



MODIFIED FREIGHT BYPASS

To Vancouver

COLUMBIA RIVER



MAX

West Bridge

N. JANTZEN AVE.

TOMAHAWK ISLAND DR.

MARINE DR.

NORTH PORTLAND HARBOR

Fly Over

MAX

DENVER CT.

VANPORT WETLANDS

MLK BLVD.

LEGEND

- Elevated
- At-Grade/Retained Fill
- Local Connections

This schematic is conceptual in nature. Further engineering development would be needed to verify road geometrics.



To Vancouver

COLUMBIA RIVER

MODIFIED LPA ALTERNATIVE

MAX

West Bridge

MAX



LEGEND

- Elevated
- At-Grade/Retained Fill
- Local Connections

This schematic is conceptual in nature. Further engineering development would be needed to verify road geometrics.

MLK BLVD.

N. FORCE AVE.

MARINE DR.

N. JANTZEN AVE.

HAYDEN ISLAND DR.

TOMAHAWK ISLAND DR.

NORTH PORTLAND HARBOR

VANPORT WETLANDS



DIVERGING DIAMOND

To Vancouver

COLUMBIA RIVER



MAX

West Bridge

N. JANTZEN AVE.

TOMAHAWK ISLAND DR.

MARINE DR.

NORTH PORTLAND HARBOR

MAX

DENVER CT.

VANPORT WETLANDS

LEGEND

- Elevated
- At-Grade/Retained Fill
- Local Connections

This schematic is conceptual in nature. Further engineering development would be needed to verify road geometrics.

MLK BLVD.



To Vancouver

COLUMBIA RIVER

BRAIDED DIVERGING DIAMOND

MAX

West Bridge

N. JANTZEN AVE.

TOMAHAWK ISLAND DR.

MARINE DR.

NORTH PORTLAND HARBOR

MAX

VANPORT WETLANDS

DENVER CT.

MLK BLVD.



LEGEND

- Elevated
- At-Grade/Retained Fill
- Local Connections

This schematic is conceptual in nature. Further engineering development would be needed to verify road geometrics.



Sam
Adams
Mayor

Susan D.
Keil
Director

M e m o

To: CRC Portland Working Group
From: John Gillam, City of Portland - Bureau of Transportation
Date: May 11, 2010
Re: PBOT Marine Drive Freight Bypass-Hayden Island Access Concept

Background: The distance between the existing I-5 Marine Drive and Hayden Island interchanges, about 2800 feet, is well below desirable interchange spacing. This short distance, coupled with the application of modern ramp design standards, results in overlapping of interchange ramps on Hayden Island as seen in the design of the LPA. The overlapping ramps on either side of I-5 create a wide interchange footprint on Hayden Island. This “footprint” requires real estate acquisitions of local businesses that provide services to island residents. The interface of the LPA and the Hayden Island local street network presents additional challenges with access limitations along Hayden Island Drive and Jantzen Drive. Considering all of the constraints associated with the LPA design of the Hayden Island interchange, PBOT has developed a concept that removes the interchange from Hayden Island with service to the island provided by additional bridges over North Portland Harbor.

The Marine Drive Freight Bypass-Hayden Island Access Concept

With this concept, the LPA could be modified as follows (see attached graphic):

- A new arterial bridge west of I-5 would be constructed over North Portland Harbor connecting Hayden Island to Marine Drive Interchange.
- A new two-way local bridge east of I-5 over the harbor would connect between Marine Drive and South Jantzen Drive.
- Freight bypass movements would be added to streamline the flow of trucks between Marine Drive and I-5. The eastbound-to-northbound flyover is similar that shown in the LPA Full Build plan.

This concept attempts to address these key design ideas:

- Hayden Island interchange is eliminated and access is replaced via Marine Drive interchange
- I-5 south from Vancouver to Hayden Island is achieved with a direct access exit ramp
- MLK extends to Hayden Island as an arterial connection between the island and the City
- Connections to Hayden Island are separated from connections to freight areas west of I-5
- Priority given to most freight movements through the Marine Drive interchange
- Existing mainline I-5 bridges over North Portland Harbor would be maintained

For this alternative, further design analysis is needed to verify that adequate horizontal and vertical geometrics could be provided, and to conceptualize the layout for support structures and structure depths. The two southbound-to-westbound movements from I-5 would be focal points of this investigation. A basic level of traffic analysis is needed to determine conceptual roadway sizing

Marine Drive Freight Bypass–Hayden Island Access Concept



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MEMORANDUM

Date: May 13, 2010
To: Susie Lahsene, Port of Portland
From: Anne Sylvester, PTE
Subject: Observations on PBOT/URS I-5 Design Options
cc: Kathryn Williams, Phil Healy
Project Number: 274-2332-017
Project Name: Traffic Engineering Support Services

The purpose of this memo is to summarize some initial reactions to the four Hayden Island/Marine Drive interchange concepts presented at the May 11, 2010 Hayden Island Design Group meeting. Also included in this memo are several questions that we have identified in reviewing the options, and some suggested evaluation criteria that should be considered, particularly as they apply to freight movements at the I-5 interchange with Marine Drive.

OBSERVATIONS/REACTIONS

Our observations of the four alternative concepts are informed by our prior review and assessment of traffic performance, safety and design requirements discussed during the development of the LPA and LPA Phase I. Accordingly, we have some of the following key concerns:

1. Projected 2030 peak hour traffic volumes may be too high to accommodate on a single ramp in many locations, particularly for the eastbound Marine Drive to northbound I-5 movement when Marine Drive and Hayden Island traffic is combined. Based on ramp volume estimates prepared for the LPA/LPA Phase I, the combined east-to-north movement for the two interchanges would be over 3,000 PM peak hourly vehicles. This substantially exceeds the capacity of a single lane ramp and would likely require, at a minimum, an add lane on the freeway. Related to this is a concern about ramp queuing (both on and off) which could affect travel time to/from marine and industrial facilities, as well as safety.
2. For some movements there are frequent decision-points that require accurate, comprehensible signing and good driver understanding to be safe and efficient. We think that, as the options are depicted, driver confusion could be a real concern. The distances between individual decision points should be maximized and signing should be simple.
3. Mixing heavy vehicle traffic and general purpose traffic also causes concern. Based on existing traffic counts, some of the individual movements at the I-5/Marine Drive interchange exceed 40 percent truck mode share during the midday peak period. Truck volumes for some movements exceed 20 percent during the AM peak and approach that proportion during the PM peak.
4. We have some concern about the design implications of the concepts for some of the on- and off-ramps, including potentially tight turns and low speeds. Consideration of truck operating characteristics needs to

clearly underlie design decisions to ensure safety and to allow heavy vehicles to maintain their momentum, particularly during adverse weather conditions.

QUESTIONS

We have identified several questions that we believe it will be important to consider as the options are evaluated:

1. Does the design fundamentally change the function of the Marine Drive interchange by adding large format retail and residential traffic to a transportation facility that is of critical importance to employment-based industrial and freight traffic?
2. There appears to be a potential for some of the options to encroach on the Vanport wetlands through the development of the proposed east/west public street along the south side of the Expo Center east of Force Avenue. Can the design options be built without impacting these wetlands?
3. What would be the potential impacts to Ross Island Sand & Gravel and other local businesses presently located along the north side of Marine Drive west of the freeway?

EVALUATION CRITERIA

Based on Andy Cotugno's request at Tuesday's meeting, we are including a few evaluation criteria that we feel should be used to help narrow the decision on selecting one of the four PBOT/URS design options for further study. Please note that this is a short list of criteria and we anticipate that a more thorough evaluation would be conducted of the selected options comparable to the analysis conducted for the LPA and LPA Phase I. We reserve the right to add additional criteria when the analysis reaches that stage.

1. Qualitative assessment of interchange, intersection and ramp traffic operations based on prior analysis conducted for the LPA.
2. Likely large scale geometric requirements (e.g., number of lanes, likely need for add lane(s), etc.)
3. Safety considerations.
4. Potential effects on the speed and movement of heavy vehicles – particularly in comparison to the Marine Drive speeds and travel times accommodated by the LPA.
5. Potential construction traffic management challenges.
6. Consideration of the options in relation to FHWA, ODOT and regional policy with respect to a National Highway System facility and Freight corridor such as Marine Drive.

Number of Lanes Discussion Project Sponsors Council

May 14, 2010

Introduction/Background

- The purpose of the work order is for URS to aid the City in its evaluation and decision-making relative to the Columbia River Crossing project (CRC).
- The City seeks to ensure that the project's locally preferred alternative (LPA):
 - Results in satisfactory performance of Oregon interchanges
 - Gives priority to freight mobility
 - Does not back up traffic from south of the project study area
 - Is cost-effective and fundable

Questions

1. Can the LPA be modified to a smaller facility that performs effectively in 2018 and 2030?
2. How will I-5 south of the project operate in the AM peak in 2030? Will the “Alberta back-up” affect traffic in the CRC project area in the AM peak period?
3. Can the Marine Drive Interchange be reconfigured to accommodate Hayden Island local and freeway access?

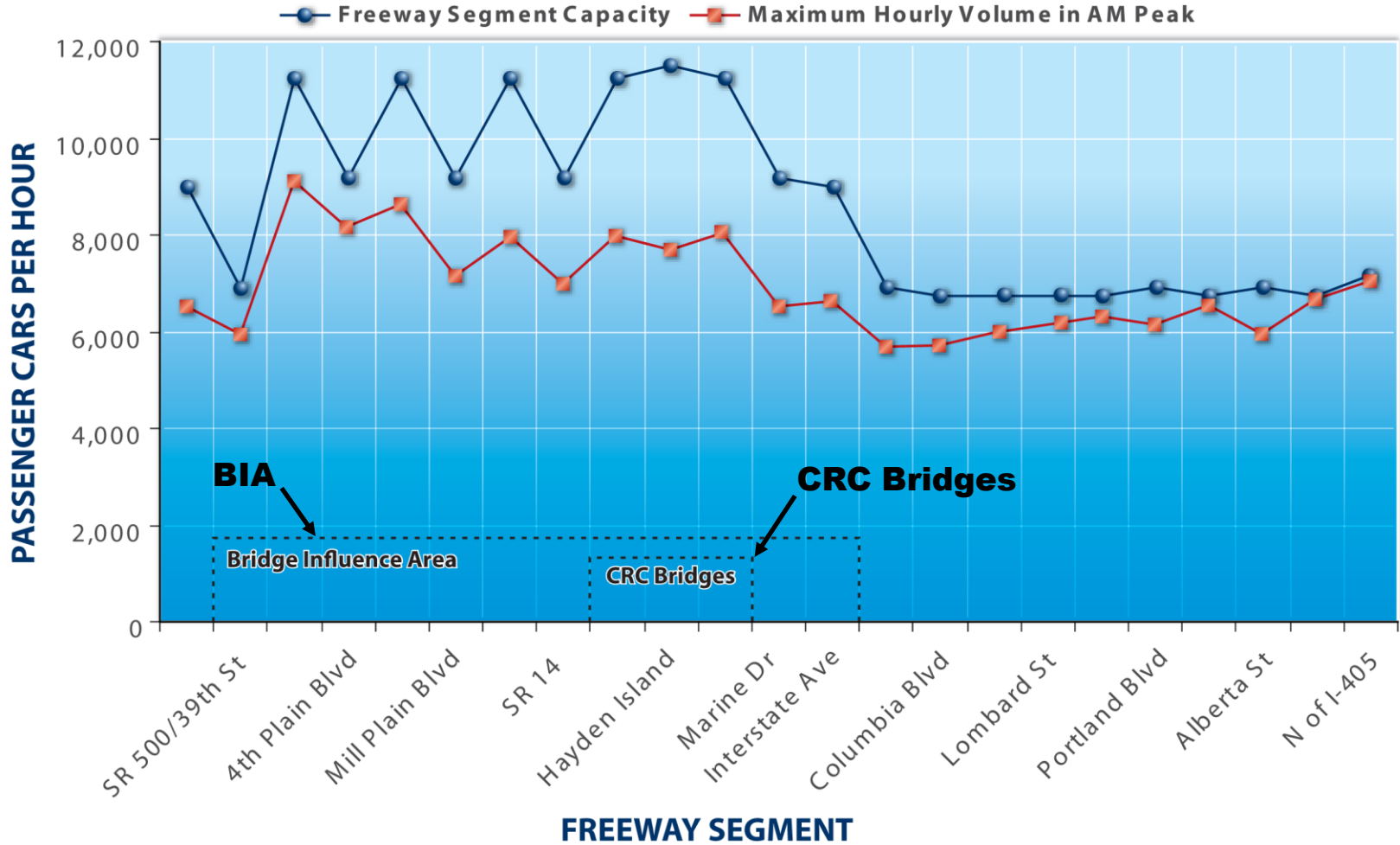
Reducing the Number of Lanes

- URS reviewed current CRC design plans and traffic analysis
- CRC plans call for 6 travel lanes in each direction in 2030 across the Columbia River
- Initial URS efforts focus on the question:

Can the LPA be modified to a smaller facility that performs effectively in 2018 and 2030?

MAXIMUM HOURLY VOLUME VS. CAPACITY I-5 SOUTHBOUND AM PEAK - 2030

pc/h/ln - passenger cars per hour per lane



(Note: Capacity based on HCM 2000 and includes merge and diverge.)

Observations related to Southbound I-5 Operations in 2030

- Traveling from north to south, peak traffic volumes generally decline from SR 500 to Victory Boulevard, then increase moving through north Portland to the I-405 split.
- Peak traffic volumes on the bridge in the 2030 AM peak hour are within the capacity range of four or five traffic lanes based on an application of HCM methodology. Further VISSIM analysis taking into consideration other recommended design geometric changes (location of auxiliary lane drop/merges; interchange reconfigurations, etc.) is needed to validate lane design options.
- The v/c ratio along I-5 southbound from Interstate Avenue/Victory Boulevard to I-405 varies between 0.82 (at Victory Boulevard Interchange) and 0.99 (between Alberta Street and I-405), indicating severe congestion will likely occur during the AM peak period in 2030 with or without construction of the CRC project.

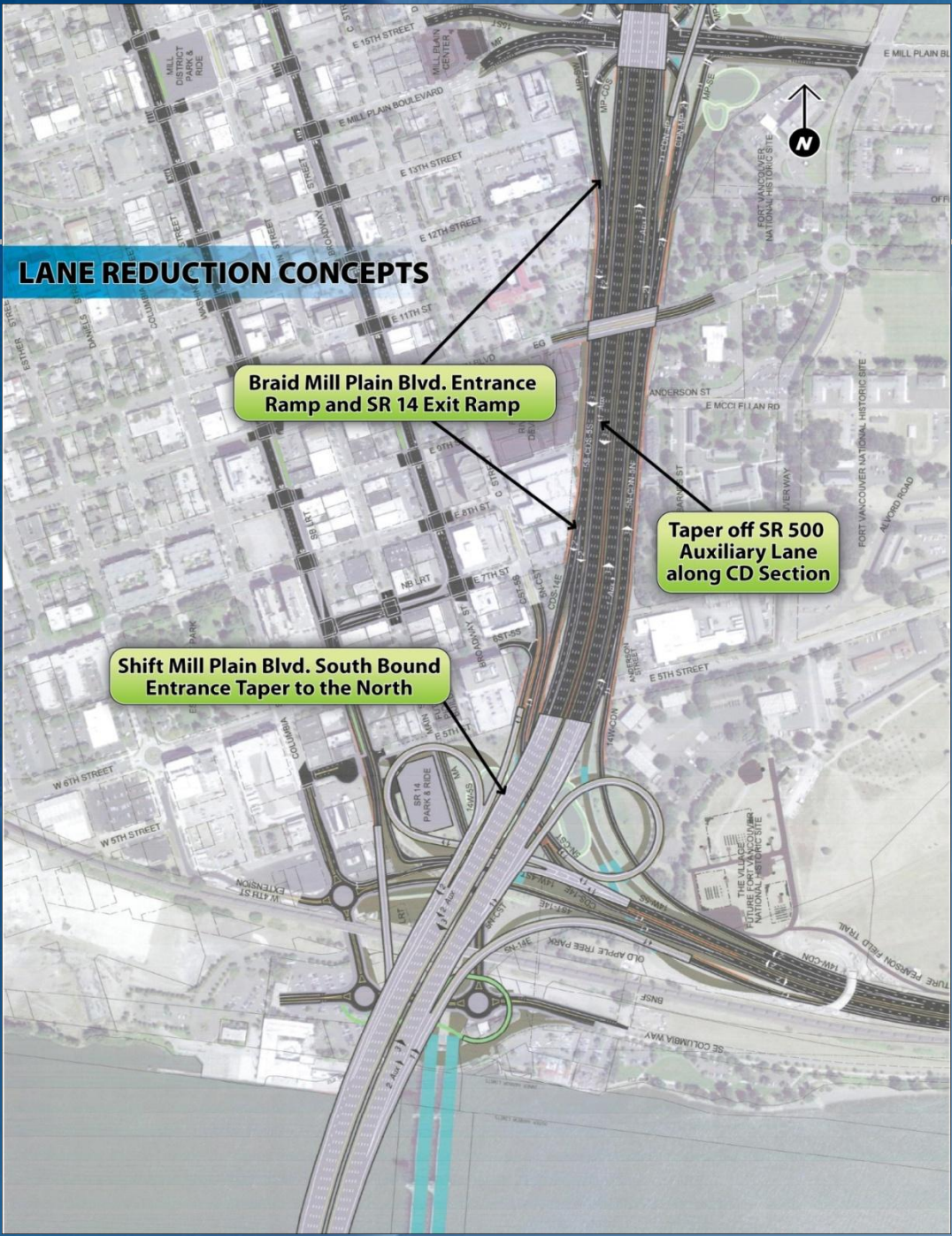
Modifications to LPA design to reduce the number of lanes

Reducing southbound lanes (options identified)

- Taper SR 500 Auxiliary Lane at CD Section
- Shift Mill Plain SB Ramp Taper to the North
- Braid Mill Plain SB Ramp with SR 14 Exit

Reducing northbound lanes (options being identified)

Further reduction in travel lanes may result from combining the Hayden Island and Marine Drive Interchanges (options identified)



LANE REDUCTION CONCEPTS

Braid Mill Plain Blvd. Entrance Ramp and SR 14 Exit Ramp

Shift Mill Plain Blvd. South Bound Entrance Taper to the North

Taper off SR 500 Auxiliary Lane along CD Section

Conclusions

- Several concepts have been identified that would potentially reduce the number of travel lanes on the bridge. Further investigation, including stakeholder receptiveness and testing within the CRC traffic model, would be needed to validate these options.
- Factors to reduce vehicle volumes should be evaluated, including active traffic management strategies, post-construction TDM programs, HOV ramps and/or lanes and peak period tolls comparable to similar West Coast bridges.

Next Steps in Concert with Integrated Project Staff (IPS)

- Evaluate the concepts for reducing southbound auxiliary lanes.
- Identify and evaluate options for reducing northbound auxiliary lanes.
- Concurrently evaluate options for combining Hayden Island and Marine Drive interchanges and, should this option appear feasible, evaluate implications on mainline lane requirements and freeway performance.
- Review the VISSIM model results to examine operations in project area relative to potential back up from the North Alberta Street area.
- Review travel demand model results with respect to the operation of parallel arterials in north Portland

CRC Performance measures (5-7-2010)

Truck movements (based upon truck speeds):

I-5/Marine Drive ramp terminal to/from:

I-5 north of SR 500
I-5 south of Columbia Blvd.
I-5 west end of Marquam Bridge

I-5/Going Street ramp terminal to/from:

I-5 north of SR 500
I-5 west end of Marquam Bridge

I-5/Mill Plain Blvd. ramp terminal:

I-5 north of SR 500
I-5 south of Columbia Blvd.
I-5 west end of Marquam Bridge
SR 14 east of I-5

Commute movements (based upon auto speeds):

From/To:

I-5/4th Plain ramp terminal
I-5/NE 99th St. ramp terminal
SR 500/St. Johns Blvd. ramp terminal
SR 14/Grand Avenue

To/From:

I-5/Marine Dr. ramp terminal
I-5/N. Denver Ave. ramp terminal
I-5/N. Going St. ramp terminal
I-5/ NE Broadway ramp terminal
I-5/Morrison Bridge ramp terminal

From/To:

SE Mill Plain/SE 164th (via I-205)

To/From: (using the regional model)

I-84/Lloyd District ramp terminal
I-5/I-84/Morrison Bridge ramp terminal
I-205/Glisan (Gateway) ramp terminal

Hayden Island movements:

Hayden Island Shopping Center to/from:

I-5 north of SR 500
I-5 south of Columbia Blvd.
I-5/Lombard ramp terminal
I-5/Marine Drive ramp terminal

Target Years:

Existing
2030 No Build
2030 LPA Phase 1
2030 Full LPA

Travel Times:

1. Peak 2-hour, Peak direction
 2. Peak 2-hour, Off-peak direction/Midday
- AM Peak 2-hour = 6:30 – 8:30 am
PM Peak 2-hour = 4-6 pm

Additional info on queue length for unmet demand:

Marine Drive EB pm approaching I-5 – Existing, No-Build
MLK Blvd. WB pm approaching I-5 – Existing, No-Build
Interstate Ave./Denver at ramp meter to I-5 – Existing, No-Build
Mill Plain EB pm approaching I-5 – Existing, No-Build
SR 14 WB am approaching I-5 – Existing, No-Build
SR 500 WB am approaching I-5 – Existing, No-Build