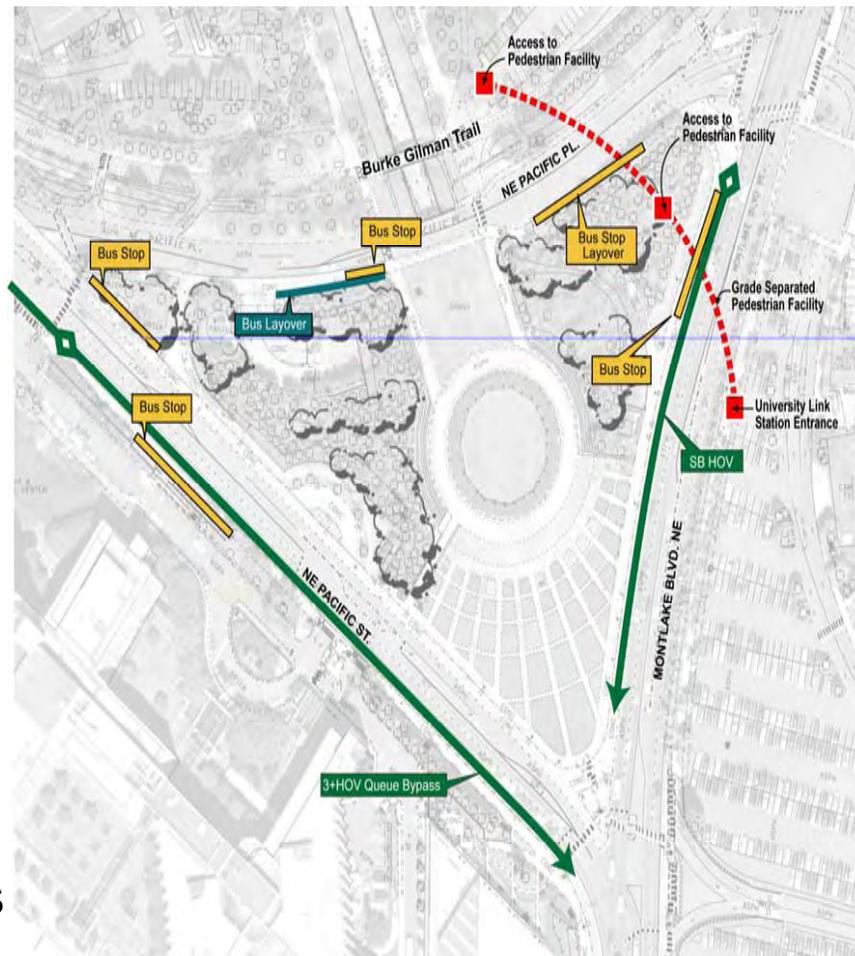
High Capacity Transit Goals

- Define Bus Rapid Transit (BRT) strategies to respond to projected increases in transit demand on the SR 520 corridor.
- Expand the strong transit market already in place.
- Build on speed and reliability benefits from the proposed new HOV lanes.
- Support future HCT improvements beginning with BRT.



Montlake Multimodal Station Agency Workshops

- Provide a guiding framework and “vision” for efficient multimodal connections in the Montlake/ SR 520 Interchange area.
- Draft layout concepts.
- Develop an approach for implementing the vision:
 - As an element of the HCT Plan.
 - Consistent with other actions in the area.



Future Transit Activity

- Forecasts for 2030 predict a tripling of SR 520 transit use from existing levels:
 - SR 520 currently carries 15,000 daily transit trips.
- SR 520 HCT Plan is considering options to:
 - Triple peak hour service.
 - More than triple mid-day service (many existing routes are peak only).
 - Improve connection between University District and Eastside destinations (Bellevue, Overlake, Eastgate, Redmond, Kirkland, Woodinville).

What's Next?

- **Fall 2008:**
 - Recommended High Capacity Transit Plan:
 - Blueprint showing the recommended service levels and facilities to meet the corridor's demand.
 - Report out at September West Side Technical Work Session.
- **December 2008:**
 - SR 520 High Capacity Transit Plan submitted to the governor and legislature.

Questions

SR 520 Health Impact Assessment



Tim Whelan 1997 (tgw.net)

The SR 520 Replacement: a bridge to a healthier community

Paul Carr
Puget Sound Clean Air Agency

Julie West
Public Health–Seattle & King County

Barbara Wright
Public Health–Seattle & King County

Washington State Senate Bill 6099

SECTION 3.

(3) Incorporate the recommendations of a health impact assessment to calculate the project's impact on air quality, carbon emissions, and other public health issues, conducted by the Puget Sound Clean Air Agency and King County Public Health.

Definition of Health



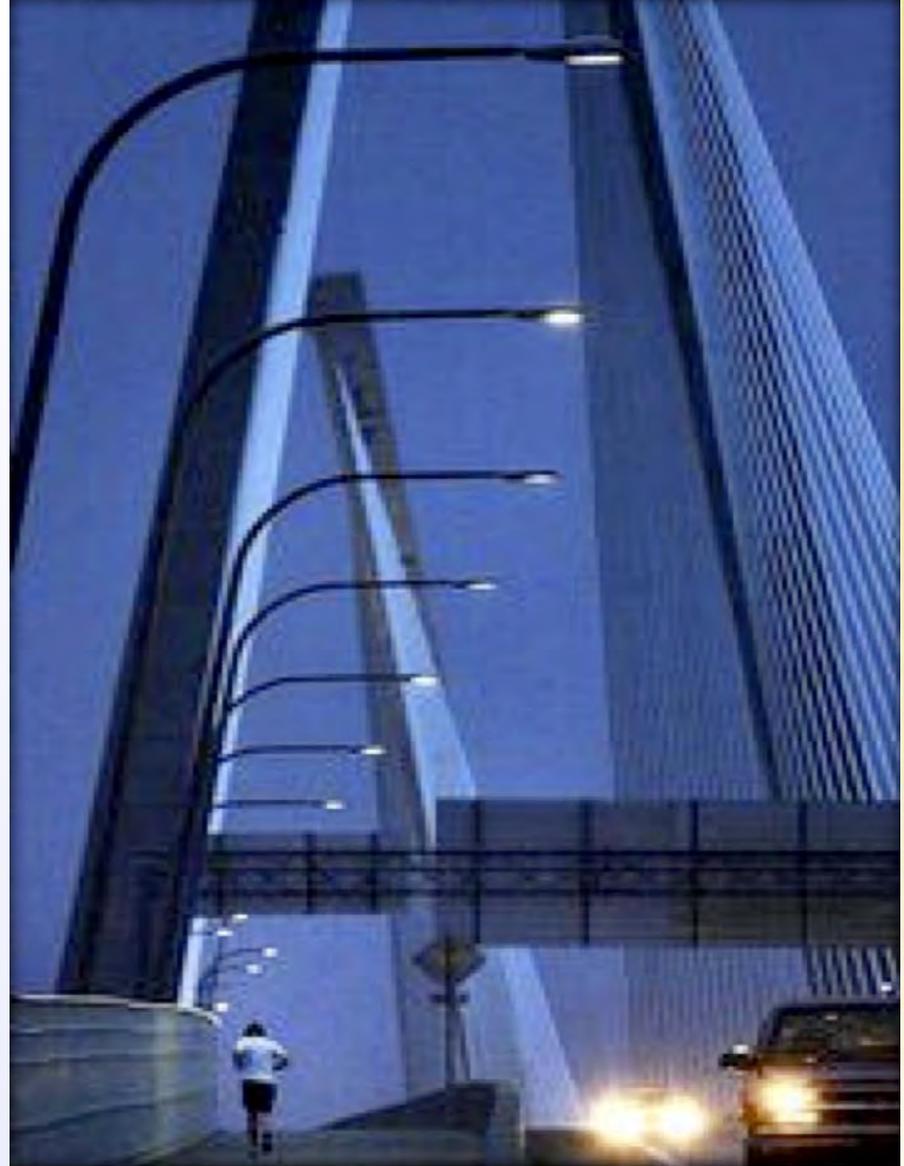
Good health is defined as a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity.

Lyn Adams photo

Opportunity of a Generation

*Charleston, South Carolina
Cooper River Bridge*

*The Post and Courier
Charleston, South Carolina*



Health Impact Assessment

A combination of procedures, methods, and tools by which a policy or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population.

*WHO, Gottenburg Consensus Paper,
December 1999*

Health Impact Assessment





Critical Health Elements

1.

Construction Period

2.

Transit, Bicycling and Walking

3.

Landscaped Lids and Green Spaces

4.

Design Features

Construction Period

Washington State
Department of Transportation



Construction Period Recommendations:

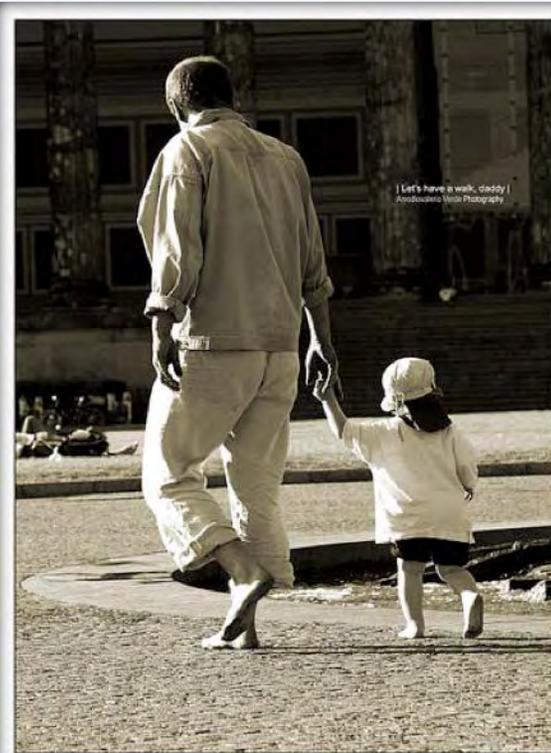
1. Reduce construction related pollution
2. Increase traffic management
3. Provide for construction noise control

Transit, Bicycling and Walking



Complete the Streets (Above)

Preliminary Concept Design for Metro's RapidRide Service to be Implemented Beginning in 2010 (Above right)



Unknown Photographer (Below right)

Transit, Bicycling and Walking Recommendations:

1. Increase and improve transit service
2. Install connected walking & bicycling facilities
3. Create a common wayfinding system
4. Provide safe mobility

Landscaped Lids & Green Spaces



Freeway Park, Seattle Parks and Recreation Department

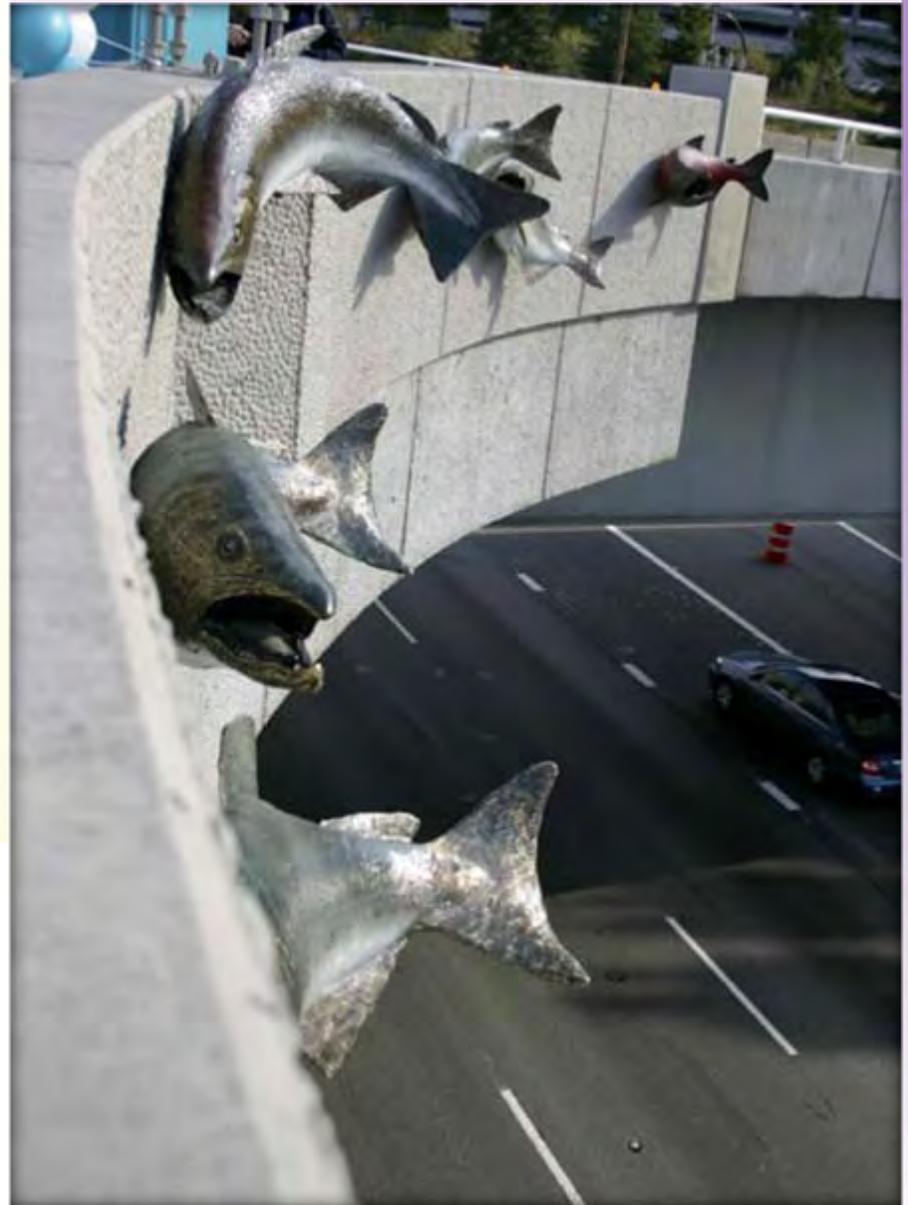
Landscaped Lids and Green Spaces Recommendations:

1. Include six landscaped freeway lids
2. Use landscaping materials throughout the SR 520 corridor, along adjacent trail and at transit stops
3. Preserve the integrity and ability to appreciate the Washington Park Arboretum and other green spaces

Design Features



Washington State Department of Transportation photos.



Design Features Recommendations:

1. Reduce noise
2. Add to the adjacent communities' visual character with art and design
3. Utilize innovative storm water management practices

Critical Health Recommendations

Ensure health elements are integral to the project plan

Support all recommendations in difficult budget times for optimal health benefits

Thank you!

Photographer Unknown

Preliminary Draft Visuals

- Alternative A
- Alternative K
- Alternative L

Alternative A

I-5 / SR 520 Interchange Vicinity – Looking North



I-5 / SR 520 Interchange Vicinity – Looking Southeast



10th & Delmar Lid Vicinity – Looking West



Montlake Interchange - Looking North



Second Bascule Bridge - Looking South



Montlake Lid Vicinity – Looking West



Montlake Interchange Vicinity – Looking West

DRAFT



Alternative K

I-5 / SR 520 Interchange Vicinity – Looking North



I-5 / SR 520 Interchange Vicinity – Looking Southeast



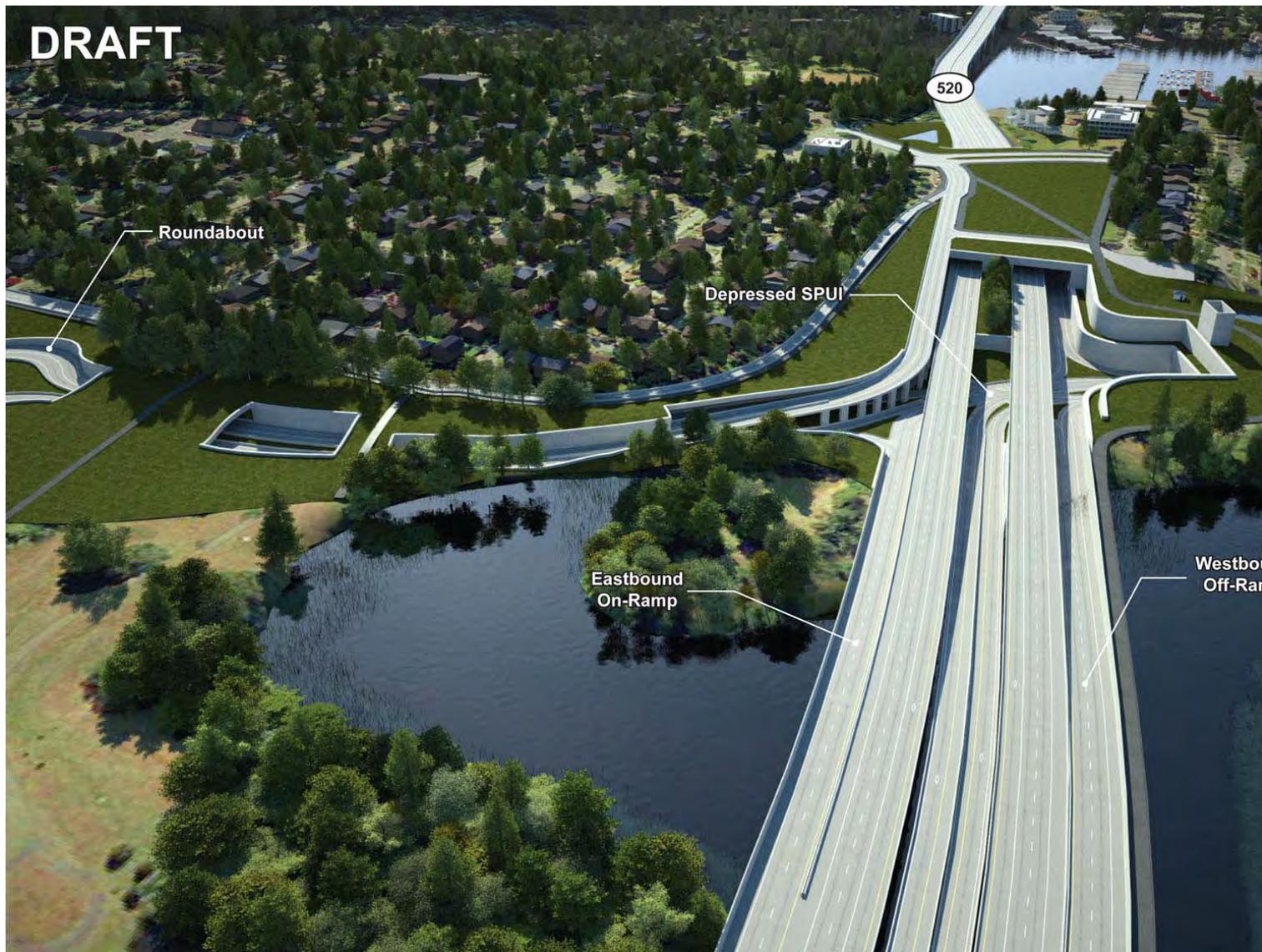
10th & Delmar Lid Vicinity – Looking West



Montlake Lid with Depressed Single Point Urban Interchange – Looking South



Depressed Single Point Urban Interchange – Looking West



Montlake Boulevard/Pacific Street Intersection Lid – Looking East



Single Point Urban Interchange Vicinity – Looking West



Alternative L

I-5 / SR 520 Interchange Vicinity – Looking North



I-5 / SR 520 Interchange Vicinity – Looking Southeast



10th & Delmar Lid Vicinity – Looking West



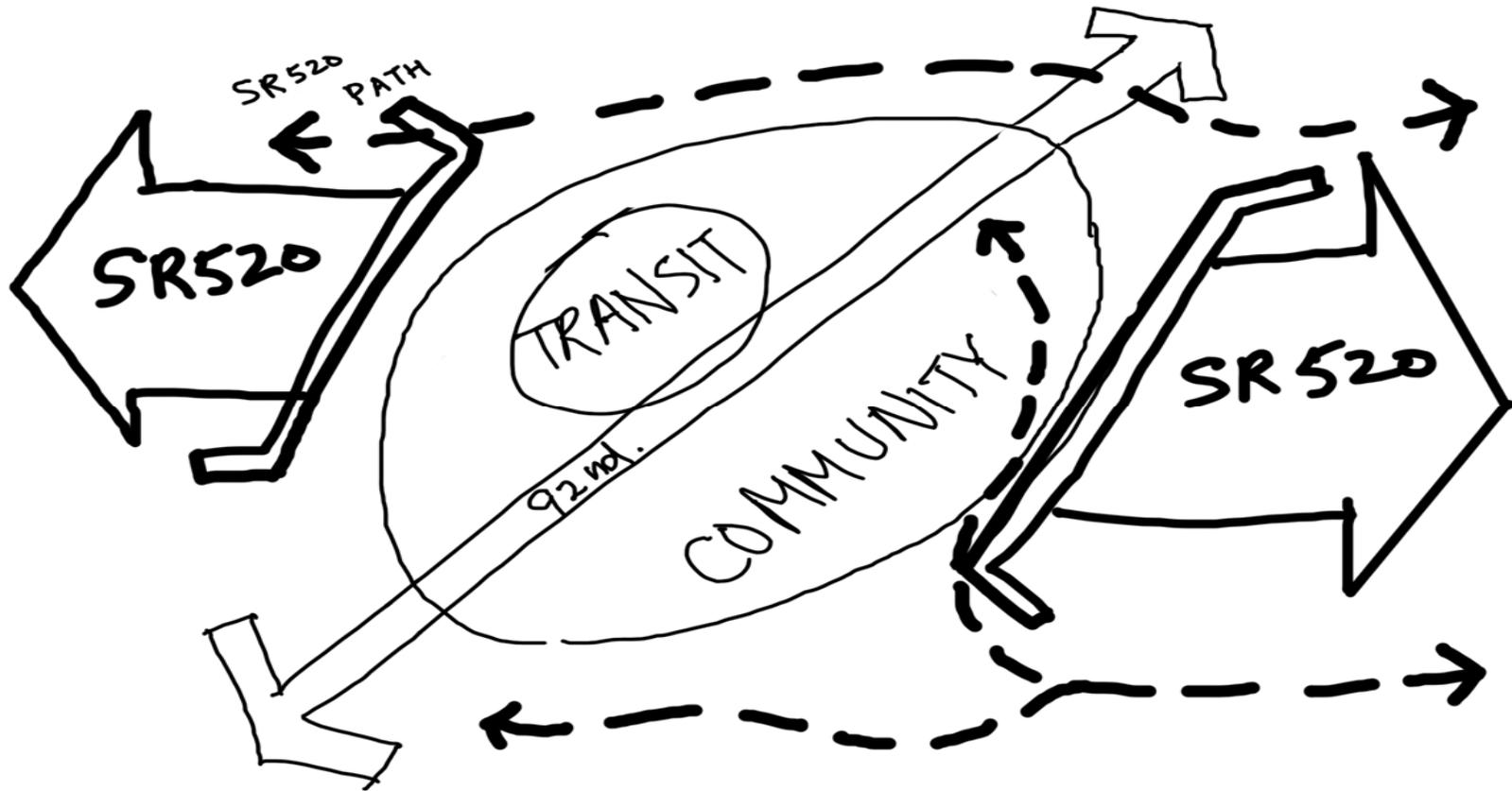
Single Point Urban Interchange Vicinity – Looking West



Montlake Boulevard / Pacific Street Intersection Vicinity – Looking East



Lid Programming



Lid Programming



Next Steps