INTERSTATE 5 COLUMBIA RIVER CROSSING

Land Use Technical Report

May 2008

Columbia River CROSSING

TO: Readers of the CRC Technical Reports

FROM: CRC Project Team

SUBJECT: Differences between CRC DEIS and Technical Reports

The I-5 Columbia River Crossing (CRC) Draft Environmental Impact Statement (DEIS) presents information summarized from numerous technical documents. Most of these documents are discipline-specific technical reports (e.g., archeology, noise and vibration, navigation, etc.). These reports include a detailed explanation of the data gathering and analytical methods used by each discipline team. The methodologies were reviewed by federal, state and local agencies before analysis began. The technical reports are longer and more detailed than the DEIS and should be referred to for information beyond that which is presented in the DEIS. For example, findings summarized in the DEIS are supported by analysis in the technical reports and their appendices.

The DEIS organizes the range of alternatives differently than the technical reports. Although the information contained in the DEIS was derived from the analyses documented in the technical reports, this information is organized differently in the DEIS than in the reports. The following explains these differences. The following details the significant differences between how alternatives are described, terminology, and how impacts are organized in the DEIS and in most technical reports so that readers of the DEIS can understand where to look for information in the technical reports. Some technical reports do not exhibit all these differences from the DEIS.

Difference #1: Description of Alternatives

The first difference readers of the technical reports are likely to discover is that the full alternatives are packaged differently than in the DEIS. The primary difference is that the DEIS includes all four transit terminus options (Kiggins Bowl, Lincoln, Clark College Minimum Operable Segment (MOS), and Mill Plain MOS) with each build alternative. In contrast, the alternatives in the technical reports assume a single transit terminus:

- Alternatives 2 and 3 both include the Kiggins Bowl terminus
- Alternatives 4 and 5 both include the Lincoln terminus

In the technical reports, the Clark College MOS and Mill Plain MOS are evaluated and discussed from the standpoint of how they would differ from the full-length Kiggins Bowl and Lincoln terminus options.

Difference #2: Terminology

Several elements of the project alternatives are described using different terms in the DEIS than in the technical reports. The following table shows the major differences in terminology.

DEIS terms	Technical report terms
Kiggins Bowl terminus	I-5 alignment
Lincoln terminus	Vancouver alignment
Efficient transit operations	Standard transit operations
Increased transit operations	Enhanced transit operations

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Difference #3: Analysis of Alternatives

The most significant difference between most of the technical reports and the DEIS is how each structures its discussion of impacts of the alternatives. Both the reports and the DEIS introduce long-term effects of the full alternatives first. However, the technical reports then discuss "segment-level options," "other project elements," and "system-level choices." The technical reports used segment-level analyses to focus on specific and consistent geographic regions. This enabled a robust analysis of the choices on Hayden Island, in downtown Vancouver, etc. The system-level analysis allowed for a comparative evaluation of major project components (replacement versus supplemental bridge, light rail versus bus rapid transit, etc). The key findings of these analyses are summarized in the DEIS; they are simply organized in only two general areas: impacts by each full alternative, and impacts of the individual "components" that comprise the alternatives (e.g. transit mode).

Difference #4: Updates

The draft technical reports were largely completed in late 2007. Some data in these reports have been updated since then and are reflected in the DEIS. However, not all changes have been incorporated into the technical reports. The DEIS reflects more recent public and agency input than is included in the technical reports. Some of the options and potential mitigation measures developed after the technical reports were drafted are included in the DEIS, but not in the technical reports. For example, Chapter 5 of the DEIS (Section 4(f) evaluation) includes a range of potential "minimization measures" that are being considered to reduce impacts to historic and public park and recreation resources. These are generally not included in the technical reports. Also, impacts related to the stacked transit/highway bridge (STHB) design for the replacement river crossing are not discussed in the individual technical reports, but are consolidated into a single technical memorandum.

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Cover Sheet

Interstate 5 Columbia River Crossing

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ACRONYMS

Acronym	Description
CAO	Critical Area Ordinance
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
DEIS	Draft Environmental Impact Statement
DEQ	Oregon Department of Environmental Quality
DLCD	Department of Land Conservation and Development
DOGAMI	Oregon Department of Geology and Mineral Industries
DOI	U.S. Department of Interior
DSL	Oregon Department of State Lands
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
Ft	feet/foot
GPS	Global Positioning System
GTEC	Growth and Transportation Efficiency Center
HAZMAT	Hazardous Materials/Incidents
HCT	High-Capacity Transit
IAMP	Interchange Area Management Plan
Mi	mile
MOA	Memorandum of Agreement
MOS	Minimum Operable Segment
MP	Milepost
Mph	Miles per hour
MSFCMA	Magnuson-Stevens Fisheries Conservation and Management Act
MTCA	Model Toxics Control Act
MTIP	Metropolitan Transportation Improvement Plan
NAAQS	National Ambient Air Quality Standards
NFA	No Further Action
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Oceanic and Atmospheric Administration for Fisheries
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish & Wildlife
OHW	Ordinary High Water Line
ONHP	Oregon Natural Heritage Program
OR-GAP	Oregon Gap Analysis Project

Acronym	Description
ORNHIC	Oregon Natural Heritage Information Center
ORS	Oregon Revised Statutes
ORT	Open Road Tolling
OTP	Oregon Transportation Plan
RCW	Revised Code of Washington
ROD	Record of Decision
ROW	Right-of-Way
RTC	Regional Transportation Council
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMA	Shoreline Management Act
SRA	Sensitive Resource Areas
STIP	State Transportation Improvement Plan
TAZ	Transportation Analysis Zone
TCP	Traditional Cultural Properties
TDR	Transfer of Development Rights
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Plan
TMOC	Transportation Management Operating Center
TMS	Transportation Management System
UPRR	Union Pacific Railroad
UPSP	Union Pacific-Southern Pacific
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VAST	Vancouver Area Smart Trek
VHD	Vehicle Hours of Delay
VMS	Variable Message Sign
VNHR	Vancouver National Historic Reserve
WDFW	Washington Department of Fish and Wildlife

1. Summary

1.1 Introduction

This report presents the evaluation of potential impacts to land use that would result from the proposed Interstate 5 (I-5) Columbia River Crossing (CRC) project. The analysis at this stage is based on conceptual designs of a range of alternatives. This report identifies the likely land use impacts from those alternatives and identifies potential measures to reduce the impacts, including possible options for avoiding, minimizing or mitigating impacts. Following the analysis and findings described in this report, and following additional agency and public coordination and input, the project sponsors will select a preferred alternative. The project team will further design and evaluate that alternative, refining the impact analysis and further developing mitigation measures.

1.2 Description of the Alternatives

The alternatives being considered for the CRC project consist of a diverse range of highway, transit and other transportation choices. Some of these choices – such as the number of traffic lanes across the river – could affect transportation performance and land use impacts throughout the bridge influence area or beyond. These are referred to as "system-level choices." Other choices – such as whether to run high-capacity transit (HCT) on Washington Street or Washington and Broadway Streets – have little impact beyond the area immediately surrounding that proposed change and no measurable effect on regional impacts or performance. These are called "segment-level choices." This report discusses the impacts from both system- and segment-level choices, as well as "full alternatives." The full alternatives combine system-level and segment-level choices for highway, transit, pedestrian, and bicycle transportation. They are representative examples of how project elements may be combined. Other combinations of specific elements are possible. Analyzing the full alternatives allows us to understand the combined performance and land use impacts that would result from multimodal improvements spanning the bridge influence area.

Following are brief descriptions of the alternatives being evaluated in this report, which include:

- System-level choices,
- Segment-level choices, and
- Full alternatives.

1.2.1 System-Level Choices

System-level choices have potentially broad influence on the magnitude and type of benefits and impacts produced by this project. These options may influence physical or

operational characteristics throughout the project area and can affect transportation and other elements outside the project corridor as well. The system-level choices include:

- River crossing type (replacement or supplemental)
- High-capacity transit mode (bus rapid transit or light rail transit)
- Tolling (no toll, I-5 only, I-5 and I-205, standard toll, higher toll)
- As well as major alignment (Vancouver or I-5), project length (full or Minimal operable segment), and mode balance (highway compared to TDM/ TSM)

This report compares replacement and supplemental river crossing options. A replacement river crossing would remove the existing highway bridge structures across the Columbia River and replace them with three new parallel structures – one for I-5 northbound traffic, another for I-5 southbound traffic, and a third for HCT, bicycles, and pedestrians. A supplemental river crossing would build a new bridge span downstream of the existing I-5 bridge. The new supplemental bridge would carry southbound I-5 traffic and HCT, while the existing I-5 bridge would carry northbound I-5 traffic, bicycles, and pedestrians. The replacement crossing would include three through-lanes and two auxiliary lanes for I-5 traffic in each direction. The supplemental crossing would include three through-lanes and one auxiliary lane in each direction.

Two types of HCT are being considered – bus rapid transit and light rail transit. Both would operate in an exclusive right-of-way through the project area, and are being evaluated for the same alignments and station locations. The HCT mode – LRT or BRT – is evaluated as a system-level choice. Alignment options and station locations are discussed as segment-level choices. BRT would use 60-foot or 80-foot long articulated buses in lanes separated from other traffic. LRT would use one- and two-car trains in an extension of the MAX line that currently ends at the Expo Center in Portland.

Under the efficient operating scenario, LRT trains would run at approximately 7.5 minute headways during the peak periods. BRT would run at headways between 2.5 and 10 minutes depending on the location in the corridor. BRT would need to run at more frequent headways to match the passenger-carrying capacity of the LRT trains. This report also evaluates performance and impacts for an increased operations scenario that would double the number of BRT vehicles or the number of LRT trains during the peak periods.

1.2.2 Segment-Level Choices

1.2.2.1 Transit Alignments

The transit alignment choices are organized into three corridor segments. Within each segment (see Exhibit 1-1) the alignment choices can be selected relatively independently of the choices in the other segments. These alignment variations generally do not affect overall system performance but could have important differences in the impacts and benefits that occur in each segment. The three segments are:

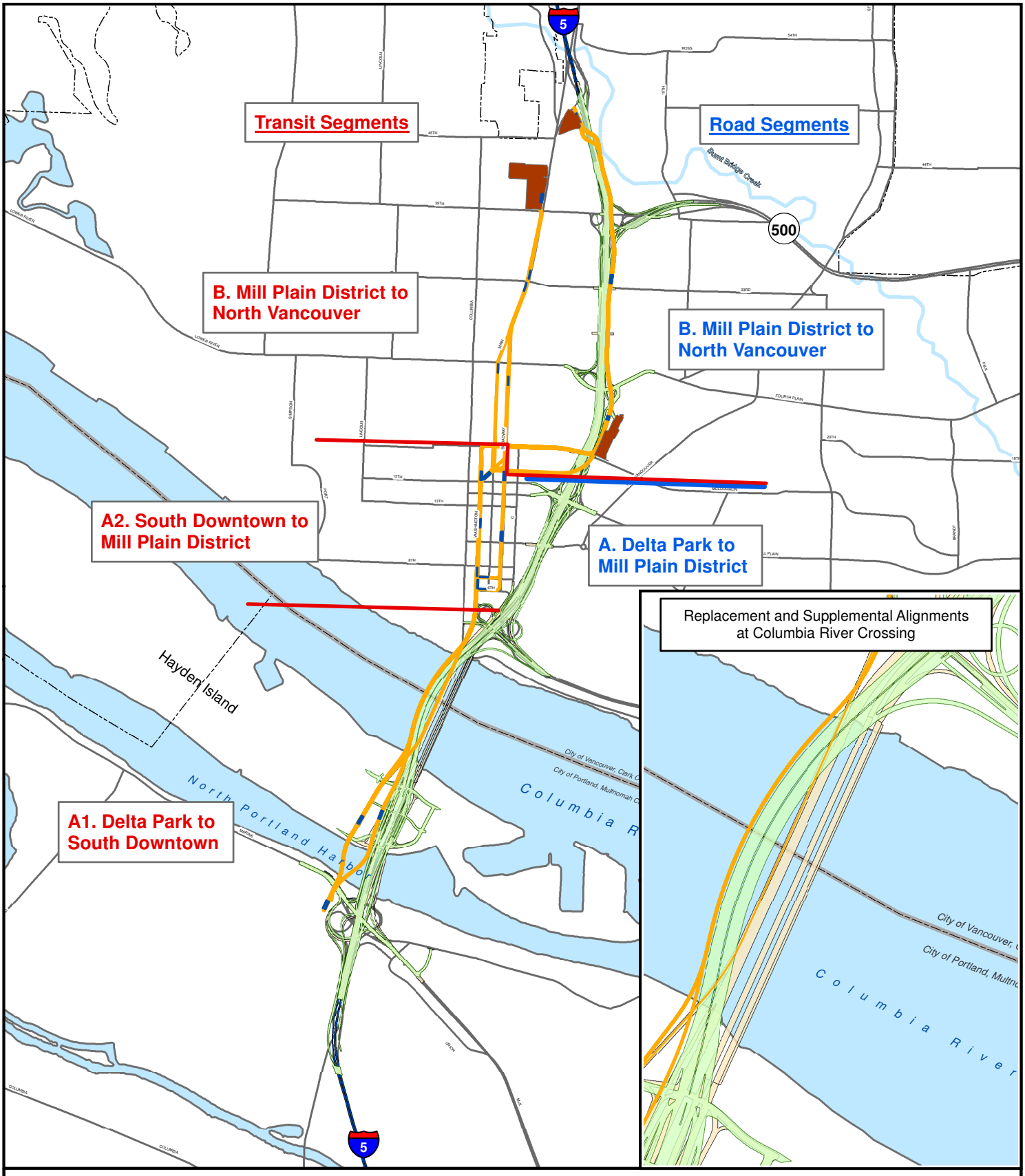

Exhibit 1-1: Project Area and Alternatives

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Aug.-2007; Plot Date: Dec.-2007; File Name: JH_014_8x11.mxd

- Segment A1 – Delta Park to South Vancouver
- Segment A2 – South Vancouver to Mill Plain District
- Segment B – Mill Plain District to North Vancouver

In Segment A1 there are two general transit alignment options - offset from, or adjacent to, I-5. An offset HCT guideway would place HCT approximately 450 to 650 feet west of I-5 on Hayden Island. An adjacent HCT guideway across Hayden Island would locate HCT immediately west of I-5. The alignment of I-5, and thus the alignment of an adjacent HCT guideway, on Hayden Island would vary slightly depending upon the river crossing and highway alignment, whereas an offset HCT guideway would retain the same station location regardless of the I-5 bridge alignment.

HCT would touch down in downtown Vancouver at Sixth Street and Washington Street with a replacement river crossing. A supplemental crossing would push the touch down location north to Seventh Street. Once in downtown Vancouver, there are two alignment options for HCT – a two-way guideway on Washington Street or a couplet design that would place southbound HCT on Washington Street and northbound HCT on Broadway. Both options would have stations at Seventh Street, 12th Street, and at the Mill District Transit Center between 15th and 16th Streets.

From downtown Vancouver, HCT could either continue north on local streets or turn east and then north adjacent to I-5. Continuing north on local streets, HCT could either use a two-way guideway on Broadway or a couplet on Main Street and Broadway. At 29th Street, both of these options would merge to a two-way guideway on Main Street and end at the Lincoln Park and Ride located at the current WSDOT maintenance facility. Once out of downtown Vancouver, transit has two options if connecting to an I-5 alignment: head east on 16th Street and then through a new tunnel under I-5, or head east on McLoughlin Street and then through the existing underpass beneath I-5. With either option HCT would connect with the Clark College Park and Ride on the east side of I-5, then head north along I-5 to about SR 500 where it would cross back over I-5 to end at the Kiggins Bowl Park and Ride.

There is also a transit length option, referred to as the minimum operable segments (MOS), which would end the HCT line at either the Mill Plain station or Clark College. The MOS options provide a lower cost, lower performance alternative in the event that the full length HCT lines could not be funded in a single phase of construction and financing.

1.2.2.2 Highway and Bridge Alignments

This analysis divides the highway and bridge options into two corridor segments, including:

- Segment A – Delta Park to Mill Plain District
- Segment B – Mill Plain District to North Vancouver

Segment A has several independent highway and bridge alignment options. Differences in highway alignment in Segment B are caused by transit alignment, and are not treated as independent options.

The replacement crossing would be located downstream of the existing I-5 bridge. At the SR 14 interchange there are two basic configurations being considered. A traditional configuration would use ramps looping around both sides of the mainline to provide direct connection between I-5 and SR 14. A less traditional design could reduce right-of-way requirements by using a "left loop" that would stack both ramps on the west side of the I-5 mainline.

1.2.3 Full Alternatives

Full alternatives represent combinations of system-level and segment-level options. These alternatives have been assembled to represent the range of possibilities and total impacts at the project and regional level. Packaging different configurations of highway, transit, river crossing, tolling and other improvements into full alternatives allows project staff to evaluate comprehensive traffic and transit performance, environmental impacts and costs.

Exhibit 1-2 summarizes how the options discussed above have been packaged into representative full alternatives.

Exhibit 1-2. Full Alternatives

	Packaged Options				
Full Alternative	River Crossing Type	HCT Mode	Northern Transit Alignment	TDM/TSM Type	Tolling Method[a]
1	Existing	None	N/A	Existing	None
2	Replacement	BRT	I-5	Aggressive	Standard Rate
3	Replacement	LRT	I-5	Aggressive	Two options[b]
4	Supplemental	BRT	Vancouver	Very Aggressive	Higher rate
5	Supplemental	LRT	Vancouver	Very Aggressive	Higher rate

[a] In addition to different tolling rates, this report evaluates options that would toll only the I-5 river crossing and options that would toll both the I-5 and the I-205 crossings.

[b] Alternative 3 is evaluated with two different tolling scenarios, tolling and non-tolling.

Modeling software used to assess alternatives' performance does not distinguish between smaller details, such as most segment-level transit alignments. However, the geographic difference between the Vancouver and I-5 transit alignments is significant enough to warrant including this variable in the model. All alternatives include Transportation Demand Management (TDM) and Transportation System Management (TSM) measures designed to improve efficient use of the transportation network and encourage alternative transportation options to commuters such as carpools, flexible work hours, and telecommuting. Alternatives 4 and 5 assume higher funding levels for some of these measures.

Alternative 1: The National Environmental Policy Act (NEPA) requires the evaluation of a No-Build or "No Action" alternative for comparison with the build alternatives. The No-Build analysis includes the same 2030 population and employment projections and the same reasonably foreseeable projects assumed in the build alternatives. It does not include any of the I-5 CRC related improvements. It provides a baseline for comparing the build alternatives, and for understanding what will happen without construction of the I-5 CRC project.

Alternative 2: This alternative would replace the two existing I-5 bridge with three new bridge structures downstream of the existing bridge. These new bridge structures would carry Interstate traffic, BRT, bicycles, and pedestrians. There would be three through-lanes and two auxiliary lanes for I-5 traffic in each direction. Transit would include a BRT system that would operate in an exclusive guideway from Kiggins Bowl in Vancouver to the Expo Center station in Portland. Express bus service and local and feeder bus service would increase to serve the added transit capacity. BRT buses would turn around at the existing Expo Station in Portland, where riders could transfer to the MAX Yellow Line.

Alternative 3: This is similar to Alternative 2 except that LRT would be used instead of BRT. This alternative is analyzed both with a toll collected from vehicles crossing the Columbia River on the new I-5 bridge, and with no toll. LRT would use the same transit alignment and station locations. Transit operations, such as headways, would differ, and LRT would connect with the existing MAX Yellow Line without requiring riders to transfer.

Alternative 4: This alternative would retain the existing I-5 bridge structures for northbound Interstate traffic, bicycles, and pedestrians. A new crossing would carry southbound Interstate traffic and BRT. The existing I-5 bridges would be re-striped to provide two lanes on each structure and allow for an outside safety shoulder for disabled vehicles. A new, wider bicycle and pedestrian facility would be cantilevered from the eastern side of the existing northbound (eastern) bridge. A new downstream supplemental bridge would carry four southbound I-5 lanes (three through-lanes and one auxiliary lane) and BRT. BRT buses would turn around at the existing Expo Station in Portland, where riders could transfer to the MAX Yellow Line. Compared to Alternative 2, increased transit service would provide more frequent service. Express bus service and local and feeder bus service would increase to serve the added transit capacity.

Alternative 5: This is similar to Alternative 4 except that LRT would be used instead of BRT. LRT would have the same alignment options, and similar station locations and requirements. LRT service would be more frequent (approximately 3.5 minute headways during the peak period) compared to 7.5 minutes with Alternative 3. LRT would connect with the existing MAX Yellow Line without requiring riders to transfer.

1.3 Long-Term Effects

1.3.1 Full Alternatives

1.3.1.1 No-Build Alternative

The No-Build Alternative would fail to support the principle elements of plans for the area, including accepted levels of service, improved freight mobility, multimodal transportation, and safety.

1.3.1.2 Findings Applicable to All Build Alternatives

The build options are generally consistent with policies and goals for investment in inner-urban infrastructure, multimodal transportation, freight mobility, economic development, and compact urban development,

1.3.1.3 Replacement Crossing

The primary land use impacts of this alternative are:

- Replacement bridge

  The replacement options would provide more vehicular capacity and would be more effective at maintaining freight mobility and economic development, which are emphasized in state, regional, and local plans. They would be less supportive (than supplemental bridge options) of goals related to the reduction of single-occupancy vehicle trips and congestion pricing.

  In Vancouver, there is little difference between the acquisition areas of the different crossings. More significant differences exist for Hayden Island. The downstream replacement option may require the acquisition of the Red Lion at the Quay along the Vancouver shoreline.

  Replacement bridge options would vacate the existing I-5 mainline right-of-way passing under the BNSF railroad berm. This space could be used to provide a roadway connection between Main Street and the planned development along the Columbia River.

- Tolling: standard, higher, or no-toll options

  Local policies support congestion pricing. Indirect impacts from tolling scenarios could affect retail land use on Hayden Island.

- BRT (I-5 alternative)

  Certain local and regional plans support high-capacity transit, in general ways. These policies and goals appear to prefer the choice of LRT over BRT as the transit mode. BRT would produce noise impacts along the alignments.

- LRT (I-5 alignment)

  Certain local and regional plans support light rail transit, in general ways. These policies and goals appear to prefer the choice of LRT as the high-capacity transit mode. Other plan policies specifically call for light rail on Hayden Island or in Vancouver. Adding light rail stations in Hayden Island and downtown Vancouver could result in more mixed-use and compact housing development around transit stations.

  Surveys of developers (WMATA 2005) show that LRT is thought to attract more economic investment than BRT due to the higher visibility of rail lines, light rail's stronger public image, and the fact that rail infrastructure is seen as a more permanent public investment. See Section 5.7.2 for more details on the differences between the indirect land use impacts of BRT and LRT.

- Full-length

  Local plans and projections for future land uses depend on high-capacity transit in the urban core. The minimal operable segments (MOS) are less supportive of these goals. However, the MOS would not require acquisitions in Segments A2 or B and would not have any of the associated short- or long-term effects.

- TDM/TSM Option 1 - Aggressive

  State, regional, and local policies can be found that support high levels of TDM/TSM activities.

1.3.1.4 Supplemental Crossing

The primary land use impacts of this alternative are:

- Supplemental bridge

  The supplemental bridge would provide less vehicular capacity and be less effective at maintaining freight mobility and economic development than the replacement options. It would be more supportive of goals to reduce single-occupancy vehicle trips and implement congestion pricing.

  The supplemental bridge options would require the closure of Sixth Street at Washington Street. This may have an adverse impact to circulation near the new Vancouver Convention Center.

  The supplemental bridge options would retain the existing mainline of I-5. This would prevent Vancouver from connecting Main Street to the Columbia River.

- Tolling: I-5 variable rate

  Some local policies support congestion pricing.

- LRT vs. BRT

  Certain local and regional plans support HCT, in general ways. These policies and goals can be interpreted to prefer the choice of LRT as the HCT mode. Other plan policies specifically call for light rail on Hayden Island or in Vancouver. The addition of light rail stations in Hayden Island and in downtown Vancouver would likely result in more mixed-use and compact housing development around transit stations.

  A survey of local developers (WMATA 2005) reported a consensus opinion that investment along a LRT line would yield a higher return than investment along a BRT line. LRT is thought to attract more economic investment than BRT due to the higher visibility of rail lines, light rail's stronger public image, and the fact that rail infrastructure is seen as a more permanent public investment. There is a moderate to high potential for transit-oriented development on Hayden Island.

- Full-length

  Local plans and projections for future land uses rely on high-capacity transit in the urban core. The minimal operable segments are less supportive of the goals. The MOS, however, would not require land acquisitions in Transit Segment A2 or B, and would not have any of the accompanying long-term or temporary effects in these areas (such as construction-related noise and delays).

- TSM/TDM Option 2 – Very Aggressive

  State, regional, and local policies can be found that would support high levels of TDM and TSM activities such as those in Option 2.

1.3.2 System-level Choices

1.3.2.1 River Crossing Type and Capacity: supplemental crossing and replacement crossing

The supplemental bridge options would provide less vehicular capacity and would be less effective at maintaining freight mobility and economic development. They would be more supportive of goals to reduce single-occupancy vehicle trips and implement congestion pricing.

The supplemental bridge options would require the closure of Sixth Street at Washington Street. This may have an adverse impact to circulation, and the visual quality of the area, which may indirectly effect downtown development and the realization of the Vancouver City Center Vision.

The replacement bridge options would vacate the existing I-5 mainline right-of-way passing under the BNSF railroad berm. This space could provide a roadway connection between Main Street and the Columbia River. The supplemental bridge options would need to retain the existing mainline of I-5. This would prevent Vancouver from connecting Main Street to future land uses along the river.

The replacement crossing would open land along the river in Vancouver's lower downtown. Currently only a narrow roadway and a walking path pass under the bridges.

On Hayden Island, the replacement crossing could be designed so as to not impact the Safeway. The supplemental crossing would require the acquisition of the Safeway, which is the only grocery on Hayden Island.

1.3.2.2 High Capacity Transit Mode: BRT and LRT

Certain local and regional plans support light rail transit (LRT), in general ways. These policies and goals can be interpreted to prefer the choice of LRT as the high-capacity transit (HCT) mode. Other plan policies specifically call for light rail on Hayden Island or in Vancouver. Adding HCT stations in Hayden Island and downtown Vancouver could result in more mixed-use and compact housing development around transit stations, with the possibility that the effect would be greater with LRT.

There are indications that investment along a LRT line could yield a higher return than would investment along a BRT line. Surveys of developers (WMATA 2005) show that LRT is thought to attract more economic investment than BRT due to the higher visibility of rail lines, light rail's stronger public image, and the fact that rail infrastructure is seen as a more permanent public investment. See Appendix A for more details on the differences between the indirect land use impacts of BRT and LRT.

Light rail attracts more riders than BRT, provides shorter travel times than BRT, and does not produce the high noise levels of BRT.

1.3.2.3 Major Transit Alignment: Vancouver Alignment and I-5 Alignment

The greatest direct impacts on land use would occur as a result of the park and ride facilities. The Vancouver alignment would entail building the Lincoln Park and Ride, which would occupy 17 acres, 12 of which are the WSDOT maintenance facility. The I-5 alignment would require the acquisition of a smaller, but still large space for the Kiggins Park and Ride. Homes in the Rose Village neighborhood would have potential right-of-way impacts from the I-5 alignment, but likely no building relocations. The I-5 alignment is consistent with the Vancouver Transportation Plan. The plan shows HCT along I-5 in this area.

The Broadway/Main couplet and two-way Broadway alignments would have parking impacts to the upper Main and Uptown areas, but would also bring HCT stations to 16th, 24th, and 33rd Streets. The impacts to on-street parking would be greater for the Main/Broadway couplet than for the two-way Broadway alignment.

New HCT alignments and stations that increase the rates and intensities of development would be consistent with Vancouver's Comprehensive and City Center Vision plans. The population and employment projections of the City, and of Clark County are based on planning that includes the integration of an HCT system into the transportation network.

Redevelopment, especially mixed-use redevelopment, is less likely to occur, and is less likely to be compatible with existing development if transit is routed along the I-5

corridor. Development incentives are likely not to be realized on portions of the HCT alignment that would be in a tunnel or elevated guideway, which would occur more often with the I-5 alignment. The R-9 zoning of the Rose Village neighborhood is not conducive to higher density development.

1.3.2.4 Balance of Transit vs. Highway Investment: Increased Transit System Operations with Aggressive TDM/TSM Measures, and Efficient Transit System Operations with Standard TDM/TSM Measures

A balance of all transportation modes would be achieved with all the build alternatives. The supplemental alternative would provide greater emphasis on transit than on automobiles. This could be interpreted as being more consistent with goals related to mode shares, single-occupancy vehicle use, and compact urban form. Several state, regional, and local policies support high levels of Transportation Demand Management (TDM) and Transportation System Management (TSM) activities and increased transit service.

1.3.2.5 Tolling: No Toll, Standard Toll, Higher Toll, I-5 Only Toll, and I-5/I-205 Toll (Considered as a Mitigation Measure)

As a part of all build alternatives, all motor vehicle users on I-5 crossing the Columbia River would pay a toll. Open road tolling (ORT) technology would be used. ORT allows the collection of tolls without the use of lane dividing barriers or toll-booths. Because the use of ORT technology requires no additional right-of-way, there are no direct impacts associated with its used.

The collection of tolls will serve to reduce the demand for vehicular capacity. In this way, tolls could (along with growth management plans and regulations) mitigate potential "induced growth" which could otherwise result from improved travel times. Furthermore, the use of tolls is consistent with adopted transportation policies, especially when it enables peak period (congestion) pricing.

1.3.2.6 Project Length: Full-Length Alternative and Minimum Operable Segments

Local plans and projections for future land uses rely on high-capacity transit in the urban core. The minimal operable segments (MOS) are less supportive of these goals than the full-length options. The MOS, however, would not require land acquisitions in Transit Segment A2 or B, and would not have any of the accompanying long-term or temporary effects. The MOSs would require a concentration of park and rides lots or structures in the downtown core. This may result in additional traffic congestion, because the Park and Ride generated trips would be more concentrated than with the full alternatives. The City of Vancouver, has found that parking facilities (especially surface lots) detract from the vibrancy and livability of the downtown area, and that a concentration of them with the MOS may have an adverse impact on the downtown.

1.3.3 Segment-level Choices

Direct effects to land use are minimal. Acquisitions would be highest on Hayden Island, where floating homes and commercial businesses would require relocation. Indirect

impacts and plan consistency issues are minimal and do little to help differentiate between choices specific to the individual segments of the project. The differences are better understood through an assessment of the system-level choices. Some differences are noted below for the transit segments.

1.3.3.1 Transit Segment A1: Delta Park to South Vancouver

The supplemental bridge with LRT would have the greatest direct land use impact of the options in this segment. The downstream replacement bridge would cause impacts to more overall acreage, but the difference between alignments is small.

Maintenance facilities outside of the project API may need to be expanded as a result of the region-wide increase in transit operations. The light rail service facility is currently in Gresham. A new facility could also be opened in Clark County. Expanding the Gresham facility would require 10 acquisitions, which is more than required to expand the BRT maintenance facility in Vancouver. It would impact more businesses and households.

There is a moderate to high potential for transit-oriented development (TOD) on Hayden Island. City of Portland, Metro, and other plans call for the extension of light rail to Hayden Island. There is currently no LRT station zoned on Hayden Island.

1.3.3.2 Transit Segment A2: South Vancouver to Mill Plain District

The two-way Washington option would require fewer than half the acquisitions of the Washington/Broadway couplet. The Washington/Broadway couplet option also would require more than four times the area of land than the two-way Washington option.

The couplet on Washington/Broadway may impact fewer on-street parking stalls, but over a larger area.

There is a potential for increased transit-oriented development near the stations at Seventh, 12th, and 16th Streets in Vancouver.

1.3.3.3 Transit Segment B: Mill Plain District to North Vancouver

Build alternatives have the potential to impact the medical office cluster north of the Southwest Washington Medical facilities, at 33rd and Main Street. This would be inconsistent with goals for economic development, specifically The City of Vancouver's No Net Loss of Employment Capacity policy.

There is a planned transit station between C and D Streets along either McLoughlin or 16th Street. This area has been identified in the Economics Technical Report as having a moderate potential for TOD. There is also a potential for increased transit-oriented development near the stations at 24th and 33rd Streets.

1.4 Temporary Effects

If properly mitigated, temporary construction impacts would not have a significant impact to the land use patterns or plans of the region. Construction delays would

negatively impact frequent users of the bridge. Lost productivity and a lower quality of life are recognized results from roadway delays. However, these delays will be actively managed with TSM and TDM measures, detours, public information, and other mechanisms. Long-term decisions regarding housing or employment would not be affected by construction related delays.

A supplemental river crossing could be completed much more quickly. This would cause less temporary disruption than the other options. Although, a replacement bridge could be almost entirely constructed before demolishing the existing bridge.

Construction of transit facilities would potentially be disruptive to commercial and residential uses, resulting in temporary closure of ingress and egress points, outdoor noise, etc.

1.5 Mitigation

Possible mitigations include improving access to the waterfront under the supplemental crossing options, and potential improvements to regional land use regulations and policies.

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2. Methods

2.1 Introduction

This section describes the approach and methods used to collect data and evaluate land use impacts of the various I-5 CRC study alternatives. The impact analysis includes a discussion of construction-related, operational, indirect, and cumulative impacts associated with the different alternatives. The project team evaluated the project's consistency with local, regional, and state transportation and land use plans and development regulations as well as the project's potential to impact the broader goals of these plans.

2.2 Study Area

The study area for this analysis consisted of the primary and secondary areas of potential impact (API).

The primary API is the area most likely to experience direct impacts from construction and operation of the proposed project. The primary API extends about five miles from north to south. It starts north of the I-5/Main Street interchange in Washington, and runs to the I-5/Columbia Boulevard interchange in Oregon. North of the river, the API extends west into downtown Vancouver, and east near Clark College to include potential high-capacity transit alignments and park and ride locations. Around the actual river crossing, the eastern and western sides each extend 0.25 mile from the I-5 right-of-way. South of the river crossing, this width narrows to 300 feet on each side.

The secondary API represents the area where indirect effects (e.g., traffic and development changes) could occur from the proposed project. The study team relied primarily on secondary data to evaluate the likelihood of indirect land use effects. The secondary API includes a broader area than the primary API and stretches from where I-5 and I-205 meet to I-84.

Major transportation projects can impact regional growth trends and patterns. The analysis considered the Metro urban growth area and Clark County, including their existing and planned land uses. The analysis has also included a review for consistency with state, regional, and locally adopted plans. Also, the potential areas for high-capacity transit maintenance facilities were analyzed.

2.3 Effects Guidelines

The approach for evaluating potential land use effects is based on guidelines (USDOT 1987) developed by the Federal Highway Administration (FHWA). The analysis included a check for consistency with state, regional, and local plans and regulations. Potential land use effects evaluated by this approach include:

- Changes in development intensities that would be substantially different than existing or planned densities.
- Changes in a recognized special district, overlay, or plan area that would be inconsistent with adopted goals, possibly including:
    - Significant impacts to historic resources, air quality, traffic, noise, or ecosystems, or
    - Property acquisitions and relocations.
- Conflicts with local plans that appropriate agencies do not favor amending.
- Project effects that would require changes in zoning not supported by the local land use planning agency.

2.4 Data Collection

For this evaluation, the project team examined the land use planning context in both Oregon and Washington, specifically in the Portland-Vancouver metropolitan area. The team reviewed the general historical development of the area, and recent development trends. Geographic Information Systems (GIS) and preliminary alternative designs were used to analyze the changes in land use that could result from the project, including any indirect impacts to land use.

The existing land use analysis primarily relied on Metro's Regional Land Information System (RLIS) and Clark County's GIS Services and Assessment. The project team conducted field visits to verify and correct information gathered from these sources, especially for existing land uses. Also, local agencies were consulted to verify the accuracy of land use and zoning maps.

The land use analysis included:

- Reviewing project consistency with state, regional, and local plans and policies, including comprehensive plans, transportation plans, zoning ordinances, subarea plans, shoreline management master plans, and site-specific master or facility plans. The reviewed plans are described in Section 4 of this report. The team contacted relevant agencies to discuss potential plan or ordinance amendments required to avoid any inconsistencies with applicable plans and development regulations.
- Interviewing local, regional, and state planning agencies and other relevant agencies to gather data and interpret policies.
- Identifying potential impacts to special districts, centers, and overlays, such as Vancouver's Central Park, through a review of relevant policies and interviews with local planning agencies. This included a review of planned developments, connectivity, access to the Interstate and transit systems, and noise and air quality.
- Reviewing required permits and development regulations for areas in the primary API that may be impacted by construction activities. To conduct the permitting

review, the team considered allowed uses, buffers around sensitive areas, demolition of significant structures, and other regulated actions.

2.5 Analysis Methods

2.5.1 Long-term Operational Impacts

In order to analyze long-term land use impacts, the project team compared conceptual designs and operational plans to the information collected on existing land uses, zoning, comprehensive plan designations, designated special districts, overlays, and subarea plans. The findings from other technical reports, including Traffic, Transit, Acquisitions and Relocations, Economics, and Air Quality were reviewed to identify any land use impacts. Long-term land use impacts were classified as either direct or indirect, as discussed below.

2.5.1.1 Direct Land Use Impacts

The analysis of direct land use impacts evaluated the following:

- The extent to which property acquisitions and relocations of existing uses within the primary API could change land uses including any necessary changes to zoning, special district plans, and overlays.
- The compatibility of new uses (such as roadway or transit facilities) with surrounding existing or planned uses, and whether such uses could disrupt or divide the physical arrangement of a community.
- The long-term effects analysis reviewed relevant state, regional, and local plans to determine:
    - Whether components of the alternatives are included in the project lists and facilities plans of the respective jurisdictions.
    - Whether the components of the alternatives are consistent with the goals and policies of the plans.
    - Whether any changes to the plans would be needed to accommodate the project.

2.5.1.2 Indirect Impacts

Indirect impacts generally occur after construction or are more physically distant from the project. These can include effects on future growth and land use patterns. The analysis of indirect land use impacts evaluated the following:

- The potential consequences on land use of significant impacts identified in the Air Quality, Noise and Vibration, Traffic, Transit, Neighborhoods, Economics, Visual, and Economics Technical Reports.
    - Any significant air quality, noise or vibration impacts were examined for their potential effect on existing or planned residential, school, hospital, certain commercial, and other sensitive uses.

  - Traffic impacts as a result of project activity were reviewed for possible effects on residential, industrial, and commercial uses as well as the effects on freight mobility.
  - Transit impacts were reviewed for their effects on land use if significant increases or decreases in transit access were identified.
  - Neighborhood, visual, and economic impacts were reviewed for their potential effects on land use.
- The long-term analysis reviewed relevant state, regional, and local plans to identify whether long-term land use changes that may result from the proposed alternatives conform to the plan.

This analysis included a review of the literature on the relationship between transportation facility changes and induced growth. The Portland-Vancouver area was modeled using sophisticated software systems including EMME2 and VISUM multimodal regional transportation modeling. This analysis reviewed modeling results to characterize changes in capacity and travel patterns in the affected area of the I-5 corridor. The project team compared the commuter travel-shed (the collection of origins for potential trips to a given destination) for major employment destinations such as the Columbia Corridor (an industrial and commercial area along Columbia Boulevard) and Portland City Center. The team also reviewed travel time differences, periods of congestion, and other performance indicators that can indicate potential for land use changes. Additional model outputs were used to determine the origin and destination of new trips in the region, and how these may differ among the alternatives.

2.5.2 Plan Consistency

Each alternative and their associated design options were checked for consistency with state, regional, and local plans and implementing regulations, including comprehensive plans, transportation plans, zoning ordinances, subarea plans, shoreline management master plans, and site-specific master or facility plans. The reviewed plans are described in Section 4 of this report. The team contacted relevant agencies to discuss potential plan or ordinance amendments required to avoid any inconsistencies with applicable plans and development regulations.

2.5.3 Short-term Construction Impacts

The land use analysis estimated short-term construction impacts based on conceptual designs for alternatives, conceptual construction plans, and the findings from other technical reports.

The analysis included evaluation of the impacts of construction activities on surrounding uses, special districts, overlays, and plan areas. These included activities with impacts to access, noise, air pollution, traffic, neighborhoods, economics, historic resources, ecosystems, and others. Such impacts could include changes to land uses resulting from temporary reduction or loss of accessibility to businesses or residences, disturbance of livability, or disruption of significant public activities or events.

2.5.4 Mitigation

Where potential impacts are identified, the project team conducted an analysis to identify potential and appropriate mitigation measures, with the intent of identifying mitigation measures directly related to the impacts. The analysis included an evaluation of the cost effectiveness of the measures. Mitigation measures were prioritized to respond to the greatest land use impacts. The mitigations are not listed in order of importance., and will be further refined through work with the participating and sponsoring agencies and in keeping with adopted federal and state guidelines.

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3. Coordination

This Land Use Technical Report was prepared using information obtained from a variety of sources. Agency and environmental documents, local maps, project drawings, aerial photographs, and field visits provided information on existing conditions in the project area. The WSDOT Environmental Procedures Manual, Federal Guidance documents, and other materials were employed to structure the analysis. Neighborhood, local, regional, and state plans and development regulations were reviewed to identify goals, and polices pertaining to transportation and land use. Agency interviews and coordination meetings enabled the project team to clarify ambiguities, legislative intent, and implementation priorities from these plans and development regulations.

Early interviews with agencies were necessary to review interpretations of plan policies and to incorporate into the study all planned projects in the primary API. Meetings and conversations were held with numerous agencies on the methodology. The Land Use Methods and Data Report, which structured this analysis, was approved by sponsoring agencies including the Washington Department of Transportation (WSDOT), Oregon Department of Transportation (ODOT), Regional Transportation Council (RTC), Metro, C-TRAN, TriMet, and the cities of Vancouver and Portland. Input was received on which plans and development regulations to review, and how to address the indirect and cumulative impacts.

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4. Affected Environment

4.1 Introduction

This section describes the existing land uses, recent and pending development, planned land uses, zoning and overlay districts, and development trends in the primary and secondary API as shown in Exhibit 4-1. It also identifies the state, regional, and local transportation and land use plans and development regulations that apply to the project. It discusses the consistency of the project alternatives with those plans and development regulations. This section also identifies the current land use patterns and zoning districts of the API.

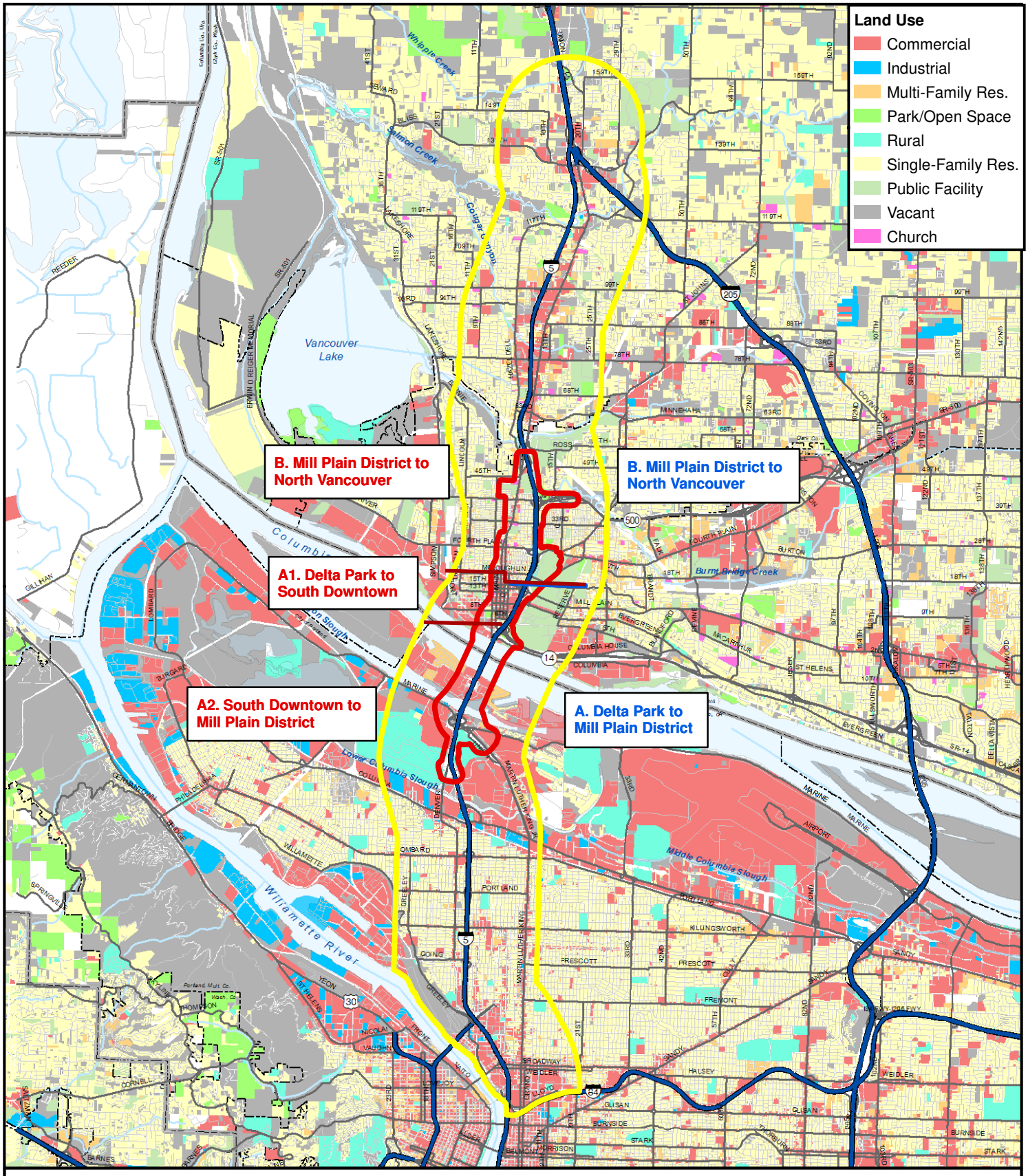
Sophisticated transportation and land use plans and development regulations for their implementation are part of this region's character. Oregon's state-wide planning laws, described below, and Washington State's Growth Management Act (GMA) agree on general principles of compact urban form, preservation of rural areas, use of urban growth boundaries, and multimodal transportation systems. Regional plans help to tailor these goals for the Portland-Vancouver area. Local plans refine the goals further and establish policies to implement them. Zoning and other development regulations are adopted through ordinances to implement these planning principles. Zoning in the study area includes numerous overlays for the protection of historic, scenic, and other resources.

4.2 Segment A Delta Park to Mill Plain District

Comprised of several neighborhoods, the Oregon portion of the secondary API is largely residential, with commercial activity on the major transportation corridors such as Interstate Avenue and Martin Luther King Jr. Boulevard. Exhibit 1-2 shows the segment boundaries for the project. Exhibits 4-1 through 4-6 shows the existing land uses in the primary and secondary APIs.

4.2.1 Existing Land Uses

The southern end of the secondary API, as shown in Exhibit 4-2, includes the Lloyd District, which is predominantly commercial in character and includes regional facilities such as the Rose Garden Arena, the Memorial Coliseum, and the Oregon Convention Center. This area is a major employment center for the region and includes several large office buildings, including the Bonneville Power Administration (BPA), State of Oregon, Metro, TriMet offices, and the Lloyd Center Mall. Light rail runs east-west along NE Holladay Street in the Lloyd District, and travels north along Interstate Avenue. The existing light rail transit system runs between Gresham and Hillsboro, traveling through downtown Portland, and connects to the Portland International Airport. The area is also well served by a large number of bus routes.



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Miles

Transit Segment Boundaries
Roadway Segment Boundary

Areas of Potential Impact
Primary API
Secondary API

Exhibit 4-1: Existing Land Uses
Portland - Vancouver Area

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 1/2/08; File Name: DC_EJ_PBR_11_1.mxd

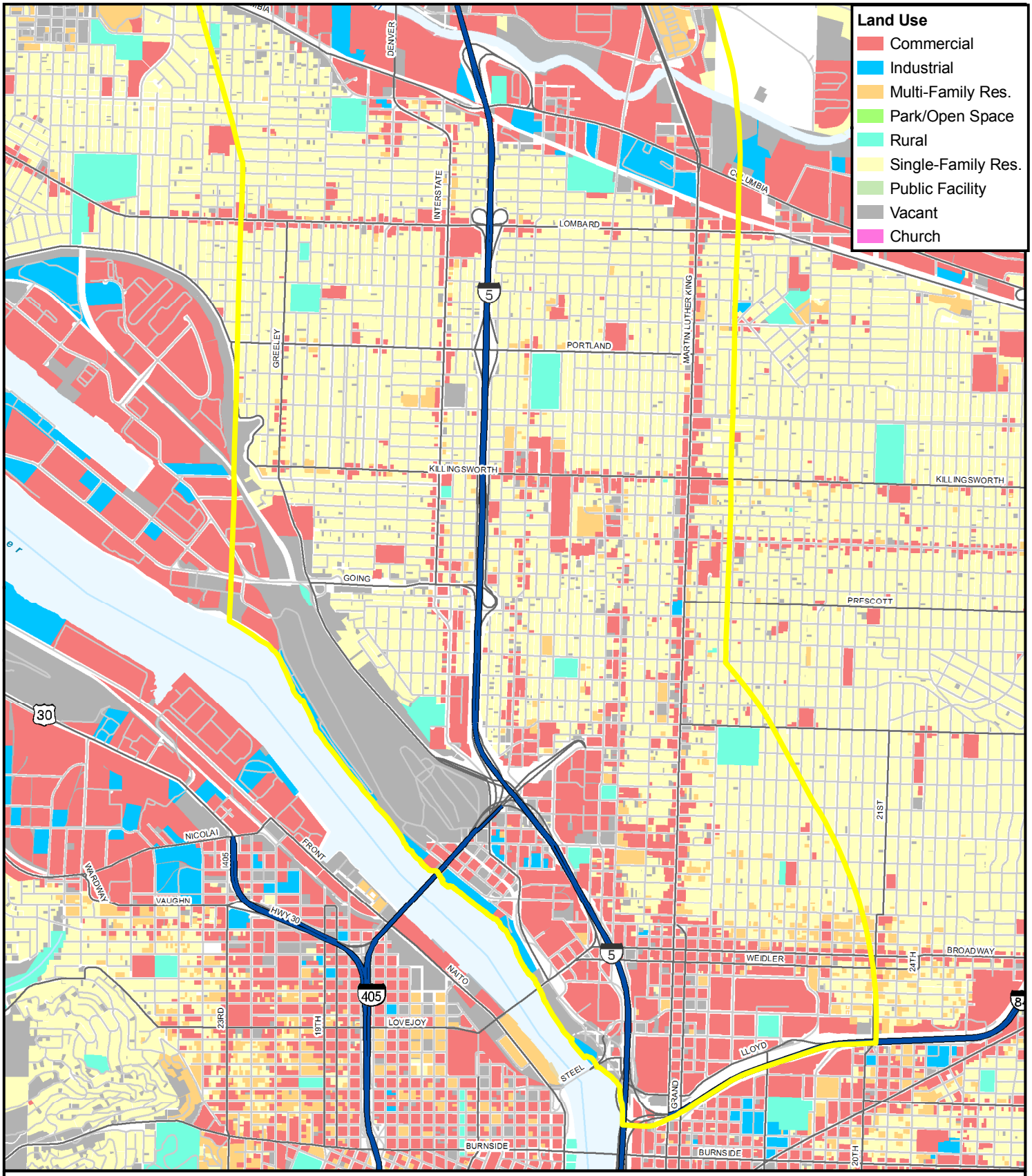


Exhibit 4-2: Existing Land Uses
North Portland / East Central Portland

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_1.mxd

Comprised of several neighborhoods, the Oregon portion of the secondary API is largely residential, with commercial activity on the major transportation corridors such as the north-south Interstate Avenue and Martin Luther King Jr. Boulevard, and many east-west corridors including Killingsworth, Alberta, Fremont and others streets. The residential mix includes both single-family and multi-family uses. I-5 and the Interstate Avenue MAX line run north-south through the area. Exhibits 4-1 through 4-6 shows the existing land uses in the primary and secondary APIs.

The area between N Columbia Boulevard and the Columbia River, as shown in Exhibit 4-3, comprises primarily industrial uses, although commercial uses, multi family housing, parks, public facilities, and open space are present as well. A number of large properties in this area have single uses, such as the Portland International Raceway, Portland Meadows, the Exposition (Expo) Center. This area includes the Columbia Slough and Hayden Island. Currently the MAX light rail line ends at the Expo Center just south of the Columbia River.

Hayden Island (Exhibit 4-3) is located in the Columbia River and is only accessible via I-5. Hayden Island Drive is the main road within the neighborhood. The west side of Hayden Island and the far eastern tip of the island are predominantly open space and the western side is unincorporated. In the eastern portion, the primary use is commercial, including the Jantzen Beach Center (a large shopping mall) and surrounding retailers. Residential uses in the area include multi family residential areas, manufactured homes, and floating homes associated with small marinas, as well as other low to medium density developments. The Columbia River forms the boundary between Oregon and Washington. It is lined on both sides by marinas, homes, hotels, restaurants, and public facilities.

Downtown Vancouver, as shown on Exhibit 4-4, includes the central business district (south of Mill Plain Boulevard and west of I-5), residential areas, and the Central Park neighborhood, which includes National Park Service (NPS) property and the Fort Vancouver National Historic Site. Land uses in the area are primarily commercial, but include retail, offices, industrial, governmental, and residential uses. The downtown serves as the governmental and cultural center of Clark County, and southwest Washington, in general. Community facilities located in the downtown area include a train station, Esther Short Park, government offices, and a bus transit center. The current I-5 corridor is a significant divide in the downtown area, with the commercial/office center on the west, and the Reserve, the Main Library, the Fort Vancouver National Historic Reserve, and Clark College on the east. A robust network of bus routes serves the downtown and inner neighborhoods of Vancouver.

4.2.2 Recent and Pending Development

Information on recent and pending development was compiled from stakeholder interviews with City of Vancouver and City of Portland staff, review of the Vancouver City Center Vision Plan, field reconnaissance, and previous data gathering exercises.

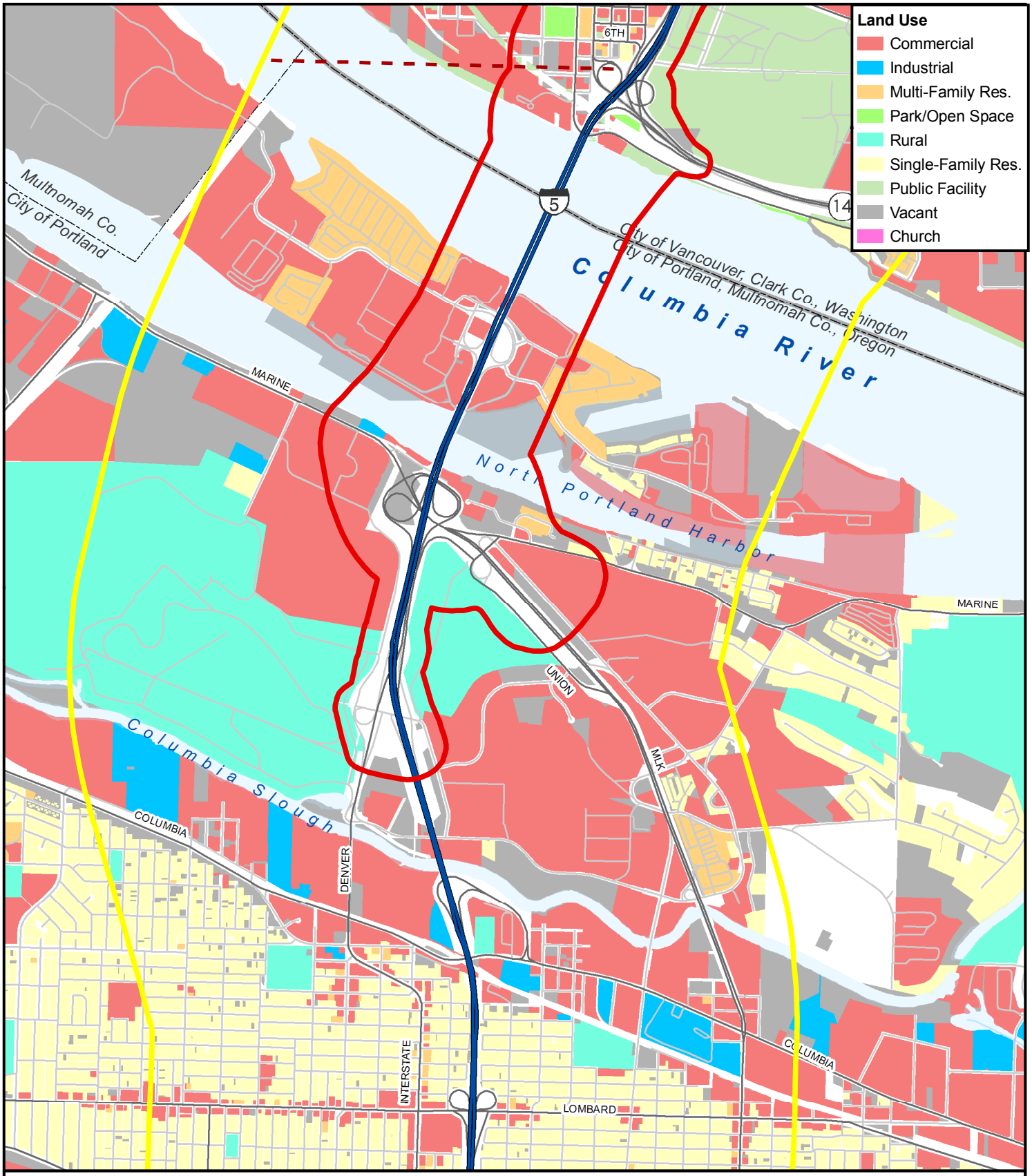
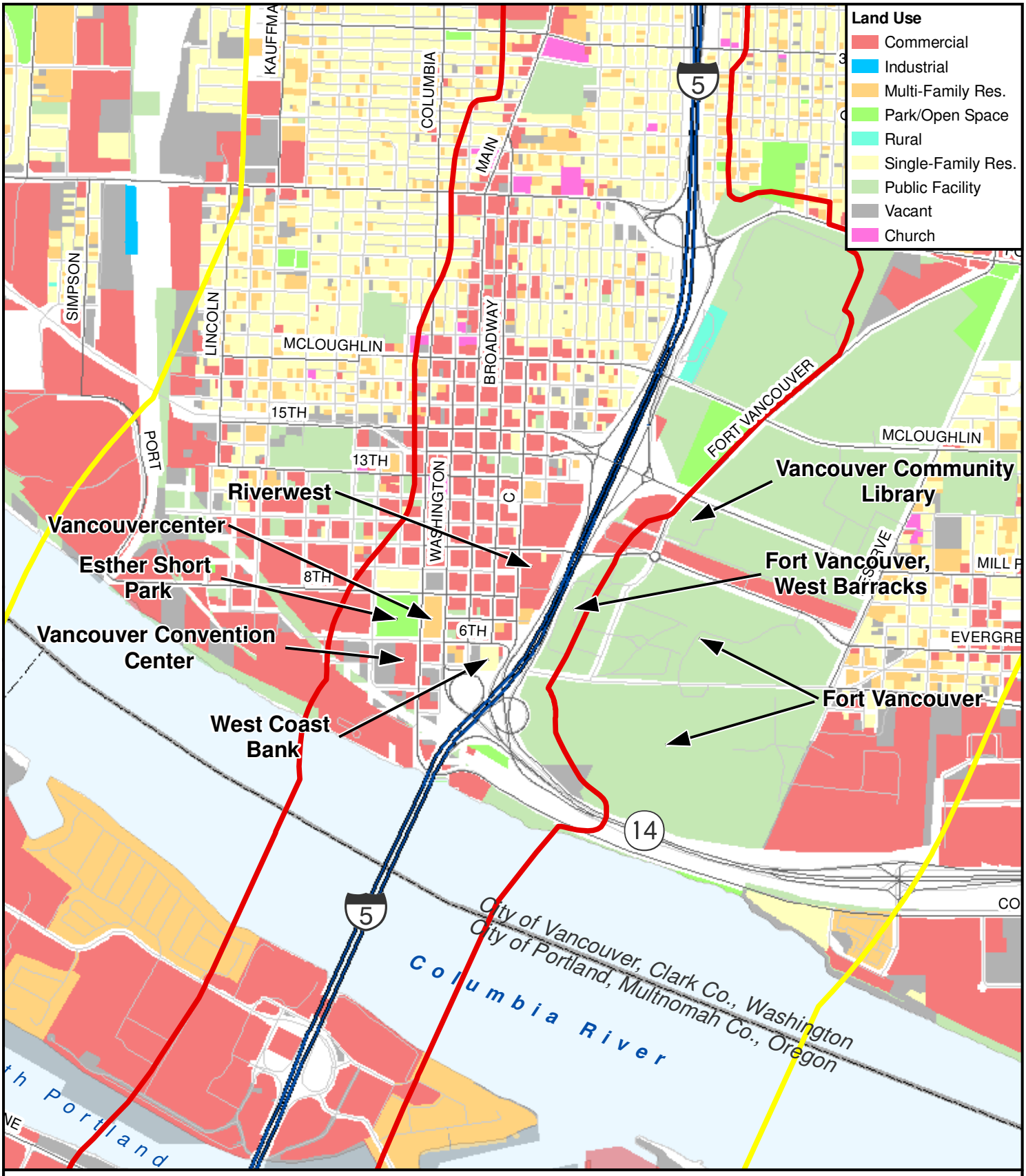


Exhibit 4-3: Existing Land Uses
Columbia Blvd / Hayden Island / Columbia River

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_1.mxd



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Areas of Potential Impact
Primary API
Secondary API
MAX Lines

Exhibit 4-4: Existing Land Uses
Vancouver

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 1/4/08; Plot Date: 1/4/08; File Name: ...\Landuse\Exhibit4_5_4_6.mxd

North Portland has experienced more stable land use patterns as it has been more fully built-out than much of Vancouver. However, there has been increased construction along the waterfront, of both hotel and condominium projects. Industrial activity along Columbia Boulevard has remained strong. The 2004 completion of the Interstate MAX Yellow Line has significantly changed Interstate Avenue and immediately surrounding neighborhoods.

Vancouver's downtown development has changed greatly during the past decade. The focus of the downtown and waterfront areas has broadened from employment-related uses to tourism and recreation development, retail shopping, meeting and convention activities, housing, and entertainment. Along with revitalizing overall downtown activity, development has emphasized new residential opportunities and revitalization of the retail core and central waterfront. New office and mixed-use development has increased in the last decade, with projects such as the Vancouver Center, West Coast Bank Building, Public Service Center, Convention Center, and numerous smaller projects. New and growing uses in the downtown include eateries, bars/taverns, a new playhouse, and personal services.

In addition to private and private-public partnered projects, the City has recently adopted the Vancouver City Center Vision, and is working on plans for both the lower Grand Avenue area and Central Park. The Historic Reserve Trust has completed and adopted a reuse and management plan for the West Barracks in Fort Vancouver. These projects have value commercially, in terms of tax revenue, and in terms of providing inner-urban opportunities for family-wage jobs.

4.2.2.1 Portland

4.2.2.1.1 Recent Development

On Hayden Island there have been changes in businesses, though the general pattern of use has remained the same for many years. An amusement park occupied Hayden Island between 1928 and 1970, and the Jantzen Beach shopping center opened in 1972. The City of Portland is completing a subarea planning project for East Hayden Island.

The Waterside. This new (2007) large condominium development is located east of the Doubletree Hotel and the I-5 alignment. The Waterside has 84 condominium units at 1,600 to 2,400 sf.

Salpare Bay. At 499 N Tomahawk Island Drive, the new Salpare Bay condos have 204 units, ranging from 1,000 to 4,000 sf in size. The first phase was completed in June 2007.

Light rail. Recent development in the API in Oregon includes the MAX light rail terminus at the Expo Center. This was completed in 2004, with the extension of the Yellow Line through north Portland. The station includes a park and ride facility, public art, and bike facilities. The Portland International Raceway (PIR) station includes a C-TRAN – TriMet transfer center and a park and ride lot.

4.2.2.1.2 Pending Development

Moratorium. The island has, until recently, been under a building moratorium with certain limitations. The commercial development on the island causes traffic volumes to exceed the system's capacity. The potential of a significant new development on the island, Wal-Mart, was the impetus for a development moratorium limiting (among other things) commercial square footage and parking on the island. The moratorium was unanimously approved by the City Council. In (LUBA No. 2006-186 THUNDERBIRD HOTELS, LLC, Petitioner, vs. CITY OF PORTLAND, Respondent and JANTZEN DYNAMIC CORPORATION, Petitioner, vs. CITY OF PORTLAND, Respondent.) the Oregon Land Use Board of Appeals found that the moratorium was not adopted in accordance with the provisions of ORS 197.520(2)(c), and therefore invalidated the moratorium. Currently the City is in the process of appealing this decision.

Hayden Island Neighborhood Plan Project. Currently the Bureau of Planning is developing and implementing a public outreach process. This process will lead to the creation of an area plan for Hayden Island. Ultimately the Hayden Island Plan may include: comprehensive plan and zoning designations, a street plan, development standards, a conservation strategy, and an affordable housing preservation strategy. This process will take into consideration both East and West Hayden Island and the Columbia River Crossings Project. The entire project will be conducted with a large amount of community and stakeholder involvement in order to create the best product for Hayden Island.

Jantzen Beach Center Redevelopment. Redevelopment plans for the shopping center are in preliminary stages. The project intends to transform the area from a conventional suburban shopping center to a more Main Street atmosphere. The City of Portland, the developers, and the CRC project team are sharing information, such as the preliminary transportation circulation plan for the Center. A significant element of the plan is to construct a connecting facility that would allow traffic to move across the Interstate alignment without interfering with traffic on the I-5 ramps.

4.2.2.2 Vancouver

4.2.2.2.1 Recent Development

Esther Short Park & Propstra Square are located in downtown Vancouver between Esther and Columbia and Sixth and Eighth Streets. Esther Short Park is the oldest public square in Washington and is considered the oldest city park in the West. Private donations of $3.6 million and city investment of $2 million were used in 1998 to redevelop the park featuring new a plaza (Propstra Square), gardens, and amenities. The site hosts activity year round with a variety of events, programs, concerts, food vendors and other activity.

Heritage Place is located just north of Esther Short Park on Eighth Street. The development includes 137 condominium units; covered, gated parking; and 14,500 square feet (sf) of retail space. Current retail includes a coffee shop, boutiques, restaurants, children's stores and gift shops. The project represents an investment of $25 million.

The Vancouver Center is located between Sixth and Eighth Streets and Columbia and Washington Streets. It includes mixed-uses with 200,000 sf of office space, 20,000 sf of retail, more than 200 condominiums and an 800-car garage. The development represents an investment of $100 million. The final phase of the development will begin in 2008, erecting a fourth tower on the site.

The Lewis and Clark Plaza is located at 621 Broadway, and includes an interpretive center that features a grouping of life-size bronze figures depicting Meriwether Lewis, William Clark, Sacagawea, a Native American Chief and the Jefferson Peace Medal. Completed in 2004, it is a four-story, 46-unit affordable senior housing project.

The Esther Short Commons is a 2-square-block development with 139 work force apartments, 21 market rate apartments, 20,000 sf of retail (part of which hosts the Vancouver Farmers Market), and 100 parking spaces. The project is located at the corner of Eighth and Esther Streets and is an $18.6 million investment.

The **Vancouver Convention Center and Hilton Hotel** is the only publicly-owned convention center and four-star hotel in the Pacific Northwest. It is located at Sixth and Columbia (south of Esther Short Park). It includes an upscale restaurant, a 30,000 sf convention center, and 226 guest rooms.

The Columbian Building is located on Sixth Street between Esther and Columbia. The $30 million project will open in late 2007 and is a six-story 118,000 sf tower. Columbian news, advertising, circulation and administrative staff will occupy four floors of the building, with the two top floors available for office lease. Some ground-level space is planned for retail tenants. The site is still under construction.

The **West Coast Bank Building**, located at W Sixth & Broadway, represents an investment of $23 million. This project is highly visible for northbound I-5 travelers. The development includes 71,000 sf of commercial space, 21 luxury condominiums and a 267-space public parking structure. Tenants include a bank, a law firm, and the University of Phoenix.

The Northwynd at Columbia Shores development includes condominiums, Beaches and McMenamin's restaurants, and a handful of small businesses along the Columbia River. The project was completed years ago, but was one of the first and most significant projects in the downtown and river front revival in Vancouver.

4.2.2.2.2 Pending Development

The Vancouver City Center Vision (VCCV) plan includes projections of employment capacities and housing units. These projections were used to model and assess potential impacts of planned development. The environmental analysis and adopting ordinances constitute a Planned Action Ordinance under the State Environmental Policy Act (SEPA) called a "planned action." As such, the VCCV and its accompanying environmental impact statement constitute an adopted plan for the downtown area. This report uses the plan's build-out projections to assess the impacts to different developments and areas.

Riverwest. This site adjoins the I-5 right-of-way, just south of Evergreen Boulevard. The development will include a new main library for the Fort Vancouver Regional Library System. Riverwest is a $165 million public-private mixed-use development that includes four multi-story buildings. In addition to the library, Riverwest will offer a new civic plaza, 200 multi-family residences, 100,000 sf of offices, 17,000 sf of retail, a boutique hotel, and a 900-stall underground parking garage. Water features, public arts, and greenspaces will be featured in this project.

Columbia West Renaissance. The recently sold Boise Cascade site along the western waterfront in Vancouver's downtown represents a significant increase in buildable area and in waterfront access. The project is expected to represent a $60 million investment. The site was purchased by Gramor development, who is working with the City on permits for a large-scale mixed-use development. The development will include shoreline-oriented uses with retail, dining, entertainment, and coffee shops. Significant amounts of new office space, public space, and residential uses are planned. The VCCV projected the area would accommodate 3,014 condo units and an upscale hotel with 200 rooms. There will be 450,000 sf of office space, more than double that provided in the recent Vancouver Center project. Mostly at the ground-floor level, there will be 125,000 sf of retail space. An additional 100,000 sf will be used for light industrial uses and professional offices. Pedestrian amenities from the east side of the Vancouver shoreline would cross under the CRC improvements and extend through the Columbia West development.

In stakeholder interviews with the City of Vancouver staff, it was stated that the property owners have leased 3.2 acres on the east side of Esther Street. Gramor has begun negotiations with the Red Lion at the Quay to relocate the facility on the west side of the original Boise Cascade area.

West Barracks. The federally-established Vancouver National Historic Reserve (VNHR) includes many buildings previously used by the United State military. Hoping to revive the area, the VNHR partners—including the City of Vancouver, National Parks Service, State of Washington, U.S. Army and the VNHR Trust—are working with private sector partners to renovate 16 historic buildings on the West Barracks for a variety of uses, from education and the arts to recreation and hospitality.

The West Barracks includes a fully-restored 1919 Red Cross building that is now used as a reception hall and for classroom space. Other historic structures on the barracks include Barnes Hospital, the Artillery Barracks and the Infantry Barracks. The Reuse and Management plans for the West Barracks have been reviewed as part of this report. However, the plans are evolving over time. Recent inquiries with City of Vancouver staff have revealed the current intended uses for certain sites near the CRC project alternatives.

The Barracks Hospital is planned to be used for the arts, including studios, galleries, and group work space. The Artillery Barracks is intended for use as a hotel or hostel. The duplexes south of the Hospital and the Artillery barracks will be used for hospitality. To realize these plans, the City has invested over $6 million in infrastructure. Numerous related projects are part of the plans for the area, including the Confluence Land Bridge

(a pedestrian overpass), reconstructions in the historic fort Village, and commercial and public uses in the Reserve.

Planning is in its early stages for transferring the south and east barracks to the City. These areas will later be integrated with the master plans for the West Barracks.

The Denny's Site. On the site of a closed Denny's restaurant, private developers are planning 60,000 sf of office space. The site is just west of the Mill Plain interchange. It should be completed in 2008. The project has value commercially, in terms of tax revenue, and in terms of providing inner-urban opportunities for family wage jobs. This site also will serve as a gateway for Vancouver.

Other sites. Additional development and redevelopment is planned in the primary API. Some of these projects have not yet been through the pre-application process with either City's development review staffs. Other projects are only conceptual at this time. Much of the information presented here was gathered through interviews with City staff people. Many of these meetings are listed in Coordination, Section 3.

For example, the Vancouver Police Department offices on Mill Plain Boulevard, and the site of a Burgerville on Mill Plain are being considered for redevelopment. The project may be largely residential. The Murdock Building next to Vancouver's City Center Cinemas has an attached two-story parking garage. There are plans to build on that space, adding as many as eleven floors of residential units. Also, the fourth Vancouver Center building is due to start construction in 2008. Details are not available as to the uses or the delay in construction.

4.3 Segment B Mill Plain District to North Vancouver

In this segment, commercial development is centered on I-5 and Highway 99, north from Fourth Plain Boulevard to Salmon Creek, as shown on Exhibit 4-5. Spreading east and west away from I-5, much of the secondary API is designated single-family residential with some multi-family districts scattered along major roadways. Public facilities, parks, and open spaces are found throughout the secondary API. The Vancouver urban growth boundary is just to the north of this segment. The boundary currently intersects Interstate 5 at approximately 209th Street.

The Uptown commercial district (between Mill Plain and Fourth Plain Boulevards on Main Street) is the transitional area between downtown and the lower-density lands to the north. Residential uses predominate, with major transportation corridors (primarily Fourth Plain Boulevard and Main Street) supporting commercial uses. Older neighborhoods are west of I-5, with many vintage homes and a tight street grid. The east side of I-5 includes more multi-family housing, less mixing of uses, and more of a suburban form. The current municipal boundaries of the City of Vancouver run roughly along 63rd Street.

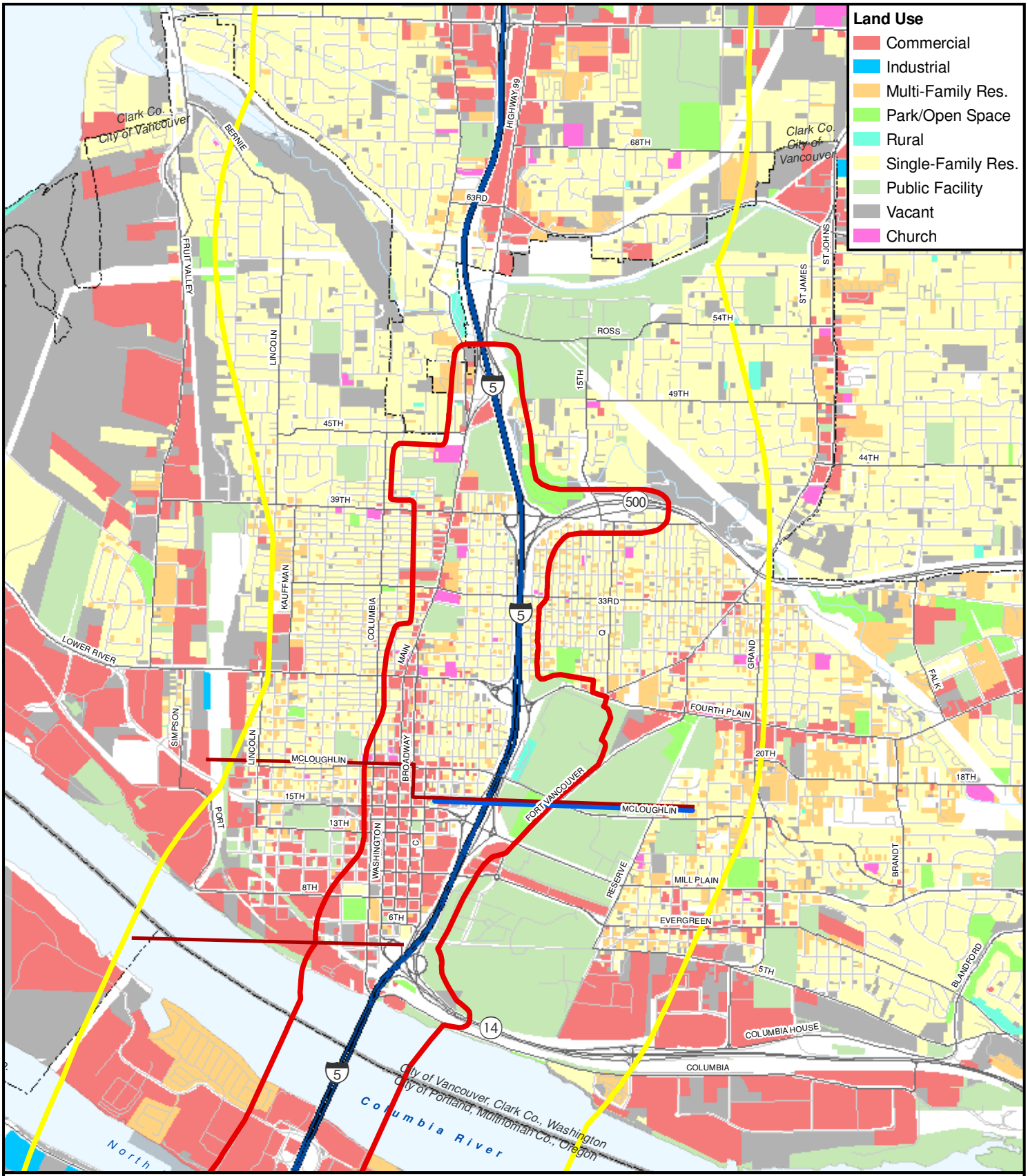


Exhibit 4-5: Existing Land Uses
Clark County

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 1/2/08; File Name: DC_EJ_PBR_11_1.mxd

Hazel Dell is primarily a suburban residential area and includes areas north of 63rd and south of Salmon Creek and 119th Street. The residential areas are heavily single-family with larger lots than are found in areas further south. The commercial areas (along Highway 99, and Hazel Dell Avenue) have frequent bus service but are primarily auto-oriented. Infill development has maintained a healthy pace in the Felida and Hazel Dell areas, with single housing units as well as very small subdivisions being built on previously overlooked parcels. A new 99th Street Park and Ride transit station is nearing completion at Stockford Village at I-5 and 99th Street.

The northernmost portion of the secondary API is suburban in character and has developed more recently. It includes some undeveloped areas with a rural character. Residential areas are predominately large-lot single-family parcels. Commercial areas along 134th Street and Highway 99 are auto-oriented. This area includes a number of regional facilities, including the Exposition Center, the Clark County Fairgrounds, the Clark County Amphitheater, and the new Legacy Hospital. The Washington State University Vancouver campus is located just outside the secondary API. I-5 and I-205 come together in this area, as do 134th Street, Salmon Creek Avenue (serving the University) and Highway 99. The confluence of these major roadways has resulted in significant congestion. This congestion has twice led to development moratoria in the area and a moratorium on new construction is currently in effect. A major park and ride facility exists on 134th Street, and is planned for relocation nearby in coming years. The Stockford Village Park and Ride will open soon next to the Hazel Dell Town Center.

4.3.1 Recent and Pending Development

In Segment B, there have been a number of recent developments, although not as many or as large as have occurred in Segment A. The Uptown area, on Main Street between McLoughlin and Fourth Plain Boulevards, has seen recent investments. Many new businesses have opened including specialty retail, restaurants, and personal services. At Main Street and Fourth Plain Boulevard the Anthem Park and Uptown Village Apartments project has been the largest single development in the immediate area.

Anthem Park and Uptown Village Apartments feature a mid-rise design with four stories above street level. It includes apartments, an underground parking garage, and community rooms. The open center of the development is City owned, as Anthem Park.

The Hazel Dell Town Center is well north of the primary API, but represents such a large investment and change in land use that it is worth mentioning here. The project includes 400,000 sf of office and retail space. Located along I-5 at NE 99th Street and Hazel Dell Avenue, it features Target, Kohl's, Best Buy, Office Depot, Petco, Famous Footwear, Party City and Sleep Country. Adjacent parcels have been rezoned and are under development with additional retail space and multi-family housing. Pine Tree Institutional Realty purchased Hazel Dell Town Center for $60 million. The first phase of the project opened in 2005.

There is a trend of increased redevelopment in the Uptown area, with recent renovations of a drug store, hardware store, and small shops along Main and Broadway. The

surrounding residential neighborhoods seem to be experiencing increased investment as well, with much rehabilitation of housing. There are no planned projects of such a size or impact that warrant inclusion in this analysis.

4.4 Transportation and Land Use Plans

This section discusses the applicable plans and implementing regulations that the project has been reviewed for consistency with. State plans are covered first, followed by bi-state, regional, and local transportation and land use plans.

4.4.1 Oregon

In 1973, the Oregon Legislature enacted Senate Bill 100[1], which requires all cities and counties to adopt and implement comprehensive land use plans that comply with 19 statewide goals and guidelines. Adopted comprehensive plans are implemented by a variety of ordinances used to enforce the provisions of the plans, capital facility plans, as well as other programs.

There are goals to provide infrastructure to urban areas and for directing high-density growth to urbanized locations. In 1978, to comply with Statewide Goal No. 14, Urbanization, Metro adopted a regional urban growth boundary (UGB) for the Portland metropolitan area. The UGB defines the area within the three Oregon metro counties where urban-level zoning, infrastructure, and development may occur. Local jurisdiction comprehensive plans and implementing ordinances must provide urban services necessary to achieve the urban level of development envisioned in the UGB assumptions. During the first 20 years of the plan, the boundary has expanded by about 1.5 percent. By comparison, population within the three-county Portland metropolitan region has increased by approximately 60 percent (1978-96), and employment has increased by approximately 73 percent (1978-96). In 2002, Metro expanded the UGB by approximately 18,000 acres. The UGB has profoundly affected the land use and development patterns in the Oregon by promoting infill and redevelopment rather than expansion.

Local comprehensive plans are based on the regional transportation policy set in 1976. At that time, the policy shifted from emphasizing automobile accommodation to a broader approach aimed the efficient use of land and integration with the transportation system. A 1973 Governor's task force on transportation concluded that fiscal and environmental realities made it impractical to rely on new radial highways to meet future travel demand, and that most of the new commuter growth into the central city needed to be accommodated with mass transit. As a result, for over 20 years land use and transportation plans have been based on the policy that no new radial highway capacity would be built in the region. Instead, future capacity and level-of-service to and from the central city would depend primarily on high-capacity transit.

[1] ORS 197.175(2)

In 1991, the Land Conservation and Development Commission (LCDC) adopted the Transportation Planning Rule (TPR) to further enhance the planning connection between land use and transportation. The TPR requires local jurisdictions to: consider changes to land use densities as a way to meet transportation needs; adopt changes to subdivision and development ordinances to encourage more transit-, pedestrian-, and bicycle-friendly development and street patterns; review comprehensive plan amendments to ensure that the transportation system is adequate to support planned land uses; and amend comprehensive plans to allow transit-oriented development (TOD) along transit routes. The TPR also requires that Metro reduce vehicle miles traveled (VMT) per capita by 10 percent over 20 years, and 20 percent over 30 years. The TPR was updated in 2006, to:

- Revise the TPR "purpose statement" to more accurately express the overall policy, consistent with Statewide Goal 12 regarding public health.
- Update requirements for metropolitan area planning.
- Revise rule provisions for transportation project development to clarify that decisions made in Transportation System Plans (TSPs) need not be revisited as projects undergo detailed design and approval.
- Consolidate requirements into the TPR for exceptions to goals for transportation projects. (Currently exceptions must address the Exceptions Rule as well as the TPR).

A series of minor and housekeeping amendments were also adopted.

The Oregon Transportation Plan (OTP)

The Oregon Transportation Plan (OTP) is the overarching policy document among a series of plans that together form the state transportation system plan. The OTP considers all modes of Oregon's transportation system as a single system and addresses the future needs of Oregon's airports, bicycle and pedestrian facilities, highways and roadways, pipelines, ports and waterway facilities, public transportation, and railroads through 2030. It assesses state, regional, and local public and private transportation facilities. The OTP establishes goals, policies, strategies, and initiatives for transportation. The Plan provides the framework for prioritizing transportation improvements based on varied future revenue conditions, but it does not identify specific projects for development. The OTP adopted September 20, 2006, supersedes the 1992 Plan.

Many of the plan policies have a bearing on the CRC project, especially the following:

Policy 1.1 – Development of an Integrated Multimodal System

It is the policy of the State of Oregon to plan and develop a balanced, integrated transportation system with modal choices for the movement of people and goods.

Policy 1.2 – Equity, Efficiency and Travel Choices

It is the policy of the State of Oregon to promote a transportation system with multiple travel choices that are easy to use, reliable, cost-effective and accessible to all potential users, including the transportation disadvantaged.

Policy 4.1 – Environmentally Responsible Transportation System

It is the policy of the State of Oregon to provide a transportation system that is environmentally responsible and encourages conservation and protection of natural resources.

Strategy 4.1.5

In the construction and maintenance of transportation infrastructure and facilities, reduce the consumption of non-renewable construction materials, promote their efficient use and reuse, and reduce other environmental impacts such as stormwater impacts where appropriate.

Policy 6.2 – Achievement of State and Local Goals

It is the policy of the State of Oregon to plan and manage the transportation finance structure to contribute to the accomplishment of state and local environmental, land use and economic goals and objectives.

The Oregon Highway Plan (OHP)

The Oregon Highway Plan includes contextual statements and policies that may have an impact on the alternatives analysis for the CRC project. The updated Oregon Highway Plan was adopted by the Oregon Transportation Commission at their September 20, 2006 meeting.

Several policies in the OHP establish general mobility objectives and approaches for maintaining mobility. It includes the following policies from the Policy Element.

- Policy 1A (State Highway Classification System) describes the functions and objectives for several categories of state highways. Greater mobility is expected on Interstate and Statewide Highways than on Regional and District Highways.
- Policy 1B (Land Use and Transportation) has an objective of coordinating land use and transportation decisions to maintain the mobility of the highway system. The policy identifies several land use types and describes the levels of mobility appropriate for each.
- Policy 1C (State Highway Freight System) has an objective of maintaining efficient through movement on major truck freight routes. The policy identifies highways that are freight routes.
- Policy 1G (Major Improvements) has the purpose of maintaining highway performance and improving highway safety by improving system efficiency and management before adding capacity.

Alternate standards for the Portland metropolitan area have been included in the policy. These standards have been adopted with an understanding of the unique context and policy choices that have been made by local governments in that area, including:

- A legally enforceable regional plan prescribing minimum densities, mixed-use development and multimodal transportation options.

- Primary reliance on high-capacity transit to provide additional capacity to the radial highway corridors serving the central city.
- Implementation of an advanced Transportation Management System (TMS), including highway ramp meters, real time traffic monitoring and incident response to maintain adequate traffic flow.
- An air quality attainment/maintenance plan that relies heavily on reducing auto trips, through land use changes and increases in transit service.

The alternate standards were granted to the Portland metropolitan area with a mutual understanding that reduced mobility standards would result in congestion that could not be reduced by state highway improvements.

Action 1F.1 provides highway mobility standards using volume-to-capacity (v/c) ratios that new facilities need to meet. It gives standards for signalized intersections, traffic queues on off-ramps, and more.

Action 1G.2 states that ODOT will support any major improvements to state highway facilities in local comprehensive plans and transportation system plans only if the improvements meet nine specific conditions. Many of these conditions will be met by the extensive planning and public involvement process for this project. The financial conditions, however, will have to be reviewed during the selection of a Preferred Alternative. For example, the Preferred Alternative must be cost effective and the funding must reasonably be expected. Additionally, the action requires local governments to schedule funding for the local street improvements needed to achieve the objectives of the highway project.

Action 1G.3 requires an intergovernmental agreement implementing cost-sharing when a project has major benefits to the local system, especially when local sponsors of the project envision purposes beyond those needed to meet state transportation objectives.

Policy 3C: Interchange Access Management Areas

It is the policy of the State of Oregon to plan for and manage grade-separated interchange areas to ensure safe and efficient operation between connecting roadways. The following Actions provide specific guidance for the I-5 CRC project. These requirements have implications for land use authorities as well as transportation system planners.

Action 3C.1: Develop interchange area management plans to: protect the function of interchanges, provide safe and efficient operations between connecting roadways, and minimize the need for major improvements of existing interchanges.

Action 3C.2: To improve an existing interchange or construct a new interchange requires:

- *Necessary supporting improvements, such as road networks, channelization, medians and access control in the interchange management area must be identified in the local comprehensive plan and committed with an identified funding source, or must be in place;*

- *The design of urban interchanges must consider the need for transit and park and ride facilities, along with the interchange's effect on pedestrian and bicycle traffic; and*
- *When possible, access control shall be purchased on crossroads for a minimum distance of 1320 feet (400 meters) from a ramp intersection or the end of a free flow ramp terminal merge lane taper.*

Policy 4C: High-Occupancy Vehicle (HOV) Facilities

It is the policy of the State of Oregon to utilize HOV facilities to improve the efficiency of the highway system in locations where travel demand, land use, transit, and other factors are favorable to their effectiveness. A systems planning approach shall be taken in which individual HOV facilities complement one another and the other elements of the multimodal transportation system.

Actions for this policy include those that promote HOV lanes, park and ride facilities with preferential HOV parking, the development of high-occupancy toll (HOT) lanes, and light duty commercial truck buy-in for HOV lanes.

Policy 4D: Transportation Demand Management

It is the policy of the State of Oregon to support the efficient use of the state transportation system through investment in transportation demand management strategies.

There are three major implications for this policy. Transportation demand management (TDM) programs need to be—and are—in place and supported. Additional TDM strategies may need to be employed during the construction of the new facility. Lastly, Action 4D2 calls on ODOT to investigate further the effectiveness, feasibility, and impacts of tolling and congestion-based pricing.

Policy 5A: Environmental Resources

It is the policy of the State of Oregon that the design, construction, operation, and maintenance of the state highway system should maintain or improve the natural and built environment including air quality, fish passage and habitat, wildlife habitat and migration routes, sensitive habitats (i.e., wetlands, designated critical habitat, etc.), vegetation, and water resources where affected by ODOT facilities.

Action 1B.5: Develop and implement plans that support compact development, including but not limited to highway segment designations. Support plans, strategies and local ordinances that include:

- *Parallel and interconnected local roadway networks to encourage local automobile trips off the state highway;*
- *Transit, bicycle and pedestrian facilities, including street amenities that support these modes;*

- *Design and orientation of buildings and amenities that accommodate pedestrian and bicycle use as well as automobiles use;*
- *Provision of public and shared parking;*
- *Infill and redevelopment;*
- *Expansion of intensive urban development guided away from state highways rather that along state highways; and*
- *Other supporting public investments that encourage compact development and development within centers.*

Action 1B.6 requires ODOT to develop design guidelines for highways that describe a range of automobile, pedestrian, bicycle or transit travel alternatives. The guidelines should include appropriate design features such as lighted, safe and accessible bus stops, on-street parking, ample sidewalks, pedestrian crossings, pedestrian scale lighting, street trees and related features. These guidelines will be applicable to the mix of transportation modes and to the design of pedestrian amenities.

4.4.2 Washington

The State of Washington adopted the Growth Management Act (GMA) in 1990. This act requires most local jurisdictions to define and implement a land use policy framework that emphasizes reducing inappropriate conversion of land to sprawling, low-density development. This emphasis is evident in statewide requirements to coordinate land use and transportation plans and strongly supports multimodal transportation systems. The law also requires designation of urban growth areas (UGAs) around cities.

In Oregon, the Portland Area Metropolitan Service District (Metro) serves as the Metropolitan Planning Organization (MPO) and has jurisdiction over both transportation and land use issues. By contrast, in Washington the Southwest Washington Regional Transportation Council (SWRTC), has regional authority over transportation only. Clark County provides regional services, which end at the County line. The County has significant authority over land use planning in the county, and governs legislative changes to the urban growth boundaries.

The SWRTC has adopted the Metropolitan Transportation Plan (MTP) for Southwest Washington, which incorporates light rail as a component of the multimodal transportation system in the Vancouver metropolitan region. The adopted Clark County Comprehensive Growth Management Plan and City of Vancouver Comprehensive Plan identify the location of the UGB that encompasses the lands planned for urban development. Implementation of high-capacity transit within the UGA is supportive of City and county plans and will help the region achieve anticipated development without expanding the urban growth area.

Urban growth boundaries function similarly in Washington and Oregon, but the processes differ for changing boundaries. Through the Oregon LCDC, the state exercises more control than in Washington. In Washington, the Department of Community, Trade, and Economic Development serves in a more advisory capacity. The Western Washington

Growth Management Hearings Board hears appeals to the plans and makes decisions that are binding on the local jurisdictions.

Washington Transportation Plan

This plan, developed by the Washington State Department of Transportation (WSDOT) was updated in 2007. The following goals are part of the plan.

Goal 4: Congestion Relief

The Washington Transportation Plan (WTP) corridors operate with minimal delay and continual reduction in the societal, environmental, and economic costs of congestion for people and freight.

Objectives:

- *Reduce person and freight delay on WTP corridors.*

Goal 5: Increased Travel Options

Throughout the state, travelers have viable alternatives to the privately owned automobile for their trips.

Under this Goal's objectives, WSDOT states that "Alternatives such as transit, passenger rail, and pedestrian and bicycle travel need to be as effective, convenient, and accessible as private automobile travel." Goal 6 is similar, requiring easy connections between transportation facilities and services.

Goal 11: Competitive Freight Movement

Freight movement is reliable and transportation investments support Washington's strategic trade advantage.

Objectives:

- *Reduce barriers that delay the effective and reliable movement of freight.*
- *Maintain the ability to move freight and goods in the event of alterations to the Columbia/Snake River system as a transportation right-of-way.*

Under the section on Stewardship of the Environment, the following goal applies to construction of the project.

Goal 17: Reuse and Recycle Resource Materials

Transportation services and facilities prudently use, reuse, and recycle resource materials.

Objective:

- *Minimize the use of resources and increase the use of recycled materials.*

The WTP was updated and re-adopted by the Washington Transportation Commission on November 14, 2006. The section previously dedicated to the Stewardship of the Environment is now referred to as Environmental Quality and Health.

The policies therein include:

- Minimize, and avoid when practical, air, water, and noise pollution; energy usage; use of hazardous materials; flood impacts; and impacts on wetlands and heritage resources from transportation activities.
- When practical, and consistent with other priorities, protect, restore, and enhance fish and wildlife habitats and wetlands impacted by transportation facilities.
- Coordinate and take the lead in partnering with other agencies on environmental issues affecting transportation to reduce costs and increase effectiveness.
- Transportation plans and actions will support and encourage partnering with local communities to achieve our mutual interests in promoting livable communities.

Together, these policies provide significant direction for this project. The preferred alternative should reduce barriers that delay the movement of freight, reduce congestion, and include travel options. The planning process should include public involvement and arrive at a decision that minimizes impacts on communities and their resources.

4.4.3 Bi-State

The Portland-Vancouver I-5 Transportation and Trade Partnership brought Washington and Oregon citizens and leaders together to respond to concerns about congestion on I-5 between Portland and Vancouver. Between January 2001 and June 2002, the I-5 Partnership worked to develop a long-range strategic plan to manage and improve transportation in the I-5 corridor between I-405 in Portland, and I-205 north of Vancouver. Governors Gary Locke and John Kitzhaber appointed a bi-state Task Force of community, business, and elected representatives in January 2001 to develop the plan. The Task Force adopted a Final Strategic Plan on June 18, 2002. Local plans have referenced or fully incorporated aspects of the final recommendations. These recommendations alone are non-binding:

- *Three through-lanes in each direction on I-5, including southbound through Delta Park.*
- *A phased light rail loop in Clark County in the vicinity of I-5, SR 500/Fourth Plain, and I-205 corridors.*
- *An additional span or a replacement bridge for the I-5 crossing of the Columbia River, with up to two additional lanes for merging and two light rail tracks.*
- *Interchange improvements and additional merging lanes where needed, between SR 500 in Vancouver and Columbia Boulevard in Portland. These include a new interchange at Columbia Boulevard.*
- *Freight rail capacity improvements.*

- *Bi-state coordination of land use and management of our transportation system to reduce demand on the highway and to protect the corridor investments.*
- *Community involvement along the corridor to ensure that the final project outcomes are equitable.*

4.4.4 Regional

Metro, established in 1992, is charged with regional planning of transportation systems and urban growth areas. In cooperation with local jurisdictions in the service district Metro has developed and adopted the Regional Urban Growth Goals and Objectives (RUGGOs) that include the Region 2040 Growth Concept and Concept Map. Metro has also adopted the Urban Growth Management Functional Plan, a Regional Framework Plan, and a Regional Transportation Plan. These plans call for "targeting public investments to reinforce a compact urban form" and state that "A regional transportation system shall be developed which reduces reliance on a single mode of transportation through development of a balanced and cost-effective transportation system." Fundamental to the implementation of these plans is a multimodal transportation system that assures mobility and supports the integration of higher density centers of employment and housing with transit service.

The effect of these plans is to focus future development into specific areas, including the Portland central city, regional centers, and along transit corridors and main streets connected by a balanced transportation system, including light rail and bus transit. The CRC project will be an important element of the planned regional transportation infrastructure, and will play a significant role in implementing many of the regional land use and transportation plans.

2040 Growth Concept and the Regional Framework Plan (Metro)

The Metro 2040 Growth Concept defines regional growth and development in the Portland metropolitan region. Metro adopted the growth concept in December 1995 as part of the Region 2040 planning and public involvement process. Policies in the 2040 Growth Concept encourage efficient use of land, protection of farmland and natural resources, a balanced transportation system, a healthy economy, and diverse housing options. The 2040 Growth Concept includes land use and transportation policies that will allow the cities located within the Portland metropolitan area to manage growth, protect natural resources, and make improvements to facilities and infrastructure while maintaining the region's quality of life.

The 2040 Growth Concept is the unifying concept around which the Regional Framework Plan is based. The Regional Framework Plan sets forth regional growth management policies for the area within Metro's jurisdiction. The Plan also incorporates goals, objectives, and policies established in other documents, including the RUGGOs and the Greenspaces Master Plan. The Regional Framework Plan creates an integrated framework to meet the goals identified in the 2040 Growth Concept.

There are policies in Chapter 2 (Transportation) of the Regional Framework Plan that generally pertain to the CRC project. These policies are identified below.

Policy 2.4 – Consistency between Land Use and Transportation Planning

Ensure that function, capacity, and level-of-service of transportation facilities are consistent with applicable regional land use and transportation policies and adjacent land use patterns.

- *Provide adequate transportation facilities to support a land use plan that implements the 2040 Growth Concept.*
- *Provide transportation facilities that enhance jobs and housing as well as the community identity of neighboring cities.*

Policy 2.13 – Regional Motor Vehicle System

Provide a regional motor vehicle system of arterials and collectors that connect the central city, regional centers, industrial areas and intermodal facilities, and other regional destinations, and provide mobility within and through the region.

Policy 2.14 – Regional Public Transportation System

Provide an appropriate level, quality, and range of public transportation options to serve the region and support implementation of the 2040 Growth Concept, consistent with the Regional Transportation Plan.

Policy 2.15 – Regional Freight System

Provide efficient, cost-effective and safe movement of freight in and through the region.

Policy 2.19 – Regional Transportation Demand Management

Enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transportation, carpooling, telecommuting, bicycling, and walking options.

- *Investigate the use of HOV lanes to improve system reliability and reduce roadway congestion.*
- *Investigate the use of market-based strategies that reflect the full costs of transportation to encourage more efficient use of resources.*

Policy 2.19.2 – Peak Period Pricing

Manage and optimize the use of highways in the region to reduce congestion, improve mobility, and maintain accessibility within limited financial resources.

- *Apply peak period pricing appropriately to manage congestion. In addition, peak period pricing may generate revenues to help with needed transportation improvements.*
- *Consider peak period pricing as a feasible option when major, new highway capacity is being added to the regional motor vehicle system, using the criteria used in Working Paper 9 of the Traffic Relief Operations study.*

Policy 2.20.0 – Transportation Funding

Ensure that the allocation of fiscal resources is driven by both land use and transportation benefits. Improve the efficiency of the existing transportation system.

Policy 2.20.1 – 2040 Growth Concept Implementation

Implement a regional transportation system that supports the 2040 Growth Concept through the selection of complementary transportation projects and programs. Place the highest priority on projects and programs that best serve the transportation needs of the central city, regional centers, intermodal facilities, and industrial areas.

Regional Transportation Plan (Metro)

The 2004 Regional Transportation Plan (RTP) is a 20-year blueprint for the Portland metropolitan region's transportation system. The RTP establishes policies and priorities for all forms of transportation and anticipates the region's current and future transportation needs. These policies focus on ensuring that the region's transportation system works in the most effective way, and they recognize the importance of the movement of goods and services for the regional economy. The RTP includes two project lists; a financially constrained system and a preferred system. The CRC highway project is included as projects 4002 and 4003 on the preferred system list. The preferred system does not have funding identified for all projects. The RTP also has specific language and recommendations about the I-5 corridor and for all projects (see below). These are linked to the Transportation Planning Rule project requirements. Mapping adopted as part of the RTP shows an extension of the light rail system into downtown Vancouver.

From Chapter 6, Implementation

Interstate-5 North (I-84 to Clark County)

This heavily traveled route is the main connection between Portland and Vancouver. In addition to a number of planned and proposed highway capacity improvements, light rail is proposed along Interstate Avenue to the Expo Center, and may eventually extend to Vancouver. As improvements are implemented in this corridor, the following design considerations should be addressed:

- consider HOV lanes and peak period pricing
- transit alternatives from Vancouver to the Portland Central City (including light rail transit and express bus)
- maintain an acceptable level of access to the central city from Portland neighborhoods and Clark County
- maintain off-peak freight mobility, especially to numerous marine, rail and truck terminals in the area
- consider adding reversible express lanes to I-5
- consider new arterial connections for freight access between Highway 30, port terminals in Portland and port facilities in Vancouver, WA.

- maintain an acceptable level of access to freight intermodal facilities and to the Northeast Portland Highway
- construct interchange improvements at Columbia Boulevard to provide freight access to Northeast Portland Highway
- address freight rail network needs
- consider additional Interstate Bridge capacity sufficient to handle project needs
- develop actions to reduce through-traffic on MLK and Interstate to allow main street redevelopment

Much as for the Southwest Washington RTC's Metropolitan Transportation Plan, complex regional modeling substantiates the balance of land use and transportation changes in the RTP. Projected land uses are converted into model inputs that reflect the intensity, type, and location of new development. The planned transportation improvements, in all modes, are then added to the model network so that the impacts of the projected land uses can be determined. As system failures are identified, additional transportation, and sometimes land use, changes are made to achieve optimal system function. This foundation of iterative modeling gives the list of projects significance beyond just financing. The list represents the transportation side of the balanced transportation and land use plans.

Transit Investment Plan (TriMet)

The Transit Investment Plan (TIP) identifies TriMet's strategies and programs to meet regional transportation and livability goals through focused investments in service, capital projects, and customer information. The TIP provides a framework for forming regional partnerships between TriMet and other agencies to improve access to transit and transit service. The TIP plans for a 5-year period and is updated annually. The TIP follows Metro's long-term goals and strategies to implement the transit portion of the Regional Transportation Plan. In addition, the TIP guides transit-related investment based on certain priorities: build the total transit system; expand high-capacity transit; expand frequent service; and improve local service. Priority 2 pertains to the I-5 CRC project.

Priority 2: Expand High-Capacity Transit

High-capacity transit influences and supports land development identified in the 2040 Growth Concept. The TIP states that high-capacity transit is not limited to light rail, it may include commuter rail, streetcar and bus rapid transit, or other modes. The Priority 2 section of the TIP identifies the I-5 CRC project as the process used to identify highway and transit improvements across the Columbia River at or near the current I-5 bridge.

Service Preservation Plan and Service Changes (C-TRAN)

C-TRAN provides transit services in Clark County, with routes into Portland as well. C-TRAN's system is largely made up of fixed routes, with limited dial-a-ride shuttle service in outlying areas. In 2004, the C-TRAN Board of Directors adopted the Service Preservation Plan. In 2005, voters approved an increase of 0.2 percent in local sales tax to restore lost levels-of-service related to falling revenues from the passage of prior

initiatives. Major goals of the service preservation plan include lowered costs, improved system efficiencies, and improved service effectiveness.

Service Preservation Plan:

The Plan requires C-TRAN to achieve high service performance standards, increase passenger fares every other year to keep pace with inflation, and allocate service hours equitably across three main service delivery systems:

- Local Urban Service and required Americans with Disabilities Act (ADA) paratransit service (C-VAN);
- Premium commuter service to downtown Portland; and
- Innovative service to Clark County's smaller cities.

C-TRAN currently operates an extensive system of fixed routes in the API. Usage is high downtown, on premium routes to Portland, and on Highway 99, Mill Plain Boulevard, and Fourth Plain Boulevard. The hub of most routes is the Seventh Street transit station downtown. Studies are in progress on the possible relocation of the transit center. Routes have already been modified so as to spread the hub of the system and have fewer buses idling and operating in the Seventh Street transit center. C-TRAN's 20-year planning includes alternatives with light rail extending from Oregon into Washington. With the passage of the tax increases for transit, the 20-year plan will be revised.

Service Changes:

The following is a list of C-TRAN service changes, effective May 13, 2007. This list is a summary of changes pertinent to the project. All service changes are a result of a Service Redesign Study that took place in the fall of 2006. C-TRAN conducted one-on-one stakeholder interviews, focus groups, and rider surveys to determine passenger needs and the best available options. Many of these changes better integrate the Delta Park light rail station with express and local bus routes in Clark County. Routes into Portland are premium commuter express services.

Regular Bus Service

- #65 Parkrose Express: New name for the #165 Parkrose Express; providing service between Fisher's Landing transit center and the Parkrose light rail station. On Saturdays, it will no longer combine with the #92, and the frequency will be increased to every 30 minutes. The first weekday departure out of Fisher's Landing will adjust to 5:45 a.m.

Express and Limited Service

- #41 Camas/Washougal Limited: New number for the #114 Camas/Washougal Limited; providing one morning and one evening commute trip between Camas/Washougal, Fisher's Landing transit center, downtown Vancouver, and the Delta Park light rail station. The schedule will adjust to arrive in downtown Vancouver at 7:20 a.m. and will no longer provide direct service to downtown Portland, but will instead connect to the Delta Park light rail station.

- #44 Fourth Plain Limited: Formerly known as the 4X, the #44 Fourth Plain Limited will provide service to a limited number of stations along Fourth Plain Boulevard during peak hours, Monday through Friday. Spaced approximately one mile apart, limited stations will provide faster connections between Orchards, Vancouver Mall, Clark College, downtown Vancouver, and the Delta Park light rail station.
- #47 Battle Ground Limited: Replaces both the Yacolt Connector and the #173 Battle Ground Limited; providing service between Yacolt, Battle Ground, downtown Vancouver, and the Delta Park light rail station. Arrival and departure times in and out of downtown Vancouver for the #47 will remain the same as the previous #173 Battle Ground Limited schedule.

The changes above are phase one of a two phase process. The second phase will conclude in October, 2007. Phase two is expected to include:

- Grand Opening of the 99th Street transit center at Stockford Village
- Issuing transfers for All Zone and Express cash fares
- #4 Fourth Plain to serve Jantzen Beach and the Delta Park/Vanport light rail Station
- More opportunities to connect to light rail with C-TRAN's Limited service including the #41 Camas Washougal Limited, #44 Fourth Plain Limited and #47 Battle Ground Limited.

Metropolitan Transportation Plan for Southwest Washington

As stated previously, the MPO serving regional transportation planning needs in Clark County is the Southwest Washington Regional Transportation Council (SWRTC). The RTC regularly updates the Metropolitan Transportation Plan (MTP). The MTP's Goals were revised in 2005 and include the following that apply to the CRC project:

MTP Goals

The MTP is a long-range plan that outlines how the transportation system and services will provide for the mobility and accessibility of people and freight within and through the region. The Goals of the MTP are:

- Maintain, preserve, and improve the existing regional transportation system.
- Provide a safe and secure transportation system that allows for the movement of people and freight.
- Support economic development and community vitality.
- Provide an efficient, balanced, multimodal regional transportation system including highway, bus transit, high-capacity transit, rail, aviation, marine, bicycle and pedestrian modes as well as transportation demand management and transportation system management strategies.

- Provide an acceptable level of mobility for personal travel and freight movement throughout the regional transportation network and adequate access to locations throughout the region.
- Provide a transportation system that is sensitive to the quality of the environment and natural resources.
- Provide for the development of a financially viable and sustainable transportation system.
- Provide a transportation system that reflects community vision and community values.

The MTP is based on travel demand modeling results that included the development of a 2030 transportation system. Only in the financially unconstrained scenario did this system assume the completion of the CRC project. It also included the redesigns of Vancouver's Broadway and Main Streets, restoring two directions of travel on both. The MTP designates I-5 and SR 500 as high-capacity transit corridors.

4.4.5 Local

Multnomah County Comprehensive Plan

The Multnomah County Comprehensive Plan is composed of three separate plans: the Comprehensive Framework Plan, the Development Plan, and the Operations Plan. The Comprehensive Framework Plan (Framework Plan) guides land use decisions by the County and sets the framework for incorporating Oregon's statewide planning goals and Metro's regional goals into a statement of policy. Three policies in the Framework Plan pertain to the I-5 CRC project and are identified below. These policies support an efficient transportation system, mobility, safety, and public transportation. This plan has direct application only to the west end of Hayden Island. Only a small corner of this unincorporated land is inside the secondary API.

Policy 33a – Transportation System: Implement a balanced, safe and efficient transportation system. In evaluating parts of the system, the County will support proposals that:

- *Support economic growth*
- *Provide a safe, functional and convenient system*
- *Provide optimum efficiency and effectiveness of investment*

Policy 34 – Trafficways: Develop the existing trafficway system to maximize efficiency, and consider the mobility of pedestrians by providing safe crossings. The County's policy is to develop a safe and efficient trafficway system using the existing road network, and by:

- *Improving streets to the standards established by the classification system, where necessary and/or appropriate, to mitigate identified transportation problems and to accommodate existing implemented and planned pedestrian, bicycle and transit facilities as established in the county, regional, and local transportation plans;*

- *Placing priority on maintaining the existing trafficways; and*
- *Developing additional transportation facilities to meet community and regional transportation needs where capacity of the existing system has been maximized through transportation system management and demand management measures.*

Policy 35 – Public Transportation: Support a safe, efficient and convenient public transportation system by:

- *Making improvements to public transportation corridors which enhance rider convenience, comfort, access and reduced travel time.*

City of Portland Comprehensive Plan

Adopted in 1980, the Comprehensive Plan is the land use plan for the City of Portland. It provides a coordinated set of guidelines for decision making on the future growth and development in Portland. Its goals and policies provide the context and guidance for future City programs, major capital projects, and other funding decisions. It also provides the City with a map and a set of regulations for development, a revised zoning code, a guide for the major public investments required to implement the Plan, and a process for review and amendment of the Plan. The Comprehensive Plan map officially describes where, and to what level, future zoning should be permitted. The Plan and its ordinances comply with Oregon's Statewide Planning Goals, and is periodically reviewed to assure that it remains a workable framework for development. Exhibit 4-6 shows the Portland Comprehensive Plan land use designations within the project API.

There are goals and policies in the Comprehensive Plan that pertain to and support the I-5 CRC project. These goals and policies generally support multimodal transportation and mobility, as identified below.

Policy 5.4 – Transportation System: Promote a multimodal regional transportation system that encourages economic development.

Goal 6 – Transportation: Develop a balanced, equitable, and efficient transportation system that: provides a range of transportation choice; reinforces the livability of neighborhoods; supports a strong and diverse economy; reduces air, noise, and water pollution; and lessens reliance on the automobile while maintaining accessibility.

Policy 6.12 – Regional and City Travel Patterns: Support the use of the street system consistent with its State, regional, and City classifications and descriptions.

- *Direct interregional traffic to use Regional Trafficways and Regional Transitways, and manage these facilities to maximize their existing capacity.*
- *Minimize the impact of interregional and long intraregional trips on Portland neighborhood and commercial areas, while supporting the travel needs of the community.*

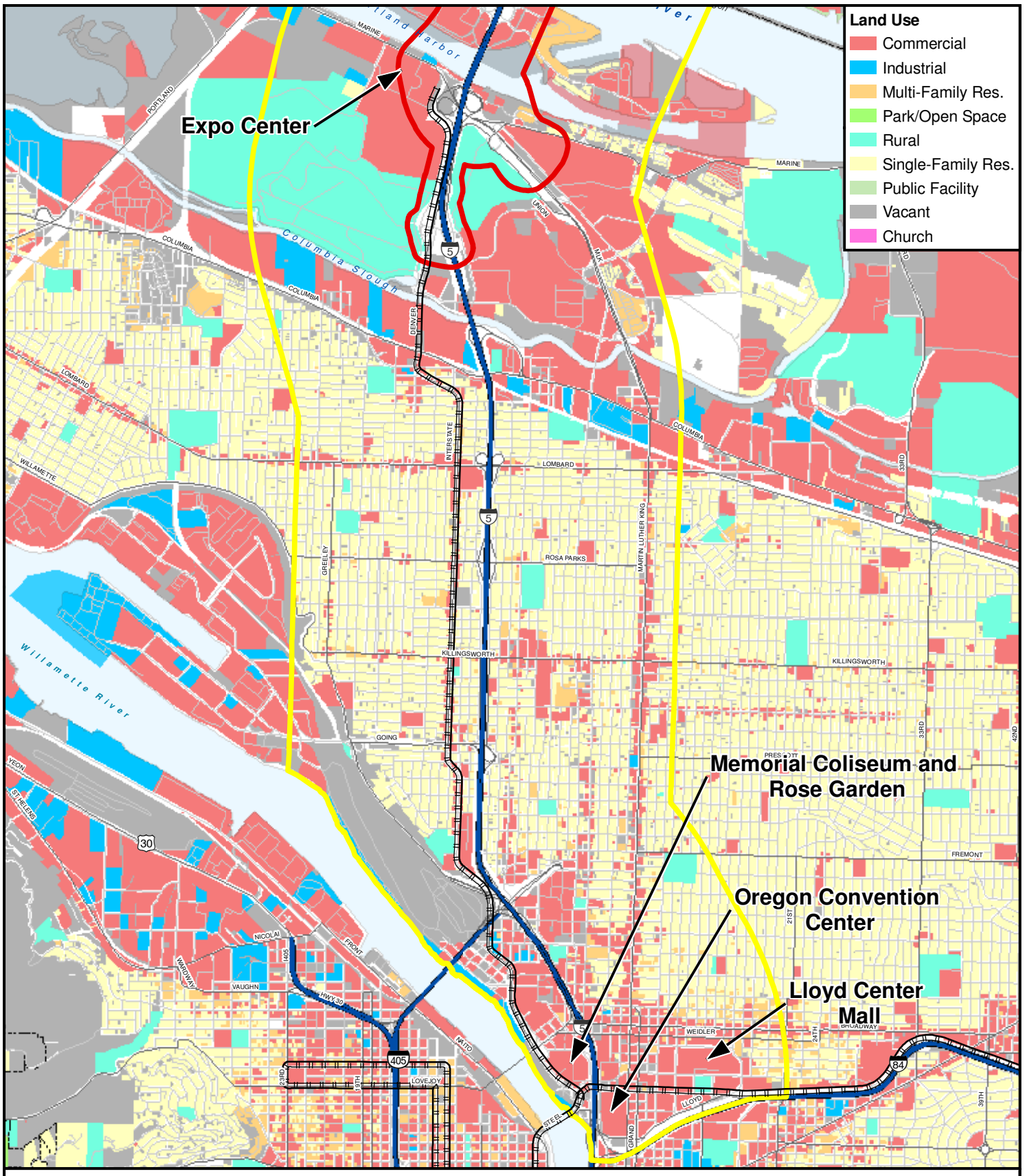


Exhibit 4-6: Existing Land Uses
Portland

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 1/4/08; Plot Date: 1/4/08; File Name: ...\Landuse\Exhibit4_5_4_6.mxd

Policy 6.17 – Coordinate Land Use and Transportation: Implement the Comprehensive Plan Map and the 2040 Growth Concept through long-range transportation and land use planning and development of efficient and effective transportation projects and programs.

Policy 6.24 – Public Transportation: Develop a public transportation system that conveniently serves city residents and workers 24 hours a day, seven days a week, and can become the preferred form of travel to major destinations, including the Central City, regional and town centers, main streets, and station communities.

- *Support light rail transit and bus connections as the foundation of the regional transit system, with completion of the system to connect all regional centers, downtown, major attractions, and intermodal passenger facilities as a high priority for the region.*
- *Expand primary and secondary bus service to meet the growing demand for trips, operate as the principal transit service for access and mobility needs, help reduce congestion, and support the economic activities of the City.*

Policy 6.29 – Freight Intermodal Facilities and Freight Activity Areas: Develop and maintain an intermodal transportation system for access and circulation in Freight Districts and for the safe, efficient, and cost-effective movement of freight, goods, and commercial vehicles within and through the city on Truck Streets.

- *Address freight movement and access needs when conducting multimodal transportation studies or designing transportation facilities.*
- *Participate in the interjurisdictional planning for improvements to the I-5 transportation and trade corridor.*

Policy 6.31- Regional Trafficways: Accommodate future increases in regional through-traffic in Portland on existing Regional Trafficways.

Policy 6.32 – Multimodal Passenger Service: Participate in coordinated planning, development, and interconnection of Portland, regional, and intercity transportation services for passenger travel.

Policy 6.33 – Congestion Pricing: Advocate for a regional, market-based pricing system for auto trips during peak hours.

Policy 6.34 – North Transportation District: Reinforce neighborhood livability and commercial activity by planning and investing in a multimodal transportation network, relieving congestion through measures that reduce transportation demand, and routing non-local and industrial traffic along the edges of the residential areas.

Policy 7.6 – Energy Efficient Transportation: Provide opportunities for non-auto transportation including alternative vehicles, buses, light rail, bikeways and walkways.

- *Promote the construction of a regional light rail system.*

City of Portland Transportation System Plan

Updated in 2004, the TSP guides the City of Portland's transportation network and investments. The TSP provides the framework for developing and implementing transportation projects. The TSP addresses local transportation needs for streets, transit, freight, bicycle, and pedestrian improvements to provide a balanced transportation system to support neighborhood livability and economic development. The policies mirror those in the Transportation Element (Chapter 6) of the City of Portland's Comprehensive Plan.

City of Portland Central City Plan

Adopted in 1988, the Central City Plan promoted goals for eight identified districts that make up Portland's Central City area. The Central City Plan identifies an urban core that extends across the Willamette River to the Central Eastside, Lloyd District, and Lower Albina areas. These three districts are within the I-5 CRC project's secondary API. The Plan advocates stimulating the city center by increasing jobs and housing in the downtown core. The Central City Plan is part of the City's Comprehensive Plan, and it updates and incorporates the Downtown Plan of 1972.

Transportation plays a major role in shaping the central city and implementing the Central City Plan. Policy 4 (Transportation) pertains to and supports the I-5 CRC project.

Policy 4 – Transportation: Improve the Central City's accessibility to the rest of the region and its ability to accommodate growth by extending the light rail system and by maintaining and improving other forms of transit and the street and highway system, while preserving and enhancing the city's livability.

- *Develop the Central City as the region's transportation hub through construction of a regional light rail transit system.*
- *Support transportation facility improvements that improve the flow of traffic to, within, and through the Central City.*
- *Improve the movement of goods to, from, and within the Central City.*
- *Develop an integrated transportation system where each mode, and the system as a whole, is both efficient and practical.*

City of Portland Albina Community Plan

In 1993, the Portland City Council adopted the Albina Community Plan as part of the City's Comprehensive Plan Goals and Policies, to be implemented through the enactment of the associated zoning code and map amendments. This Plan is a framework for revitalizing a 19-square mile area in North and Northeast Portland. Development of the Albina Plan completed many neighborhood plans, which are reviewed in the Neighborhoods Technical Report.

Policy II (Transportation) pertains to the I-5 CRC project. This policy supports light rail investment and improved highway access in the Albina Community Plan study area.

Policy II – Transportation: Take full advantage of the Albina Community's location by improving its connections to the region. Emphasize light rail transit as the major transportation investment while improving access to highways that serve industrial and employment centers. Protect neighborhood livability and the viability of commercial areas when making transportation improvements. Provide safe and attractive routes for bicyclists and pedestrians.

Lloyd District Partnership Plan

The Lloyd District Partnership Plan was an effort by the Lloyd District Transportation Management Association (LDTMA), City of Portland, and TriMet to address issues that affect economic vitality in the Lloyd District, such as parking meter installation, transit service improvements, and a comprehensive implementation plan. The Partnership Plan is non-binding.

The Lloyd District is located within the secondary API. However, there are no goals or policies in the Lloyd District Partnership Plan that are directly applicable to the I-5 CRC project. The goals and objectives were created to reflect local transportation and parking requirements, regional transit ridership, commute option targets, and specific needs of the LDTMA and associated businesses.

Central City Plan: Lloyd Center-Coliseum

A number of plans provide guidance for development, transportation, and design in the Lloyd District. The Central City Plan includes the Lloyd District, but also addresses issues throughout the downtown area west of the Willamette River. Relevant policies from the Plan include:

- *Improve the environment for pedestrians throughout the district and create a regional civic facilities campus that joins the Convention Center and Coliseum.*

Proposals for Action:

- *Create a connection from the Convention Center to the riverbank.*
- *Buffer the Sullivan's Gulch neighborhood from through auto and truck traffic.*

Special Design Guidelines for the Design Zone of the Lloyd District of the Central City Plan

This non-binding plan calls for improving the environment for pedestrians. No goals in this plan are likely to directly apply to the alternatives. The Design Guidelines include:

- Fostering superblock formation throughout the district south of Weidler Street.
- Emphasizing light rail transit service and facilities as an urban design feature in the district.
- Developing a comprehensive circulation system – of pedestrians, bicyclists, motorists, and transit service – that is logical, easily understandable, and distinguishes the intended functions of streets in the district.

- Improving the pedestrian links between the river, residential neighborhoods, Broadway/Weidler Corridor, Lloyd Center, Convention Center, and the Coliseum.

Lloyd Crossing Sustainable Urban Design Plan and Catalyst Project

The Portland Development Commission (PDC) sponsored this non-binding plan, completed in July 2004. It sets some goals for the area that could be affected by the CRC project. It calls for habitat pockets and corridors that connect to Sullivan's Gulch. The plan also sets a goal for 25 to 30 percent tree coverage in the District in 2050.

The PDC Interstate Corridor Urban Renewal Plan

The Interstate Corridor Urban Renewal Area (URA) is located in North Portland and incorporates regional features such as I-5, the Willamette River, and the Columbia Slough. Developed by the PDC and adopted in 2000, the Interstate Corridor Urban Renewal Plan sets forth a comprehensive program to address economic and social challenges, and to capitalize on the opportunities of the community. The goals and objectives are to improve livability, increase job opportunities, assist small businesses, and benefit from major infrastructure projects, including the Interstate MAX light rail line. The following goals in the Interstate Corridor Urban Renewal Plan pertain to the I-5 CRC project.

Economic Development/Jobs – Goal 10 – Job Access: Optimize access of area residents to employment opportunities both inside and outside of the URA.

Transportation – Goal 7 – Transportation Modes: Encourage alternatives to auto travel by improving facilities for pedestrians, bicyclists, buses, and light rail, while still accommodating auto travel in the area.

Transportation – Goal 8 – Truck Access: Maintain good truck access to businesses within the urban area, but discourage truck movement from passing through the area on residential streets.

City of Vancouver Comprehensive Plan

The City of Vancouver's Comprehensive Plan, adopted May 2004, encourages compact urban centers, transit, and supportive development regulations for areas along the defined high-capacity transit corridors identified along I-5 and SR 500. The City of Vancouver maintains a separate Transportation Plan that includes policy statements. The Comprehensive Plan applies to the downtown Vancouver and North Vancouver project subareas. Exhibit 4-7 shows the land use designations of the City of Vancouver Comprehensive Plan for the API.

Community Development:

CD-2. Efficient Development Patterns: Encourage efficient development throughout Vancouver to achieve average densities of 8 units per acre. Encourage higher density and more intense development in areas that are more extensively served by public facilities, particularly by transportation and transit services.

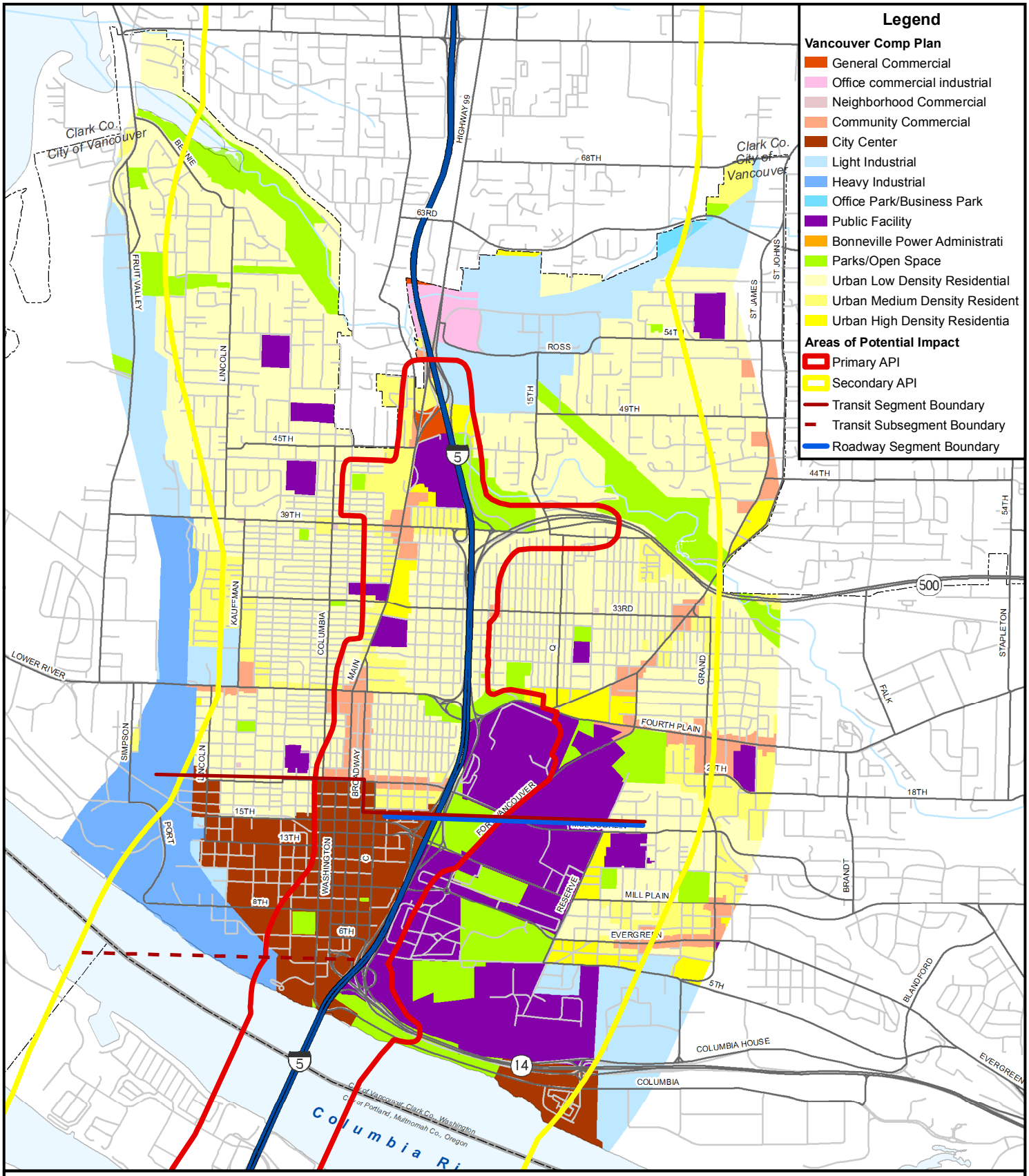


Exhibit 4-7: Comprehensive Plan
Vancouver

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_3.mxd

CD-4. Urban Centers and Corridors: Achieve the full potential of existing and emerging urban activity centers and the corridors that connect them, by:

- *Promoting or reinforcing a unique identity or function for individual centers and corridors.*
- *Planning for a compact urban form with an appropriate mix of uses.*
- *Establishing connectivity and accessibility within each center and to other areas.*
- *Providing a range of transportation options.*

CD-11. Archaeological and Historic Resources: Protect and preserve cultural, historic and archaeological resources. Promote preservation, restoration, rehabilitation, and reuse of historically or architecturally significant older buildings. Increase knowledge and awareness of historic and archaeological resources. Work with Clark County to maintain State certified Local Government status.

The following two polices are intended to protect employment opportunities, especially where they may yield family-wage jobs.

EC-5. *No Net Loss Of Employment Capacity*: Restrict zone changes or legislative approvals which lessen long term capacity for high wage employment, unless accompanied by other changes within the same annual review cycle that would compensate for the lost capacity, or unless the proposed change would promote the long-term economic health of the city.

ED-6. *Efficient Use Of Employment Land*: Maximize utilization of land designated for employment through more intensive new building construction, and redevelopment and intensification of existing sites.

The Plan also calls for protecting historic structures and trees. Many of these immediately adjoin the existing I-5 right-of-way. Although transportation issues are addressed more fully in the City's Transportation Plan, the Comprehensive Plan refers to a balance of transportation choices, human scale, livable design, and efficiency.

PFS-17. Use transportation and land use measures to maintain or reduce single-occupant motor vehicle miles traveled per capita to increase system efficiency and lower overall environmental impacts. Further analysis will be needed to determine whether increased vehicular capacity on I-5 will encourage urban sprawl and vehicle miles traveled.

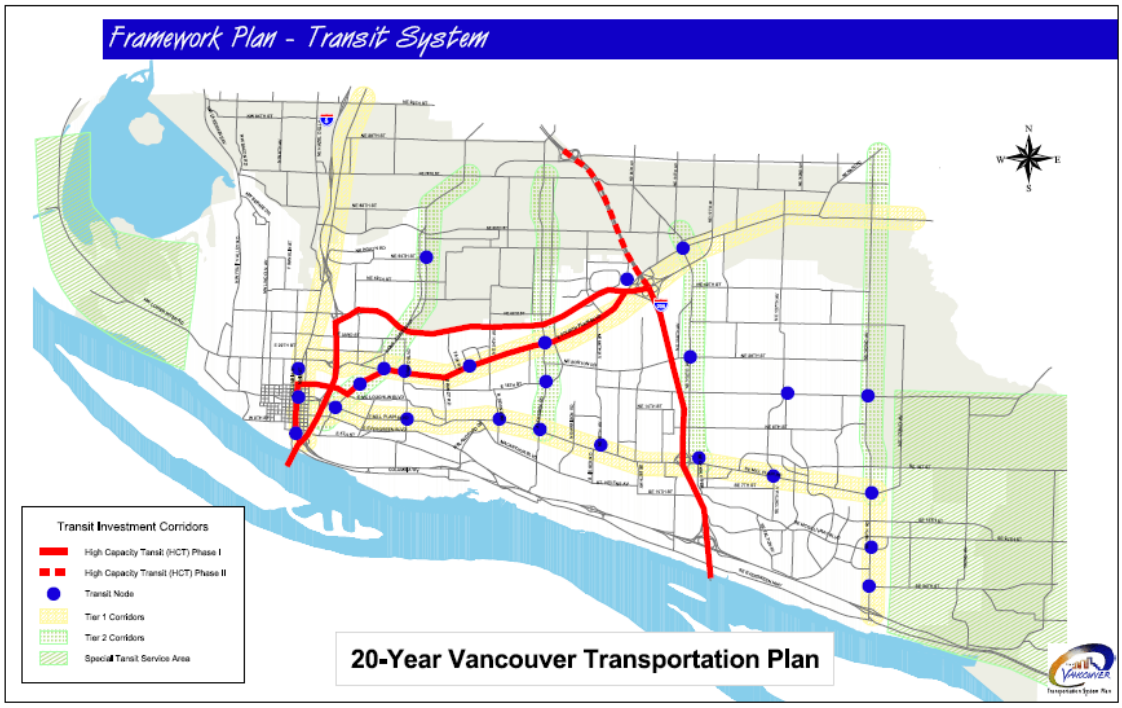
City of Vancouver's Transportation Plan

The City's Transportation Plan, effective in 2001, includes broader vision statements than many plans reviewed for this report. The vision is one of accessibility, not just mobility, emphasizing system efficiency, connectivity, multimodalism, and a walkable community.

The Plan includes a future transit system map (Exhibit 4-8). The map shows high-capacity transit running north along I-5, east across Fourth Plain Boulevard or SR 500, and south on I-205. There is also a longer-term project shown headed north along I-205. The Plan designates Main Street as a Tier One Transit Corridor, meaning that Main Street

is targeted for short term improvement to enhance transit service. These improvements would include signalization changes and pedestrian improvements. The Transportation Plan lists light rail as a Strategic Option.

Exhibit 4-8. City of Vancouver Long Range Transit Plan



Downtown Vancouver Transportation System Plan

The City of Vancouver had adopted a Subarea and Redevelopment Plan for the Esther Short neighborhood, which includes most of downtown Vancouver. It has significance for the project beyond that of most neighborhood plans. Much of the plan has been implemented in the Vancouver City Center Vision, which largely supplanted it. The Downtown Vancouver TSP addresses transportation conditions and plans from Fourth Plain Boulevard south to the Columbia River. Transit service objectives pertain directly to the project as quoted below:

Objective 7.6: Provide sufficient downtown street and intersection capacity to accommodate future potential light rail transit operations along a preferred rail alignment.

Objective 7.7: Provide sufficient sidewalk capacity in the downtown area to accommodate transit facilities such as passenger shelters.

Objective 7.8: Provide key pedestrian links between major activity areas (current and future) and transit focal points such as the Seventh Street transit center.

About light rail transit (LRT), the plan states:

> "The extension of MAX service into Vancouver is a key ingredient to the region's growth management strategy and the overall I-5 Corridor plan. … LRT in Vancouver would directly benefit the downtown area by improving access to downtown Vancouver, particularly during the peak commuter hours. LRT service would also greatly improve the City's ability to collect and disperse Special Event Center crowds. Key issues involving LRT include identifying an appropriate terminal location in Vancouver, which should be addressed as part of the City of Vancouver's city-wide Transportation System Plan. Other, more regional issues revolve around funding and timing, which should be addressed in the I-5 Trade Corridor Study. The City of Vancouver should take actions now that will support the Plan and help make transit more successful for downtown Vancouver. These include:
>
> - Designating Main and Washington Streets as transit streets — Main Street for local transit service and Washington Street for regional transit service.
> - Restricting curb cuts along both Washington and Main Streets to improve the pedestrian environment, making it easier for people to avoid using their cars.
> - Supporting increases in density and activity in the transit corridor.
> - Allowing reduced parking requirements in the transit corridor."

Objective 12.1: This objective strongly asserts the use of the TSP in City decision making, including financing and prioritization of projects.

The City of Vancouver Strategic Plan

In addition to a Comprehensive Plan, the City of Vancouver has completed a strategic planning project. The goals are similar to those in the Comprehensive Plan. A team of City employees convened in January 2000 to review the Strategic Plan and to update it to address the current needs of the community. The plan makes a number of pledges, including a pledge regarding managed growth and one regarding transportation.

Vancouver City Center Vision Plan

The City Center Vision Plan divides the downtown into six areas and includes a list of goals and guiding principles. Land use goals include: focusing waterfront redevelopment on residential uses, with significant public access, recreation, cultural, hospitality, entertainment, and limited commercial uses. The plan advocates protecting key historic buildings and established residential neighborhoods. Detailed goals include:

- Strengthen the primary street connections, (Columbia and Esther) to the waterfront.
- Support a secondary connection to the waterfront (e.g., Daniels).
- Connect downtown with the Vancouver National Historic Reserve via a Seventh Street (Heritage Way) pedestrian bridge.

- Ensure that expansion of I-5 and Columbia River crossing improvements improve access to the city center and minimize potentially negative effects.
- Overcome the barrier-like feeling of the BNSF railroad berm between downtown and the waterfront.
- Provide improved access into the southern and western areas of the city center.
- Focus waterfront redevelopment on residential uses supported by significant public access, recreation, cultural, hospitality, entertainment, and limited commercial uses.
- The Plan specifically addresses the CRC project with the following directions:
    - Analyze proposed engineering designs that could potentially affect adjoining properties negatively and result in wasteful use of downtown land.
    - Enhance existing connections between the Vancouver National Historic Reserve and downtown.
    - In addition to the I-5 southbound ramp to Sixth Street, explore other opportunities to improve access to downtown.
    - Integrate the Heritage Way Bridge concept into the I-5 improvements project.
    - Integrate all modes of transportation, including high-capacity transit, bicycle, and pedestrian circulation, to achieve a true regional multimodal corridor.
    - Coordinate I-5 improvements with city center access and circulation needs.

City of Vancouver, Heritage Tree Program

In 1998, the City of Vancouver established the Heritage Tree program in order to preserve and recognize the significant trees in the community. Portland has a similar program. Vancouver has designated a number of significant tress within the primary API. One goal of the program is to provide a way for people to save trees on private property from unnecessary removal and aggressive maintenance actions. With the consent of the property owner, trees receive Heritage Tree status if they meet at least one of the following requirements; at least 36 inches in diameter; located on a special site; related to a historical event; an unusual species for the area; or an exemplary form of the species. All Heritage Trees are inventoried and can be easily identified by plaques with their designation either on or adjacent to the tree.

City of Vancouver Shoreline Management Master Program

Implementing the Washington State Shoreline Management Act of 1971, the City of Vancouver adopted its Shoreline Management Master Program in 1975. The program was amended in 2006. The program is meant to protect natural values and functions of the shorelines while guiding and allowing appropriate development. Development in this area must meet goals of the program, and the respective code requirements. The goals of the program most pertinent to land use include:

- The Circulation Element, with goals for good transportation networks, strong bike and pedestrian circulation, and building facilities away from the shoreline.

- The Design Element, with goals for a "visually coherent" design and for a design that enhances the waterfront.
- The Long Range Planning Element, with emphasis on an integrated trail system.

The section of the program that addresses transportation projects includes regulations that require transportation systems to be built within an existing transportation corridor, unless the alternative would have less environmental impact.

Central Park Plan

The Central Park Plan was adopted in 1979, and since then, the area has seen dramatic changes, recognized by recent collaborative updates to the plan. The following early findings are derived from the Final Report, Central Park Subarea Update, of May 2007.

Key features identified in the planning process were prioritized by participants. Gateway features ranked highest, meaning that the CRC project should contribute to the planned gateway design on McLoughlin just south of the proposed park and ride. The plan describes gateways as "attractive entry points to the Subarea that visually signal arrival and differentiate the Subarea from the surrounding areas…and will likely include special signage, landscaping, paving, and structures." The plan policies address the construction of a station/park and ride facility and seek to integrate it as a service for Central Park users, especially the campus. The plan calls for reducing surface parking and eventually eliminating some on-street stalls. The addition of HCT to the campus would support this plan. The plan also supports a lid connecting downtown with Central Park and the Heritage Way pedestrian bridge.

Clark College Facilities Master Plan

Enrollment at Clark College has increased from 15,149 in 1990-91 to 19,100 in 2005-06, an increase of 26 percent. In the fall of 2006, a Facilities Master Plan Task Force was chartered by the Executive Cabinet to update the 2001 Facilities Master Plan. The Plan focuses considerable attention on growth and potential sites for future growth projects. The main campus has limited space to accommodate new buildings, and capital projects will therefore focus on renovation and replacement projects. The acquisition of the seven-acre "Triangle" property in June, 2007 added the space on the west side of Fort Vancouver Way, between McLoughlin Street and Fourth Plain Boulevard. There are three elements to the Campus Master Plan that may be impacted by the CRC project. These elements relate to parking, access, and land use.

Access

One Clark College Main Campus "Theme" is to "Address access and traffic on Fort Vancouver Way to provide better pedestrian connection between Main Campus and the so-called "Triangle Property" on the western side of Fort Vancouver Way." A key feature is a planned pedestrian plaza bridging Fort Vancouver Way that will connect the Triangle property to the main campus and provide a safe crossing for students and employees.

The plan asserts that there is a "consensus among the College community that an elevated pedestrian crossing/bridge is critically needed to provide safe and convenient access to

the College facilities west of Fort Vancouver Way." The plan also states that the "support of the City of Vancouver, along with state and federal agencies, will be enlisted to fund and accomplish the project by 2013."

Parking

Another Clark College Main Campus "Theme" is to "provide adequate access to the campus by adding parking structures and other commuter options. "

The main campus has a total of 2,806 parking spaces, many of which have been constructed in the past 15 years to accommodate growth. Parking on the main campus is fully utilized during prime daytime hours when the college is operating at full capacity. The Plan calls for modest improvements in surface level lots and a larger expansion with a structured parking facility.

Land Use

Another Clark College Main Campus "Theme" is to "preserve and enhance green space, art, and plazas. "

The Visitor Center property (part of the Triangle) was purchased by the College in 1999 and includes a small 1,610 square foot wood frame building built in 1982. The building is currently utilized to provide space for athletic offices and storage. Proposed development of this five acre site includes demolition of the existing building and construction of a large multi-floor mixed use building located on the site adjacent to McLoughlin Boulevard.

The plan goes on to note that "Regional transportation planners have indicated an interest in acquiring this property for a large structured parking facility and/or a light rail terminal to support the Columbia Crossing Project."

Clark County Comprehensive Growth Management Plan

The Clark County Comprehensive Growth Management Plan directly governs the unincorporated portions of the County, but has a regional function in that it represents the coordinated land use/transportation system plans for the County and seven cities. The following polices and strategies were derived from the adopted Plan of 2004. The plan is currently being updated. The scheduled adoption of the updated plan is in late 2007. Exhibit 4-9 shows the designated land uses in the API for the Clark County comprehensive Plan.

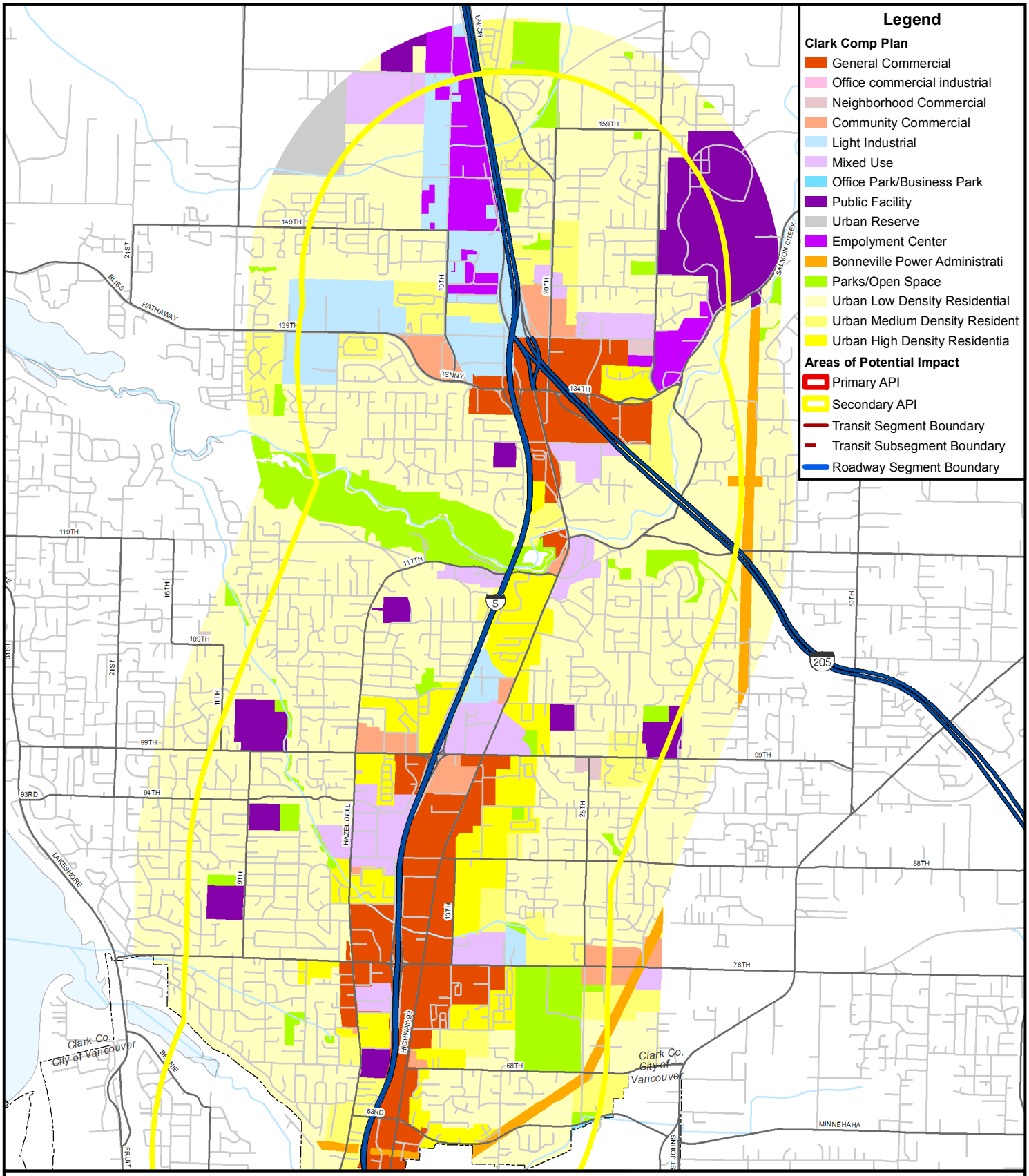


Exhibit 4-9: Comprehensive Plan
Clark County

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_3.mxd

Framework Plan Policies

The Framework Plan is the foundation of the County's and each City's Comprehensive Plans. It was developed in the early 1990s. These policies have relevance to the entire Clark County area, not just the unincorporated portions.

Section 5.0 – Transportation: Policy 5.1.3 represents the County's commitment to integrated transportation and land use planning. Within the transportation section, the policy encourages mixed land use and locating as many other activities as possible within easy walking and bicycling distances from public transit stations. It also explicitly encourages use of alternative transportation types. Policy 5.1.10 calls for a coordinated effort to develop park and ride sites along regional transportation facilities.

Section 8.0 – Historic Preservation: requires programs to identify archaeological and historic resources, protect them, and educate the public about the history of the region. This policy could impact the development of new highways and the movement of rights-of-way into cultural landscapes and historic structures.

Section 10 – Community Design: calls for development of high-quality design and site planning standards for publicly funded projects (e.g., civic buildings, parks, etc.). This policy encourages considering aesthetic values in the design and selection process for the I-5 CRC project.

Comprehensive Plan Policies

The following policies refer specifically to the unincorporated areas of Clark County.

Land Use and Housing: Clark County's planning policies encourage compact urban forms with an emphasis on mixed uses and urban centers. Higher intensity uses should be located on or near streets served by transit, and streets, pedestrian paths and bike paths should contribute to a system of fully connected routes to all destinations. The Housing section commits to a multimodal transportation system that would serve new and existing neighborhoods. It commits to preserving and building additional affordable housing. Strategies listed under the Land Use Policies include:

- Coordinate a business revitalization plan for the Hazel Dell/Highway 99 commercial corridors reflecting incentives for: reconfiguring commercial uses from strips to larger centers; transit orientation of both commercial and residential developments; and conversion of excess commercial sites to multi-family housing.

The Highway 99 Focused Public Investment Area Action Plan is described further later in this report.

Environment: Policy 4.1.2 states that "the county and each municipality shall cooperate to ensure the preservation and protection of natural resources, critical areas, open space, and recreational lands within and near the urban area through adequate and compatible policies and regulations."

Transportation: Policy 5.0.1 - Clark County, Metropolitan Planning Organization (MPO) and the Regional Transportation Planning Organization (RTPO), state, bi-state, municipalities, and C-TRAN shall work together to establish a truly regional transportation system which:

- *Reduces reliance on single occupancy vehicle transportation through development of a balanced transportation system, high-capacity transit, bicycle and pedestrian improvements, and transportation demand management;*
- *Encourages energy efficiency;*
- *Minimizes environmental impacts of the transportation systems development, operation and maintenance.*

A commitment to a multimodal system, which is emphasized in Policy 5.1.2: "Long range land use and transportation plans shall be coordinated with high-capacity transit plans." Policy 5.2.1 makes it clear that roadway improvements which provide for additional capacity for the automobile shall also include design accommodations for alternative travel modes.

Economic Development: Policy 9.1.12 - Encourage use of a multimodal transportation system that facilitates the reduction of travel times and reduces the need for additional road construction within the region.

Highway 99, Focused Public Investment Area Action Plan

In 2004, Clark County completed an Action Plan for the area from 63rd Street north to approximately 134th Street. This plan serves as a guide for public investments and for Team 99, a group of business leaders in the corridor.

Transportation: Improve safety, comfort and circulation for pedestrians, bicyclists, transit riders and motor vehicle users.

- Develop public support to secure funding for a 10-block pilot project.
- Build partnerships to locate, design, fund and construct safe mid-block pedestrian crossings and to remove obstructions in the sidewalk area.

Landscape and Environmental Design: Implement landscaping and other visual enhancements on public and private land to improve the image, identity and aesthetic environment of Hazel Dell.

- Design and develop partnerships to fund and construct entry features south of the railroad bridge and on the north end near Salmon Creek. Investigate the potential for a community plaza or entry feature on NE 78th Street between Highway 99 and I-5.
- Coordinate with WSDOT and community organizations to landscape the I-5 right-of-way from Main to NE 99th Street.

4.5 Zoning and Overlay Districts

Zoning districts for Portland, Multnomah County, Vancouver, and Clark County are based on the principle of separating uses (residential, commercial, industrial, etc). The codes dictate allowed uses, building heights, off-site impacts, etc. Both Portland and Vancouver use overlays to protect natural resources, urban form, and historic properties. The zones found within the primary API are described in below, and depicted in Exhibits 4-10 through 4-19.

4.5.1 City of Portland Zoning

Exhibit 4-10 shows the zoning designations for the project API in Portland.

General Commercial Zone (CG) – General Commercial zones allow a range of both retail and services businesses. These zones are generally auto-oriented except when near transit facilities, and are intended to be aesthetically pleasing to motorists, pedestrians, transit users, and other businesses. This zone applies to most of the primary API on Hayden Island and along the south bank of the North Portland Harbor east of I-5.

General Industrial 2 (IG2) – The General Industrial 2 designation provides for large lots developed in a larger or irregular block pattern with medium to low coverage, with development generally set back from the street. This zone applies to areas west of I-5 near the Marine Drive interchange and along the Columbia Slough.

General Employment 2 (EG2) – This designation provides for large lots developed in larger or irregular block patterns with medium to low coverage, with development generally set back from the street. This zone applies to the area directly east of I-5, from the Columbia Slough to N Hayden Meadows Drive.

Mixed Commercial/Residential Zone (CM) – This designation allows commercial and residential development on a single site. It is intended for busier streets with an emphasis on transit-friendly and pedestrian-oriented development. This encourages first floor retail development with residences on the upper floors. This zone applies to the area between N Marine Drive and the commercial district along North Portland Harbor.

Residential 2 (R2) – The R2 designation allows for low-density multi-dwelling structures, including duplexes, townhouses, rowhouses, and garden apartments. Housing in this zone is usually one to three stories and is located along streets with moderate traffic. This zone applies to a small area on Hayden Island along the eastern border of the primary API.

Open Space Zone (OS) – This designation provides for the enhancement and preservation of public and privately owned open, natural, and improved parks and recreational areas. Open Space can be found on the east side of I-5 between N Martin Luther King Jr. Boulevard and N Hayden Meadows Drive, and on the west side near the Expo Center exit. Open space also borders the N Columbia Boulevard interchange at the southern end of the primary API.

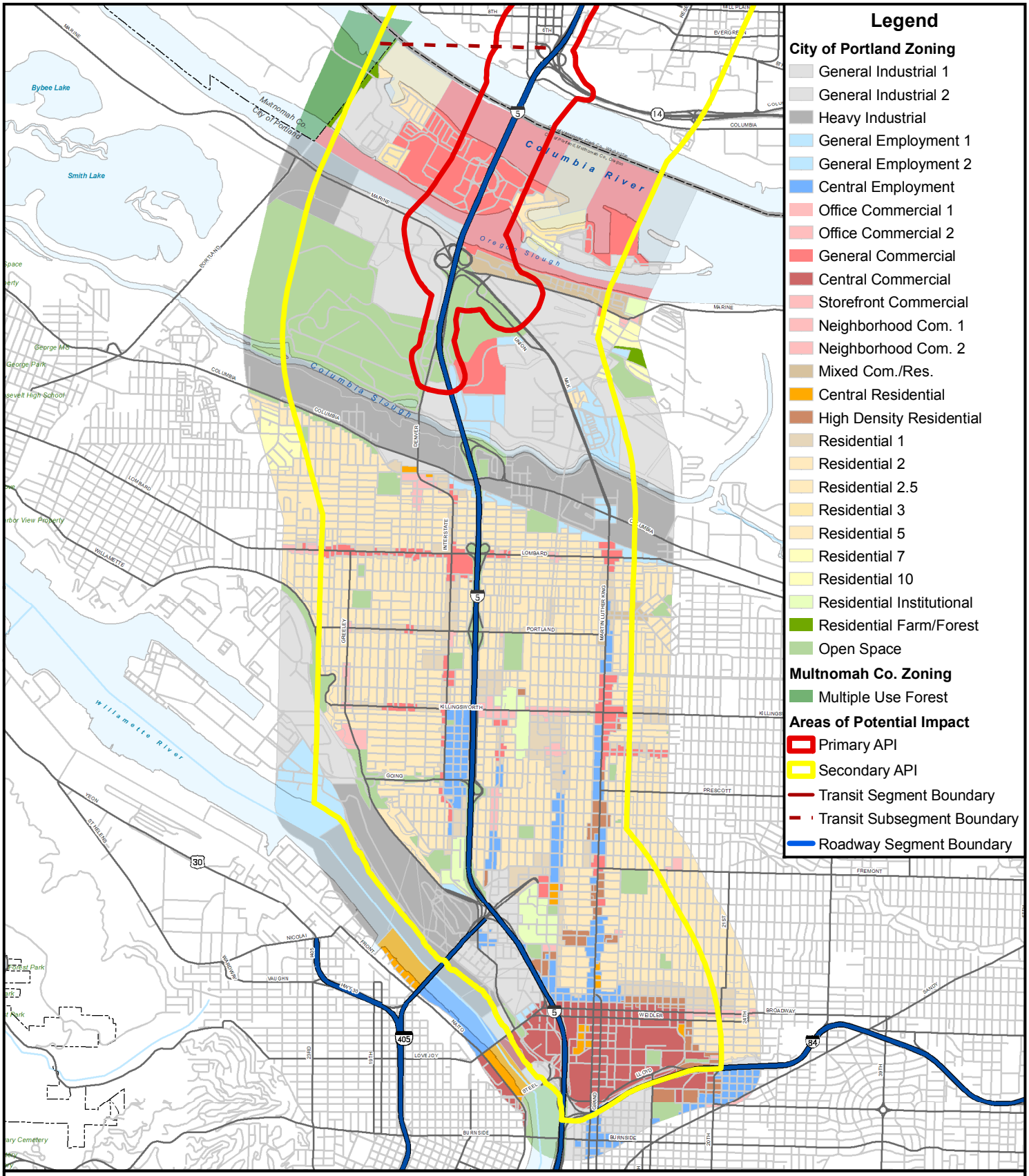


Exhibit 4-10: Zoning
Portland

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_2.mxd

4.5.2 City of Portland Overlay Zones

Exhibits 4-11, 4-12, and 4-13 show Portland overlay zones in the API.

Environmental Protection & Conservation Zones (p & c) – The Environmental Protection & Conservation designation protects the most important resources and functional values through identification, inventory, and analysis. This designation limits development, permitting it only in rare or unusual circumstances. Within the primary API, the conservation zone applies to the riparian corridors and aquatic habitat along the Columbia River, North Portland Harbor, Columbia Slough, and the Vanport Wetlands. The overlay zone regulations at Vanport Wetlands are superseded by the regulations of The Peninsula Drainage District number 1. An 11-person staff manages all four adjacent districts as a single environmental system. The districts' responsibilities have grown in scope and complexity over the years. The districts are managed to remove and direct stormwater to protect lives, property and the environment; and lead efforts to return the district's waterway network to a more natural condition.

Design Overlay Zone (d) – This designation promotes conserving and enhancing scenic, architectural or cultural values within new and pre-existing development; building quality high-density development near transit facilities; and requires compliance with Community Design Standards or a design review to ensure that the development is compatible with its surrounding area. The design overlay applies to areas along North Portland Harbor and around the Marine Drive interchange, covering most of the Bridgeton neighborhood and parts of the Albina community.

Aircraft Landing Overlay Zone (h) – This designation provides safer operating conditions near the Portland International Airport by restricting the height of structures and vegetation. It applies to almost the entire area between the Columbia River and Columbia Slough.

Portland International Airport Noise Impact Zone (x) – This designation is intended to reduce noise impacts from aircraft in the area surrounding the Portland International Airport. Reducing noise impacts is achieved by limiting residential development, and requiring noise insulation, easements and disclosure statements. This overlay applies to all of Hayden and Tomahawk Islands, as well as the North Portland Harbor and its shorelines.

Light Rail Transit Station Overlay Zone (t) - This overlay zone encourages a mix of uses within identified light rail station areas. The zone allows for more intense and efficient use of land at increased densities. Uses and development are regulated to create an environment oriented to pedestrians, and ensure a density and intensity that is transit supportive. There is not currently a Light Rail Transit Station Overlay on Hayden Island. Potential use and requirements of the overlay are discussed in Section 5.3.3, Segment A1 Transit Alignments. There is currently a regional effort to develop new guidance and regulations for station area plans. Zones based on these new plans will supplant the Light Rail Transit Station Overlays

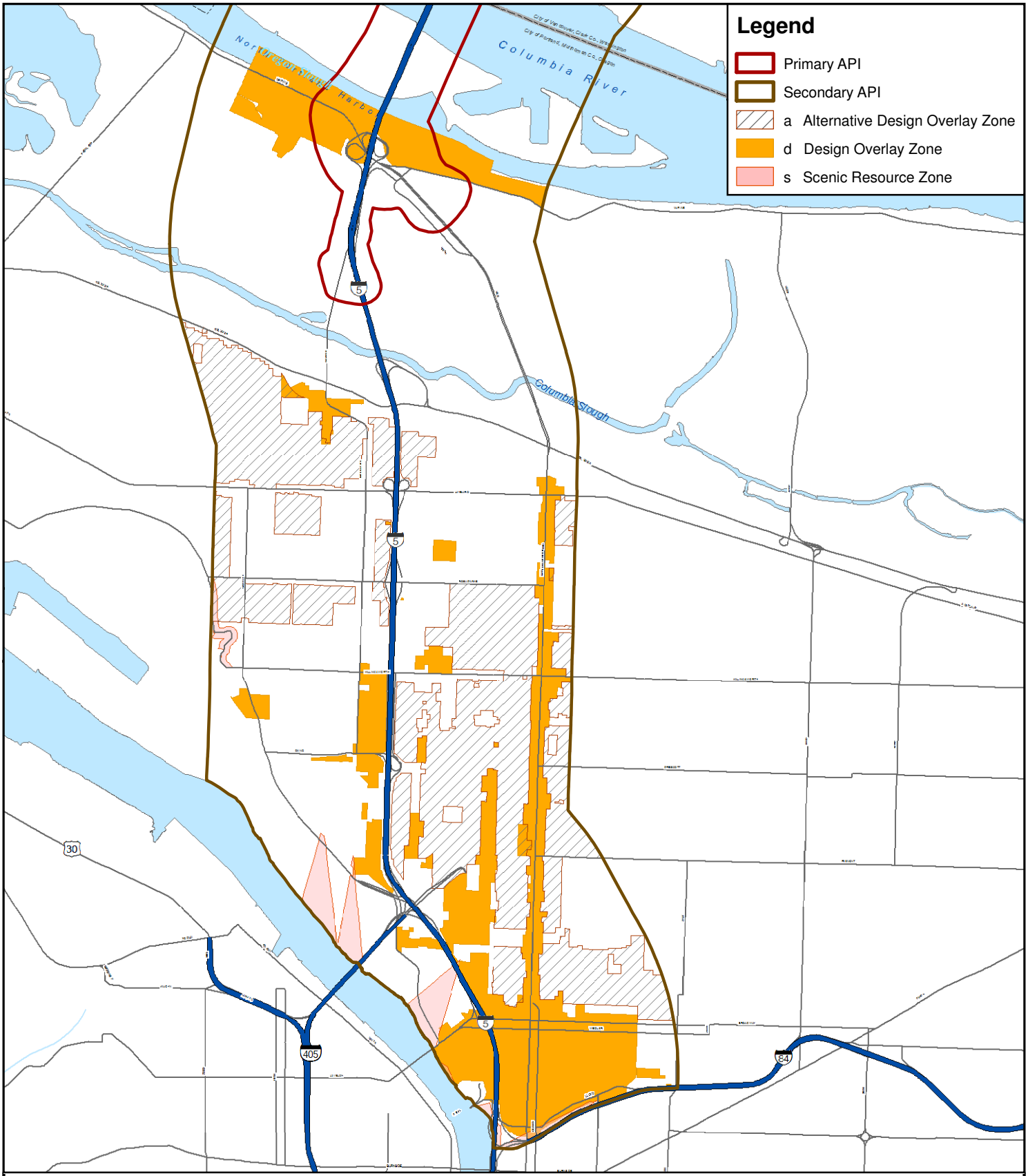


Exhibit 4-11: Overlay Zones - Design Overlay Zones
Portland, Oregon

Columbia River CROSSING

Analysis by C. Hainey; Analysis Date: 7/07/07; Plot Date: 9/25/07; File Name: Zover_Or_Zones_ADS.mxd

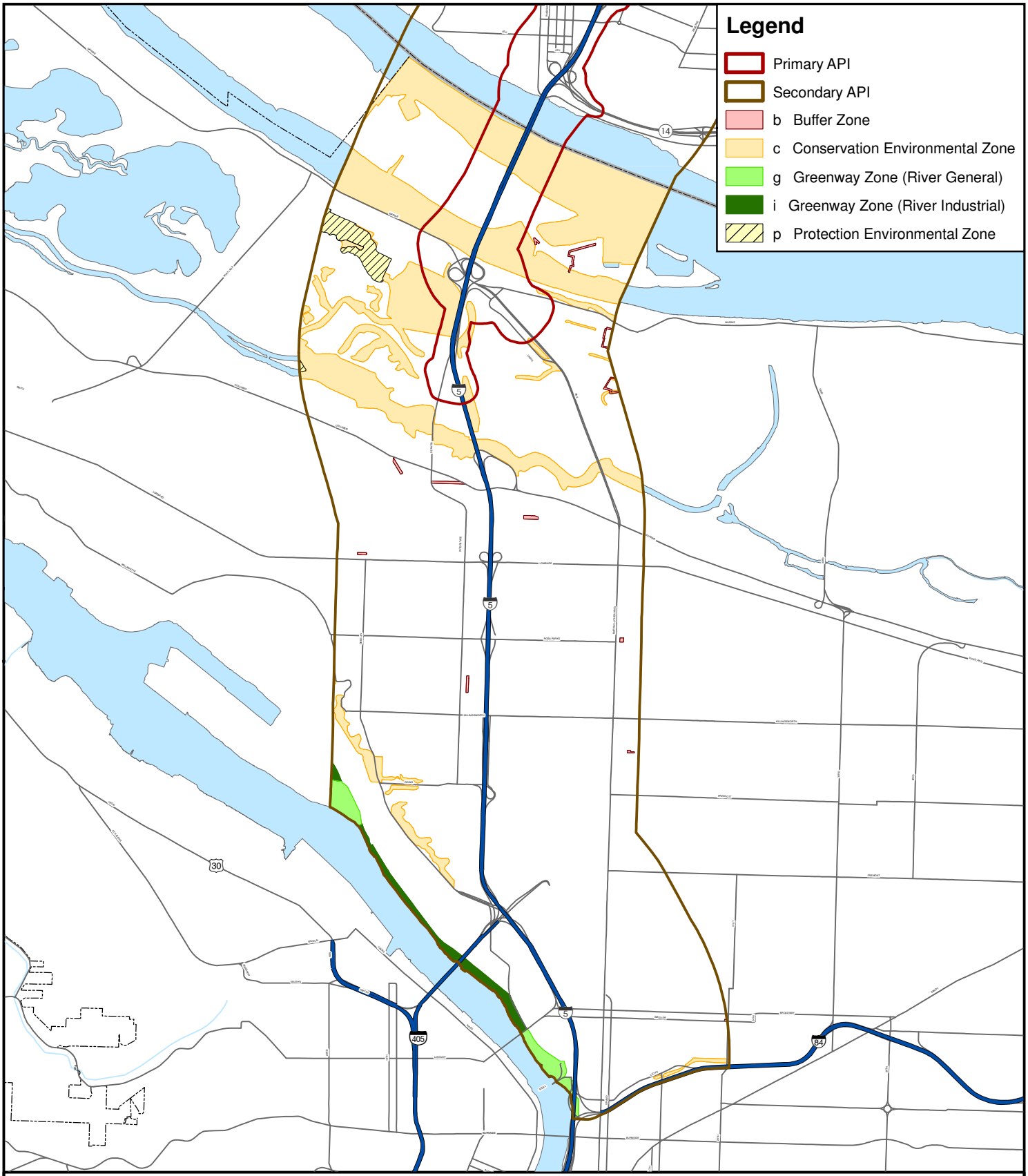


Exhibit 4-12: Overlay Zones - Environmental Protection and Conservation Zones
Portland, Oregon

Columbia River CROSSING

Analysis by C. Hainey; Analysis Date: 7/0707; Plot Date: 9/25/07; File Name: Zover_Or_Zones_bcgip.mxd

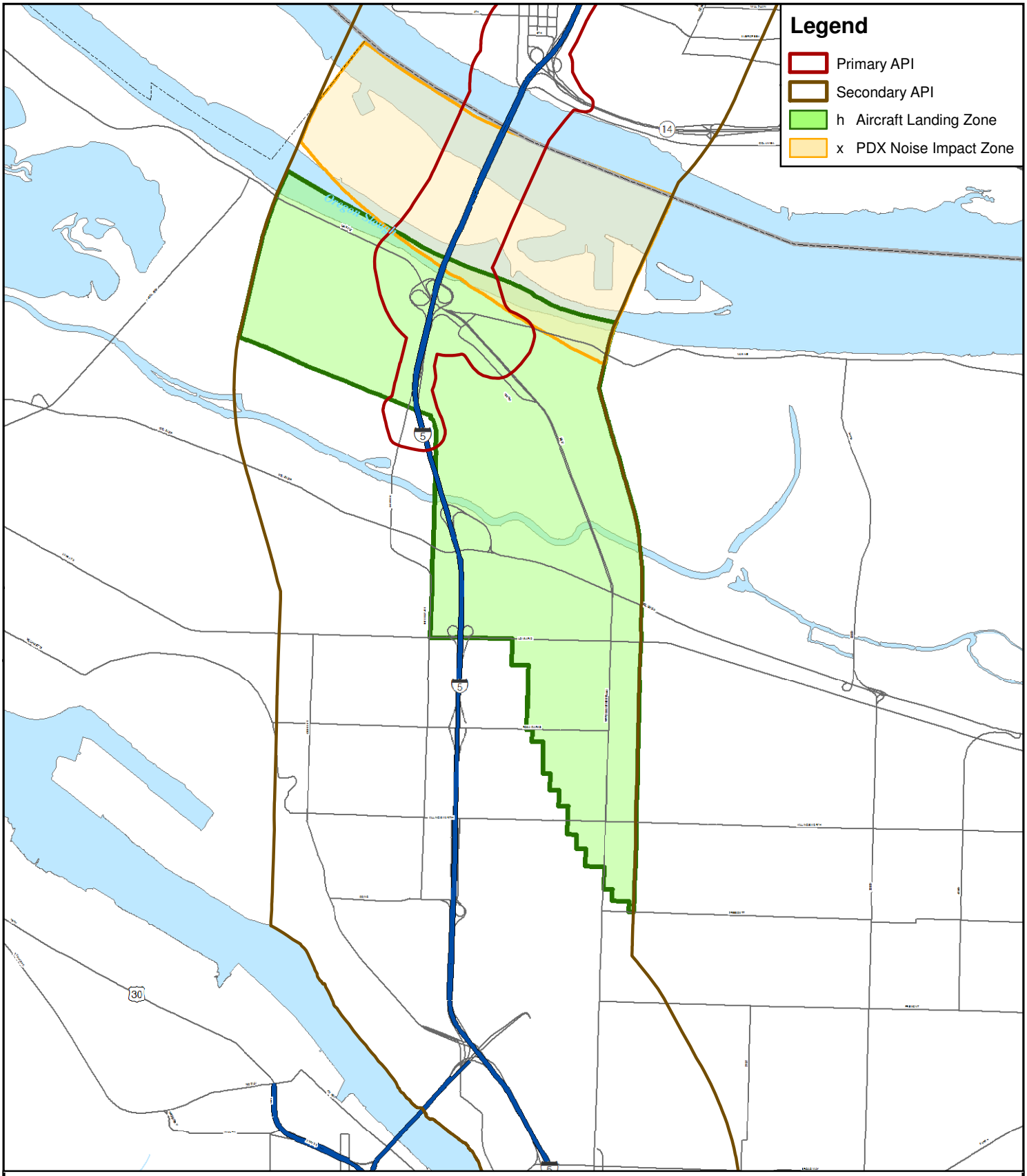


Exhibit 4-13: Overlay Zones - Noise and Aircraft Zones
Portland, Oregon

Columbia River CROSSING

Analysis by C. Hainey; Analysis Date: 7/07/07; Plot Date: 9/25/07; File Name: Zover_Or_Zones_hx.mxd

Public Recreational Trail Designations - The City also has adopted regulations pertaining to Public Recreational Trails. These regulations apply to areas along Marine Drive, are in addition to those of the base zones and other overlays.

4.5.3 City of Vancouver Zoning Districts

Exhibit 4-14 shows zoning in the project API within Vancouver.

Community Commercial (CC) – This designation is intended for retail development near residential neighborhoods. This designation allows for structures that include some offices, institutions, and upper floor housing, but cannot exceed 50 feet in height. Development is intended to be pedestrian-friendly, while promoting bicycle and transit travel. Community Commercial zoning is located in the Uptown area along Main Street and McLoughlin Boulevard, and exists in patches at the intersections of 39th and Main Street, 45th and Main Street, and 33rd Street on the eastern edge of the primary API.

General Commercial (CG) – The CG zoning district allows for a full range of retail, office, and civic uses. This zone has no height limits and allows for housing above the ground floor. Some light industrial uses are allowed, but is limited so as not to detract from the predominant commercial character of the district. This zone is located north of the intersection of 45th and Main Street.

Commercial Downtown District (CX) – The CX zoning district provides for a concentrated mix of retail, office, civic and housing uses in downtown Vancouver. The broad range of allowed uses is intended to promote Vancouver as the commercial, cultural, financial and municipal center of Clark County. Typical uses include, but are not limited to retail sales; hotels/motels; restaurants; professional offices; educational, cultural, and civic institutions; public buildings; commercial parking; and above-grade housing. This zone encompasses most of the area west of I-5 between McLoughlin Boulevard and the Columbia River, and is located at both ends of the Waterfront Park area east of I-5 along the Columbia River.

Vancouver Central Park Mixed Use (CPX) – The CPX zone is the base zoned designation for all land located within the Vancouver Central Park Plan District that contains a number of parks, government, institutional, and educational facilities. The district also contains the Vancouver National Historic reserve including Officers' Row, Vancouver Barracks, Fort Vancouver, Pearson Airfield and other resources. The district is designed to enhance and protect the existing facilities and permit new uses that are compatible in design and scale.

Office Commercial Industrial (OCI) – This designation provides office, light industrial, and small-scale commercial development with no off-site impacts. Review of proposed site plans for design and development standards ensure that development integrates into its surroundings. This district straddles I-5 at the northern end of the primary API.

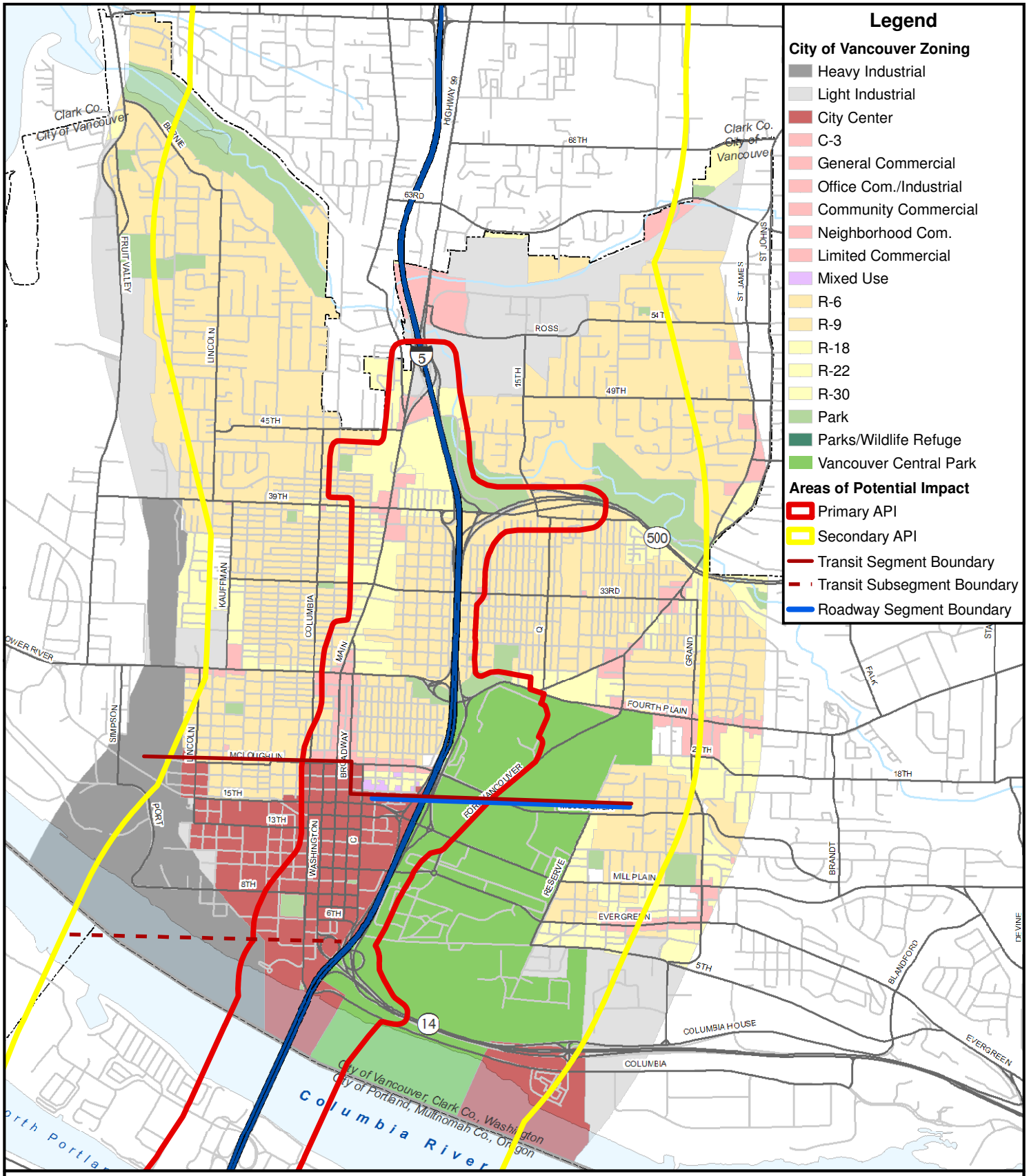


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Exhibit 4-14: Zoning
Vancouver

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_2.mxd

Light Industrial (IL) – This designation provides locations for light or clean industrial uses with office and retail businesses. These uses would not require marine or rail access and contain limited outdoor storage. This district applies to the area the northern end of the project from 49th Street to the city limits.

Heavy Industrial (HL) – The Heavy Industrial Zone provides appropriate locations for intensive industrial uses that involve the use of raw materials and require significant outdoor storage. These zones can generate heavy truck and rail traffic. This district is located at the western edge of the primary API along the Columbia River.

Lower Density Residential Districts – These districts are designed to preserve and promote neighborhoods of detached single dwellings at low intensities. Flexibility in housing type is promoted by allowing manufactured homes, duplexes, and planned unit developments under special conditions. The only Lower Density district in the primary API is the R-9. The R-9 zoning district accommodates detached single dwellings with or without accessory residential units at a minimum lot size of 5,000 sf and a density of 5.9 to 8.7 units/net acre. Some civic and institutional uses are permitted as limited or conditional uses. Within the API, this district is located on both sides of Main Street and along the I-5 corridor from Fourth Plain Boulevard to 39th Street.

Higher Density Zoning Districts – These districts promote medium- to high-density in residential neighborhoods. Housing types include manufactured homes, duplexes, rowhouses, and multi-unit structures. Non-residential uses, such as professional office and limited commercial, civic, or institutional use, are permitted subject to certain provisions. In the primary API, Higher Density zones include: R-18, R-22, and R-30. The R-18 district accommodates attached homes such as duplexes and rowhouses, and garden-type apartments at a minimum lot size of 1,800 sf per unit. The R-22 zoning district accommodates similar structures, plus lower-density multi-dwelling structures, at a minimum lot size of 1,500 sf per unit. The R-30 zoning district accommodates multi-dwelling structures at a minimum lot size of 1,500 sf per unit. High Density residential development is concentrated along Main Street from Fourth Plain Boulevard to the north end of the primary API and directly west of I-5 along McLoughlin Boulevard.

Greenway (GW) – The Greenway District is intended to preserve, conserve, and enhance natural features and support water quality, habitat, public access, and education. Low impact, low-intensity uses and activities are appropriate for these areas. The Greenway District consists of a set of greenways, some of which are regulated individually to achieve their special purposes. The Burnt Bridge Creek Greenway is located along SR 500 toward the northern extent of the primary API.

Park – Consisting of neighborhood, community, and regional parks, this designation provides for the environmental preservation, conservation and enhancement of park districts. These parks provide for passive, low, medium, and high intensity recreational activities. Parks are located throughout the primary API, the largest being Vancouver Central Park on the east side of I-5, which encompasses the Waterfront Park, the Old Apple Tree Park, Fort Vancouver, Officers Row, and Marshall Park.

4.5.4 City of Vancouver Overlay Districts

Exhibits 4-15, 4-16, and 4-17 show the Vancouver Overlay Districts in the project API.

Historic Preservation Overlay District – This district preserves the unique architectural character and historic or cultural significance of specific areas within the city. It ensures that all new development is compatible in scale, character, and design with existing structures, and that older buildings are preserved and their original character restored. One overlay applies to the House of Providence Academy on Evergreen Boulevard, and the other applies to the most southern blocks of Main Street.

Hough Neighborhood Overlay District – This district protects the low-density residential character of the Hough neighborhood, while allowing for the continued use of multi-family and non-residential structures currently in place. It also allows for rebuilding these structures if they become damaged. This overlay applies to approximately 20 blocks north of Mill Plain Boulevard, between Daniels and Markle Streets.

Noise Impact Overlay District – This district is in place to inform property owners within the district of unusually high noise levels from nearby airports, railroads, and highways. It applies to a section of the Columbia River shoreline beginning at Columbia Shores Boulevard and extending west to the Esther Short Park neighborhood, and those blocks that abut I-5 up to McLoughlin Boulevard. The overlay requires that any new residential construction within the district employ construction techniques that insulate residents from this high noise level.

Office Development Overlay District – This district requires careful review of any non-residential development planned along major streets to protect neighborhoods from increased pedestrian and automotive traffic, noise and light pollution, or changes to community aesthetic. This overlay is located along Main Street from Fourth Plain Boulevard to 45th Street.

Transit Overlay District – This district provides financial incentives to promote high-density residential and commercial development along main traffic corridors that is both pedestrian and transit-friendly. It provides specific guidelines for desired uses, densities, orientation, setback, and floor-area ratios for non-residential and residential structures. The overlay is broken into two tiers. The stricter, Tier 1 zoning is located in patches along Main Street and Fourth Plain Boulevard, often at major intersections or interchanges. Tier 2 zoning applies to a much larger area along Main Street, from Mill Plan Boulevard to 159th Street, and along Fourth Plain Boulevard.

Vision and Airport Height Overlay District – This district protects against structures that could interfere with views from the residential slopes east of I-5, or obstruct the airspace associated with Pearson Airfield. This overlay applies to the area bounded by Fifth, Sixth, U and Z Streets, and the Pearson Airfield approach and take-off zones that extend south into the Columbia River and west across the I-5 to the SR 14 interchange.

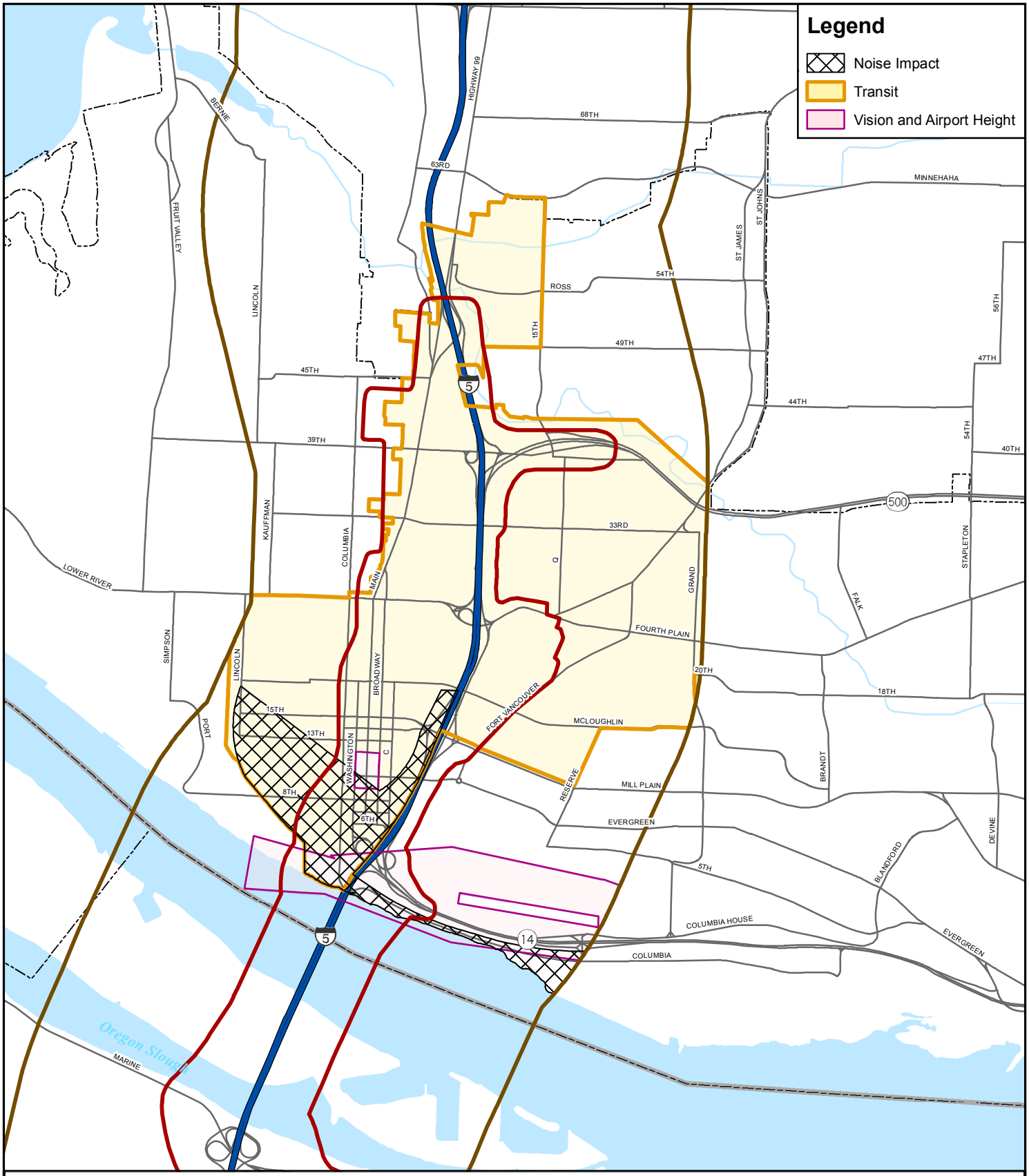

Exhibit 4-15: Overlay Districts - Noise and Transportation
Vancouver, Washington

Columbia River CROSSING

Analysis by C. Hainey; Analysis Date: 7/07/07; Plot Date: 9/25/07; File Name: Zover_Wa_Zones_1.mxd

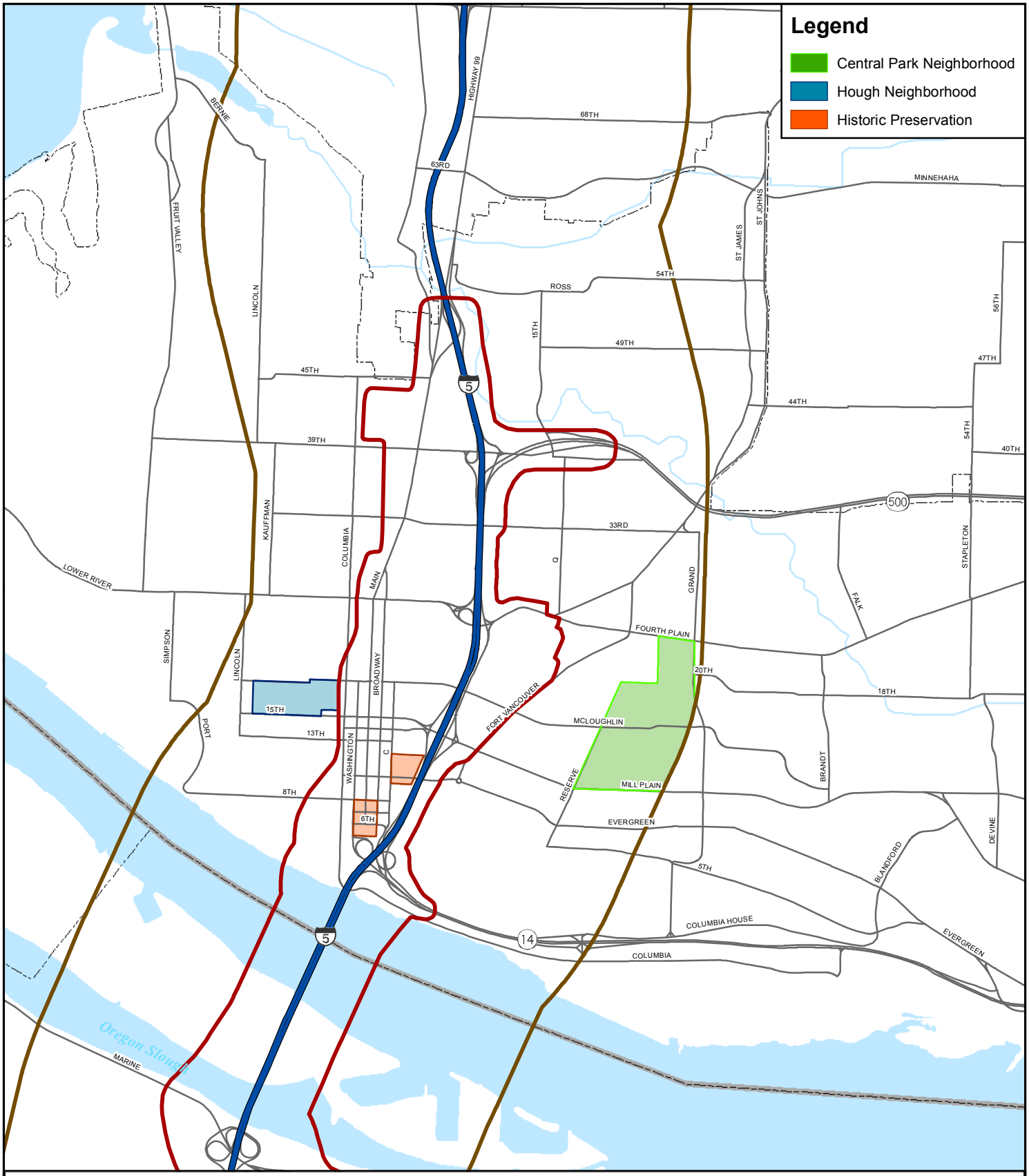

Exhibit 4-16: Overlay Districts - Neighborhood and Historic Preservation
Vancouver, Washington

Columbia River CROSSING

Analysis by C. Hainey; Analysis Date: 7/07/07; Plot Date: 9/25/07; File Name: Zover_Wa_Zones_2.mxd

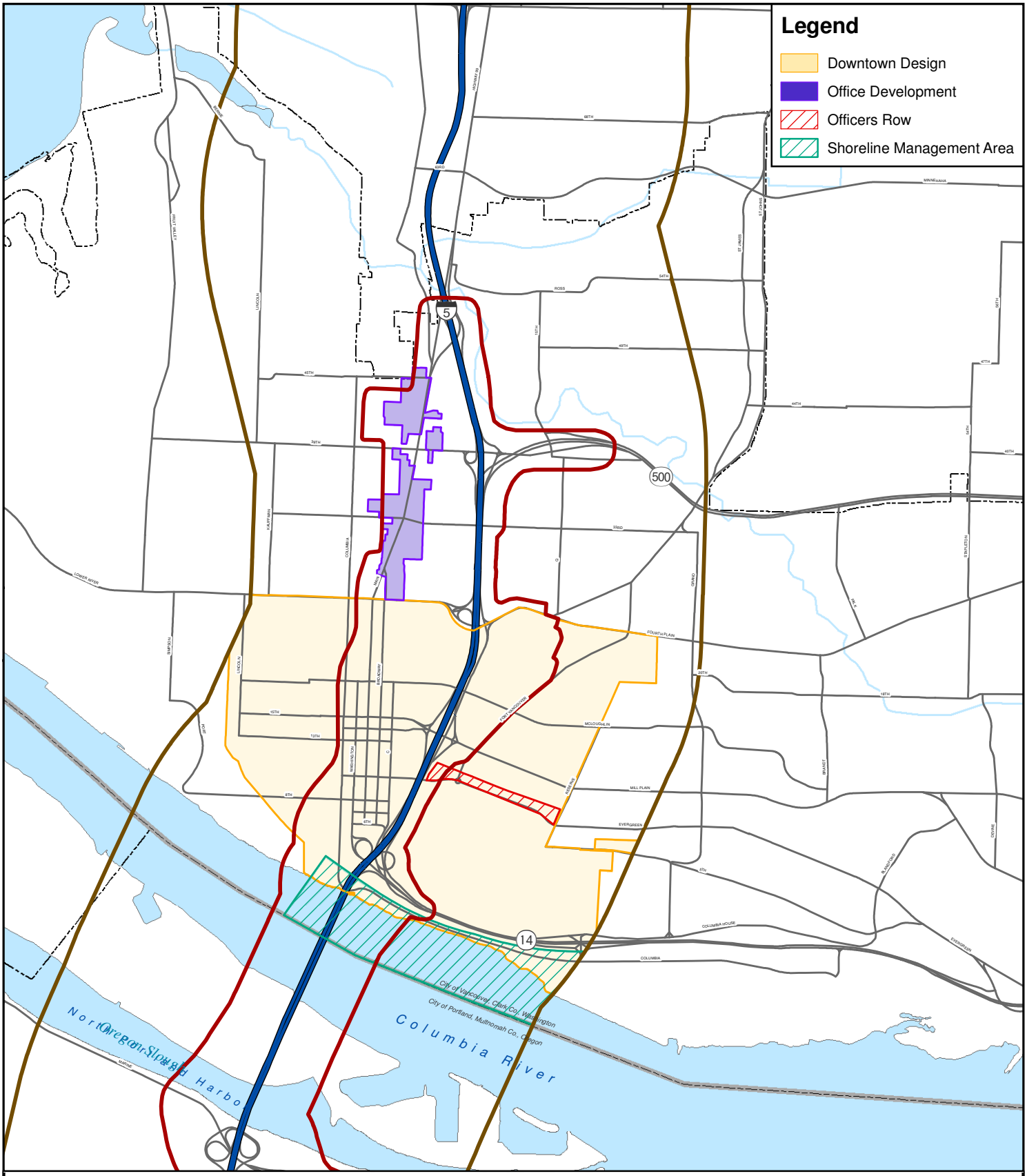

Exhibit 4-17: Overlay Districts - Development and Shoreline
Vancouver, Washington

Columbia River CROSSING

Analysis by C. Hainey; Analysis Date: 7/07/07; Plot Date: 9/25/07; File Name: Zover_Wa_Zones_3.mxd

Columbia River Shoreline Enhancement Plan District – This district is in place to maintain the community's physical and visual access to the waterfront, while supporting reasonable and appropriate activities on the shoreline. This overlay applies to all land and shoreline located south of the BNRR main line, from Wintler Park downstream to the Red Lion Inn at the Quay.

Shoreline Management Area – This overlay is in place to implement the policies and procedures set forth by the Shoreline Management Act of 1971. It prevents uncoordinated development of valuable shorelines, and promotes land use that preserves and protects water quality, the natural environment, and public access.

Central Park Overlay District (CPX) – This zone preserves and protects the low density of Central Park by monitoring remodeling and redevelopment of existing multi-family and non-residential buildings. This overlay extends from Mill Plain to Fourth Plain Boulevard, between E Reserve and Grand Boulevard. The uses allowed in this district are governed by Municipal ordinance M-2011. The City of Vancouver Community Planning Department intends to clarify and update this section of code in 2008.

Downtown District – This zone provides an implementing mechanism for the City's Design Review Committee functions. New development, redevelopment, signage, and more are reviewed by the committee to ensure consistency with design principles for downtown. Section 20.630.010 includes these different principles, though more are provided in design-related documents adopted by the City (e.g. Central Park Plan). Design regulations pertain to building lines, rain protection, blank walls, maximum building heights, parking, waterfront development, and more.

4.5.5 Clark County Zoning

Exhibit 4-18 shows the Clark County Zoning in the secondary API in Washington.

Low Density Residential (R1-20, R1-10, R1-7.5, R1-6 and R1-5) – This designation provides for predominantly single-family residential development with densities of between five and ten units per gross acre. Minimum densities assure that new development will maximize the efficiency of public services. Duplex and attached single-family homes may be permitted through in-fill provisions or approval of a Planned Unit Development. In addition, public facilities, churches, institutions and other special uses may be allowed in this designation if certain conditions are met. The zones may be applied in a manner that provides for densities slightly higher than existing urban development, but the density increase should continue to protect the character of the area.

Medium Density Residential (R-12, R-18 and R-22) – This designation provides land for single-family attached housing, garden apartment, and multi-family developments ranging from 10 to 22 dwelling units per gross acre. Minimum densities assure that areas build out to the density planned, ensuring that the urban areas accommodate anticipated residential needs. Areas planned for urban medium residential use and assisted living facilities shall be located near commercial uses and transportation facilities in order to efficiently provide these services. Public facilities and institutions are allowed under certain conditions.

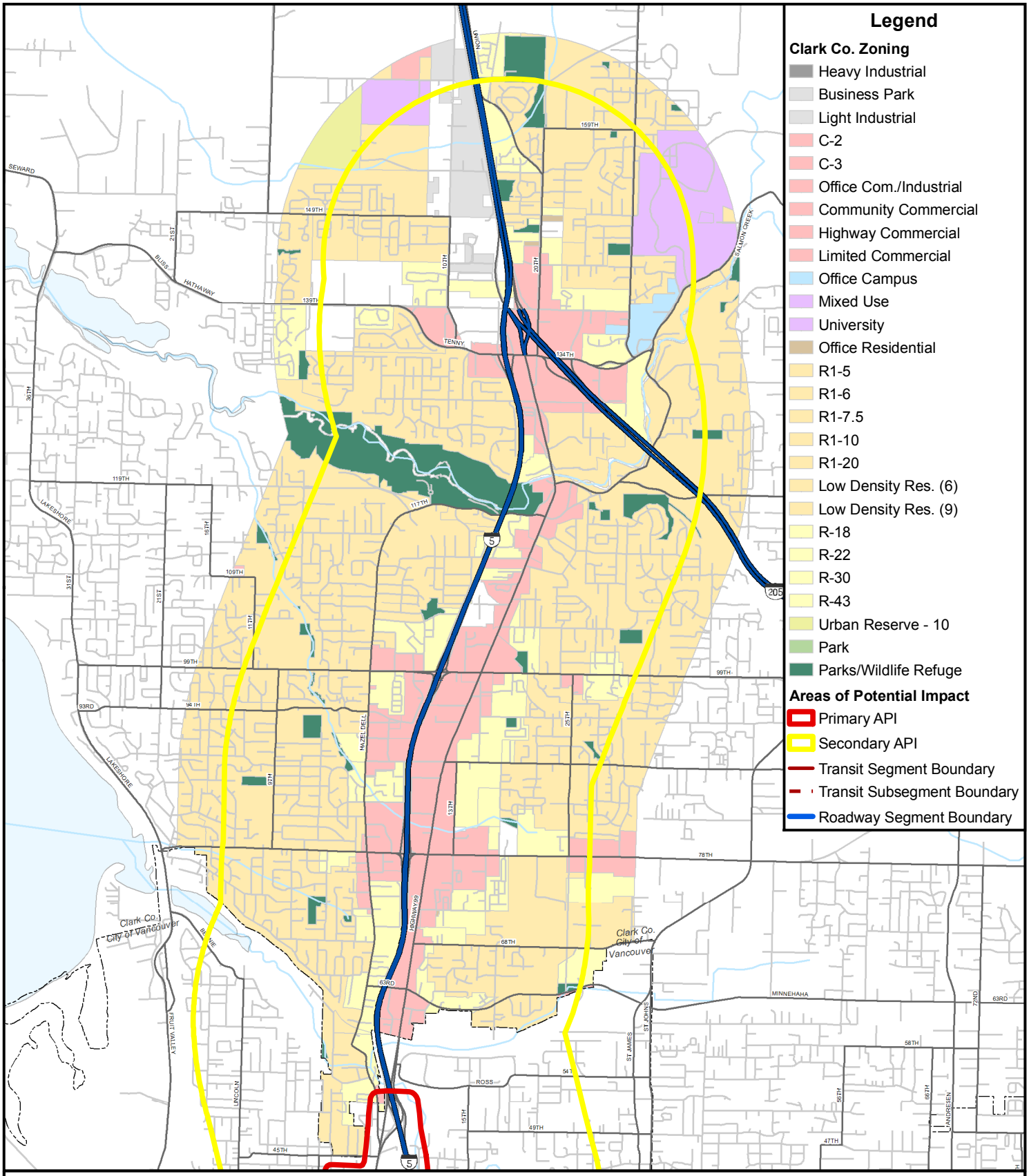

Exhibit 4-18: Zoning
Clark County

Columbia River CROSSING

Analysis by K. Benck; Analysis Date: 7/17/07; Plot Date: 9/25/07; File Name: DC_EJ_PBR_11_2.mxd

High Density Residential (R-30 and R-43) – These areas provide for the highest density housing in the urban area with 43 units per gross acre. Minimum densities assure that these areas build out to the density planned, ensuring that the urban areas accommodate anticipated residential needs including assisted living facilities. Areas with this designation shall be located in transit corridors and near commercial and employment centers to provide demand for commercial and transportation services while providing easy access to employment. Institutions and public facilities are allowed in this zone under certain conditions.

General Commercial (CG) This designation is applied to existing strip commercial areas as highway or limited commercial zoning. The strip commercial areas are generally characterized as narrow bands of commercial uses adjacent to major and minor arterial roadways. The 20-Year Plan strongly discourages additional strip commercial (highway or limited commercial base zones) being applied to new areas or extending existing strip commercial areas.

Mixed Use (MX) – Areas within this designation are implemented with the list of uses allowed in the mixed use (MX) zone and are intended to provide the community with a mix of compatible urban retail service, office, and residential uses. The mix of uses should be mutually supporting and pedestrian and transit-oriented. Pedestrian and transit orientation shall be accomplished through design requirements governing such elements as scale, bulk, street orientation, landscaping, and parking.

Employment Center (EC) – Areas within this designation are implemented with Office Campus (OC) and Business Park (BP) base zones and are intended to provide the community with a compatible office and attractive new non-polluting industries. Office and Business Park areas are designated for more intensive job-related land uses that pay family wages, such as professional offices, research, and technology related industries located in a campus like setting. Business Park areas may also be targeted by special public or private incentive programs that provide up front public service improvements or other inducements to attract family wage employment where higher job densities are encouraged. These areas are specifically targeted by local government and private sector job development organizations to consider special incentives to attract large scale businesses with public improvements, tax incentives, expedited development review or other considerations

Light Industrial (ML) – Areas within this designation provide for light manufacturing, warehousing, and other land intensive uses. Services and uses which support industrial uses are allowed in these areas but limited in size and location to serve workers within the light industrial area. Industrial lands are located in areas of compatible land uses with arterial access to the regional transportation network.

Heavy Industrial (MH) – This designation is implemented with a heavy industrial base zone and provides land for heavy manufacturing, warehousing, and industrial uses that may be incompatible with other categories of land use. This designation is appropriate for areas that have extensive rail and shipping facilities.

Public Facilities (PF) – This designation is applied to land uses that have facilities or are for public use. Public schools, government buildings, water towers, sewer treatment plants, and other publicly owned uses are included in this designation. The implementing base zone may be Public Facilities.

Open Space – These areas provide visual and psychological relief from man-made development in the urban area. Open space also provides opportunities for recreational activity and environmental preservation, maintenance, and enhancement. Open space may include, but is not limited to developed parks, trails and greenways, special areas, public and private recreational facilities, critical lands, and public gathering spaces. Open space is not implemented with a base zone but may be implemented with specific overlay, combining district or development review standards.

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5. Long-Term Effects

5.1 How is this section organized?

This chapter describes the long-term land use impacts that would be expected from the I-5 CRC alternatives and options. It first describes impacts from the four full alternatives and the No-Build Alternative. These are the five representative alternatives that include specific highway, transit, bicycle, pedestrian and other elements. The discussion focuses on how these alternatives would affect corridor and regional land use. It then focuses on impacts that would occur with various design options at the segment level, for example, comparing the impacts of each alignment option in each segment. Finally, it provides a more comparative and synthesized summary of the impacts associated with the system-level choices. This three part approach provides a comprehensive description and comparison of (1) the combination of system-level and segment-level choices expressed as five specific alternatives (2) discrete system-level choices, and (3) discrete segment-level choices. It addresses both direct and indirect long-term impacts. The Acquisitions Technical Report has further discussion on the changes in land use caused by right-of-way acquisitions of buildings or parcels.

5.2 No-Build Alternative

5.2.1 Direct Impacts

There are no direct impacts associated with the No-Build Alternative

5.2.2 Indirect Impacts

The No-Build Alternative would not directly address current deficiencies in the bridge structure, design, or capacity. As such, existing land uses served by the structure, as well as interstate commerce and daily commute patterns would remain vulnerable to high levels of congestion, safety limitations, and potential earthquake-induced failure.

There would also be no high-capacity transit service between the regional centers of downtown Vancouver and downtown Portland.

The No-Build Alternative would result in a level of traffic congestion that would impair freight movement and reduce area productivity. Each of these impacts may have indirect impacts on land use plans and goals. For example, high levels of traffic congestion may undermine economic development opportunities. A loss in the growth of local jobs would have an impact on housing prices, downtown revitalization, and more.

For more information on the changing traffic conditions between existing and the No-Build scenario, refer to the Traffic Technical Report.

5.2.2.1 Transportation and Land Use Plans

Regional transportation plans, as well as the numerous plans developed by the City of Vancouver, call for high-capacity transit in Vancouver, which would be provided by the build alternatives. Further details are provided below. The following discussion is organized topically rather than by jurisdiction, as there are so many plans that are pertinent and many similarities in their policies. Representative policies are referenced with each topic. Please refer to Section 4.4, Plans and Policies, for more details on specific plans.

5.2.2.1.1 Mobility

The current and projected levels of congestion on I-5 make the No-Build Alternative inconsistent with policies and goals for acceptable levels-of-service. In the Oregon Highway Plan, Action 1F.1 provides a standard for the level-of-service (LOS) required for an Oregon highway of this type. These standards are largely based on volume-to-capacity (v/c) ratios. The Metro 2040 Growth Concept and the Regional Framework Plan include sections on transportation that require an "acceptable" LOS and a "reasonable and reliable" travel time for moving freight.

Length of time for southbound congestion on the Interstate Bridge is expected to increase from 2 hours currently to over 7 hours in 2030 under No-Build conditions (During the 2-hour morning peak, southbound I-5 travel times are forecast to increase by 3 minutes (20 percent) for a vehicle-trip along I-5 from SR 500 to Columbia Boulevard, and by 15 minutes (50 percent) for a vehicle-trip from 179th Street to I-84.

Under 2030 No-Build conditions, northbound congestion periods on the Interstate Bridge are expected to increase from 4 hours to almost 8 hours. During the 2-hour afternoon peak, northbound I-5 travel times are forecast to increase by 2 minutes (15 percent) for a vehicle-trip from Columbia Boulevard to SR 500 and by 6 minutes (16 percent) from I-84 to 179th Street.

The No-Build Alternative (representing conditions in 2030) will be accompanied by many intersection failures in both Portland and Vancouver. In both cities, 17 intersections will not meet standards in the morning peak. During the afternoon peak, 33 intersections will no longer meet standards.

A replacement crossing would provide more congestion relief than the supplemental crossing or No-Build Alternative. The No-Build Alternative would only accommodate about 55,000 person-trips during peak periods, and is predicted to increase congestion to 15 hours/day by 2030. The greater capacity of a replacement crossing – over 75,000 person-trips/day during peak commute periods, versus approximately 66,000 person-trips for a supplemental crossing – would reduce duration of congestion to 3.5 to 5.5 hours/day. A supplemental crossing would result in about 11 hours of congestion daily.

The replacement crossing, while serving substantially more traffic than the supplemental crossing, would also save 3 minutes of travel time in the project area for northbound traffic during the afternoon peak. During the morning peak, either the replacement or supplemental crossing would provide similar southbound travel times in the project area.

5.2.2.1.2 Enabling Implementation of Regional Plans

Recently completed traffic modeling suggests that accommodating the projected growth in the Vancouver-Portland area may be difficult to achieve without adding capacity to the I-5 river crossing. However, models completed for regional transportation plans, local comprehensive plans, and other adopted plans have been able to balance transportation and land use assumptions without river crossing improvements.

5.2.2.1.3 Historic Preservation

The replacement alternatives would require the demolition of the historic 1917 bridge, a resource that is on the National Register of Historic Places, that currently serves as the northbound bridge. This is inconsistent with numerous policies regarding preservation of historic structures. The supplemental alternatives would not demolish the existing bridge, but would include retrofitting to bring the bridge to better seismic and safety standards. The new design for the bridge may undermine its architectural integrity, and subsequently its historic status.

5.2.2.1.4 Multimodalism

A number of policies in many plans refer to a balance of transit modes. This includes the WTP, Metro 2040 Growth Concept, the Regional Framework Plan, the Vancouver Comprehensive Plan, and the Clark County Comprehensive Plan. The existing facilities for bicycle and pedestrian use of the bridge are inadequate. They do not meet local or state design standards and subject the user to unsafe and unpleasant conditions, within 2 feet of vehicular traffic on a very narrow pathway. The existing bridge has no accommodations for high-capacity transit. The existing bike and pedestrian facilities are substandard and are sufficiently unpleasant (with narrow pathways and high noise levels from nearby high speed traffic) to discourage bike and pedestrian trips on the bridge. The No-Build Alternative would be inconsistent with policies requiring a balanced transportation system.

5.2.2.1.5 High-Capacity Transit

The No-Build Alternative would be inconsistent with the need and plan for a regional HCT system. Priority 2 of the Metro TIP requires the expansion of HCT, defined as light rail, commuter rail, streetcar, bus rapid transit, or other modes; and clearly promotes a regional light rail system. The regional light rail system is also supported in Portland's Central City Plan, Policy 4 A. The Vancouver Transportation Plan supports all travel modes, including high-capacity transit. These and numerous other plans call for HCT in Vancouver, connecting Vancouver and Portland.

5.2.2.2 Conclusion

The No-Build Alternative would fail to support the principle elements of transportation and other plans for the area such as accepted levels-of-service, improved freight mobility, multimodalism, and safety.

The selection of the No-Build Alternative would likely:

- Fail to address safety issues associated with the existing bridge, increasing the risk that the region could experience a significant failure in its transportation system. Such a failure could result in economic impacts, housing impacts, and other factors which would potentially change the pattern and intensity of planned land uses and jeopardize the achievement of goals in adopted plans.
- Prevent the achievement of adopted goals regarding levels-of-service, freight mobility, and congestion.
- Be more supportive of adopted goals regarding historic preservation, by not requiring the demolition of the existing bridge or historic structures that would be acquired for construction of the build alternatives.
- Fail to provide a sufficiently multimodal transportation system for the corridor, most significantly by failing to extend a high-capacity transit system to the Vancouver, WA regional center.

5.3 Findings Applicable to all Build Alternatives

This section is divided into two parts, one addressing consistency with plans and policies, and the other addressing the indirect land use impacts of the differing levels of transportation system capacity. The potential for the project to induce growth, and potentially sprawl, is a serious issue. For this report, the project team conducted a literature review, interviews, a comparative analysis of other case studies, and a review of travel model outputs. The findings of the induced growth study are applicable to the question of build versus No-Build choices, and to the choice regarding the number of lanes planned for the facility. Appendix A reviews induced growth studies and concludes that there will not likely be regional induced growth, sprawl, nor commercialization or other zone changes near interchanges. There could, however, be increased rates and intensity of development and redevelopment near transit stations.

5.3.1 Air Quality

Findings from the Air Quality report suggest there will be no impacts that could be disproportionately borne by Environmental Justice communities. An analysis was performed to estimate carbon monoxide (CO) concentrations near poorly performing intersections for the project alternatives. No violations of the National Ambient Air Quality Standards were shown for existing conditions, the no-build condition, or any of the build alternatives. Therefore, air quality impacts are not expected as a result of the project. The results of an emissions analysis showed that for any future condition (no-build or build) emissions are expected to be substantially lower than exiting emissions for the region and the subareas for all pollutants. The expected emissions reductions are in the range of 30 percent for CO, 70 percent for nitrogen oxides, 50 percent for volatile organic compounds, 90 percent for particulate matter, approximately 50 percent reductions in the volatile mobile source air toxics such as benzene, 1,3-butadiene, formaldehyde, acetaldehyde, and acrolein, and a 90 percent reduction in diesel particulate emissions.

A one or two percent change is not a meaningful difference between alternatives. For criteria pollutant emissions, CO is the pollutant with the largest absolute emissions and the largest difference between alternatives. The difference between alternatives ranges up to approximately 30 percent. The emissions are highest when the vehicle throughput is highest (the replacement crossing and no-toll). However, the local hot spot analysis of CO concentrations performed for the project indicates that no violations of the CO NAAQS are expected.

To summarize, air pollutant emissions are expected to be substantially lower in the future than existing conditions. For most pollutants of concern, future differences between alternatives are small enough not to be meaningful within the accuracy of the estimation methods, and the differences are much smaller than the anticipated reductions with time. This is true both for the region and the subareas evaluated. Local concentrations of CO at congested intersections were analyzed for the project alternatives and found to be below the NAAQS. Therefore, no air quality impacts, and few meaningful difference between alternatives were found as a result of the project alternatives.

5.3.2 Consistency with Plans and Policies

The proposed project would generally support Growth Management Act policies and the Oregon State-wide Planning Goals pertaining to transportation and infrastructure improvements. The project would accommodate and integrate with a variety of planned transportation facilities throughout the study area. The build alternatives would be consistent with goals for providing infrastructure to urban areas and for directing high-density growth to urbanized locations. Regional plans, adopted by the Southwest Washington RTC, Clark County, and Metro would also be supported by improved infrastructure in the urban core and the extension of a high-capacity transit system.

The proposed project would comply with the direction of the Vancouver Comprehensive Plan to provide infrastructure to city centers and to provide a range of transportation facilities that would accommodate transit, bicycles, and pedestrians. Comprehensive Plan goals include improved access to the Interstate and the introduction of HCT to Vancouver, and improving connections to the Historic Reserve and waterfront areas. The project would meet some, but not all, goals and objectives in local neighborhood plans. Consistency with neighborhood plans is addressed in the Population and Neighborhoods Technical Report.

Goals in the state highway plans (the OHP and the WTP) clearly state objectives for mobility, congestion relief, and freight movement. The build alternatives would support these goals, where the No-Build would not.

The following goals apply to any build alternative, but do not help differentiate between them. None the less, the goals should be used in guiding the winnowing of alternatives and in the preliminary and final design stages.

5.3.2.1 Construction and Design

WTP, Goal 17 pertains to reuse and recycling of materials. During construction, this should be implemented by a conscious attempt to reuse and recycle materials and waste, and to use recycled materials where prudent.

The Vancouver City Center Vision specifically addresses the CRC and calls for integration and accommodation of the Heritage Way Bridge concept into the I-5 improvements project. The Heritage Way Bridge has been a planned element in Vancouver plans for years, and is in their Transportation Improvement Plan. The pedestrian bridge is intended to join downtown to the Fort Vancouver National Historic Reserve, and would enable pedestrian movement from Esther Short Park to the Reserve. At this time, the Heritage Way concept would not be built by the CRC project but would not be precluded by it either. Engineering and other challenges have greatly complicated its construction. The Heritage Way Bridge would have to be high enough above the Interstate to meet safety standards, and be constructed at an accessible grade for walkers and American with Disabilities. These factors would push the landings too far into the reserve, and into downtown along Seventh Street.

Clark County's Comprehensive Plan requires the development of high quality design and site planning standards for publicly funded projects.

Nearly all of the plans refer to environmental protection, such as the protection of shorelines, habitat, threatened and endangered species, etc.

5.3.2.2 Congestion Pricing and Tolls

The Metro Regional Framework Plan calls for peak period pricing. The policy seeks to optimize the use of highways by applying peak pricing to mange congestion. It establishes criteria for a decision regarding peak period pricing in Working Paper 9 of the Traffic Relief Operations Study. Goal 6.33 of Portland's Comprehensive Plan also calls for congestion pricing. Preliminary tolling structure plans include options for peak period pricing (See section 5.7.5).

5.3.2.3 HOV and HOT Lanes

High-occupancy vehicle lanes encourage ride sharing and are an implementation technique for transportation demand management. HOV lanes are supported in a number of plans. Oregon Highway Plan Action 4c.4 requires the support of HOV and high-occupancy toll (HOT) lanes when consistent with local plans. This OHP Action also supports park and ride lots and preferential HOV parking to complement the HOV/HOT lanes. At this time, none of the build alternatives include HOV lanes, and are thereby not fully consistent with this element of the OHP.

5.3.2.4 Local Government Participation

The OHP provides a great number of actions related to this project. Action 1G.2 provides tests to receive ODOT support of major improvements to state highway facilities that are projected by local plans. Most tests require environmental analysis, public involvement, and other requirements that are either planned or underway. The Action also requires that

local jurisdictions include the funds needed to complete related local street projects in their transportation capital facilities planning. It is possible that local government would be required to further restrict land use changes that could place additional demand on the new facility, beyond that which was foreseen during the design phase of the project. With the completion of the Hayden Island subarea and redevelopment plans, the Vancouver City Center Vision, other studies, and much collaboration with local jurisdictions, the full build-out demand on the crossing will be well established. However, additional measures may still be required. Some of these are included in the Mitigations section of this report. Some measures are required by law, such as the ODOT Refinement Plan and Interchange Area Management Plan.

OHP Action 1G.3 requires an interlocal agreement to implement cost-sharing when a project has major benefits to the local system. It could be argued that any capacity increase on I-5 would have "major benefits" to the local system. For the bridge portion of the project, there are no local alternate routes. However, the bridge connection to Hayden Island serves the purpose of a local route (such as a later constructed arterial bridge).

5.3.2.5 Conclusion

The build alternatives would support the principle elements of transportation and other plans for the area (infrastructure investments in the urban core, support for compact urban form, multimodalism, etc.) The project can be designed and constructed to be more consistent with some specific policies. At this time, there does not appear to be an option that would integrate the Heritage Way pedestrian bridge as called for in the VCCV and the Central Park Plan. There also does not appear to be an option that would utilize HOV lanes to the extent that local policy encourages.

5.3.3 Indirect Land Use Impacts

Please refer to Appendix A (Indirect Effects: Induced Growth) for a full discussion of this issue:

The following points are critical to the understanding of the indirect impact of HCT in the Columbia River Crossing Project.

- Economic development, and land use intensification opportunities will continue to arise from investment in high-capacity transit. There is documented evidence of this occurring at both Light Rail and Bus Rapid Transit Stations. (APTA 2007, Cura 2003, Levinson 2003, Light Rail Now 2006a, MaryPIRG Foundation 2003, Weinstein 1999). This has also been found to be the case in the Portland Metropolitan Area. (Portland Office of Transportation 2006, TriMet 2006)
- There is still limited documentation about the expected level of economic development around BRT and LRT stations, or whether one mode of transit will consistently induce more economic development than the other. Local zoning, market forces, developer incentives, origin and destination points, and public preferences have been found to greatly affect the levels of economic development at transit stations. (Cervero 2004, 1993, ECONorthwest 1998, Seskin 1996, Thomas 2004)

- Ridership is directly correlated with transit oriented development (TOD) potential. LRT is preferred by riders because it is considered to provide better transit performance and because it is less associated with the noise, and pollutants of diesel based transit systems. (Currie, 2006, Dittmar and Poticha 2004, Henry 1989, Kenworthy 2000, Vuchic, 2005)
- There is a perception among the public and among real estate developers that rail is a more permanent transit investment, and therefore more likely to encourage and sustain TOD. (Austin Planning and Growth Management Department 1986, California Department of Transportation 2002, Ottawa Rapid Transit Expansion Study 2003, TCRP 2007, WMATA 2005)

5.4 Impacts from Full Alternatives

This section describes the direct and indirect land use impacts from the five full alternatives. These are representative combinations of highway, river crossing, transit and pedestrian/bicycle alternatives and options covering all of the CRC segments. The full alternatives are most useful for understanding the regional impacts, performance and total costs associated with the CRC project. The findings below integrate the findings from the segment level analyses.

5.4.1 Replacement Crossing (Alternatives 2 and 3)

The primary elements of this alternative are:

- Replacement bridge

  The replacement bridge would provide more vehicular capacity and would be more effective at maintaining freight mobility and economic development, which are emphasized in state, regional, and local plans.

  The replacement alternatives are less supportive of goals related to the reduction of single-occupancy vehicle trips and implementing congestion pricing. These would both be better achieved with a more constrained highway capacity.

  The replacement alternatives would vacate the existing I-5 mainline right-of-way passing under the BNRR railroad berm in Vancouver. This space could then provide a roadway connection between Main Street and the Columbia River.
- Local policies support congestion pricing.
- LRT and. BRT

  Both BRT and LRT would substantially increase the number of daily and annual passenger trips on transit above the No Build Alternative. LRT (Alternative 3) with a replacement bridge would have 24 percent (4,000) more daily passenger trips on transit than BRT (Alternative 2). With increased service, LRT would have just over 15 percent (3,300) more daily passenger trips on transit than BRT with an increased transit system. System-wide, whether LRT or BRT is the HCT mode, the total daily boardings would be practically the same. This is because with BRT

as the HCT mode, passengers traveling between Clark County and downtown Portland must transfer at the Expo Center station to the existing MAX Yellow Line or another TriMet local bus line. Therefore, trips that would take one boarding with LRT alternatives would require two boardings (one on a standard bus or BRT to one on LRT). Both BRT and LRT would substantially reduce the transit Vehicle Hours of Delay (VHD) for local and express buses within the I-5 corridor, and there would be no VHD for HCT within the exclusive guideway.

Certain local and regional plans support light rail transit, in general ways. These policies and goals can be interpreted to prefer the choice of LRT as the HCT mode. Other plan policies specifically call for light rail on Hayden Island or in Vancouver. The addition of light rail stations in Hayden Island and in downtown Vancouver would likely result in more mixed use and compact housing development around transit stations.

A study that surveyed developers (WMATA 2005) reported a consensus opinion that investment along a LRT line would yield a higher return than would investment along a BRT line. LRT is thought to attract more economic investment than BRT due to the higher visibility of rail lines, light rail's stronger public image, and the fact that rail infrastructure is seen as a more permanent public investment. See Appendix A for an analysis of induced growth related to transit.

- Full-length

  Given that local plans and projections for future land uses are reliant on high-capacity transit in the urban core, the minimal operable segments would be less supportive of the goals. The MOSs, however, would also not require land acquisitions in Segments A2 or B, and would not have any of the accompanying long term or temporary effects.

- TSM/TDM Option 1 - Aggressive

  State, regional, and local policies can be found that would support high levels of Transportation Systems and Demand Management activities.

5.4.2 Supplemental Crossing (Alternatives 4 and 5)

The primary elements of this alternative are:

- Supplemental bridge

  The supplemental bridge would provide lower vehicular capacity and would be less effective at maintaining freight mobility and economic development. It would be more supportive of goals related to the reduction of single-occupancy vehicle trips.

  Supplemental bridge options would require the closure of Sixth Street at Washington Street. This may have an adverse impact to traffic circulation, visual quality, and nearby land uses including the new Vancouver Convention Center.

Supplemental bridge options would need to retain the existing mainline of I-5. This would prevent Vancouver from connecting Main Street to existing and planned land uses on the waterfront.

- Tolling

  Local policies support congestion pricing. This is the only full option that is fully consistent with these policies.

- LRT vs. BRT

  Certain local and regional plans support light rail transit, in general ways. These policies and goals can be interpreted to prefer the choice of LRT as the HCT mode. Other plan policies specifically call for light rail on Hayden Island or in Vancouver. The addition of light rail stations in Hayden Island and in downtown Vancouver would likely result in more mixed use and compact housing development around transit stations.

  A study that surveyed developers (WMATA 2005) reported a consensus opinion that investment along a LRT line would yield a higher return than would investment along a BRT line. LRT is thought to attract more economic investment than BRT due to the higher visibility of rail lines, light rail's stronger public image, and the fact that rail infrastructure is seen as a more permanent public investment. See Appendix A for an analysis of induced growth related to transit.

- Full-length

  Given that local plans and projections for future land uses are reliant on high-capacity transit in the urban core, the minimal operable segments would be less supportive of the goals. The MOS, however, would also not require land acquisitions in Segments A2 or B, and would not have any of the accompanying long term or temporary effects.

- TSM/TDM Option 2 Very Aggressive

  State, regional, and local policies can be found that would support high levels of TSM/TDM activities such as those in Option 2.

5.5 Impacts from Segment-level Options

This section describes and compares the land use impacts associated with specific highway alignment and interchange options and specific transit alignments and options. They are organized by segment, including:

- Segment A: Delta Park to Mill Plain District
- Segment B: Mill Plain District to North Vancouver

For transit options, Segment A is divided into two sub-segments, each with a discrete set of transit choices:

- Sub-segment A1: Delta Park to South Vancouver
- Sub-segment A2: South Vancouver to Mill Plain District

Impacts from highway options are described separately from impacts from transit options. The purpose of this organization is to present the information according to the choices to be made. Where the traffic and transit choices would have a substantial effect on each other, this is considered.

5.5.1 Segment A: Delta Park to Mill Plain District - Highway Alternatives

5.5.1.1 Comparison of Direct Impacts

Exhibit 5-1 shows the full and partial right-of-way acquisitions by count and by acreage for the existing zoning categories within highway Segment A. The downstream alternative would have the greatest impacts in Oregon. The supplemental option would impact the fewest properties. However, the difference between the highway alternatives' direct impacts in Segment A is not large enough to cause a differential impact to land uses or plans.

Exhibits 5-1 and 5-2 show the comparative direct impacts of all building acquisitions under the highway alternatives. Partial acquisitions will leave a remainder parcel after acquisition and may or may not require the acquisition of buildings. These remainder parcels may still be buildable and available for redevelopment. The Acquisitions Technical Report includes detailed information about the right-of-way acquisitions for the proposed alternatives.

Exhibit 5-1. Segment A: Highway Alignment Right-of-way Acquisitions

Zoning	Full Acquisitions	Partial Acquisitions[a]	Right-of-Way Acquisitions[b]	Total Count of New Acquisitions	Total Area Acquired (Acres)
Replacement					
CG[c]	8	11	17	36	20.7
CPX	0	1	5	6	3.2
CX	5	3	16	24	2.4
IG2	5	0	11	16	10.5
Total	**18**	**15**	**49**	**82**	**36.8[d]**

Zoning	Full Acquisitions	Partial Acquisitions[a]	Right-of-Way Acquisitions[b]	Total Count of New Acquisitions	Total Area Acquired (Acres)
Supplemental					
CG[c]	11	11	14	36	21.8
CPX	0	0	6	6	0.7
CX	4	1	5	10	1.3
IG2[c]	1	2	9	12	2.3
CM[c]	0	0	2	2	0.0
Total	**16**	**14**	**36**	**66**	**26.1[e]**

[a] A partial acquisition means that a structure on the lot is impacted in some way, but enough of the parcel is left that it has resale value.

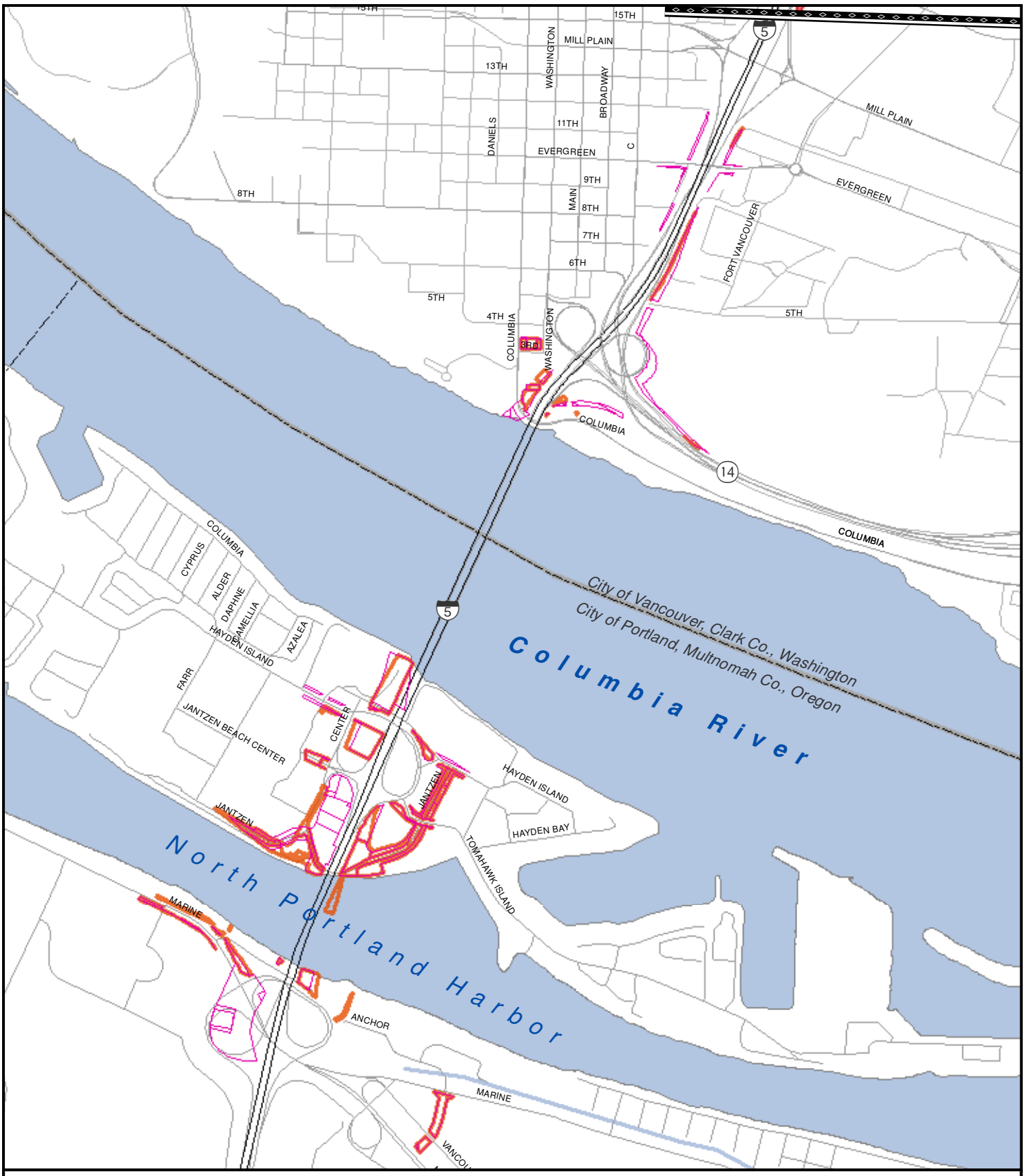
[b] A right-of-way acquisition is a small "sliver" acquisition that does not impact structures.

[c] Zoning occurs in Portland, un-notated zoning occurs in Vancouver

[d] This includes 9.5 acres of ODOT property and right-of-way.

[e] This includes 2 acres of ODOT property.

Definitions: CG – General Commercial; CPX – Central Park; CX – City Center; IG2 – General Industrial; CM – Mixed Commercial



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Replacement RoW Requirement

Supplemental RoW Requirements

Roadway Segment Boundary

Exhibit 5-2: Right-of-Way Requirements for Highway Alignments

Segment A

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Nov-2007; Plot Date: Apr.-2008; File Name: RoadAlignments_MK089.mxd

This report discusses specific acquisitions in detail only for Hayden Island. Only on Hayden Island would project related acquisitions potentially cause a change in land use patterns or planned areas. The second unique land use issue on Hayden Island is related to its possible redevelopment. The privately initiated redevelopment plan for the shopping center (the indoor portion with Target, Ross, and many small stores) envisions a "Main Street" feel and a greater mix of uses. Portland's current subarea planning effort may support this concept as well as integrating a high-capacity transit station and better bike facilities. Exhibit 5-3 summarizes how building impacts could affect land uses.

Exhibit 5-3. Direct Acquisitions on Hayden Island

No-Build	**Buildings**	**Uses**
Full Acquisitions	0	
Partial Acquisitions	0	
Replacement	**Buildings**	**Uses**
Full Acquisitions	3	2 retail, 1 City of Portland
Partial Acquisitions	10	7 retail, 1 vacant lodging, ODOT, floating homes
Supplemental	**Buildings**	**Uses**
Full Acquisitions	11	5 retail, 1 public
Partial Acquisitions	10	2 lodging (1 vacant) 5 retail/service, ODOT, floating homes

Other areas of the API, such as Vancouver's Downtown and Uptown would also likely be impacted, but not to this extent as a result of acquisitions. The exhibit shows the respective zoning and planning designations of the lands that would be required. In downtown Vancouver, these acquisitions are all of land zoned City Center. Most of the land is already within the DOT right-of-way. The one significant potential change in land use is directly under the bridge. The existing bridge footing occupies all of the land under the bridge, allowing for only a two-lane roadway and wide sidewalk to pass underneath. Because of the height and design of the new bridge, this area could be opened up for new uses, likely being open space. The supplemental bridge options would not require the removal of the existing bridges. Only the replacement bridge would result in this change in the land use directly under the bridge. The photo simulation shown here (in Exhibit 5-4) shows the new land that would be available between the bridge structure and the shoreline.

Exhibit 5-4. Photo Simulation Showing Land under Bridge

Marine Drive Interchange Options

There are two interchange options in addition to the standard design assessed with the full alternatives. The two designs are called the Southern and the Diagonal Marine Drive Realignments. Both would directly impact buildings to the north and west of the Expo Center and could indirectly impact freight movement through traffic changes.

Realigning Marine Drive south of Expo Center requires acquisitions of two existing buildings located at the SW corner of Marine Drive and Force Avenue. The southern realignment would also displace parking for the Expo Center.

The diagonal realignment of Marine Drive would divide the Expo Center Complex by removing about 3 acres of land on the north side of the complex. The northern building of the Expo Center would be removed to provide right-of-way for Marine Drive. The diagonal realignment would also displace parking for the Expo Center.

5.5.1.2 No-Build

5.5.1.2.1 Direct Impacts

There are no significant direct impacts associated with the No-Build Alternative.

Noise levels would be reduced with any build scenario and the accompanying mitigation. Without mitigation, noise impacts resulting from the highway alternatives would occur throughout the project corridor. With mitigation (i.e., the replacement of old noise walls, and construction of new noise walls), there are only a handful of properties that would continue to be affected by increased noise levels.

In Segment A, these properties include:

- **Red Lion Hotel at Columbia Center**: Rooms facing I-5 will have a slight reduction in noise when compared to the existing conditions, but will continue to exceed the criteria. No mitigation was recommended because the rooms have been insulated to reduce noise on the rooms' interiors.

- **Federal Lands (FHWA) Building** adjacent to I-5 in the Fort Vancouver National Historic Reserve (VNHR): There is no outdoor use at this building and mitigation would not meet WSDOT criteria. The VNHR as a whole would actually get quieter with the build options, due to the sound wall improvements.
- Two Hotels (**Econo Lodge** on Fifth and Broadway, and **Shilo Inn** on 12th and D Street) and two Multi-Story Apartments (**Normandy Apartments** at Seventh and C Street, and **Fort Apartments** [previously the Fort Vancouver Motel] at the SW corner of the Mill Plain interchange) in downtown Vancouver: Noise mitigation was not able to meet reasonability criteria due to the low number of units and topographical conditions. More specifically, the upper stories are too high to be adequately and cost effectively mitigated with noise walls.

Despite these residual impacts, as the project will provide mitigation where none exists today, and will improve existing sound walls, the project will result in an overall decrease in noise levels in the corridor.

5.5.1.2.2 Indirect Impacts

The No-Build Alternative is inconsistent with numerous plans and policies as discussed in section 5.2.1, No-Build. The No-Build would have additional impacts to Hayden Island. The island is dependent on the Interstate facility for access to and from the island. The No-Build Alternative would not address the safety deficiencies of the existing structures, reduce congestion on I-5, or bring high-capacity transit to the island, all of which would support the high-intensity urban development found and planned for the island.

5.5.1.3 Replacement Crossing

5.5.1.3.1 Direct Impacts

Most of the roadway options would require right-of-way within or very near to the existing right-of-way. For the purpose of this analysis, it is assumed that no development will be permitted within the right-of-way, except for transportation facilities. For example, the pedestrian accessway along the river could be extended through the right-of-way so that the accessway can be connected underneath the Interstate. The area under the bridge head would allow for an improved connection to the waterfront. The existing bridges require that most of the waterfront be used for bridge-related appurtenances. The replacement bridge would open up this land for recreation, scenic views, and possible parks programming.

For the replacement alignment, Exhibit 5-5 shows direct parcel impacts resulting from full or partial right-of-way acquisitions for roadways. For the replacement alignment, an estimated 13 direct parcel impacts resulting from full or partial right-of-way acquisitions for roadways. The downstream alignment appears to acquire businesses that have significantly higher annual sales. The supplemental bridge would directly impact 21 buildings. These impacts have the potential of slightly weakening the island's job base.

Riverwest

The build alternatives do not have any differing direct impacts on the Riverwest development (described in Section 4 of this report). The acquisitions data suggest that no land would be required from the site. However, indirect impacts are possible, including noise, walls, and potentially changing traffic patterns.

Potential Impacts to Heritage Trees

A Heritage Tree Red Oak is located near the entrance to Providence Academy on Evergreen Boulevard. With the replacement options this lot would be partially acquired on its western edge. This acquisition would not impact any structures on this lot, nor would it endanger the Red Oak.

A mix of tree species lines both sides of Officers Row along Evergreen Boulevard. The replacement options would acquire part of the lot where this grove occurs, on the Fort Vancouver National Historic Reserve. This acquisition would not impact any structures on this lot or endanger any portion of this grove.

The Old Apple Tree is located in Heritage Tree Park on Columbia Way, south of the SR 14 interchange. A portion of this lot would be acquired with the replacement options, but this alternative would not physically impact the Old Apple Tree. The presence of new elevated ramps may indirectly affect the tree by increasing shading over the park.

5.5.1.3.2 Indirect Impacts

Increased mobility for freight vehicles is a benefit that would arise from any of the build alternatives. This would support plan goals for freight mobility and economic development.

Previous analysis of Interstate expansion (as part of the Trade Partnership Project) determined that the construction of the project, the addition of light rail, and new vehicular capacity would draw more employment to the I-5 corridor. That analysis, discussed in Appendix A of this report, found that North Portland residents may benefit from the creation of jobs near to the corridor.

There are different impacts to land use patterns or plans between the replacement and supplemental options as discussed below.

5.5.1.4 Supplemental Crossing

5.5.1.4.1 Direct Impacts

For the supplemental alternatives, Exhibit 5-3 shows an estimated 21 direct building impacts resulting from the roadway alignment. This is significantly higher than the impacts for the replacement alternatives. The Economics Technical Report describes the significance of these acquisitions in greater detail. The existing land use pattern on Hayden Island could be significantly impacted by the acquisitions. Part of the draw of the shopping center is that it is a single location where many goods and services can be purchased. If a large number of restaurants, retail businesses, or services are acquired it

could lose its ability to draw customers in this manner. There is not yet sufficient information on the proposed redevelopment of the island to determine how these additional acquisitions might support or hinder the new plans.

Riverwest and Heritage Trees

Potential impacts would be the same as those discussed above for the replacement alternatives.

Closure of Sixth Street

The supplemental alternatives would require the closure of Sixth Street at Washington Street. The supplemental bridge would require HCT to descend from a higher deck than the replacement bridge design would require. HCT can descend at a grade no higher than 5 percent, which would place the landing between Sixth and Seventh Streets. Fifth and Seventh Streets would remain open, but the HCT landing would block Sixth Street and require its closure.

This would have potentially significant impacts on traffic circulation, pedestrian circulation, and the viability of certain businesses. With less exposure, commercial space on Sixth may become less attractive. This could impact land uses in numerous historic structures including:

- The U.S. National Bank Building, which currently houses offices.
- The Vancouver National Bank Building, which currently houses a glass blowing studio.
- The Schofield Building, which houses a non-profit theater and a pawn shop.

With less traffic on Sixth, the uses on adjoining blocks of Main Street may also experience a degree of isolation. These uses, zoned City Center like those throughout the downtown, include two bars, professional offices, specialty retail, pawn brokers, a coffee shop, a glass blowing studio, and a salon.

The supplemental bridge alignment would require HCT to use Seventh Street, Ninth Street or another connecting street to reach the Broadway half of the proposed transit couplet in Segment A2. None of these would have direct impacts to uses along these corridors. However, indirect impacts could include increased pedestrian traffic for the small businesses on these blocks, increased noise levels associated with BRT vehicles, etc.

Main Street Connectivity

The replacement bridge options would vacate the existing I-5 mainline right-of-way passing under the railroad berm. This space could be used to provide a roadway connection between Main Street and the Columbia River. The supplemental bridge options would need to retain the existing mainline of I-5. This would prevent Vancouver from connecting Main Street to the Renaissance project.

5.5.1.4.2 Indirect Impacts

Increased mobility for freight vehicles is a benefit that would arise from any of the build alternatives. This would support plan goals for freight mobility and economic development. The supplemental option, however, would provide less vehicular capacity and would be less effective at maintaining freight mobility and economic development. This issue is explored in greater detail in the Economics Technical Report.

As mentioned above, the Trade Partnership Project determined that the addition of light rail and new vehicular capacity would draw more employment to the I-5 corridor. This project found that North Portland residents may benefit from the creation of jobs near to the corridor. The supplemental option would provide less capacity to the Interstate than replacement options and may therefore provide fewer jobs in North Portland.

Reduction of Single-Occupancy Vehicle Trips

Numerous plans call for a reduction of single-occupancy vehicle (SOV) trips and for gradual reduction in vehicle-miles traveled (VMT). These goals can be found in both the RTP and MTP, and in all local comprehensive plans. The replacement and supplemental alternatives have different levels of support for these goals inherent in their designs. The supplemental bridge would provide less capacity for through trips in the corridor.

The supplemental alternatives have greater accompanying levels of Transportation System and Demand Management programs. For example, the supplemental alternatives would include $850,000 for focused outreach in Clark County, supportive of TDM. The replacement alternatives would only include $500,000 for these programs, although either TSM/TDM package could be implemented with either the supplemental or replacement crossing. The more aggressive TSM/TDM program would include greater levels of support for vanpools, more support for transportation management associations (and possibly Growth and Transportation Efficiency Centers in Washington), etc. The lesser capacity of the supplemental bridge, and the accompanying TSM/TDM measures, make the supplemental alternatives more consistent with SOV reduction goals.

Congestion Pricing

Numerous local plans call for the use of congestion pricing to curb demand for new capacity. Congestion pricing can both reduce overall use of the facility and would help to temporally disperse the trips in the corridor, so that peak hours would be less congested.

If tolls are instituted, all bridge options would have differential time of day tolling. This would at least partially satisfy policies regarding congestion pricing. The supplemental alternatives would include tolls at 1.5 to 2 times the level of tolling with the replacement alternatives (see Exhibit 5.5). These tolls, pending system designs that are not yet known, may serve the goals of congestion pricing better than the toll structures for the replacement alternatives.

Exhibit 5-5. Toll Rate Structures Used for Evaluation

For Replacement Options							
		Passenger Car		Trucks with Transponders		Trucks w/o Transponders	
Start	End	w/Transp	No Transp	Med Truck	Heavy Truck	Med Truck	Heavy Truck
Midnight	5:00AM	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00
5:00AM	6:00AM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
6:00AM	10:00AM	$2.00	$3.00	$4.00	$8.00	$5.00	$9.00
10:00AM	3:00PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
3:00PM	7:00PM	$2.00	$3.00	$4.00	$8.00	$5.00	$9.00
7:00PM	8:00PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
8:00PM	Midnight	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00
For Supplemental/Increased Transit Options							
		Passenger Car		Trucks with Transponders		Trucks w/o Transponders	
Start	End	w/Transp	No Transp	Med Truck	Heavy Truck	Med Truck	Heavy Truck
Midnight	5:00AM	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00
5:00AM	6:00AM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
6:00AM	10:00AM	$2.50	$3.50	$5.00	$10.00	$6.00	$11.00
10:00AM	3:00PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
3:00PM	7:00PM	$2.50	$3.50	$5.00	$10.00	$6.00	$11.00
7:00PM	8:00PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
8:00PM	Midnight	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00

Main Street Connectivity

Providing connections between Main Street and the Columbia West Renaissance project is very important to the City of Vancouver, is called for in their plans, and is an important element to the private developers of the Renaissance project. The Renaissance project site is immediately west of the corridor along the Columbia River. The replacement bridge options would vacate the existing I-5 mainline right-of-way passing under the railroad berm. This space could be used to provide a roadway connection between Main Street and the Columbia River. The supplemental bridge options would need to retain the existing mainline of I-5. This would prevent Vancouver from connecting Main Street to the Renaissance project. The lack of this connection may hinder full development in the southern end of Main Street, and may also have impacts for the Renaissance project.

5.5.2 Segment B: Mill Plain District to North Vancouver - Highway Alternatives

Exhibit 5-6 shows acquisitions by count and by acreage for zones within Segment B. The acreage and number of acquisitions would be more in this segment for the replacement alternative than for the supplemental alternatives. The replacement alignment would acquire five buildings, while the supplemental alternatives would require none in Segment B. This is because it provides less capacity and has less right-of-way. The difference between the direct roadway impacts in Segment B is not large enough to cause a differential impact to land use patterns or plans.

Exhibit 5-6. Segment B: Highway Alignment Right-of-Way Acquisitions

Zoning	Full Acquisitions	Partial Acquisitions**	Right-of-Way Acquisitions***	Total Count of New Acquisitions	Total Area Acquired (Acres)
Replacement I-5					
CPX	0	0	4	4	1.2
Park	0	0	5	5	0.4
R-22	0	3	2	5	0.5
R-9	0	1	26	27	0.6
Total	**0**	**4**	**37**	**41**	**2.7**
Replacement/Vancouver					
CPX*	0	0	3	3	1.2
Park	0	0	4	4	0.3
R-22	0	3	1	4	0.1
R-9	0	2	20	22	0.4
Total	**0**	**5**	**28**	**33**	**2.0**
Supplemental/I-5					
CPX	0	0	3	3	1.2
Park	0	0	4	4	0.3
R-22	0	0	1	1	0.1
R-9	0	0	20	20	0.4
Total	**0**	**0**	**28**	**28**	**2.0**
Supplemental/ Vancouver					
CPX	0	0	3	3	1.2
Park	0	0	4	4	0.3
R-22	0	0	1	1	0.1
R-9	0	0	25	25	0.4
Total	**0**	**0**	**33**	**33**	**2.0**

5.5.2.1 No-Build

5.5.2.1.1 Direct Impacts

There are no significant direct impacts associated with the No-Build Alternative.

Noise levels would be reduced with any build scenario and the accompanying mitigation. After the replacement of currently ineffective sound walls along I-5 in Northern Vancouver, residual noise may still affect some homes, primarily in the Shumway and Rose Village neighborhoods.

In Segment B, these impacts occur at:

- **I-5 Overpasses in North Vancouver:** Openings in the proposed noise walls near Mill Plain, 29th Street, 33rd Street and 39th Street allow noise to reach some residential uses in North Vancouver.

Despite this residual impact, as the project will provide mitigation where none exists today, and will improve existing sound walls, the project will result in an overall decrease in noise levels in the corridor.

5.5.2.1.2 Indirect Impacts

The No-Build Alternative would be inconsistent with numerous plans and policies as discussed earlier in this section.

5.5.2.2 Replacement Bridge

5.5.2.2.1 Direct Impacts

Please refer to the Acquisitions and Relocation Technical Report for details on direct acquisitions and the differences between these alternatives. There are relatively few acquisitions for each alternative, and little difference between the alternatives. None of the differences would lead to a change in land use patterns, zoning, or land use plans.

Riverwest

The acquisitions data suggest that no land would be required from the Riverwest site, described in Section 4 of this report. Given that mixed-use developments are often occupied by residents and employees who use public transit, the development would be best served by HCT alignments that are within a short walking distance. However, the furthest alignment option (two-way Washington) would not be more than four blocks from the development.

Potential Impacts to Heritage Trees

The Mayor's Grove is a mixed-species grove located in Marshall Park on McLoughlin Boulevard. With the downstream roadway option this lot would be partially acquired. Under this alternative, the acquisition would not impact any structures on this lot or endanger any portion of this grove.

5.5.2.2.2 Indirect Impacts

Increased mobility for freight vehicles is a benefit that would arise from any of the Build Alternatives. This would support plan goals for freight mobility and economic development.

5.5.2.3 Supplemental Bridge (I-5 Current Alignment)

5.5.2.3.1 Direct Impacts

Riverwest and Heritage Trees

Direct impacts from the supplemental bridge alignment would not differ from those described above under the replacement alignment options.

5.5.2.3.2 Indirect Impacts

The supplemental bridge would provide less vehicular capacity and may be less effective at maintaining freight mobility and economic development. This issue is explored in greater detail in the Economics Technical Report.

5.5.3 Segment A1: Delta Park to South Vancouver - Transit Alternatives

Exhibits 5-7 and 5-8 show the right-of-way needs associated with LRT and BRT, respectively, in Segment A1. The tables are organized by type of acquisition and total acreage required for each alternative. Data are presented separately for Oregon and Washington and as a total for both. Note that the adjacent and offset transit alignments would require different amounts of right-of-way depending on which highway alternative is selected. Exhibit 5-9 shows the data on a map.

In Segment A1, the transit alignments would require between 2.3 and 4.2 acres of additional right-of-way and would affect 14 to 23 parcels. Up to 8 buildings would be affected. Additionally, floating homes would be affected under the offset transit alignment paired with the replacement or supplemental river crossings, as well as the adjacent transit alignment paired with the supplemental river crossing. The adjacent alignment, when paired with the replacement river crossing, affects no additional floating homes.

Although efforts have been made to minimize double-counting, the reader should note that some parcels are affected by both highway and transit improvements and so may be double-counted in the transit and highway sections.

Exhibit 5-7. Segment A1: Delta Park to South Vancouver LRT Options

Bridge Type	**Replacement**		**Supplemental**	
Transit Alignment	Adjacent	Offset	Adjacent	Offset
OR – Full	1	0	1	0
WA – Full	1	1	0	0
Total Full Acquisitions	2	1	1	0
OR – Partial	17	9	11	8
WA – Partial	4	5	8	8
Total Partial Acquisitions	21	14	19	16
All Acquisitions (Parcels)	**23**	**15**	**20**	**16**
OR – Building Impacts	8+	2	7	2+
WA – Building Impacts	1	1	1	1
All – Building Impacts	9+	3	8	3+
OR – Acres	2.5	3.2	2.0	2.6
WA – Acres	0.5	0.6	0.3	0.3
Acres - Total	**3.0**[a]	**3.7**	**2.3**[b]	**2.9**[c]

Numbers may not sum due to rounding.

+ Refers to potential impacts to floating homes.

[a] Includes 0.5 acre of ODOT-owned land

[b] Includes 0.1 acre of ODOT-owned land

[c] Includes 0.7 acre of ODOT-owned land

Exhibit 5-8. Segment A1: Delta Park to South Vancouver BRT Options

Bridge Type	Replacement		Supplemental	
Transit alignment	Adjacent	Offset	Adjacent	Offset
OR – Full	1	0	1	0
WA – Full	1	1	0	0
Total Full Acquisitions	2	1	1	0
OR – Partial	17	8	11	9
WA – Partial	4	5	8	8
Total Partial Acquisitions	21	13	19	17
All Acquisitions (Parcels)	**23**	**14**	**20**	**17**
OR – Building Impacts	8+	2	7+	2+
WA – Building Impacts	0	0	0	0
All – Building Impacts	8+	2	7+	2+
OR – Acres	3.0	3.7	2.7	3.3
WA – Acres	0.5	0.5	0.4	0.4
Acres - Total	**3.5**	**4.2**	**3.1**[a]	**3.7**[b]

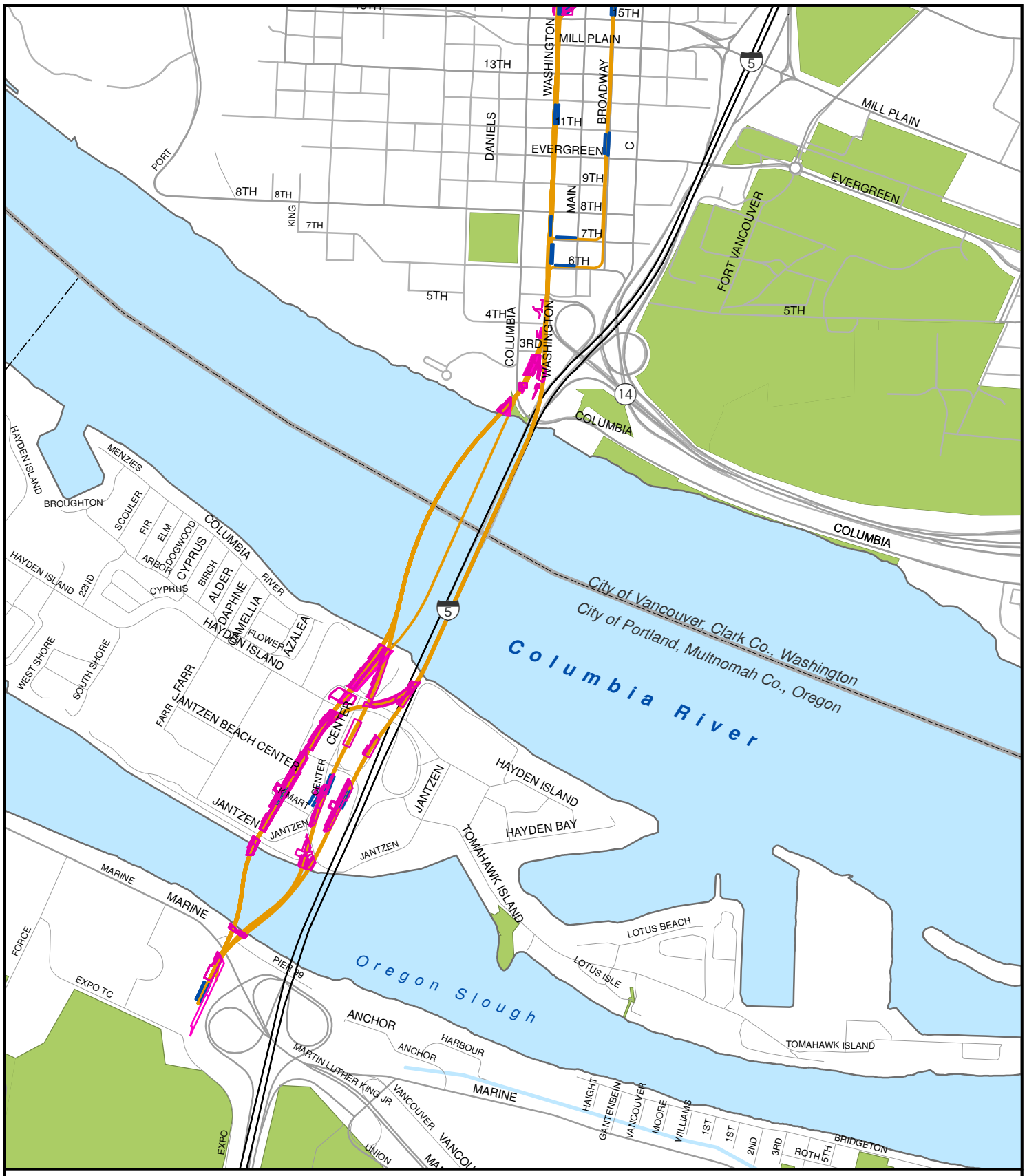
Numbers may not sum due to rounding.

+ Refers to potential impacts to floating homes.

[a] Includes 0.1 acre of ODOT-owned land.

[b] Includes 0.7 acre of ODOT-owned land

BRT and LRT would affect the same number of parcels in Segment A1, with the exception of the offset alignment for BRT, which would affect one additional parcel in Oregon, on the south side of the North Portland Harbor. Although the number of parcels affected is similar between options, the acreage impacts are higher under BRT than LRT across all alternatives. BRT would require more acreage for the Expo Center station, where there would be bus queuing and the potential for HCT users to transfer to LRT. In Exhibit 5-10, the potential acquisitions are shown by zoning.



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Transit RoW Requirements
Transit Lines
Park and Ride
Transit Station

Exhibit 5-9: Right-of-Way Requirements for Transit Options
Segment A1

Columbia River CROSSING

Analysis by J. Koloszar; Analysis Date: Nov-2007; Plot Date: Nov-2007; File Name: RoadAlignments_MK089.mxd

Exhibit 5-10. Segment A1: Transit (LRT & BRT) Alignment Right-of-Way Acquisitions

Zoning	Full Acquisitions	Partial Acquisitions**	Right-of-Way Acquisitions***	Total Count of New Acquisitions	Total Area Acquired (Acres)***
Adjacent Replacement**					
CG*	1	9	6	16	2.1
CX	1	0	4	5	0.5
IG2*	0	0	2	2	0.5
Total	**2**	**9**	**12**	**23**	**3.1**
Adjacent Supplemental					
CG*	1	8	0	9	1.7
CX	0	1	7	8	0.3
IG2*	0	2	1	3	0.3
Total	**1**	**11**	**8**	**20**	**2.3**
Offset Replacement					
CG*	0	2	4	6	2.7
CX	1	0	5	6	0.5
IG2*	0	0	2	2	0.5
Total	**1**	**2**	**11**	**14**	**3.7**
Offset Supplemental					
CG*	0	2	4	6	2.2
CX	0	1	7	8	0.3
IG2*	0	1	1	2	0.5
Total	**0**	**4**	**12**	**16**	**2.9**

* Zoning occurs in Portland, un-starred zoning occurs in Vancouver.

** The roadway alignment in Segment A1 dictates the HCT alignment, and therefore results in a range of Acquisition data.

*** These acreages are for LRT. BRT requires slightly more acreage (less than 1 acre total in Segment A1) due to a wider guideway

Definitions: CG – General Commercial; CX – City Center; IG2 – General Industrial

Both options would require acquisition of floating homes adjacent to the existing bridge in the Hayden Island neighborhood which could slightly change the balance of residential to commercial land use on Hayden Island. Exhibit 5-11 represents the most accurate assessment based on early designs. The supplemental bridge would require the relocation of the greatest number of homes. With the supplemental bridge, the adjacent transit alignment would impact the fewest homes. For the other alternatives, the offset alignment has fewer impacts.

Exhibit 5-11. Impacts to Floating Homes

	HCT Alignment					
	Adjacent			Offset		
Bridge Option	Highway	Transit	Total	Highway	Transit	Total
No-Build						
Replacement	13	0	13	13	7	20
Supplemental	15	8	23	15	7	22

5.5.3.1 No-Build

5.5.3.1.1 Direct Impacts

There are no significant direct impacts associated with the No-Build Alternative.

5.5.3.1.2 Indirect Impacts

The failure of the No-Build Alternative to bring high-capacity transit to Hayden Island and Vancouver would be inconsistent with local plans.

5.5.3.2 All Build Options

5.5.3.2.1 Direct Impacts

I-5 adjacent transit alignments in Segment A1 would affect more properties than the offset alignments. However, the roadway construction would need to acquire most of the same properties that would be affected by the adjacent alignment, whereas the offset alignment would require acquisitions in addition to those needed for roadway construction. Therefore, the adjacent alignments would result in fewer total direct land use impacts than the offset alignments. See the Economics Technical Report for a discussion of the potential effects on sales and employment.

The floating home community in North Portland Harbor is the only residential community impacted by noise as a result of HCT mode and alignment in Segment A1. The adjacent transit alignment would result in more noise impacts to this community than the offset. When paired with the BRT mode choice, the number and severity of these noise impacts would increase. All of these noise impacts could be mitigated through the placement of sound walls along the HCT bridge over North Portland Harbor. LRT would require significantly shorter walls.

5.5.3.2.2 Indirect Impacts

The Economics Technical Report finds that there is a moderate or high potential for new Transit-Oriented Development (TOD) to occur on Hayden Island. TOD would fulfill local land use plans and comprehensive plan policies. The TOD potential of the Hayden Island transit station would likely be reduced in the adjacent alignment. Over 100 feet of right-of-way would exist immediately to the east of the station, which is a large area

within which some of the transit-oriented development could occur, and decreases pedestrian access to the station from the east. Sites to the east of I-5 would be divided from the transit station by the highway itself. Plans to integrate the station with the redevelopment of the shopping center on Hayden Island would not benefit from an I-5 adjacent alignment as much as from an offset alignment. However, the area between the HCT alignment and the highway may be impacted by site constraints and circulation problems. If this area is not able to develop, or is not able to develop to its full TOD potential, then the benefits of the offset alignment may be reduced. The offset alignment could also limit redevelopment options by providing another unchangeable element of infrastructure in the middle of the developable area.

Interviews and meetings were held with City of Portland staff regarding many issues on Hayden Island. During one of these meetings, City staff expressed concern over the personal safety of riders when HCT stations are located adjacent to the highway. Anecdotal evidence suggests that the TriMet MAX stations located adjacent to highways facilities experience a higher level of criminal activity than do the stations away from the highway. There are considerable differences between BRT and LRT. BRT is not as consistent with local plans.

LRT attracts approximately 30 to 40 percent more riders than BRT (Exhibit 5-12). Integration with the existing MAX system is important benefit of LRT that would help attract these additional transit riders. This integration allows transit riders to travel between Vancouver and Portland without a transfer.

Exhibit 5-12. Transit Riders Over the Columbia River

	No-Build	BRT		LRT	
		Efficient Transit	Increased Transit	Efficient Transit	Increased Transit
Annual transit riders over the Columbia River Crossing	2.5 million	4.8 million	5.7 million	6.7 million	7.4 million

5.5.4 Segment A2: South Vancouver to Mill Plain District - Transit Alternatives

In downtown Vancouver there are two alignment options for HCT; a two-way guideway on Washington Street or a couplet on Washington Street and Broadway. Both options would have stations at Seventh Street, 12th Street, and at the Mill Plain transit center between 15th and 16th Streets.

Running both northbound and southbound HCT on Washington Street would place the transit vehicles in the median of the right-of-way. On a station block, a single platform would be located in the center of the guideway. The exclusive guideway would be separated from general purpose traffic with a physical barrier such as a rumble strip. This option would allow for two-way traffic and, where feasible on a non-station block, on-street parking. Stations between Sixth Street and Seventh Street and between 11th Street and 12th Street would include amenities such as shelters, benches, ticket vending machines, brick or architectural concrete paving, and level boarding. A third station

between 15th Street and 16th Street would include similar amenities and serve as a Transit Center with nine bus bays to provide connections between HCT and the local bus network.

In addition to the full length transit alignment, there are two Minimal Operable Segments that would terminate just north of Segment A2.

5.5.4.1 No-Build

5.5.4.1.1 Direct Impacts

There are no significant direct impacts associated with the No-Build Alternative.

5.5.4.1.2 Indirect Impacts

The failure of the No-Build Alternative to bring high-capacity transit to Vancouver would be inconsistent with local plans.

5.5.4.2 All Build Alternatives

5.5.4.2.1 Direct Impacts

Exhibits 5-13 and 5-14 describe the transit related acquisitions in segment A2. BRT could avoid some of the right-of-way acquisition need as it can stay within existing right-of-way in select areas where light rail cannot. The land use impacts of options in Segment A2 do not significantly differ regardless of the combination of Segment B options. The entire central business district of Vancouver, and every parcel that is to be acquired are zoned City Center (CX).

As can be seen in the graphs, The Washington/Broadway couplet would require more right-of-way than the two-way Washington option. There are very few impacts to buildings, with early estimates showing no building acquisitions necessary for either north-south alignment. However, for the two-way Washington option to be combined with a McLoughlin boulevard transition to Segment B, there would be a building impacted. The single US Bank building on main includes eight individual [parcels, and is the reason for the eight full acquisitions shown in the table. Many of the identified impacts are slivers of parcels and parking and would not have a significant impact on land use. A more detailed discussion of parking can be found in the Economics Technical Report.

Exhibit 5-13. Summary of Right-of-Way Requirements for Vancouver Alignments Transit Options, Segment A2 (Number of Parcels, Acres)

Mode	Option Combination	Acquisition Level	Parking Parcels	Acres of Parking	Retail/ Services Parcels	Acres of Retail Services	Total Acquisitions	Parcels with Building Impacts	Total Acres
LRT	Two-way Washington to Two-way Broadway	Full	5	0.4	0	0	5	0	0.4
		Partial	0	0	7[a]	0.4	7	1	0.4
		Total	5	0.4	7	0.4	12	1	0.8
	Washington/Broadway to Two-way Broadway	Full	5	0.4	0	0	5	1	0.4
		Partial	0	0	8	0.9	8	0	0.9
		Total	5	0.4	8	0.9	13	1	1.3
	Two-way Washington to Broadway/Main	Full	5	0.4	0	0	5	0	0.4
		Partial	0	0	7	0.3	7	0	0.3
		Total	5	0.4	7	0.3	12	0	0.7
	Washington/Broadway to Broadway/Main	Full	5	0.4	0	0	5	0	0.4
		Partial	0	0	1	<0.1	1	0	<0.1
		Total	5	0.4	0	< 0.1	6	0	0.4

[a] One Building Impact.

Exhibit 5-14. Summary of Right-of-Way Requirements for I-5 Alignments Transit Options, Segment A2

Mode	Option Combination	Acquisition Level	Parking	Acres of Parking	Retail/ Services	Acres of Retail/ Services	Office/ Professional/ Health Care	Acres of Office/ Professional/ Health Care	Park/ Historic Site/ Museum	Acres of Park/ Historic Site/ Museum	Total Acquisitions	Total Acres
BRT	Two-way Washington to McLoughlin	Full	3	0.1	0	0	0	0	0	0	3	0.06
		Partial	0	0	4[a]	0.1	0	0	0	0	4	0.10
	Total		3	0.1	4	0.1	0	0	0	0	7	0.17
	Two-way Washington to 16th	Partial	5	0.4	0	0	1	< 0.1	1	< 0.1	2	< 0.5
	Total		5	0.4	0	0	1	< 0.1	1	< 0.1	2	unknown
	Washington/Broadway to McLoughlin	Full	5	0.4	8 [a]	0.9	0	0	0	0	13	1.3
	Total		5	0.4	8	0.9	0	0	0	0	13	1.3
	Two-way Washington to 16th	Full	5	0.4	0	0	1	< 0.1	1	< 0.1	7	< 0.5
	Total		5	0.4	0	0	1	< 0.1	1	< 0.1	7	< 0.5
	Washington/Broadway to 16th	Full	5	0.4	0	0	1	< 0.1	1	< 0.1	7	< 0.5
	Total		5	0.4	0	0	1	< 0.1	1	< 0.1	7	< 0.5

[a] One Building Impact (U.S. Bank).

Parking and Access

Downtown Vancouver is planned to become, and is becoming, a vibrant, high density mixed use center. To achieve such a goal requires robust planning, investment in infrastructure, incentives, and public-private partnerships. It is possible to undermine such goals by having significant impacts to parking and property access. The estimates in Exhibit 5-15 and 5-16, below, allow for some comparative assessment of the alternatives. Balanced against this is the additional access provided by proximity to HCT.

The two-way Washington Street option would remove all on-street parking and five loading zones along Washington Street between Fifth Street and Mill Plain Boulevard. The existing access points would remain, but drivers would be prohibited from making left turns across the high-capacity transit guideway, except at signalized intersections. This option would not require the removal of disabled parking. However, the removal of all on-street parking along Washington Street would impact the ease of auto accessibility to these properties. Potential mitigation may be required to improve auto access for the disabled. When combined with the impacts on 16th and/or McLoughlin, the impacts are considerably higher as shown in the table below.

The Washington-Broadway couplet option would remove 70 on-street parking spaces and one loading zone along Washington and Broadway Streets between Sixth Street and Mill Plain Boulevard. This option would also remove 20 access points along these streets. When combined with the impacts on 16th and/or McLoughlin, the impacts are considerably higher as shown in the table below.

Exhibit 5-15. I-5 Alignment and Clark College MOS Parking and Access Impacts

	2-way Washington to 2-way 16th	2-way Washington to 2-way McLoughlin	Washington -Broadway to 2-way 16th	Washington-Broadway to 2-way McLoughlin
Parking				
Total	205	237	310	342
Parking Lost	151	197	123	169
Percent	74%	83%	40%	49%
Access Points				
Total	46	51	61	66
Points Lost	11	0	31	20
Percent	24%	0%	51%	30%
Loading Zones				
Total	5	5	2	2
Loading Zones Lost	0	0	1	1

The parking and access related impacts for the downtown alignments alone (not matched with east-west HCT corridors) are shown in Exhibit 5-12, below. These include the additional impacts associated with the Mil Plain terminal park and ride.

Exhibit 5-16. Mill Plain MOS Parking and Access Impacts

Mill Plain MOS Parking and Access Impacts		
	Washington-Broadway Couplet	2-way Washington
Parking		
Total	281	150
Parking Lost	109	119
Percent	39%	79%
Access Points		
Total	44	27
Points Lost	26	4
Percent	59%	15%
Loading Zones		
Total	4	5
Zones Lost	1	0

Noise

As existing noise levels are so high along the HCT alignments in Segment A2, the only impacts that would occur are a result of one combination of river crossing and HCT mode. With the supplemental crossing, HCT descends into Vancouver from a higher point than with replacement. Due to the grade threshold for HCT, the HCT bridge would not touch down until after Sixth on Washington, putting the HCT ramp near the higher units of the Smith Tower Apartments. With BRT, this alignment would result in noise impacts to three of the units in this building. Impacts can be mitigated through residential sound insulation, which would be costly due to the size and age of the building.

5.5.4.3 LRT Two-Way on Washington Street

The Vancouver City Center Vision (VCCV) depicts tracks on Washington for both north and southbound light rail. The two-way Washington option is most consistent with this plan. The VCCV was part of what is called a Planned Action Ordinance (PAO) in Washington. The plan has additional authority and significance as a PAO.

This option would include transit stations between Sixth and Seventh Streets, 11th and 12th Streets, and between 15th and 16th Streets. Properties surrounding these stations will likely experience increased value, increased rates of development, and increased intensity of development. The Economics Technical Report finds that the potential for TOD is low to moderate at Seventh/Eighth Streets. This station is already surrounded on many sides by recent development that is not likely to redevelop. The potential is moderate at 11th/12th Streets. This station is near publicly held land that could redevelop in partnership with a private firm. Lastly, the station at 15th/16th Streets is likely to have a high rate and level of TOD activity. It is near many undeveloped or underdeveloped properties. A local development firm has an option on properties near the station and has expressed interest in partnerships for TOD.

5.5.5 Segment B: Mill Plain District to North Vancouver - Transit Alternatives

Transitioning from downtown Vancouver, HCT has two major alignment options—continue north on local streets (Vancouver alignments) or turn east and then north adjacent to I-5 (I-5 alignments). The transition would turn east at the Mill Plain transit center onto McLoughlin Boulevard or 16th Street. On McLoughlin, HCT would pass under I-5 in the existing underpass. On 16th it would pass through a new tunnel under I-5. Both alignments would turn north to follow I-5 to a proposed park and ride at Clark College. A full-length alignment would extend north from the Clark College and travel along the east side of I-5, with a station located at 33rd Street, to the terminus in northern Vancouver west of the Interstate at a proposed Kiggins Bowl Park and Ride. The HCT guideway would be constructed on the eastern side of the existing I-5 right-of-way, shifting the new I-5 alignment slightly west.

The Vancouver alignments would continue north through Vancouver on Broadway or via a couplet on Main Street and Broadway to merge to a two-way guideway on Main Street and end at the Lincoln Park and Ride. Both options would include a station at 24th Street. A couplet on Main Street and Broadway would place the HCT guideway on the west side of both streets and afford one lane of northbound travel on Main Street and two lanes of northbound travel on Broadway. North of 29th Street, where Main and Broadway converge, the alignment would become two-way, continue on Main Street to a station at 33rd Street, and end at the Lincoln Park and Ride. The existing 80-foot wide right-of-way on Main Street would be widened to 100 feet to accommodate the two-way HCT guideway in the center of the street and two-way automobile travel on either side of the guideway.

The Mill Plain MOS and the Clark College MOS would not require any construction north of their terminal park and rides. They will also not bring the land use benefits associated with HCT's ability to improve access and incent development.

5.5.5.1 No-Build

5.5.5.1.1 Direct Impacts

There are no significant direct impacts associated with the No-Build Alternative.

5.5.5.1.2 Indirect Impacts

The failure of the No-Build option to bring high-capacity transit to Vancouver would be inconsistent with local plans.

5.5.5.2 All Build Alternatives

5.5.5.2.1 Direct Impacts

Exhibit 5-17 shows acquisitions by count and by acreage for Segment B. These are individually calculated impacts for the combinations of project components. The greatest impacts would occur as a result of park and ride facilities. The Vancouver alignment would be combined with the Lincoln Park and Ride, which would occupy 17 acres, 12 of

which are the WSDOT maintenance facility. The I-5 alignment would require the acquisition of a smaller, but still large space for the Kiggins Park and Ride. The Clark College Park and Ride is most closely associated with the I-5 alignment but could also be constructed on an HCT spur for the Vancouver alignment.

Exhibit 5-17. Segment B: Mill Plain District to North Vancouver – Vancouver Alignments

Measure	Two-way Broadway	Broadway-Main Couplet
Full Parcels	15	16
Partial Parcels	48	50
Total Parcels	63	66
Building Impacts	17	16
Total Acres	24.7[a]	25.1[a]

[a] Includes 14 acres of WSDOT-owned property.

The Vancouver alignment would have more direct impacts to properties in Segment B than the I-5 alignment (Exhibit 5-18). However, these impacts are mostly partial property acquisitions that would not remove buildings or relocate uses. There are relocations identified for the U.S. Bank on Main Street (with light rail and the Washington/Broadway couplet only). An alternative design for that immediate area would result in the two different transit platforms (northbound and southbound) being offset by one block. This design may preserve the US Bank building.

Other direct impacts arise from the acquisition of medical office buildings north of the Southwest Washington Medical Center and Urgent Care Clinic at 33rd and Main Streets. These relocations may have an impact on jobs. However, the parcels are currently underutilized and would likely redevelop. Given the proximity to the medical center, the Pythian Center, and other medical businesses, it is likely that some of the redeveloped office space would be used to continue the medical service industry cluster in this location. The construction of a transit station at 33rd would encourage redevelopment.

Exhibit 5-18. Segment B: Transit (LRT & BRT) Alignment Right-of-Way Acquisitions

Zoning	Full Acquisitions	Partial Acquisitions	Right-of-Way Acquisitions	Total Count of New Acquisitions	Total Area Acquired (Acres)*
16th Replacement (for I-5 or Clark College MOS)					
CC	2	0	2	4	0.3
CG	1	0	0	1	2.9
CPX	0	0	3	3	6.1
CX	0	0	8	8	>0.1
Park	0	0	1	1	>0.1
R-18	0	1	0	1	0.1
R-22	0	0	1	1	0.1
R-9	5	2	15	22	1.1
Total	**8**	**3**	**30**	**41**	**10.6**

Zoning	Full Acquisitions	Partial Acquisitions	Right-of-Way Acquisitions	Total Count of New Acquisitions	Total Area Acquired (Acres)*
16th Supplemental (for I-5 or Clark College MOS)					
CC	2	0	2	4	0.3
CG	1	0	0	1	2.9
CPX	0	0	3	3	6.1
CX	0	0	8	8	>0.1
Park	0	0	1	1	>0.1
R-18	0	1	0	1	0.1
R-22	0	0	1	1	0.1
R-9	0	0	13	13	0.2
Total	**3**	**1**	**28**	**32**	**9.7**
McLoughlin Replacement (for I-5 or Clark College MOS)					
CC	2	0	33	35	0.6
CG	0	0	1	1	2.8
CPX	1	0	2	3	6.1
CX	0	2	0	2	>0.1
Park	0	0	1	1	>0.1
R-18	0	1	0	1	0.1
R-22	0	0	1	1	0.1
R-9	0	1	12	13	1.1
Total	**3**	**4**	**50**	**57**	**10.8**
McLoughlin Supplemental (for I-5 or Clark College MOS)					
CC	2	0	33	35	0.6
CG	0	0	1	1	2.8
CPX	1	0	2	3	6.1
CX	0	2	0	2	>0.1
Park	0	0	1	1	>0.1
R-18	0	1	0	1	0.1
R-22	0	0	1	1	0.1
R-9	0	1	12	13	0.2
Total	**3**	**4**	**50**	**57**	**10.0**
Vancouver 2-way Broadway (Vancouver alignment)					
CC	8	2	21	31	3.0
CG	1	0	0	1	2.9
CPX	1	0	2	3	6.1
R-22	5	5	18	28	12.7
Total	**15**	**7**	**41**	**63**	**24.7**
Vancouver Broadway-Main (Vancouver alignment)					
CC	8	1	25	34	3.0
CG	1	0	0	1	2.9
CPX	1	0	2	3	6.1
R-22	6	4	18	28	13.1
Total	**16**	**5**	**45**	**66**	**25.1**

* These acreages are for LRT. BRT may require slightly less acreage.

Definitions: CG – General Commercial; CX – City Center; IG2 – General Industrial

Parking and Access

As shown in Exhibit 5-19, the two-way Broadway option would remove 83 (about 51 percent) on-street parking spaces along Broadway between Mill Plain Boulevard and 29th Street; none of these are disabled parking spaces or loading zones. North of 29th Street there is no on-street parking, so all impacts would be to access. This option, from Mill Plain Boulevard to 40th Street, would remove 13 (22 percent) access points.

The Broadway-Main Street couplet option would remove 206 (about 80 percent) on-street parking spaces along Broadway Street between Mill Plain Boulevard and 29th Street, but no loading zones. This option, from Mill Plain Boulevard to 40th Street, would remove 38 (46 percent) access points along these streets.

In north Vancouver, the City of Vancouver has found on-street parking to be underutilized. A recent study conducted in the north Vancouver area (bound by 15th Street, 28th Street, Columbia Street and D Street) found that on-street parking had a 44.5 percent utilization in the weekday peak hour at 11 a.m. This parking space utilization was even lower in the weekend peak hour at 1 p.m. with 28.7 percent of spaces occupied.

All options assume the construction of an angled high-capacity transit station north of 15th Street (bound by 15th Street, 16th Street, Washington Street and Main Street). Currently, this block is undeveloped and used by area employees for long-term off-street parking. This alignment would remove the existing off-street parking without providing alternate facilities at this location.

As shown in Exhibit 5-19, the 16th Street option would remove 54 (50 percent) on-street parking spaces along 16th Street between Mill Plain Boulevard and G Street; two of these are disabled parking spaces, and none of them are loading zones. It would also eliminate 11 (39 percent) access points in this segment.

The McLoughlin Boulevard option would remove 100 (about 71 percent) on-street parking spaces along McLoughlin Boulevard between Mill Plain Boulevard and G Street; none of these are disabled parking spaces or loading zones. None of the mid-block driveways would be lost but drivers would be prohibited from making left turns across the guideway, except at signalized intersections.

These options also assume the construction of an angled high-capacity transit station north of 15th Street (bound by 15th Street, 16th Street, Washington Street, and Main Street). Currently, this block is undeveloped and used by area employees for long-term off-street parking. This would remove existing off-street parking without providing alternate facilities at this location.

Exhibit 5-19. Transit B, Direct Impacts to On-Street Parking and Access

	16th Street	McLoughlin	Main – Broadway Couplet	2-way Broadway
Parking				
Total	108	140	256	163
Parking Loss	54	100	206	83
Percent	50%	71%	80%	51%
Access Points				
Total	28	33	83	60
Parking Loss	11	0	38	19
Percent	39%	0%	46%	32%
Loading Zones				
Total	0	0	0	0
Zones Lost	0	0	0	0

Noise

In Segment B, HCT along the two-way Broadway I-5 alignments would result in noise impacts to residential units in the Arnada neighborhood. The most significant impact would occur along 16th, which is currently a low-traffic, predominately residential street. Though all of the noise impacts could be mitigated for the living spaces within the residences (via sound insulation), outside noise levels would remain high.

When paired with the BRT mode choice, the number and severity of these noise impacts would increase. BRT would also result in noise impacts to residential units in Rose Village near the HCT flyover ramp over the SR 500 interchange to Kiggins Park and Ride. All of these impacts would be mitigated via residential sound insulation, though again, increased noise would occur in the front yards of residences.

5.5.5.2.2 Indirect Impacts

Impacts Relevant to Both Alignments

There are considerable differences between BRT and LRT. BRT is not as consistent with local plans, and will have lower ridership.

Vancouver Alignments

Options would include transit stations at 24th Street, as well as between 33rd and 34th Streets. Properties surrounding these stations would generally experience increased value, and those parcels that are developable or economically redevelopable would experience increased rates and intensities of development. The Economics Technical Report finds that the potential for TOD is moderate at 24th Street. This station is already surrounded on many sides by existing development. Some of this will redevelop. The redevelopment of these properties would be compliant with code, and consistent with plan goals. The economic potential for TOD is low at 33rd Street. Existing, high value residences and

medical offices limit the number of opportunities. However, parking lots could be redeveloped.

There is a planned transit station between C and D streets on the transit leg transitioning between Segments A2 and B. This area has been identified in the Economics Technical Report as having a moderate potential for TOD. The area has some vacant parcels and some underutilized parcels with small homes on commercial lots. However, as many of the homes are well-cared for vintage properties, the redevelopment may be limited or slow.

The R-9 zoning of the Rose Village neighborhood is not conducive to higher density development. The zone allows some small multi-family structures, but does not allow mixed-use structures, apartment complexes, or the like. One of the major potential benefits of adding HCT to a community is the positive impact on land values, floor area ratios, private and public investment in pedestrian-oriented development, and the mixing of land uses. These benefits would likely not be realized with the I-5 alignment. Further, the extent to which they are realized may be slightly inconsistent with the land use pattern that exists there now. The alignment would be adjacent to a predominantly single-family neighborhood. This neighborhood would not be significantly impacted by an increase in small scale multi-family development (e.g. duplexes) and some small lot development. But pressure to re-zone property for more intensive use could occur.

With the Vancouver alignments there is a possible inconsistency with the Vancouver Transportation Plan. The plan identifies Main Street as a Tier One Corridor but does not specifically show HCT on Main in this area. A Tier One Corridor represents the City's most urgent priority for transit improvements. Representatives from the City of Vancouver have suggested that the plan would have to be minimally amended. Any amendment of the Transportation Plan would also be a comprehensive plan change, and would therefore be tied to the once-per-year plan changes rule of the Growth Management Act (RCW 36.70A.130).

This report has presented findings that clearly indicate the ability of new HCT alignments and stations to increase the rates and intensities of development. This would be consistent with the City's Comprehensive and City Center Vision Plan.

There are structures on Broadway listed on the Clark County Heritage Register or eligible for such listing. Appropriate rehabilitations would not adversely impact historic structures, but could add new square footage to the district. Inappropriate rehabilitations or demolitions would have an adverse impact on the historic structures. The Wisteria Court apartment at 23rd and Broadway is listed and serves as a good example. TOD redevelopment would likely lead to many more units in a taller building. This would serve the City's goals for density, but would be inconsistent with goals for historic preservation.

The Uptown area (along Main Street between McLoughlin and Fourth Plain Boulevards) benefits from a stock of vintage buildings. These buildings are a character-defining aspect of the district. The Vancouver City Center Vision recognizes the value of these buildings and implemented a zoning overlay in this area. The overlay protects these

buildings, and dictates standards for new construction. Appropriate rehabilitations would not adversely impact historic structures, but could add new square footage to the district. Inappropriate rehabilitations and demolitions would have an adverse impact on the historic structures and, consequently, on the Uptown district as a whole. It is possible that with the introduction of a HCT station, large mixed use projects may be constructed. Mixed uses would be consistent with City plans, but would represent a change from the existing (rather strictly retail) land uses.

5.6 Impacts from Other Project Elements

5.6.1 Transit Maintenance Base Options

BRT would require an expanded maintenance facility in Vancouver, while the LRT option would require either an expansion to TriMet's maintenance facility in Gresham, or a new facility to be constructed elsewhere (possibly in Vancouver). As both facilities are located in areas with other light-manufacturing uses, this would not significantly change land use.

5.6.1.1 LRT Maintenance Base Options

TriMet's existing Ruby Junction maintenance base in Gresham could be expanded to support the extra light rail service under all LRT options. The expansion of the current Ruby Junction maintenance facility would require the full acquisition of 14 parcels, and the partial acquisition of one parcel. This partial acquisition would be required for the construction of a cul-de-sac and would not displace the use on the property. In many cases there appears to be multiple uses occurring on a single property. Initial drive-by counts estimate that seven light industrial or manufacturing uses, not including one vacant factory, and seven single family residences (SFRs), not including a vacant SFR, would be displaced to make room for this expansion. These parcels are zoned for heavy industrial, yet currently support residential, commercial, and light industrial uses. In many cases there seems to be multiple uses occurring on a single lot. This expansion would be more consistent with the Heavy Industrial zoning than the SFR and small service businesses currently located in this area.

5.6.1.2 BRT Maintenance Base Options

C-TRAN's existing maintenance base in east Vancouver would be expanded to support the BRT alternatives. The maintenance facility would require the full acquisition of five parcels. The land uses of the parcels include two single-family residences, one manufacturing business, and two vacant lots. All of the parcels are zoned Industrial.

5.7 Impacts from System-Level Choices

5.7.1 River Crossing Type and Capacity: How does the supplemental crossing compare to the replacement crossing?

The difference in the number of lanes (eight total for supplemental option, 10 for replacement) has two major implications for this analysis. First, the additional right-of-

way associated with additional lanes would require the acquisition of more private property and has a greater potential for direct disruption of special districts and planned areas. Second, the additional lanes would provide additional capacity to the Interstate system, which in this case serves also as a local arterial connection between two regional centers of the same metropolitan area. While local plan policies generally recommend limiting capacity increases, selective increases on the Interstate system will serve to reduce cut-through traffic on local streets and reduce the overwhelming traffic congestion on local streets that would occur without the CRC highway improvements. In that respect, the effect of capacity improvements on local traffic would be generally supported in local plan policies.

5.7.1.1 Direct Impacts

For the replacement alignment, the Exhibit 5-20 shows an estimated 13 direct parcel impacts resulting from roadways. The supplemental alignment would directly impact 21 buildings. These impacts have the potential of slightly weakening the island's job base. Also the loss of a number of retail, service, and dining establishments may impact the shopping center and surrounding land uses as a whole. Additional information is contained in the Economics Technical Report.

Exhibit 5-20. Direct Acquisitions on Hayden Island

No-Build	**Buildings**	**Uses**
Full Acquisitions	0	
Partial Acquisitions	0	
Replacement	**Buildings**	**Uses**
Full Acquisitions	3	2 retail, 1 City of Portland
Partial Acquisitions	10	7 retail, 1 vacant lodging, ODOT, floating homes
Supplemental	**Buildings**	**Uses**
Full Acquisitions	11	5 retail, 1 public
Partial Acquisitions	10	2 lodging (1 vacant) 5 retail/service, ODOT, floating homes

There is not yet sufficient information on the proposed redevelopment of the island to determine how these additional acquisitions might support or hinder the new uses.

5.7.1.2 Plan and Policy Consistency

There are three areas of policy that can be applied to comparing the crossing options: mobility, multimodalism, and historic preservation.

5.7.1.2.1 Mobility

Policies of the Oregon Highway Plan call for maintaining the mobility of the highway system and maintaining efficient through movement on major truck freight routes. Interstate 5 within the project area and across the Columbia River is the primary truck facility for local, regional, national, and international movement of goods through the Portland-Vancouver region. Tucks carry more freight in the Portland-Vancouver region

then the other five modes (rail, ocean, barge, pipeline, and air) combined. Trucks carry 67 percent of all freight in the region today and the percentage of freight moved by truck is forecast to grow in the future. This goal would be supported by increasing freight access to the Port of Portland, as the currently signalized intersection for the nearby I-5 entrance would be replaced by a through lane with no signal and with added capacity.

The Washington Transportation Plan has goals of congestion relief and effective and reliable movement of freight. More capacity would support this goal if it results in the greatest reduction in delay. The replacement bridge options greatly reduce the periods of congestion and greatly improve the throughput over both the No-Build and the supplemental options.

5.7.1.2.2 Multimodalism and Drive Alone Trips

There is a potential for additional Interstate capacity to have negative indirect impacts on an urban area. This can typically occur through the inducement of unplanned growth (or sprawl) or through contributing to an unbalanced transportation system which accommodates single-occupancy vehicles.

It is unlikely that either option would have a significant impact on regional growth, change zoning, endanger rural lands, or create significant new pressure to move urban growth boundaries.

Either crossing would be part of a balanced transportation project and would include high-capacity transit and substantial enhancements of the pedestrian and bicycle connections across the river. Both alternative would be in keeping with local policy, and would likely decrease reliance on SOVs. The eight lane supplemental bridge option would be a more constrained facility than the 10 lane replacement bridge and would be more effective at limiting drive alone trips and encouraging alternative modes, ridesharing, telecommuting, etc.

5.7.1.2.3 Historic Preservation

The replacement alternatives would entail the demolition of the Nationally Registered 1917 bridge. This is inconsistent with policies regarding preservation of historic structures. The supplemental alternatives would not demolish the existing bridge, but would likely include retrofitting to bring the bridge to better seismic and safety standards. The new design for the bridge may undermine its architectural integrity, and subsequently its historic status. More will be known after the completion of these retrofitting designs.

5.7.1.2.4 Connections in Vancouver

The replacement alternatives would vacate the existing I-5 mainline right-of-way passing under the railroad berm in Vancouver. This space could be used to provide a roadway connection between Main Street and the Columbia River. The supplemental alternatives would need to retain the existing mainline of I-5. This would prevent the City from connecting Main Street to the Renaissance project. The lack of this connection may

hinder full development in the southern end of Main Street, and may also have impacts for the Renaissance project.

5.7.2 Transit Mode: How does BRT compare to LRT?

5.7.2.1 Direct Impacts

BRT and LRT would not significantly differ in levels of acquisitions within the API. LRT would require acquisitions for expansion of a maintenance facility in Gresham. BRT would require expansion of a facility in Vancouver which would impacts fewer parcels and acres. The maintenance for LRT could also be accomplished with the construction of a new facility in Vancouver.

Vancouver light rail alignments could require the acquisition of the US Bank building on Main Street. The acquisition of a single bank does not have a broad land use impact in a downtown as large as Vancouver's. However, at this time, the bank provides an active use and a high quality building in what is otherwise an underdeveloped gap between downtown and the Uptown business district. The transit station itself will help to bridge this gap. There is also a high potential for transit-oriented development to be stimulated in this area. Vancouver BRT alignments would not require this acquisition.

The noise and vibration analysis shows that BRT would have significant noise impacts. Most of these can be mitigated through improvements to windows and insulation. However, outdoor noise levels will remain higher with BRT than under the No-Build or LRT options. Additionally, the higher levels of noise associated with BRT contribute to its perceived lower quality of service. High noise levels can be detrimental in an urban environment, especially one like downtown Vancouver or in the potential lifestyle center developed on Hayden Island. These areas are destinations, which need to have positive pedestrian environments, opportunities for outdoor dining, and (in downtown Vancouver) accommodations for events and concerts in public parks and plazas.

In general, the light rail alternatives would have much lower impacts to the community than the BRT alternatives. For example, Alternative 3 is projected to result in 37 noise impacts, while the BRT Alternative 2 would result in 79 impacts, including 26 impacts considered severe under FTA criteria. LRT noise impacts have lower severity and are easier to mitigate than the BRT noise impacts. BRT has no vibration impacts; while LRT could result in 32 vibration impacts for the Vancouver alignment, or 47 vibration impacts for the full length along I-5. All vibration impacts can be mitigated.

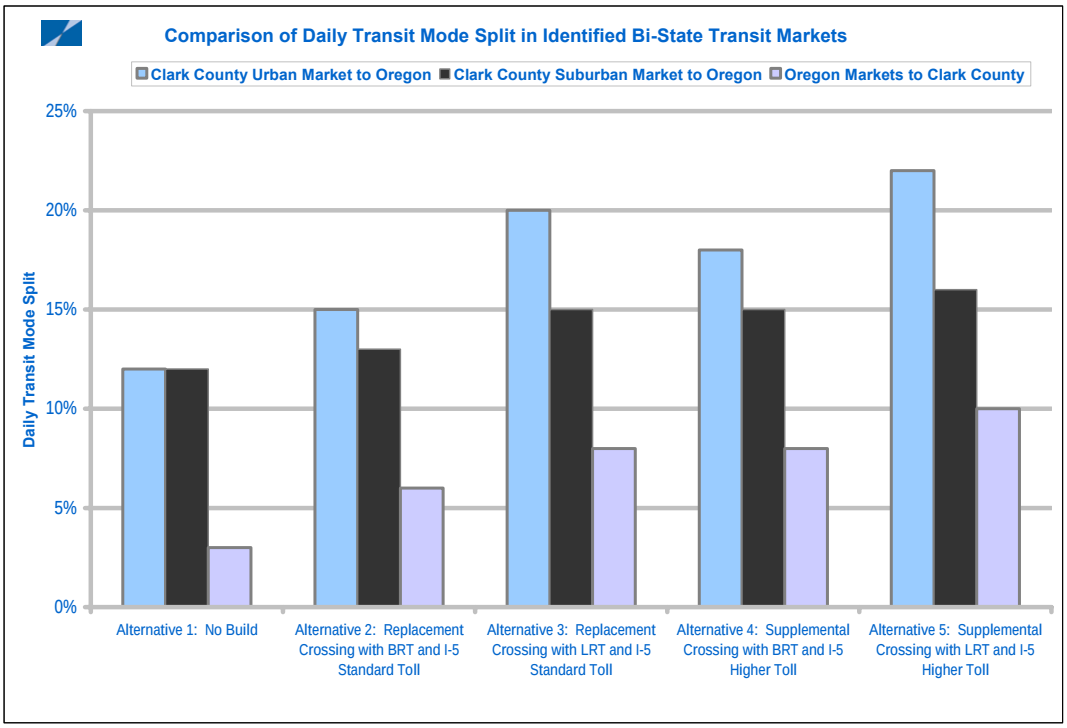
5.7.2.2 Operational Issues

Compared to the No-Build Alternative, the build alternatives (including both BRT and LRT as the HCT mode) would be effective transit alternatives to serve bi-state travel and improve transit service. However, with most metrics used to evaluate the bi-state transit performance of the build alternatives, LRT would perform better than BRT. The differences include ridership, which is an important issue for fulfilling plan goals.

Both BRT and LRT would substantially increase the number of daily and annual passenger trips on transit above the No Build Alternative. LRT, with a replacement

bridge in Alternative 3, would have 24 percent (4,000) more daily passenger trips on transit than BRT (Alternative 2). With the increased transit system (ETS) in Alternative 5, LRT would have just over 15 percent (3,300) more daily passenger trips on transit than BRT with an increased transit system (Alternative 4). The transit trip increases would also result in significant changes to the mode splits for the area (see Exhibit 5-21). With the use of a standard toll, LRT would produce a mode split approximately one third higher than with BRT.

Exhibit 5-21. Comparison of Daily Transit Mode Split



Trips that would take no transfers with LRT alternatives, would require two boardings (one on a standard bus or BRT to one on LRT). Both BRT and LRT would substantially reduce the transit Vehicle Hours of Delay (VHD) for local and express buses within the I-5 corridor. BRT and LRT would increase the average HCT vehicle speed and the average transit vehicle speed in downtown Vancouver. However, the average BRT travel speeds within the guideway would be slower than LRT because BRT vehicles would not have signal priority, there would be more variation in operator performance, dwell times would be slightly longer, and acceleration would be slower. Signal priority would not be possible for BRT because the high service frequencies would significantly disrupt cross traffic flow. In addition, LRT would be able to carry more passengers across the river with fewer vehicles.

5.7.2.3 Plan and Policy Consistency

High-capacity transit systems are included in planning documents for the greater Portland-Vancouver area. Where only HCT is mentioned, the plans do not help to determine the more appropriate mode (BRT versus LRT). Light rail is specifically supported by the Vancouver City Center Vision Plan, the Vancouver Transportation Plan, and the Portland Comprehensive Plan. Metro's TIP supports HCT in general but also encourages energy-efficient transportation, which would favor a regional light rail system.

The Oregon Highway Plan and City of Portland Comprehensive Plan support energy efficiency and reduction of air pollutants. The highway system should maintain or improve a number of natural functions such as air quality. This can be interpreted to support an emission-free transit alternative across the river. At this time LRT is designed to function electrically, while the BRT vehicles would have internal combustion engines and emit pollutants.

The City of Portland Comprehensive Plan includes a Policy (7.6) calling for an energy efficient transportation system. Item E of its implementation strategies specifically calls for the construction of a regional light rail system. As it is assumed that a Light Rail, and not a BRT, system will run on electricity, the City considers this policy to favor LRT.

5.7.2.4 High-capacity Transit Impacts to Land Use and Economic Development

Please refer to Appendix A (Indirect Effects: Induced Growth) for a full discussion of this issue:

The following points are critical to the understanding of the indirect impact of HCT in the Columbia River Crossing Project.

- Economic development, and land use intensification opportunities will continue to arise from investment in high-capacity transit. There is documented evidence of this occurring at both Light Rail and Bus Rapid Transit Stations. (APTA 2007, Cura 2003, Levinson 2003, Light Rail Now 2006a, MaryPIRG Foundation 2003, Weinstein 1999). This has also been found to be the case in the Portland Metropolitan Area. (Portland Office of Transportation 2006, TriMet 2006)
- There is still limited documentation about the expected level of economic development around BRT and LRT stations, or whether one mode of transit will consistently induce more economic development than the other. Local zoning, market forces, developer incentives, origin and destination points, and public preferences have been found to greatly affect the levels of economic development at transit stations. (Cervero 2004, 1993, ECONorthwest 1998, Seskin 1996, Thomas 2004)
- Ridership is directly correlated with transit oriented development (TOD) potential. LRT is preferred by riders because it is considered to provide better transit performance and because it is less associated with the noise, and pollutants of diesel based transit systems. (Currie, 2006, Dittmar and Poticha 2004, Henry 1989, Kenworthy 2000, Vuchic, 2005)

- There is a perception among the public and among real estate developers that rail is a more permanent transit investment, and therefore more likely to encourage and sustain TOD. (Austin Planning and Growth Management Department 1986, California Department of Transportation 2002, Ottawa Rapid Transit Expansion Study 2003, TCRP 2007, WMATA 2005)

5.7.3 Balance of Transit vs. Highway Investment: Increased Transit System Operations with Aggressive TDM/TSM Measures, and Efficient Transit System Operations with Standard TDM/TSM Measures

A balance of transportation modes would be achieved with all the build alternatives. The supplemental alternatives would provide a balance with greater emphasis on transit than on automobiles. This could be interpreted as being more consistent with goals related to mode shares, single-occupancy vehicle use, and compact urban form. State, regional, and local policies can be found that would support high levels of TDM and TSM activities as well as increased transit service.

Alternatives 4 and 5 are paired with more robust Travel Demand Management and Transportation System Management measures, and with increased transit service. This list summarizes the types of TDM policies that will be implemented in the aggressive package:

- User Fees ("Tolling"),
- Parking prices (or parking restrictions),
- Reduced Price Transit Passes,
- Additional transit service (or newly implemented service),
- Traffic signal priority (TSP) for transit,
- Educational programs,
- Flexible work schedules,
- Tele-commuting, and
- Bicycle or pedestrian paths.

These measures attempt to reduce the demand on the transportation system, by providing education and incentives to carpool, telecommute, purchase transit passes etc. These measures would likely be beneficial to residents and businesses within the API. The API has the level of transit service, urban densities, and other elements that enable these programs to be effective. It is possible that long-term indirect effects from a reduced supply of parking could cause higher demand for parking in residential neighborhoods bordering commercial areas.

With an increased transit system, travel times by LRT would be improved. Early findings suggest that increased transit service with BRT would likely slow the system, as the higher number of BRT vehicles would cause delays at local intersections. In Alternatives 4 and 5, mode splits are higher, with BRT increasing from 15 to 18 percent and LRT from 20 to 22.5 percent.

All of these TDM/TSM elements would be supportive of the multimodal, compact urban form envisioned in adopted plans.

5.7.4 Major Transit Alignments

5.7.4.1 Direct Impacts

The greatest direct land use impacts of the alignment options would occur as a result of the park and ride facilities. The Vancouver alignment would entail building the Lincoln Park and Ride, which would occupy 17 acres, 12 of which are the WSDOT maintenance facility. The I-5 alignment would require the acquisition of a smaller, approximately 4-acre space for the Kiggins Park and Ride. The Clark College Park and Ride is most closely associated with the I-5 alignment, and Clark College MOS but could be constructed on a HCT spur for the Vancouver alignment as well. Other direct land use impacts are minimal and do not help discern between alternatives.

5.7.4.1.1 Parking and Access

The Vancouver alignments would have parking impacts to the upper Main and Uptown areas, but would also bring HCT stations to 16th, 24th, and 33rd Streets. The impacts to on-street parking would be greater for the Main/Broadway couplet than on the two-way Broadway alignment. Neither MOS n or the I-5 alignment would not have direct impacts to on-street parking loading zones, or access points in the Uptown area.

5.7.4.2 Vancouver Transit Alignments

Vancouver alignments would require the acquisition of three medical office buildings near the Southwest Washington Medical Center and Urgent Care Clinic. These relocations may have an impact on the land use in the area, as it may result in more development with a larger medical office node, or it may be part of a shift away from such uses. The construction of a transit station at 33rd would encourage redevelopment.

Vancouver alignments have a possible inconsistency with the Vancouver Transportation Plan. The plan does not show HCT on Main in this area, but does identify Main as a Tier One Corridor. Some representatives from the City of Vancouver have identified this as an inconsistency. Other have suggested that the plan would have to be minimally amended.

New HCT alignments and stations that increase the rates and intensities of development would be consistent with the City's Comprehensive and City Center Vision Plan.

The Uptown area benefits from a stock of vintage buildings that are protected by a zoning overlay in this area. Given this policy framework, induced redevelopment from Vancouver transit alignments becomes a complicated issue. Appropriate rehabilitations would not adversely impact historic structures, but could add new square footage to the district. Inappropriate rehabilitations or demolitions would have an adverse impact on the historic structures and, consequently, on the Uptown district as a whole. The historic zoning overlay would help prevent demolitions and inappropriate rehabilitations.

5.7.4.3 North I-5 Transit Alignments

The I-5 transit alignments in Segment B would have fewer direct impacts to properties than the Vancouver alignments, and they would generally not require the relocation of buildings and uses. The design for transit along the I-5 corridor would require acquisition of land west of the highway along the entire corridor. It would require the acquisition of no or very few buildings. However, some home owners and residents along I-5 would have land use impacts. Homes in the Rose Village neighborhood would also have potential right-of-way acquisition impacts from the I-5 alignments but likely no building relocations.

The use of BRT would result in noise impacts to residential units in Rose Village near the HCT flyover ramp over the SR 500 interchange to Kiggins Park and Ride. All of these impacts would be mitigated via residential sound insulation, though again, noise would increase in the front yards of residences.

This alignment is consistent with the Vancouver Transportation Plan. The plan shows HCT along I-5 in this area.

The R-9 zoning of the Rose Village neighborhood is not conducive to higher density development. The zone allows some small multi-family structures, but does not allow mixed-use structures, apartments complexes, and the like. One of the major potential benefits of the HCT alignment choice is the positive impact of land values, floor area ratios, and the mixing of land uses. These benefits are not likely to be realized with the I-5 alignment, and the extent to which they are realized may be inconsistent with the land use pattern that exists there now. This alignment would be adjacent to a predominantly single family neighborhood.

5.7.5 Tolling: How do the tolling options compare (no toll, standard or higher toll on I-5, toll on both I-5 and I-205)?

As a part of all build alternatives, all motor vehicle users on I-5 crossing the Columbia River would pay a toll. Open road tolling (ORT) technology would be used. ORT allows the collection of tolls without the use of lane dividing barriers or toll-booths. With ORT, users are able to drive through at highway speeds without having to slow down at barriers or to physically pay a toll. Full use of ORT eliminates the need for toll plazas.

Because the use of ORT technology requires no additional right-of-way, there are no direct impacts associated with its use.

Due to the supplemental bridge's assumed higher toll, less available highway capacity, and provision of an increased transit system, daily I-5 vehicle crossings would be 13,000 vehicles per day lower compared to the replacement bridge, while I-205's crossings would increase by 6,000 vehicles per day. Overall, there would be 7,000 fewer vehicle crossings of the Columbia River via I-5 and I-205.

The effect of tolling can significantly mitigate the potential land use impacts of increased highway capacity. Highway capacity increases provide to the commute a savings in travel time. This savings is one of many factors with financial implications and which may

influence locational decisions for residential and commercial growth. The monetary cost of transportation (especially of the home to work commute) is also a factor. The travel time savings provided in the possible build scenarios (from I-84 to 179th Street) ranges from 15 to 18 minutes. These savings are likely offset by the costs of tolling.

The collection of tolls will serve to reduce the demand for vehicular capacity. In this way, it mitigates potential "induced growth" which could otherwise result from improved travel times. Furthermore, the use of tolls is consistent with adopted transportation policies, especially when it enables peak period (congestion) pricing.

5.7.6 Transit Project Length: How do the full-length alternatives compare to the shorter length options?

The direct impacts of property acquisitions would not occur in Segment B if there is no construction of new facilities. The medical offices, houses, and other land uses in this segment would not be affected by the minimum operable segments.

There are four HCT terminus options being evaluated – the Lincoln, Kiggins Bowl, Mill Plain, and Clark College options. The choice of terminus location could substantially affect the overall transit ridership. The park and ride facilities would change the uses of large portions of land in the urban core of Vancouver, with the Lincoln Park and Ride requiring a full 17 acre site for construction. Each of these facilities is a permitted use. The Clark College Park and Ride would be subject to a determination by the City that it is an allowed use. The existing code for the Central Park Plan does not have a clear list of uses.

Construction of a full length project may be disruptive to commercial and neighborhood activities in transit Segment B. In this case, the MOS would spare Uptown Vancouver from most impacts associated with transit.

The MOSs would require a concentration of park and rides lots or structures in the downtown core. The Clark College MOS would include two park and ride facilities with about 1,300 parking spaces. Parking facilities would include a surface lot at Kiggins Bowl, and a parking structure at Clark College. The Kiggins Bowl lot would connect to the high-capacity transit station via shuttle bus. The City of Vancouver, has found that surface parking lots detract from the vibrancy and livability of the downtown area, and that a concentration of them with the MOS may have an adverse impact on the downtown.

The Clark College MOS would have the same parking and access impacts between Fifth and G Streets as the Kiggins Bowl terminus. However, these impacts vary based on the packaging of the four alignment options. Routing high-capacity transit along the Broadway-Washington couplet in downtown would require removing less on-street parking; however, this option would entail greater loss of access to surface lots that serve downtown businesses. Additionally, the Clark College MOS would provide half as much new parking at park and ride lots.

The Mill Plain MOS would have varying impacts to on-street parking and access in downtown Vancouver, depending on the alignment option. The two-way Washington

alignment option would impact more parking than the couplet. Approximately 79 percent of on-street parking would be lost with the two-way Washington option; with the couplet only 39 percent on each street would be lost. With regard to access, the Washington-Broadway couplet would lose 59 percent, a greater impact than the 15 percent loss expected with the two-way Washington option. One loading zone in this area would be lost with the Washington-Broadway couplet alignment option.

The Mill Plain MOS would end the guideway near 17th Street and based on the alignment options, could provide additional park and ride spaces. The two-way Washington Street option would terminate at a mid-block station (Mill Plain Station) between 15th and 16th Streets (two additional blocks northeast of this station would be used for turn-around). This option would provide 564 new park and ride spaces in a parking structure on 17th Street. The Washington-Broadway couplet would not provide new parking, instead using this block to turn from Broadway Street to the Mill Plain Station. Adjustments in lane configurations could reduce or mitigate these impacts but are unlikely to change the relationship between alignment options.

The introduction of transit service would have both positive benefits and negative impacts. On the whole, the land-use related benefits would outweigh the impacts, and the MOS would fail to realize many of the benefits for the Uptown area and northward. The residents of the Rose Village neighborhood would benefit from a transit station if the I-5 alignment is chosen. These benefits and the related negative impacts would not be realized with the MOS.

Many plan policies and goals apply to the question of project length. A full length project is more likely to achieve plan goals. It would encourage mixed use compact urban development, provide for better transit ridership, and potentially operate with less vehicle emissions. The full length project would not cause significant adverse impacts to land use patterns or plans.

Only the full-length project options would reduce the emphasis on the auto-oriented character of Highway 99, as is called for in the pending Highway 99 subarea plan to other plans.

6. Temporary Effects

6.1 Introduction

Temporary construction impacts would be unlikely to have any significant impacts on land uses, land use patterns or plans. Construction-related impacts from noise, dust, lighting (for nighttime construction), and traffic delays may have secondary impacts to land uses, especially commercial uses which may rely upon easy access and a pleasant experience, and residential uses. It is unlikely that many long-term decisions regarding housing or employment would be affected by the construction related delays.

6.2 Segment A: Delta Park to Mill Plain District

6.2.1 Impacts Common to All Alternatives

6.2.1.1 Hayden Island

Bridge construction would disturb land use activities on Hayden Island. The existing commercial use pattern on the island is predominantly auto-oriented, big-box retail. One compelling reason to shop and eat on Hayden Island is its efficient auto-oriented pattern. Washington shoppers seeking to avoid sales tax on large purchases, as well as Oregon shoppers and visitors to the area, would likely face delays, detours, and other inconveniences. This may temporarily reduce the attraction of the shopping center, especially when compared to similar shopping centers nearby. This is not likely to lead to a change in land use. The Economics Technical Report addresses this in greater detail.

It is difficult to assess how the CRC project would impact land use in this area while the shopping center owner is considering a major redevelopment and the city is undergoing subarea planning. Attracting new anchor and other tenants, as well as possible new residents, could be temporarily impeded by construction activities, but short-term impacts would likely be offset by the long-term improvements in access associated with the CRC project. Overall, construction disruptions are unlikely to have long-term effects on Hayden Island land uses.

6.2.1.2 Downtown Vancouver

Downtown Vancouver has benefited from significant new investment. Numerous mixed use, mid to high-rise buildings have been constructed, and more are planned. This progress has been the result of numerous contributing factors.

Unlike Hayden Island, downtown Vancouver is a cultural and governmental center for the City, the County, and for southwest Washington. Also, I-5 is only one of many ways to access downtown. Many land uses in downtown Vancouver would be negatively impacted by the construction activities, but are not likely to move elsewhere. It is not

likely, therefore, that construction activities would cause any changes in land use downtown.

6.2.2 Impacts Unique to Highway Alternatives and Options

6.2.2.1 Periods of Construction

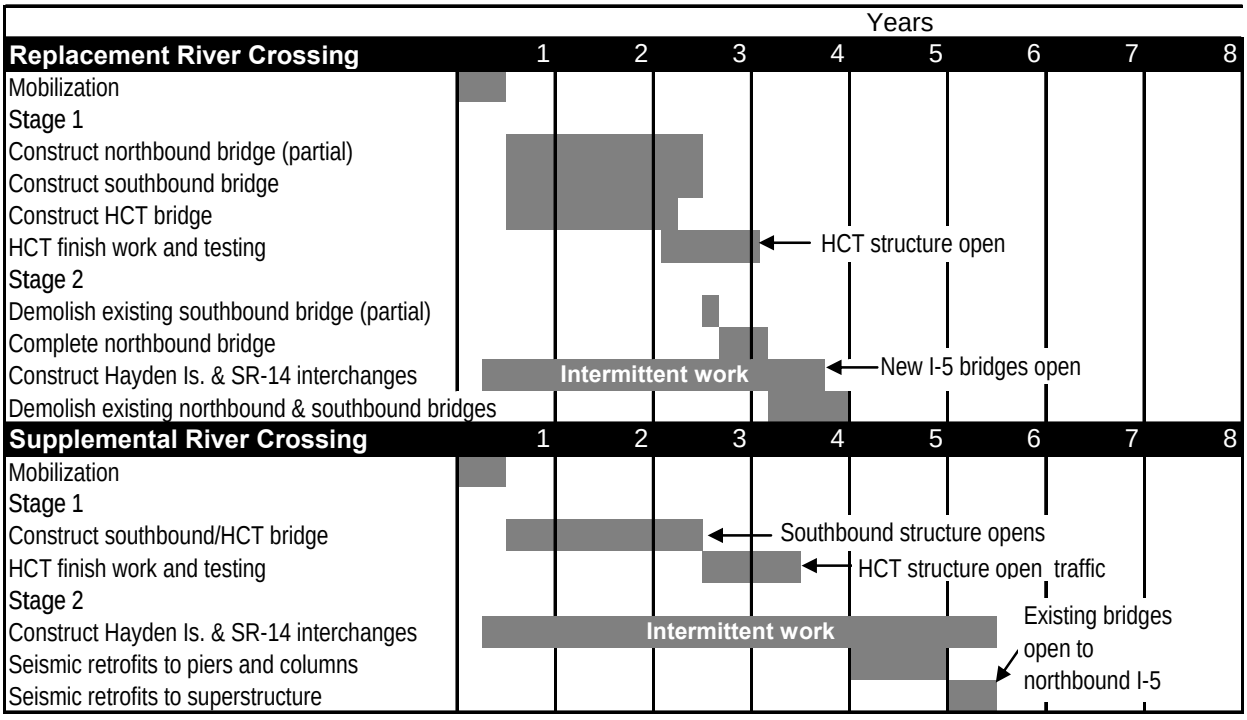
Building a new bridge over the Columbia River is an enormous task that will require multiple phases of work over several years. The general sequence of constructing the bridges would likely entail the following steps:

- Initial preparation – mobilize construction materials, heavy equipment and crews; prepare staging areas.
- Installation of piles – drive or drill steel tubes into firm soils or bedrock.
- Bridge piers – construct and anchor concrete foundations on the piles; construct or install pier columns onto these foundations.
- Bridge superstructure – build or install the horizontal structure of the bridge spanning across the piers; the superstructure could be steel or reinforced concrete; concrete could be cast-in-place or pre-cast off site assembled on site.
- Bridge deck – construct the bridge deck on top of the superstructure.

Exhibit 6-1 shows the likely length of time required for each phase of the project, the stages that could overlap, their sequences, and the differing requirements for the replacement and supplemental river crossing options. As shown, for the replacement crossing the high-capacity transit system could be operational within about three years, and the highway and interchange projects would be completed within about five years.

For the supplemental crossing, transit could be operational within about three and a half years. The southbound highway crossing would be complete in about two and a half years, and the northbound crossing retrofits and all interchange construction would be finished in about six years.

Exhibit 6-1. CRC Project Construction Timeline



6.2.2.2 Construction Easement Acquisitions

Construction easements of approximately 1.0 to 1.6 acres (45,345 to 67,750 sf) would be required under the roadway alternatives. Between 0.46 and 1.45 acres would be required under the transit alternatives. These easements would be temporary and the property would be restored to the landowner after construction is complete. Exhibit 6-2 details the easement requirement for each alternative.

Exhibit 6-2. Temporary Construction Easements (Square Feet)

	Washington	Oregon	Total
Roadway Replacement	29,570	38,180	67,750
Roadway Supplemental	22,248	23,097	45,345
Transit – 16th	1,118 – 2,719	N/A	1,118 – 2,719
Transit - Main	0	N/A	0
Transit – Offset	6,574 - 15,960	39,088-44,346	45,662 – 60,306
Transit – Adjacent	6,574 - 15336	13,613-18,657	20,187 – 33,993

Of all the crossing options, the replacement alignment would require construction easements on the greatest amount of land. Though this land would return to its former use, and while there would be no lasting effect on the land uses in the area, the use of this

area may hinder planned development, and thereby slightly delay the achievement of adopted goals.

Nearly all of these easement will be located immediately adjacent to the Interstate right-of-way. In most cases the easements will occupy very little land, with almost no impacts to active uses including g buildings, parking, etc. In Oregon, easements will be required in the northeast corner of the Expo center parking lot. These will temporarily occupy space currently used for parking. Except for large special events, the parking lot is not fully utilized and the temporary loss of spaces is not thought to pose a significant problem. On Hayden Island all of the easements are slivers along the Interstate right-of-way. The space underneath the new structures can be used for storage and construction purposes. In downtown Vancouver, the easements are also along the right-of-way with very few impacts. However, at this time an easement has been identified intruding slightly into National Park Service property.

6.3 Segment B: Mill Plain District to North Vancouver

6.3.1 Uptown and Upper Vancouver

Many of the businesses along Main in Uptown Vancouver are locally-owned small operations. These businesses may be susceptible to a loss in sales due to construction traffic impacts. Business closures are not likely to result from temporary impacts of this project, so no changes in land use are expected in the area.

Other temporary impacts that may occur in Transit Segment B are not likely to change land use patterns.

7. Mitigation for Long-Term Effects

This section describes measures that could be considered for reducing potential effects on land use.

7.1 Connect Main Street and Waterfront Land Uses

The supplemental bridge alternatives preclude the City of Vancouver's planned extension of Main Street to the waterfront area. The City has planned other connections to the waterfront through the railroad berm at Esther Street and elsewhere. Aiding in the completion of these connections could help to mitigate for the lack of the Main Street connection with the supplemental alternative.

7.2 Manage Induced Growth or Secondary Impacts

It is expected that any development that would be induced by the proposed transit, highway or other improvements would be generally consistent with local and regional plans. However, the following describes potential measures that could help ensure that growth is managed by local plans and implementing regulations.

7.2.1 Guide and Regulate Transit Oriented Development

The introduction of transit oriented design could represent a change in land use at certain locations. TOD design is already evident in the Vancouver downtown. However, on parts of Hayden Island, and at northern stations like 33rd street and 39th street, there are mostly single story, auto oriented uses with large setbacks filled with parking stalls. The City of Portland's Light Rail transit overlay could aid in the development transitions on Hayden Island. It is not in place now. Similarly, The City of Vancouver could develop TOD goals and implementing regulations. Additionally, the jurisdiction of Vancouver's Design Review Committee could be extended to help guide implementation in these areas.

7.2.2 Regional Urban Land Needs Projections

The movement of the urban growth boundary in Clark County is the most prominent point at which potentially competing interests of land development and conservation meet. The decision about the transition of new rural lands into developable urban area influences attempts to encourage infill development, concentrate urban services, and increase residential and employment densities.

In Clark County there is a robust, public process leading up to the decision of moving the urban growth boundary. Input is taken from the Cities in Clark County, and other regional entities including Metro and WSDOT. Steps could be taken to formalize the process by which these regionally significant decisions are made. Broad intergovernmental agreements could be made to allow for collaboration on the decision

on how much urban land is opened for development in Clark County. Such an agreement could help to protect new highway capacity, and balance growth on a regional level.

7.2.3 Interchange Area Management Plans

An Interchange Area Management Plan (IAMP) is a joint ODOT and local government long-term transportation and land use plan to balance and manage decisions in interchange areas, and is an important tool in protecting the functions of state highway interchanges and the supporting local street network. An IAMP will be completed for the CRC project. An IAMP identifies local and state transportation and land use objectives for the interchange area and guides the management of the transportation system and land use development patterns. It also guides subsequent decisions by the affected local government and ODOT about land uses, the street network, and access.

Similar steps could be undertaken in Vancouver and Clark County for each interchange area. If future land use changes around these interchanges are insufficiently planned the function of the Interstate could be undermined. Access management plans can be a key mechanism in protecting interchange functions, and could be incorporated into the interchange plans. An Interchange Justification Report, in Washington, will serve similar purposes and is also underway. This report includes an analysis of alternatives, access connections, and design, and consistency with transportation and land use plans.

8. Mitigation for Temporary Effects

Land Uses are potentially indirectly impacted by construction effects to traffic flow and patterns, noise levels, and other disruptions. These issues are explored in greater detail in the transportation reports and (specific to small businesses) in the economics reports. The necessary mitigations include public information, assistance to small businesses whose entrances are blocked, etc. There are no specific land use mitigations recommended for temporary effects.

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9. Permits and Approvals

The proposed project will require a number of permits and approvals from state and local agencies. The following list includes the permits specific to land use. This section does not review approvals necessary as part of the formal NEPA, or FTA New Starts process. This section includes a summary of the necessary, zoning related approvals.

9.1 State

A Washington Model Toxics Control Act approval will be required.

An Interchange Area Management Plan will need to be completed and approved.

9.2 Local

Listed below are some of the known permits needed for the proposed build alternatives. General transportation facilities are not often listed in the typical use lists of zoning code. Certain specific facilities, like park and rides and transit stations, often are listed.

9.2.1 Vancouver

The proposed project would need a determination to be an allowed use in base and overlay zones. Not all of the Vancouver zones specifically mention transportation facilities. The following criteria and requirements are clear:

The Lincoln Park and Ride would be in the R-22 Residential zone. Transportation facilities are a permitted use. The R-22 zone has a 50-foot height limit, which is a constraint on potential parking garages. There is also a 50 percent lot coverage maximum. The maximum does not apply to surface parking lots, only to structures. However, plans for a structured parking garage or later conversion of the site for office would be constrained by this regulation. Streetcar (presumably including light rail transit) and bus stops are allowed outright.

The Kiggins Bowl Park and Ride would be on a general Commercial (GC) zone. The zone allows transportation facilities outright.

The Clark College Park and Ride would be in an open space zone and in the Central Park Overlay Zone. Open Space zones allowed parking as a limited use. The approval for a park and ride facility within the Central Park Overlay Zone may be complicated by the lack of clear guidelines on allowed and conditioned uses. The City of Vancouver Department of Community Planning will update and clarify these use requirements in 2008. The park and ride would also be reviewed by the Design Review Committee. Their recommendations are advisory in nature and there is no accompanying approval or permit. The staff and the Design Review Committee will apply the design guidelines (also to be updated in 2008) for Central Park. One goal of the guidelines is to preserve

remaining open space by minimization of further development, especially for institutional uses.

Much of the Segment B transit options would pass through R-9 zoned land. In R-9, a lower density residential district, transit stations are allowed outright.

Internal circulation permits will be required for park and rides.

Temporary Use approvals will be needed for temporary offices for contractors, staging areas, etc.

A Vancouver Substantial Shorelines Development Permit is required. The project is a permitted use in all of the Shoreline Programs "environmental" classifications, expect for Urban natural and Aquatic. These classifications were developed to enable different kinds of shoreline uses to be considered in different environmental contexts, including high-intensity urban, urban conservancy, etc). The Shorelines Management Master Program has goals and policies and use regulations. The consistency of the proposed project components with the Program's goals are discussed in the respective segment section (and again in some of the system level sections). Transportation projects are allowed as a permitted use in the Urban High Intensity Areas, which covers much of the shoreline in the primary API. Regulation 62 requires that projects use existing corridors unless there is an alternative with less environmental impact. At the shoreline, the replacement alternatives would vary from the existing corridor alignment very slightly. Each of the bridge alignments would likely be considered as being within the existing transportation corridor. From the ordinary high water mark to the state line in the middle of the Columbia River, the area is classified as Aquatic. In this area, transportation projects are considered to be prohibited unless specifically allowed for in the text of the Program Master Plan. There is such text that allows for a facility so long as it is within previously established right-of-way for the corridor, and of no feasible, less environmentally detrimental alternative exists.

Critical Areas Ordinance (CAO) Permits will be needed. These permits are coordinated with the Shorelines permit and the regulatory requirements were made consistent in 2007. The proposed project will possibly impact a Riparian Management Area, and other areas covered by the CAOs.

A Tree Plan will need approval, addressing the plantings for the roadway segments, park and rides, and other facilities.

Alteration or demolition of any structure listed on the Clark County Heritage Register will require a Certificate of Approval from the Clark County Historic Preservation Commission. No alterations or demolitions to listed structures have been identified. However, the transit alignments are near to many listed structures, like the Carnegie Library at 26th and Main Street, and alterations to the property which may obscure the view of the building may be subject to review.

Other permits required include those for flood plain development and geohazard development.

9.2.2 Portland

The proposed project will need a determination that it is an allowed use in the base and overlay zones. Not all of the zones specifically mention transportation facilities. Further discussions with the City of Portland will be needed. Transportation right of way is not considered a use in the Portland Zoning code. Transit stops and stations fall within the category of Basic Utilities. Basic Utilities are limited or require conditional use review approval in the Open Space zone and Commercial zones. They are allowed in industrial zones.

Land Use Approvals will be required. The permitted use lists in the General Commercial, Open Space, and General Industrial zones do not specifically address transportation facilities. Further discussions will be required with the City of Portland. As part of the land use approval process, numerous issues, from internal circulation to design, will also be addressed. This will be most significant in the review of the facilities planned for Hayden Island. If there is any disturbance in the Environmental Conservation Overlay Zones, and Environmental Review and approval will be necessary.

There is currently no light rail transit station (t) overlay zone on Hayden Island. This overlay zone has been used by the City to improve the compatibility with land developments that follow the installation of a light rail station, and to guide the development of pedestrian systems and amenities so as to provide a safer and more pleasant pedestrian experience. If this zone is implemented before projected construction and permitting, compliance issues will need to be addressed. Regardless of the implementation of this zone, or the Station Area overlay which is in development, there may need to be a Design Review for changes at the Expo Center.

The northbound, existing bridge is listed on the National Register of Historic Places. It is therefore covered by Chapter 846, Historic Reviews. The Portland Historic Landmarks Commission implements the 120 delay period for demolitions and conducts demolition reviews. These will be needed for the replacement bridge options. The Landmarks Commission recommendation is advisory to City Council.

Other permits required include a Street Use Permit, Public Improvement Permit, and a Site Development Permit.

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APPENDIX A

Indirect Effects: Induced Growth

Appendix A
Indirect Effects: Induced Growth

The following sections address the potential for the proposed project to cause indirect impacts to land use. Indirect effects from transit and highway projects can occur on immediately adjacent lands and throughout the region as a whole. Especially where new or greatly improved interchanges are constructed, there may be pressure to allow a greater intensity of development than previously planned for, or to allow commercialization where it was not previously planned. There is also a potential to provide enough new highway capacity that it impacts employment and residential location decisions, allowing more businesses or homes to be located further from the urban core. Lastly, the introduction of transit stations to existing neighborhoods and business districts can indirectly change economic conditions, put pressure on land uses to change, or increase the intensity of development adjacent to the stops and stations.

One of the specific needs the CRC project is addressing is the growing travel demand and congestion in the I-5 Columbia River Crossing. Existing travel demand exceeds capacity in the I-5 bridge and associated interchanges. This corridor experiences heavy congestion and delay lasting hours during both the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge-lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many people take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Boulevard, Interstate Avenue, Main Street, and Columbia Street increases the congestion on local intersections. The No-Build Alternative would only accommodate about 55,000 person-trips during peak periods, far less than the predicted demand, and is predicted to increase congestion to 15 hours/day by 2030.

The following sections are separated into two discussions. One addresses the potential for induced development as a result of the increased highway capacity. The second addresses the induced growth associated with the construction of new High Capacity Transit stations.

A.1 Impacts from Increased Vehicular Capacity

The potential for increased highway capacity to impact employment and residential location decisions is well documented. Many refer to the phenomenon as induced growth. The Portland/ Vancouver area has a reputation for growth management and vibrant urban centers. Local elected and appointed officials, planning professionals, and a large number of the area's citizens have recognized sprawl to be a significant public policy issue. Local, state, and federal laws and regulations also require large transportation projects to consider the potential for indirect effects on land use patterns. The following section reviews pertinent findings regarding induced growth resulting from highway capacity projects and specifically from a "widening" of the I-5 bridge. The following three

sections review published studies on induced growth, previous Metroscope modeling, and recent transportation modeling.

A.1.1 Published Studies

The Governor's Task Force for the I-5 Transportation and Trade Partnership appointed a Regional Land Use Assessment Committee in January 2001. The Committee worked with the larger Partnership in assessing the potential for induced growth. For that study, Parsons Brinkerhoff was contracted to complete an exhaustive literature review on the subject.

A.1.1.1 Parsons Brinkerhoff. 2001. Land Use-Transportation Literature Review for the I-5 Trade Corridor Regional Land Use Committee (2001)

This review of 75 academic reports and case studies sought to answer three questions: "How does transportation investment affect household and business location decisions," "How does transportation investment affect travel behavior," and "How can public policy shape the resulting growth." Based on this review, the authors found that roadway investments can increase accessibility to land, accessibility can alter travel patterns and changes in travel patterns potentially affect development. The review found that communities at the edge of an urban area are most often affected by expansions of transportation infrastructure, and that new development in land outside urban areas tends to be residential, followed over time by commercial development.

The review also found that, as regions grow, any one transportation investment has less impact on accessibility and therefore has less impact on development. Rather than opening up areas to new development, most transportation investment projects in 2001 (and today) provide only small accessibility enhancements in the context of the larger regional transportation system. Because of the relatively small overall impact of modern transportation projects, they are unlikely to change what gets developed, but can facilitate development that is already allowed, contributing to the rate of land use development. This study concludes that local comprehensive plans and overall economic conditions have a more significant impact on land uses than capacity changes resulting from highway widening projects.

A.1.1.2 Additional Studies and Case Studies Published Since 2001

The following review was completed as the project team revisited published literature. Many recent studies have been completed since the review was completed for the Trade and Transportation Partnership. These are summarized below.

Paving New Ground: A Markov Chain model of the change in transportation networks and land use (Draft: May 4, 2005)

Levinson and Chen (2005) employed a Markov Chain model to understand the relationship between land use and transportation systems over time. The study area selected was the Twin Cities Metropolitan Area (Minnesota) from 1958 to 1990. In the model, the presence of highways in areas with an Agricultural and Recreation designation were much more likely to experience urbanization than Agricultural and Recreation areas without highways. Land with an Employment, Residential or Mixed Use designation (the

land use designations which are urbanized) were less impacted by the presence of highways. The study produced no evidence to suggest that the presence of highways resulted in land changing from an Employment or Mixed Use designation to any other designation. However, Residential areas were more likely to change to Mixed Use areas if they contained highways.

Using Highway Investments to Shape Growth: Assessing intentions and reality in Virginia (July 27, 2005)

Miller et al (2005) analyzed the effectiveness of controlling highway investments to influence growth and land development over time. It focused on three areas within Virginia: Fairfax County, Spotsylvania County, and the Hampton Roads region. The study found that decisions not to build highways did not stop growth and that decisions to build highways did not produce growth in predictable ways. It concluded that while transportation investments can facilitate growth, external growth pressures play a much bigger role in triggering growth.

Economic Growth from Transportation Improvements: Does it or doesn't it? (October 28, 2005)

Weiss (2005) evaluated past research linking transportation investments with economic development. A 1970 FHWA report was referenced that showed more job growth from 1958 to 1963 in high density urban areas serviced by highways compared with job growth in similar areas without highway service. Other studies prominently featured showed a link between poverty in Appalachian communities and distance from metropolitan areas and/or a lack of improved highways. Despite finding that some studies have linked economic development with the existence of highway infrastructure, the report concluded that little conclusive evidence exists linking the existence of highway infrastructure with particular types of economic development, or whether transportation investments also produce negative consequences as well. The significant impacts from highway construction were in areas (unlike the CRC API) previously unserved or greatly underserved by highway facilities.

Influence of Transportation Access on Individual Firm Location Decisions (2006)

Targa et al (2006) analyzed the relationship between transportation investments, business cost structure and the decisions by firms on where to locate. The study used a firm-level econometric model to analyze data collected from a web-based survey about individual firms in a four-county region of Maryland. It found that having existing access to major highways contributed to firms remaining at their present locations, and further extrapolated that land along primary highways is more attractive to firms when making location decisions.

Road Expansion, Urban Growth, and Induced Travel (2003)

Cervero (2003) tested the theory that roadway building decreases roadway congestion in the short term, resulting in new development (and therefore new trips) and shifts in existing driving behavior that results in a return to a congested state in the long term. The study compared information related to select California highway expansions from 1980 to 1994 with building records for the same period. It found that roadway expansions do

contribute to new residential and commercial building activities as well as congestion-inducing changes in existing travel patterns. However, overall effect of induced travel is of a lesser magnitude than estimated by previous studies, and it is unclear whether the induced demand effect that occurs in suburban settings would apply to urban settings. The study found that other factors, such as a community's relative level of affluence, have a greater effect on spurring development than transportation investments.

A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements (2001)

In 2001 (Moore and Sanchez 2001), the consulting firm ECONorthwest and Portland State University completed a guidebook based on the findings of a 1998 ODOT study of the link between highway capacity, travel demand, and development patterns.

The guidebook identifies a number of factors influencing indirect impacts: socioeconomic conditions, land use patterns, transportation system characteristics, public services, and public policy. It determined that added highway capacity does not change development from local land use plans, or what would have occurred in no-build scenarios. It also found that public investment in utilities (e.g. water, sewer, or roads) and zoning tools were the primary shapers of development patterns. The study differentiated past large projects (new corridors, greatly enhancing transportation access to areas of the country that did not previously have access) from small, incremental projects on a few miles of existing highways, without substantial improvement and no new access.

Evaluating Transportation Land Use Impacts (2005)

Litman (2005) reviewed findings from other academic studies. The report stated that decisions that reduce the overall cost of vehicular travel increase the amount of traffic and low density, dispersed, outlying development. As with other studies, it acknowledged that it is difficult to determine exactly what land use impacts are caused by specific transportation infrastructure investments.

The Cost of Congestion to the Economy of the Portland Region (2005)

The Economic Development Research Group (2005) prepared a study of congestion in the Portland area for the Portland Business Alliance, Metro, the Port of Portland, and ODOT. This study's findings include:

- Congestion currently threatens economic growth in the Portland region.
- Congestion problems are already reducing profits for local businesses.
- Failure to invest in the region's transportation system could create an $844 million annual value loss.

According to this study, increased regional investment in transportation would create a $2 benefit for every dollar spent. Interviews conducted for this report found that local businesses have shifted their work shifts and deliveries to the early morning to avoid congestion, but as congestion increases the peak period gets longer and businesses are being left with an even smaller early morning window. Some businesses have increased their internal inventory to reduce disruption from missed deliveries. Still others have

passed transportation cost increases on to the consumer. Additionally, some have chosen to relocate outside the region. These locational decisions may indirectly affect land uses and land use plans.

Many other regions are currently addressing the need to reduce congestion. For the Portland area to stay competitive, this study recommended addressing congestion and mitigating future congestion growth.

I-80 and Alice's Road / 105th Street Interchange Indirect and Cumulative Impact Analysis: Technical Report (2006)

CH2M Hill completed an analysis in 2006 of the Interstate 80 and Alice's Road/105th Street Interchange. The Indirect and Cumulative Impact Analysis Technical Report had key findings associated with two issues:

The first issue was the impact of transportation investment on household and business location decisions. Transportation was found to have historically played an important role in shaping modern U.S. metropolitan urban forms. Improved transportation access (and reduced travel times) can improve an area's attractiveness for development, though with diminishing returns. Transportation is not the only influence on development, and many times is not the most important influence on development.

The second issue was the role of land use and public policy in shaping regional growth following transportation investments. The land use effects of transportation investment are often small compared to the effect of local land use plans, policies and political structures. Effective policies are able to control growth resulting from transport investment, effectively disconnecting the land use response from the transport network. Oregon and Washington planning rules in general, (Portland and Vancouver's plans and regulations in particular) are considered to be some of the most effective controls that exist in the United States.

Market studies will determine a proposed project's feasibility at a certain location, and the developer will consider the size, location, environmental constraints, and access of a site. Existing and programmed transportation improvements play a role in the decision-making process, though they are not the driving force itself. The jurisdiction's willingness to work with developers, and the predictability of their development permit and exactions process is also important.

Washington SR 520 Indirect and Cumulative Effects Discipline Report (2005)

In 2005, a report entitled the "Indirect and Cumulative Effects Discipline Report" was published as a part of the environmental analysis for the Washington State Route 520 Bridge Replacement and HOV Project Draft EIS. The Discipline Report included a literature search and used a land use/transportation model called Dram/EMPAL. Forecast results for indirect effects showed minor differences in the distribution of population and employment for the No Build Alternative relative to the Build Alternatives. The differences would range from an increase of less than one percent to a decrease of less than 0.5 percent. The alternatives did show a slight difference in where population and employment growth may occur under both scenarios; however, the differences were

minor. The report concluded that the forecasted distribution of population and employment growth without the project would not be noticeably different from the distribution of population and employment growth that could occur under either of the Build Alternatives. There are similarities in the SR 520 project and the proposed CRC alternatives, and these findings are generally applicable to the proposed CRC alternatives.

Alaska Way Viaduct and Seawall Replacement Project Land Use and Shoreline Technical Report (2005)

Another current, major project for the Washington State Department of Transportation is the potential replacement of the Alaska Way Viaduct. The 2001 Nisqually earthquake damaged the viaduct and its supporting Alaskan Way Seawall. Replacement options will have transportation improvements as well as structural improvements. Parsons Brinkerhoff Quade & Douglas, Inc. (2006) suggested it is difficult to predict land use effects for the Alaska Way Viaduct project; and that it was unlikely that redevelopment over a large area would occur as a result of the Alaska Way project. They sited the following reasons:

- The project does not open up large areas of land for development or redevelopment.
- The project is replacing an existing structure, not creating a new travel route.
- There are many other improvements which have occurred or are planned to occur in downtown Seattle.
- The City of Seattle has begun a Central Waterfront Concept Plan which will lead to the establishment of allowable development patterns adjacent to significant portions of the Alaska Way Viaduct replacement project.

The CRC project is similar, as it is within core of urbanized, managed area.

A.1.1.3 Conclusion

Findings from published literature suggest that adding additional vehicular capacity within a well-planned urban area that has had, for decades, the full range of services and infrastructure, is unlikely to have significant indirect land use effects.

A.1.2 Computer Modeling

Computer modeling was used to assess the potential changes to land use that could indirectly result from improved mobility in the I-5 corridor. The following section includes a review of the findings from Metroscope modeling completed for the Phase 1 - Trade and Transportation Partnership Study of the Columbia River Crossing as well as a summary and analysis of the modeling completed in 2006 and 2007.

A.1.2.1 Metroscope Modeling

The Governor's Task Force for the I-5 Transportation and Trade Partnership appointed a Regional Land Use Assessment Committee in January 2001. The following findings are derived from their work, as summarized in numerous PowerPoint presentations to the Task Force and in a memo titled Regional Land Use Assessment Committee Findings

and Policy Executive Summary, dated October 23, 2001. The Committee used the Metroscope, iterative land use/ transportation model to evaluate the land use impacts of capacity and transit improvements in the I-5 corridor.

Metroscope modeling showed that population and employment growth in the region will develop in a more dispersed pattern than anticipated in current adopted plans even under a No-Build scenario. The high levels of congestion on the bridge impede the region from functioning as a single economy. Development continues on the fringe of the Vancouver urban growth area, and the model shows transit has lower ridership as a consequence of the more dispersed development patterns.

Continued traffic congestion at the river crossing and reduced travel reliability have an adverse economic effect. Air, rail, and truck terminals are likely to suffer a decline.

Travel time savings with investments in the corridor would strengthen job growth along I-5. The study found that the "investment" of adding light rail and one additional through lane resulted in a 25 percent reduction in travel time between the key regional centers of downtown Vancouver and downtown Portland. The travel time savings studied in 2001 were found to redistribute 1 percent of regional employment to the I-5 corridor. This equates to 4,000 jobs for North Portland and 1,000 for Clark County. To a lesser extent the investment was also found to increase job growth in the Portland City Center. The following sections discussing the VISSUM modeling from 2007 describe how less travel time savings can be expected, with the replacement bridge, projected to experience south bound travel times roughly the same as with the No-Build (19 minutes between SR 500 and Columbia Boulevard).

The study also found that land values near improved interchanges would rise. There are limitations on how much these increases are realized, especially if interchanges are improved rather than newly added. Other limitations arise from local plans and other factors. Within downtown Vancouver and throughout the primary API, zoning and other land use regulations already allow for intense development. Flight patterns and protected air zones associated with Pearson Air Park and the Portland International Airport place a limit on the height of new development. Subsequently, the airport serves to slightly limit the development intensities in the API.

The Metroscope modeling showed that faster highway travel-times would slightly (under 0.5 percent) increase housing values in Clark County, but as land is added to the urban growth areas of Clark County, the increase in values would slow or stop. Since the completion of the study, Clark County significantly amended its urban growth boundary in 2004 and again in 2007. Clark County has increased its projected rate of growth and has sized the growth area accordingly. The 2007 boundary amendment is supported by the County's Comprehensive Growth Management Plan Environmental Impact Statement (2006). This document analyzed new estimates for a 2024 County population of 584,310. This reflects a 2 percent growth rate, compared to the 1.67 percent rate envisioned in 2001. The most recent urban boundary amendments and Plan update (adopted September 25, 2007) includes an addition of approximately 12,000 acres of rural and agricultural land.

The study concluded that adding light rail and an additional lane in each direction would not, without other regional policy and development changes, lead to sprawling land use patterns. According to the Metroscope outputs approximately 8 percent (20,000 households) of new residential development will occur outside of established urban growth boundaries with or without the investments in the I-5 corridor. Some of the areas wherein this development was projected have now been brought into the urban growth area. Though Replacement Alternatives provide for two additional auxiliary lanes rather than the one additional lane assumed in this study, the findings are still applicable.

A.1.2.2 Travel Modeling

A.1.2.2.1 Travel Model Forecasting Methods

Travel demand models have been in use since the 1950s and employ a market-based approach by considering both the transportation supply and travel demand for producing mobility characteristics such as roadway traffic volumes and transit ridership. The two Metropolitan Planning Organizations (MPO) in the bi-state Portland-Vancouver metropolitan area are the Metropolitan Service District (Metro) and the Southwest Washington Regional Transportation Council (RTC). Both organizations coordinate and share a consistent approach and network in transportation modeling. For the purposes of the Columbia River Crossing analysis, it was determined that Metro would lead the modeling effort, supported closely by the RTC. The regional travel model at Metro was expanded to include population and employment forecasts from southwest Washington that were approved by Clark County and its cities.

A.1.2.2.2 Travel Model Findings

Indirect land use impacts from highway and transit improvement projects often result when previous undeveloped, or underdeveloped, areas receive benefits associated with the new facility. More specifically, residential areas that are brought within a reasonable commute to job centers will likely experience increased rates and intensities of development. In order to assess the likelihood of this occurrence for the CRC project, a number of travel model outputs can be used. These include travel time data, vehicle throughput and periods of congestion. The following section explores the operational differences between the no-build, replacement, and supplemental options.

Summary of Bridge Capacity and Operations

A replacement crossing would provide more congestion relief than the supplemental crossing or No-Build Alternative. The No-Build Alternative would only accommodate about 55,000 person-trips during peak periods, and is predicted to increase congestion to 15 hours/day by 2030. The greater capacity of a replacement crossing—over 75,000 person-trips/day during peak commute periods, versus approximately 66,000 person-trips for a supplemental crossing—would reduce the duration of congestion to 3.5 to 5.5 hours/day. A supplemental crossing would result in about 11 hours of congestion each day.

Transit

All build options at least double transit ridership over the No-Build scenario. LRT attracts approximately 30 to 40 percent more riders than BRT. Integration with the existing MAX system is an important benefit of LRT that helps attract these additional transit riders. This integration allows transit patrons to travel between Vancouver and Portland without a transfer. Transfers add time and, more importantly, are perceived by potential transit patrons as adding even more time, unreliability, and inconvenience to their commute.

Bike and Pedestrian

Pedestrians and bicyclists experience challenging conditions when crossing the Columbia River in the I-5 bridge influence area. The replacement bridge would include a multi-use pathway west of the high-capacity transit guideway and on the same elevated structure. The supplemental bridge would include a multi-use pathway for pedestrians and bicyclists, cantilevered on the east side of the existing northbound bridge.

Detailed Findings for the No-Build River Crossing Alternative

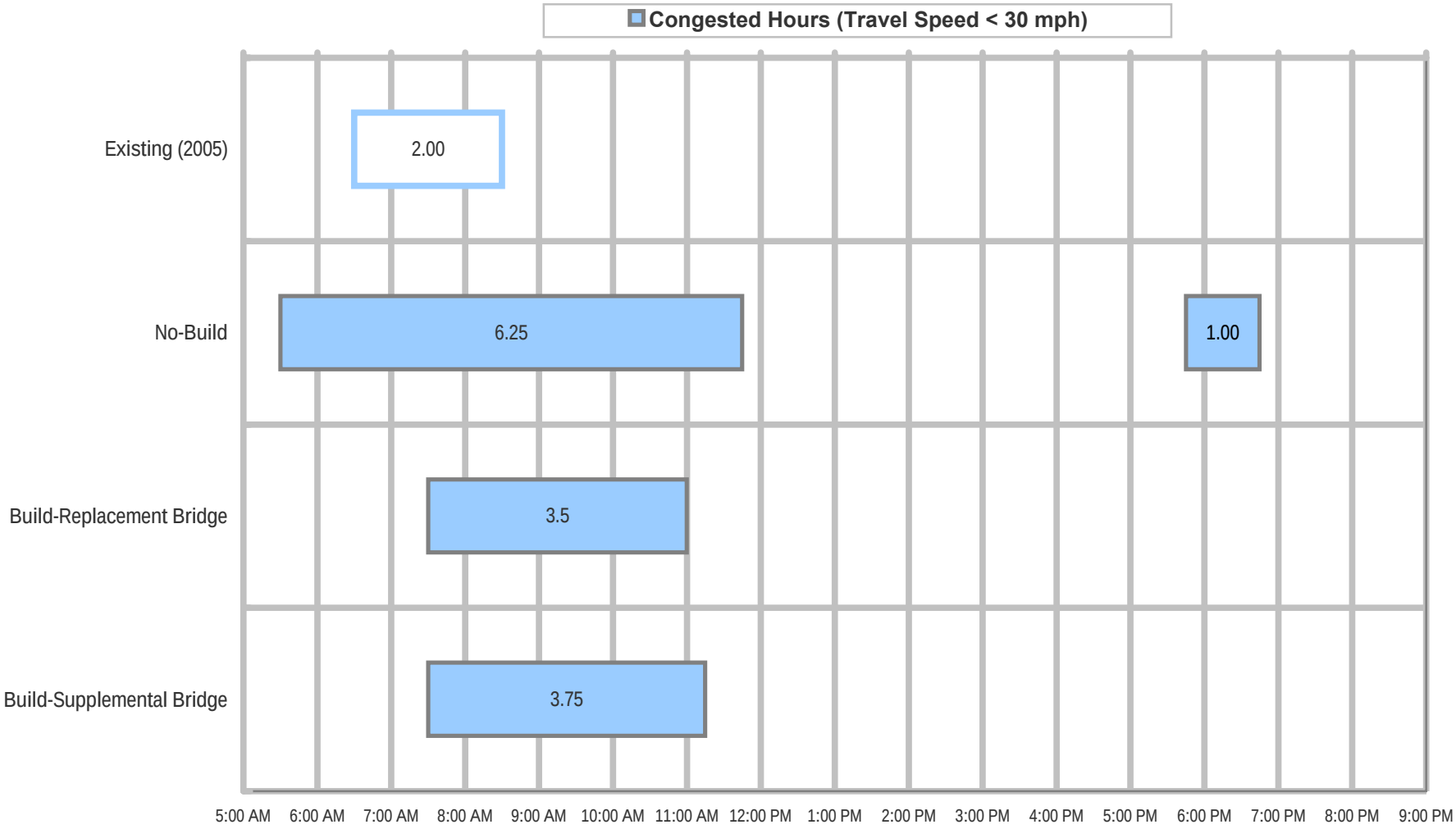
Southbound Mainline Operations

Between existing conditions and those in 2030 with the No-Build Alternative, weekday morning southbound peak travel demands are projected to increase throughout the corridor, with the highest growth projected for North Clark County (100 percent) and the lowest growth projected for North Portland (less than 5 percent). The growth projected within the bridge influence area ranges from 20 to 35 percent. Length of time for southbound congestion on the Interstate Bridge is expected to increase from 2 hours currently to over 7 hours in 2030 under No-Build conditions (see Exhibit A-1). One of these hours would occur during the afternoon/evening peak from an increase in reverse commutes.

The Delta Park project, which widens I-5 southbound from two lanes to three lanes between Victory and Columbia Boulevards, will eliminate the Delta Park lane drop bottleneck. However, in 2030 under No-Build conditions congestion would still exist from the existing capacity constraints near the I-405/Alberta area. Southbound congestion here would increase from 2.5 hours to over 7 hours in 2030 under No-Build conditions.

During the 2-hour morning peak, southbound I-5 travel times are forecast to increase by 3 minutes (20 percent) for a vehicle-trip along I-5 from SR 500 to Columbia Boulevard, and by 15 minutes (50 percent) for a vehicle-trip from 179th Street to I-84. The 50 percent increase in travel time for the longer segment is due to the increase in congestion levels along I-5.

Southbound I-5 Daily Highway Congestion at the I-5 Bridge (Year 2030*)



*Except for Existing Conditions (Year 2005)

Exhibit A-1

Northbound Mainline Operations

Forecast growth rates for northbound I-5 afternoon peak travel demands range between 5 and 20 percent in North Portland, 30 to 35 percent within the bridge influence area, and 30 to over 100 percent in northern Clark County. Under 2030 No-Build conditions, northbound congestion periods on the Interstate Bridge are expected to increase from 4 hours to almost 8 hours (see Exhibit A-2). Northbound congestion near the I-405/Rose Quarter weaving area could increase from over 2 hours today to over 7 hours.

Growth rates for southbound I-5 afternoon peak travel demands are forecast from 10 to 20 percent in North Portland, 20 to 40 percent within the bridge influence area, and from 40 to over 100 percent in northern Clark County. During the 2-hour afternoon peak, northbound I-5 travel times are forecast to increase by 2 minutes (15 percent) for a vehicle-trip from Columbia Boulevard to SR 500 and by 6 minutes (16 percent) from I-84 to 179th Street. These are forecast to increase due to increased congestion in the two existing bottleneck locations (Interstate Bridge and I-405/Rose Quarter weave).

Detailed Findings for the Replacement River Crossing Alternative

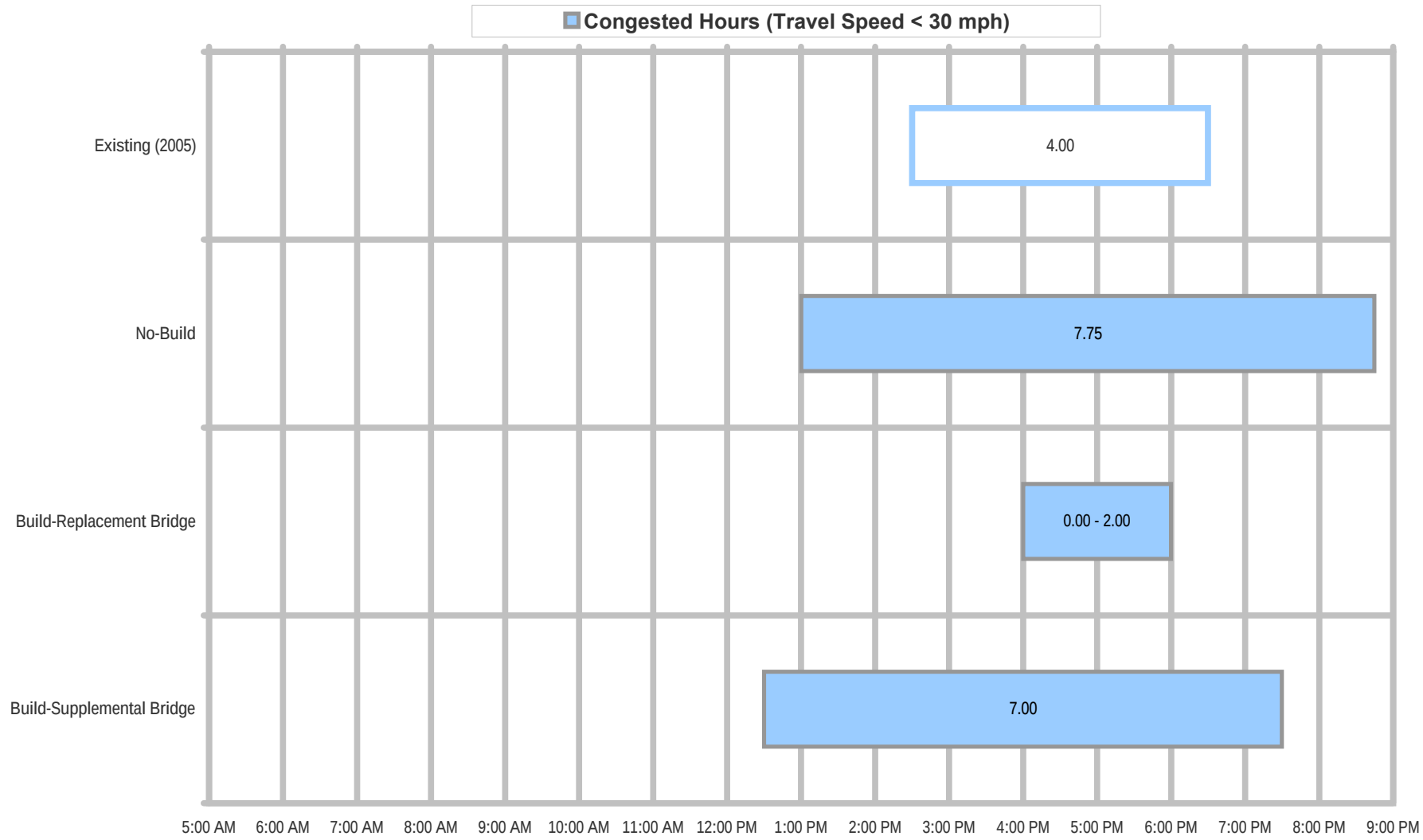
Southbound Mainline Operations

North of the Interstate Bridge during the morning peak, the replacement crossing would accommodate higher vehicle demands for southbound I-5. The build options reduce the congestion near the bridge, and include improvement s at entrance ramps. In the model, this increases the willingness of motorists to use the Interstate facility in Vancouver. In the no-build scenario, these trips use local streets to avoid the congestion, entering the highway further south, before the bridge. The increase would be 20% greater than No-Build demand at SR 500 (approximately 7,000 vehicles). Near the CRC project area, sections of southbound I-5 would show minimal vehicle demand decreases (less than 3 percent compared to No-Build conditions) due to providing high-capacity transit, tolling the bridge, and downstream congestion forecast near the I-405/Alberta bottleneck. South of the project area, I-5 would show small increases and decreases. Peak traffic demand forecasts are similar for southbound I-5 afternoon peak traffic and southbound I-5 morning peak conditions.

The replacement crossing would reduce congestion on the I-5 Bridge from over 7 hours under No-Build conditions down to 3.5. As shown in Exhibit A-1, congestion would still occur, but to a lesser extent, due to a downstream bottleneck in the I-405/Alberta area.

The replacement crossing would result in a 2 minute (10 percent) increase in southbound I-5 travel time for the segment from SR 500 to Columbia Boulevard. Although under both the Replacement and No-Build Alternatives the I-405/Alberta bottleneck would occur during the morning peak, the Interstate Bridge bottleneck would moderate the flow southbound under the No-Build Alternative. Although the southbound 2-hour morning peak travel time for the shorter segment from SR 500 to Columbia Boulevard would be higher under the Replacement Bridge alternative, the longer segment travel time section from 179th Street to I-84 would be lower by 5 minutes (12 percent) compared to No-Build conditions.

Northbound I-5 Daily Highway Congestion at I-5 Bridge (Year 2030*)



*Except for Existing Conditions (Year 2005)

Exhibit A-2

Northbound Mainline Operations

Northbound traffic demands along the entire length of the I-5 corridor are forecast to increase during the afternoon peak for the replacement crossing compared to No-Build conditions. The increase is nearly 30% over No-Build demand, with approximately 9,000 more vehicles. Although the Replacement Alternatives, in the afternoon, would have tolling similar to morning conditions, capacity improvements identified under the Replacement Alternatives combined with the forecast congestion along I-205 would result in vehicle demand growth along I-5 and decreases along I-205. North of the bridge, there would not be other bottlenecks, and so the route choice of the interstate, as opposed to local streets, becomes more attractive. The increased capacity also enables trips that would otherwise have been adjusted to the off-peak hours to be taken during the peak.

The Replacement Alternatives would reduce northbound congestion on the I-5 Bridge from almost 8 hours under No-Build conditions to less than 2 hours (see Exhibit A-2).

Northbound travel times during the two-hour afternoon peak are forecast to improve by 8 minutes (55 percent) from Columbia Boulevard to SR 500 and by 18 minutes (40 percent) from I-84 to 179th Street for Replacement Alternatives compared to No-Build conditions.

Detailed Findings for the Supplemental River Crossing Alternative

Southbound Mainline Operations

The supplemental alternatives would accommodate increased vehicle demands for southbound I-5 north of the Interstate Bridge during the morning peak. Sections of southbound I-5 within the I-5 bridge influence area would show decreases in vehicle demands; approaching 10 percent compared to No-Build conditions, due to the provision of high-capacity transit, tolling of the I-5 bridge, and downstream congestion forecast near the I-405/Alberta bottleneck.

The supplemental crossing would result in a reduction of congestion on the I-5 Bridge from over 7 hours under No-Build conditions down to 3.75 hours. Congestion would still occur, but to a lesser extent, due to a downstream bottleneck in the I-405/Alberta area. The downstream bottleneck located near the I-405/Alberta area would remain similar to 2030 No-Build conditions, experiencing 7 hours of congestion. Similarly, the effects of the southbound bottleneck located near the I-5 lane drop in the Rose Quarter would remain similar to 2030 No-Build conditions, with nearly 3 hours of congestion.

The supplemental crossing would result in a 2 minute (10 percent) increase in southbound I-5 travel time for the segment from SR 500 to Columbia Boulevard (see Exhibit A-3). Although under both the Supplemental and No-Build Alternatives the I-405/Alberta bottleneck would occur during the morning peak, the Interstate Bridge bottleneck would moderate the flow southbound under the No-Build Alternative.

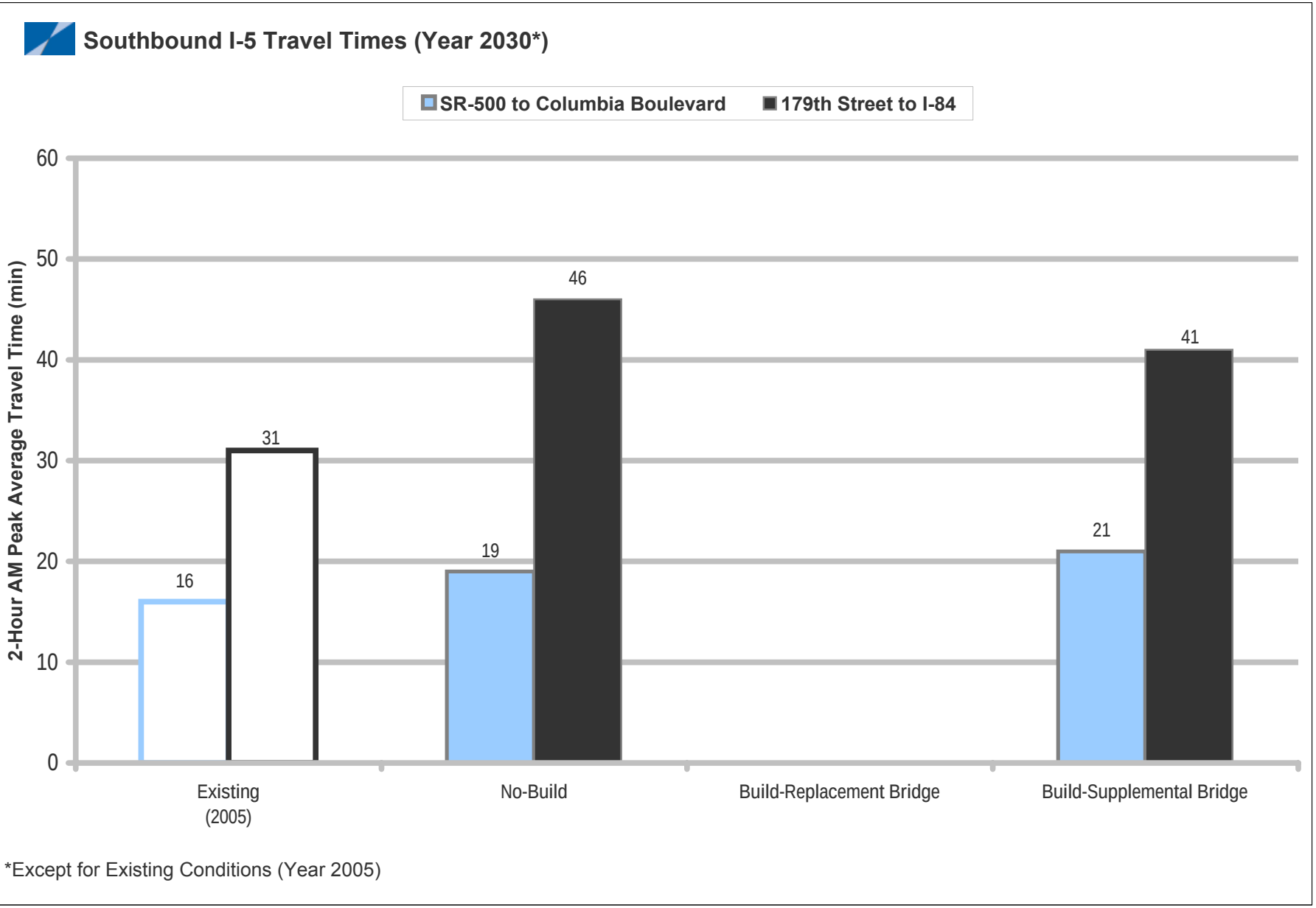

Southbound I-5 Travel Times (Year 2030*)
SR-500 to Columbia Boulevard
179th Street to I-84
2-Hour AM Peak Average Travel Time (min)
60
50
40
30
20
10
0
16
31
19
46
21
41
Existing (2005)
No-Build
Build-Replacement Bridge
Build-Supplemental Bridge
*Except for Existing Conditions (Year 2005)

Exhibit A-3

Although the southbound 2-hour morning peak travel time for the shorter segment from SR 500 to Columbia Boulevard would be higher under the supplemental crossing, the longer segment travel time section from 179th Street to I-84 would be lower by 5 minutes (12 percent) compared to No-Build conditions. The elimination of the Interstate Bridge bottleneck would result in longer travel times within the bridge influence area, the length and duration of congestion are forecast to be less under the supplemental crossing compared to No-Build conditions.

Northbound Mainline Operations

Northbound travel demands along the length of the I-5 corridor, excluding the area south of the crossing, which shows minimal decreases less than 5 percent, are forecast to increase during the afternoon peak for the supplemental crossing compared to the No-Build Alternative. South of the bridge influence area the growth forecasts are for less than 5 percent while north of the bridge influence area the travel demands are forecast to increase by 5 to 25 percent.

The supplemental crossing would result in a reduction of congestion on the I-5 bridge from almost 8 hours under No-Build conditions to 7 hours. The forecast congestion for the supplemental crossing is caused by the split highway system with the east span being overloaded with high volume versus the two-lane highway design combined with the short merging distance from Marine Drive on-ramp and Hayden Island on-ramp. The split in the highway requires all traffic from Marine Drive on-ramp, Hayden Island on-ramp, SR 14 off-ramp, and Mill Plain/Fourth Plain off-ramps to use the east span while all other traffic can use the west span causing congestion on the east span.

Northbound travel times during the two-hour afternoon peak are forecast to improve by 5 or 7 minutes (50 percent) depending upon which bridge span from Columbia Boulevard to SR 500 and by 15 to 17 minutes (40 percent) again depending upon which bridge span is chosen from I-84 to 179th Street for supplemental crossing compared to No-Build conditions.

Transit

All build options at least double transit ridership over the No-Build scenario. LRT attracts approximately 30–40 percent more riders than BRT (Exhibit A-4). Integration with the existing MAX system is important benefit of LRT that helps attract these additional transit riders. Exhibit A-4, below, shows ridership data for transit.

Exhibit A-4. Transit Riders Over the Columbia River

		BRT		LRT	
	No Build	**Standard Transit**	**Enhanced Transit**	**Standard Transit**	**Enhanced Transit**
Annual transit riders over the Columbia River Crossing	2.5 million	4.8 million	5.7 million	6.7 million	7.4 million

Tolling

As a part of the Replacement and Supplemental Alternatives, all motor vehicle users on I-5 crossing the Columbia River would pay a toll. Open road tolling (ORT) technology would be used. ORT allows the collection of tolls without the use of lane dividing barriers or toll-booths.

Exhibit A-5 summarizes the tolling rate structure for the replacement alternatives. For the supplemental alternatives, which include enhanced transit and transportation demand incentives compared to the replacement alternatives, the peak period toll for passenger vehicles would be $0.50 higher than shown in Exhibit A-5 (i.e., between 6–10 a.m. and 3–7 p.m., vehicles with transponders would be charged $2.50 and vehicles without transponders would be charged $3.00). Tolls would be administered for both directions of travel along I-5, e.g., a vehicle with a transponder traveling southbound across the bridge at 9 a.m. and then northbound across the bridge at 5 p.m. would pay a total of $4.00 in tolls. The toll rates shown in Exhibit A-5 are based on year 2006 dollars and have been assumed to increase at 2.5 percent per year, an assumed long-term inflation rate.

Replacement vs. Supplemental

Exhibit A-6 compares the effect of tolling for the supplemental bridge (Alternatives 4 and 5) with tolling the replacement bridge (Alternatives 2 and 3). Due to the supplemental bridge's assumed higher toll, less available highway capacity, and provision of an enhanced transit system, daily I-5 vehicle crossings would be 13,000 vehicles per day lower compared to the replacement bridge, while I-205's crossings would increase by 6,000 vehicles per day. Overall, there would be 7,000 fewer vehicle crossings of the Columbia River via I-5 and I-205.

The effect of tolling can substantially reduce the potential land use impacts of increased highway capacity. Highway capacity increases provide to the commute a savings in travel time. This savings is one of many factors with financial implications and which may influence locational decisions for residential and commercial growth. The monetary cost of transportation (especially of the home to work commute) is also a factor. In some cases, the build options and the no-build have no discernable differences in travel times. This is particularly true for southbound, AM peak trips. Northbound trips show a greater difference, but only near the bridge and north. When comparing the travel times from I-84 to SR 500, the options all provide the same travel time (approximately 19 minutes). However, when comparing the trip from I-84 to 179th street, the replacement bridge provides 2 minutes of additional savings.

East Vancouver/I- 205

No-Build

Under No-Build conditions, weekday southbound I-205 morning peak travel demands are projected to increase throughout the corridor between 10 and 90 percent over current levels, with the highest growth occurring in Vancouver. Forecast growth rates for I-205 northbound afternoon peak travel demands range from 0 to 95 percent.

		Passenger Cars		Trucks with Transponders		Trucks without Transponders	
Start	End	with Transponder	No Transponder	Medium Truck	Heavy Truck	Medium Truck	Heavy Truck
Midnight	5:00 AM	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00
5:00 AM	6:00 AM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
6:00 AM	10:00 AM	$2.00	$3.00	$4.00	$8.00	$5.00	$9.00
10:00 AM	3:00 PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
3:00 PM	7:00 PM	$2.00	$3.00	$4.00	$8.00	$5.00	$9.00
7:00 PM	8:00 PM	$1.50	$2.50	$3.00	$6.00	$4.00	$7.00
8:00 PM	Midnight	$1.00	$2.00	$2.00	$4.00	$3.00	$5.00

Note: For Supplemental Bridge alternatives, the passenger car tolls would be increased by $0.50 between 6 – 10:00 AM and between 3 – 7:00 PM.

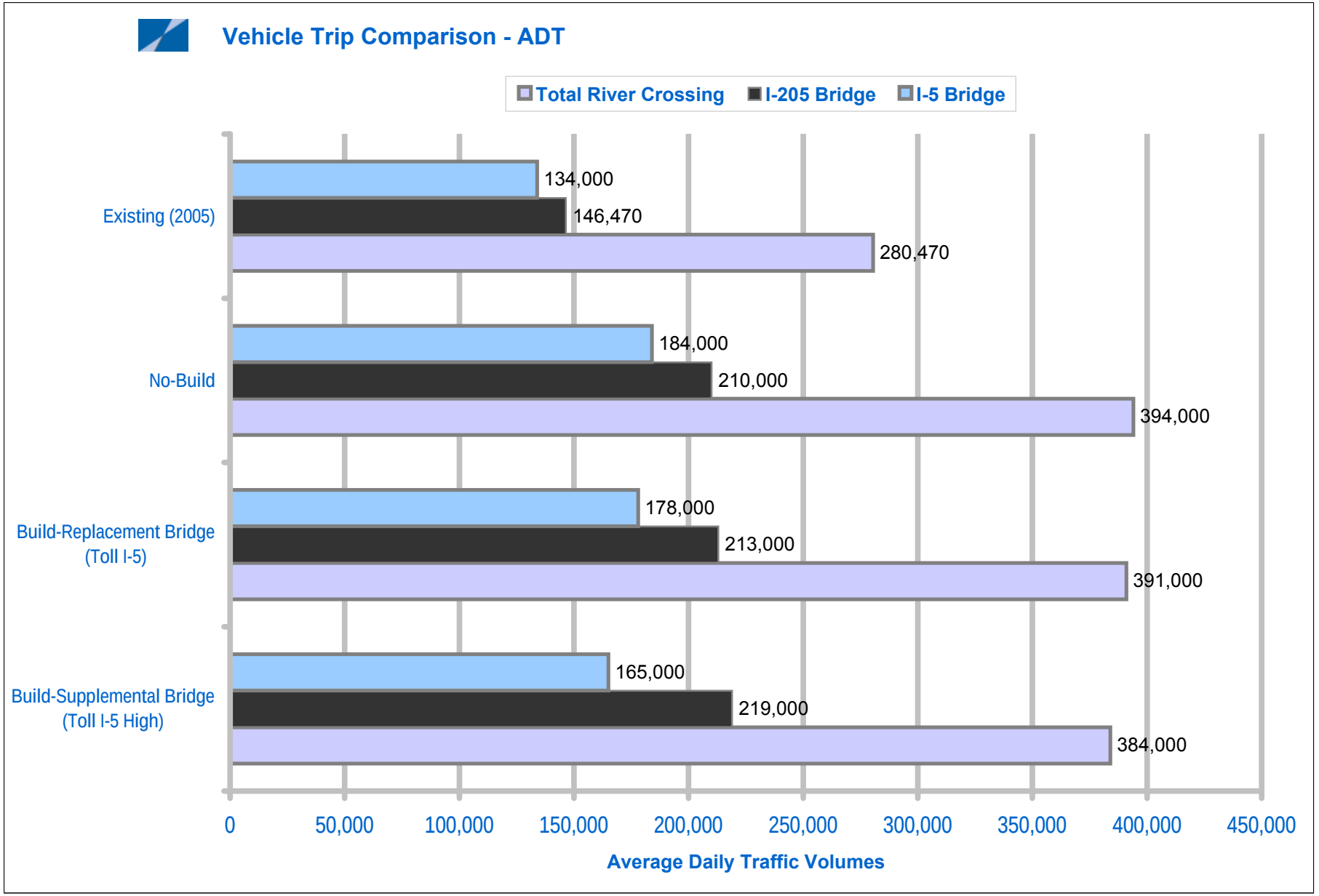

Vehicle Trip Comparison - ADT
Total River Crossing
I-205 Bridge
I-5 Bridge
Existing (2005)
134,000
146,470
280,470
No-Build
184,000
210,000
394,000
Build-Replacement Bridge (Toll I-5)
178,000
213,000
391,000
Build-Supplemental Bridge (Toll I-5 High)
165,000
219,000
384,000
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
400,000
450,000
Average Daily Traffic Volumes

Exhibit A-6

Replacement

Southbound I-205 would experience less traffic volume growth with the replacement crossing compared to the No-Build Alternative during the morning peak. Providing high-capacity transit and including tolls on I-5 reduces overall southbound river crossing by car. The improved capacity of I-5 and the improved transit options attract more trips that would otherwise be using I-205.

Compared to the No-Build Alternative, weekday northbound I-205 morning peak traffic demands are forecast to increase between 1 and 20 percent throughout the entire corridor under the Replacement Alternatives. The increased volume would divert from I-5 during the northbound morning, off-peak period due to the tolling of I-5 and as the relatively free-flowing conditions forecast for I-205 during the morning peak.

Southbound I-205 afternoon peak traffic demand growth forecasts are similar to morning northbound peak conditions, with small growth estimated throughout the I-205 corridor. Similarly, southbound I-205 volumes would increase during the afternoon off-peak period due to free-flowing conditions along southbound I-205.

Northbound traffic demands along the entire length of the I-205 corridor are forecast to decrease during the afternoon peak for the Replacement Alternatives compared to the No-Build Alternative. Although the Alternative would have tolling similar to morning conditions, I-5 capacity improvements identified under the Replacement Alternatives, combined with forecast congestion along I-205, would result in vehicle demand reduction along I-205. Northbound I-205 vehicle demand with the Replacement Alternative is forecast to be reduced by 10 percent or less compared to the No-Build Alternative.

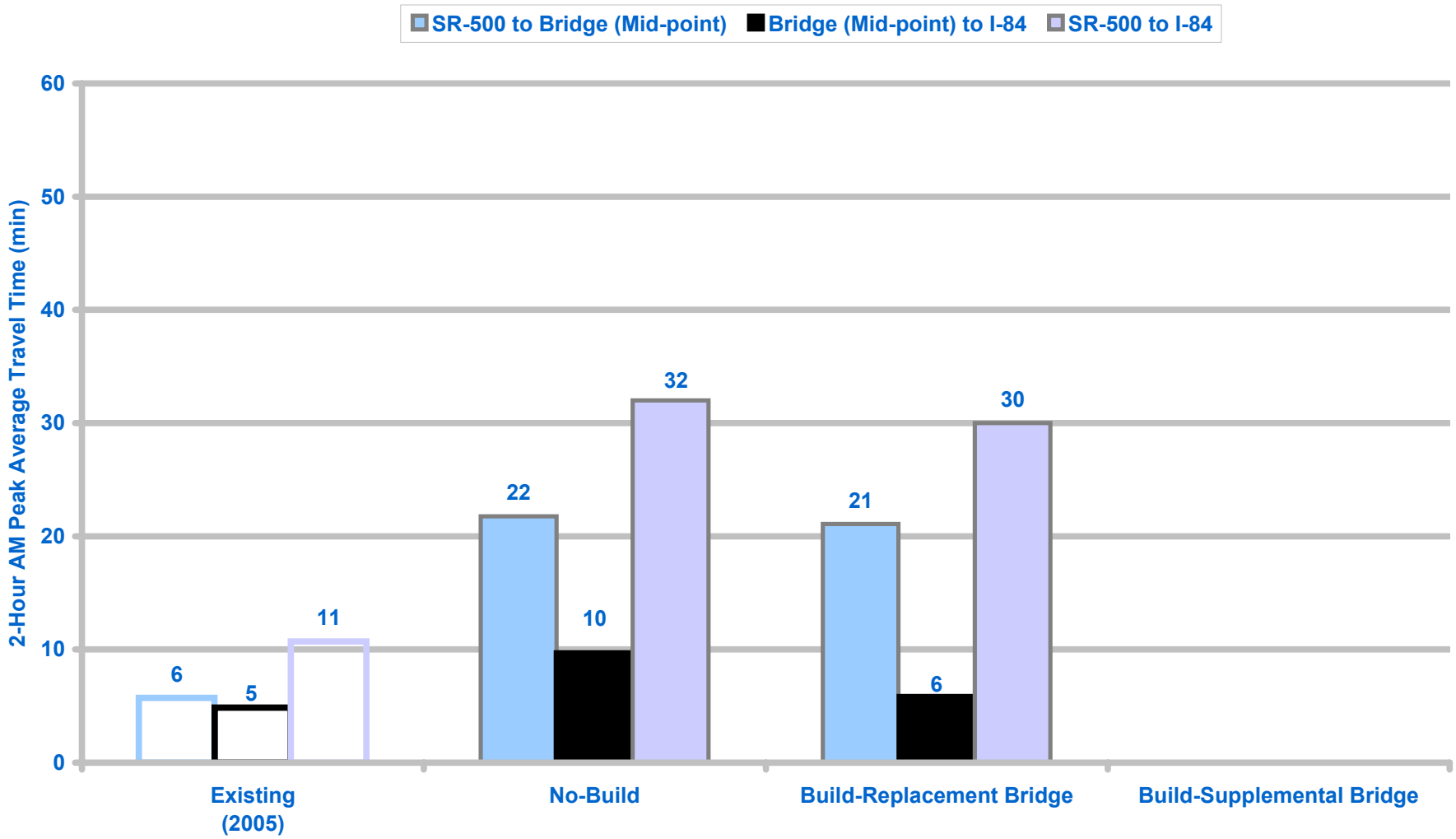
Southbound I-205 travel times during the two-hour morning peak period are forecast to decrease by 2 minutes (6 percent) from SR 500 to I-84 for the Replacement Alternative compared to the No-Build Alternative (see Exhibit A-7). This would occur due to decreased demands along I-205 from vehicles shifting to I-5.

Northbound I-205 travel times from I-84 to SR 500 would remain similar under both the Replacement and No-Build Alternatives during the afternoon peak.

Supplemental

The supplemental crossing would experience less traffic volume growth along southbound I-205 compared to the No-Build Alternative during the morning peak. The provision of high-capacity transit and tolling reduces overall southbound river crossings by car. The vehicle demand for the supplemental crossing would be reduced by less than 5 percent compared to No-Build conditions throughout the I-205 corridor.

Southbound I-205 Travel Times (Year 2030*)



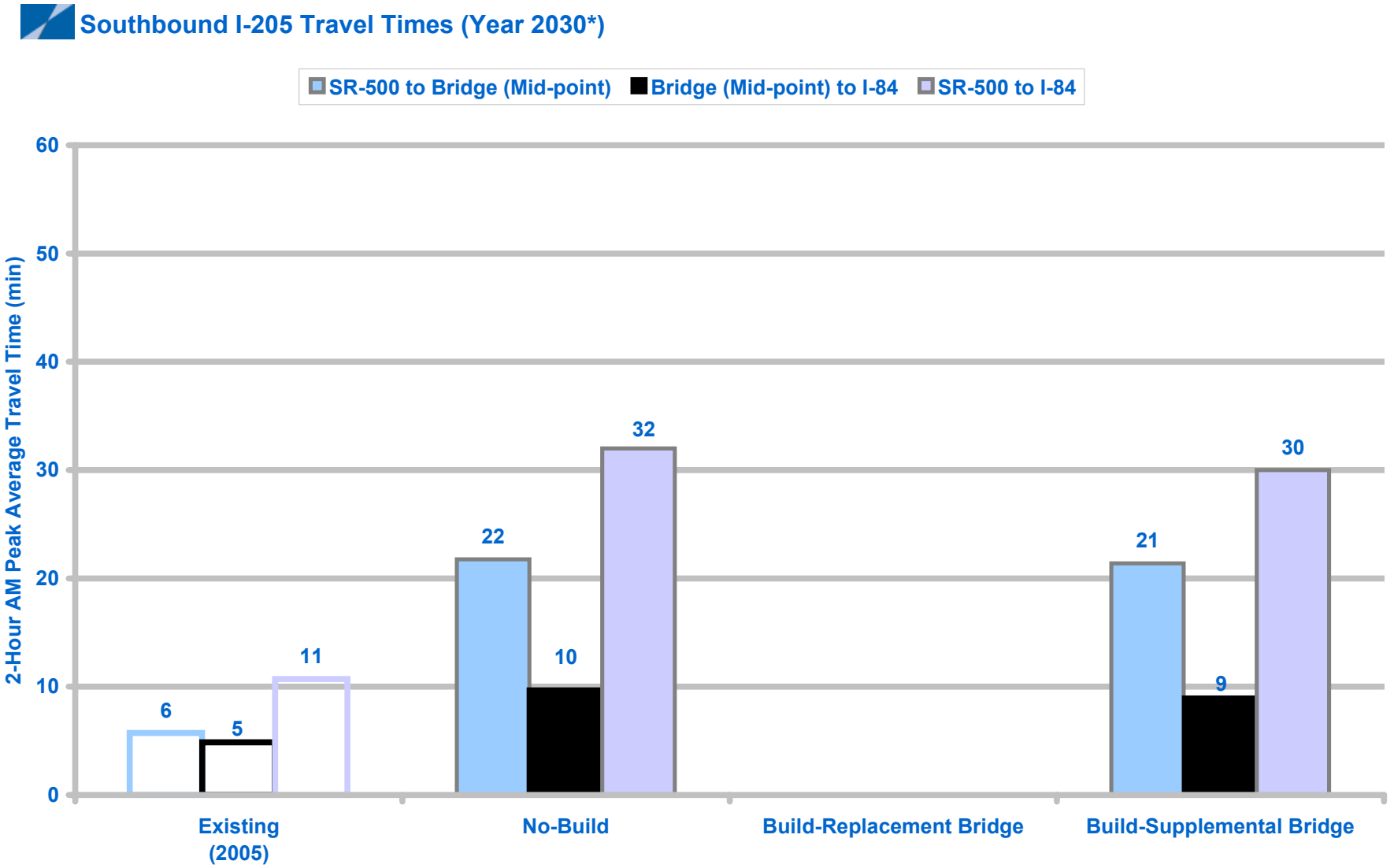
*Except for Existing Conditions (Year 2005)

Exhibit A-7

Compared to No-Build conditions, weekday morning peak period travel demands on I-205 northbound are forecast to increase throughout the entire corridor between 3 and 25 percent. The increased volume would divert from I-5 during the off-peak period due to the relatively free-flowing conditions forecast for I-205 during the morning peak. Vehicle demand with the supplemental crossing is forecast to be reduced by 7 percent or less compared to the No-Build Alternative.

Southbound I-205 travel times during the two-hour morning peak period would decrease by 2 minutes (6 percent) from SR 500 to I-84 for the supplemental crossing compared to the No-Build Alternative (see Exhibit A-8). This would occur due to decreased demand along I-205 from vehicles shifting to I-5.

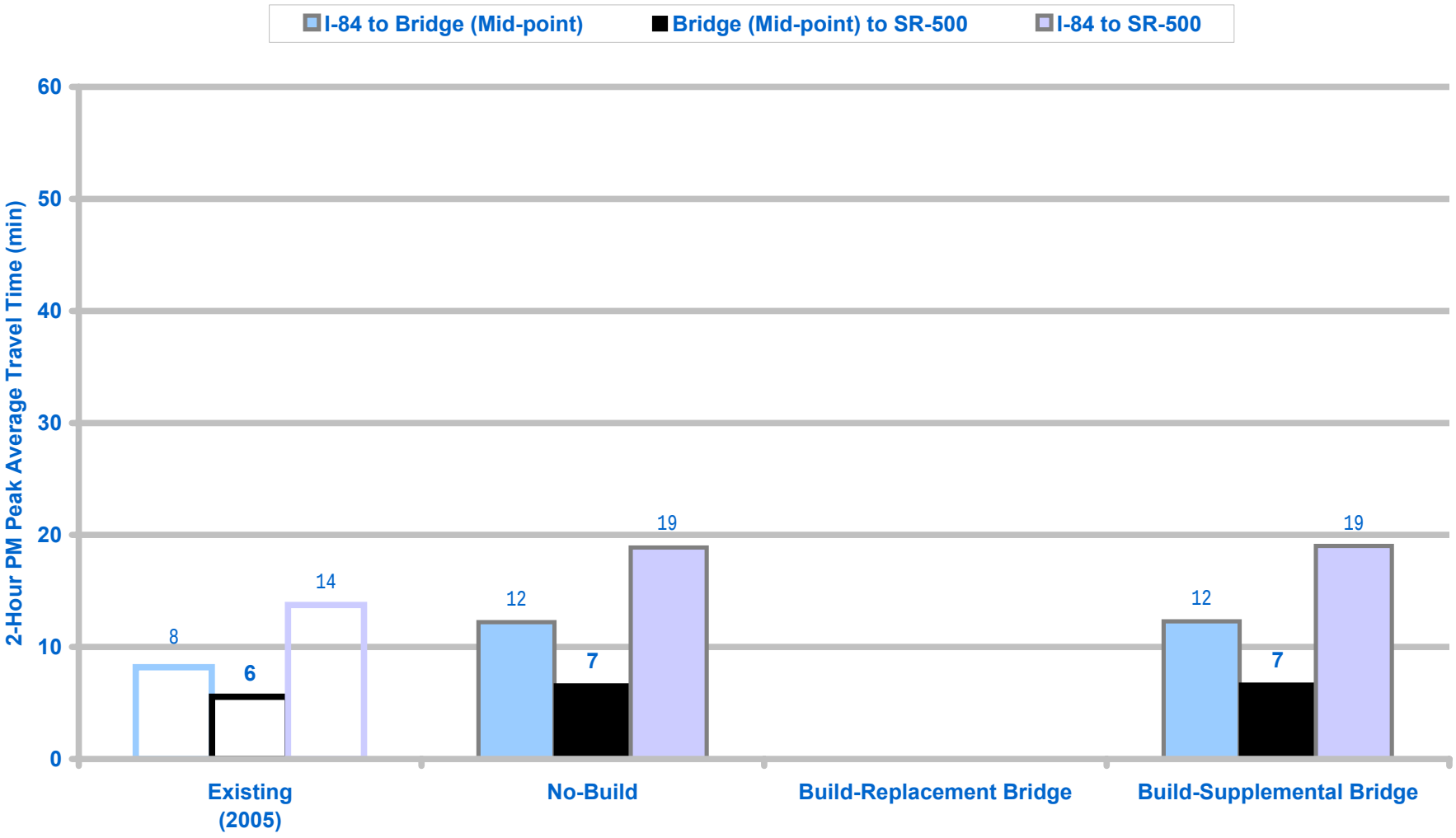
Northbound I-205 travel times from I-84 to SR 500 would remain similar under both the Supplemental and No-Build Alternatives during the two-hour afternoon peak (see Exhibit A-9).



*Except for Existing Conditions (Year 2005)

Exhibit A-8

Northbound I-205 Travel Times (Year 2030*)



*Except for Existing Conditions (Year 2005)

Exhibit A-9

A.1.3 Impacts from Increased Vehicular Capacity, Conclusion

A replacement crossing would provide more congestion relief than the supplemental crossing or No-Build Alternative. The No-Build Alternative would only accommodate about 55,000 person-trips during peak periods, and is predicted to increase congestion to 15 hours/day by 2030. The greater capacity of a replacement crossing—over 75,000 person-trips/day during peak commute periods, versus approximately 66,000 person-trips for a supplemental crossing—would reduce duration of congestion to 3.5 to 5.5 hours/day. For the morning peak providing high-capacity transit and including tolls on I-5 would reduce overall southbound volumes for both I-205 and I-5.

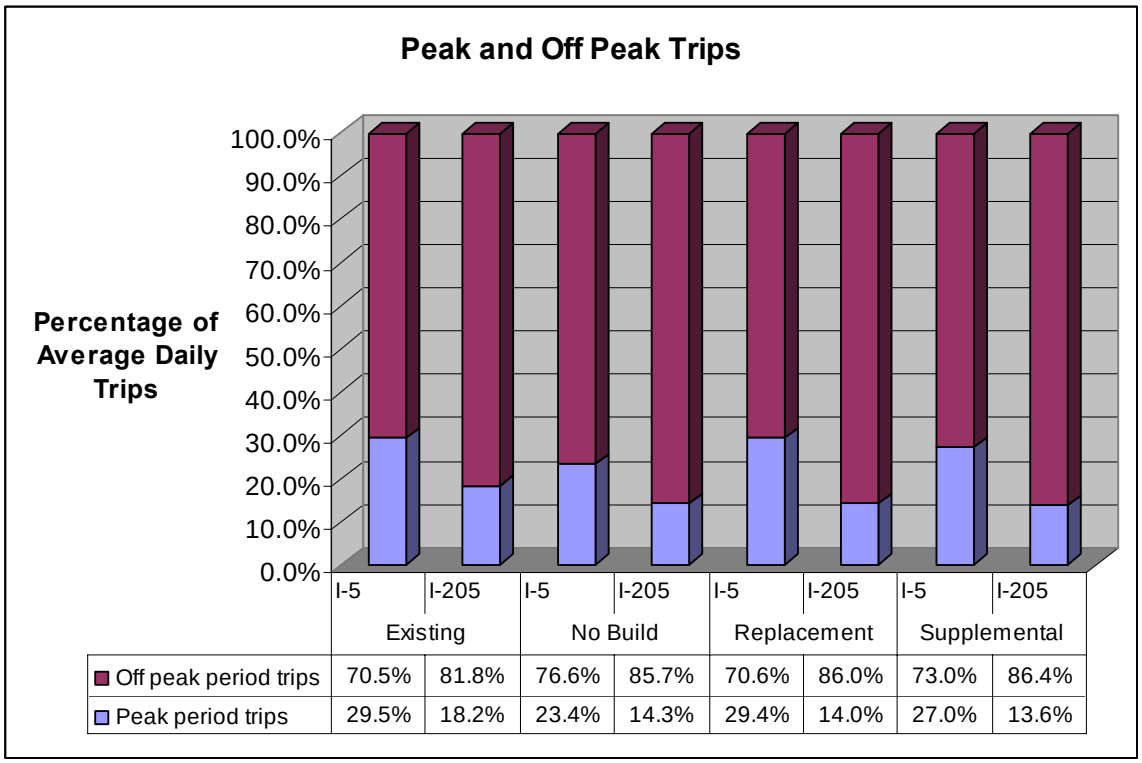
The replacement option provides the most capacity. On I-5, in the northbound PM peak, the replacement option can accommodate more trips than any other option (see Exhibit A-10 and Exhibit A-11). In the southbound AM peak, the throughput between the replacement, supplemental, and no-build options differ very little.

Exhibit A-10. Peak and Off Peak Period Throughput

	Existing		No Build		Replacement		Supplemental	
	I-5	I-205	I-5	I-205	I-5	I-205	I-5	I-205
SB, AM	19,000	13,300	22,000	15,900	24,000	16,100	23,200	16,100
NB PM	20,500	13,400	21,100	14,100	28,400	13,700	21,400	13,700
Total Peak trips	39,500	26,700	43,100	30,000	52,400	29,800	44,600	29,800
Average Daily Trips	134,000	146,470	184,000	210,000	178,000	213,000	165,000	219,000
% peak	29.5%	18.2%	23.4%	14.3%	29.4%	14.0%	27.0%	13.6%
% off peak	70.5%	81.8%	76.6%	85.7%	70.6%	86.0%	73.0%	86.4%

Northbound, pm peak commute patterns provide the best data for comparing the differing levels of capacity and throughout. The replacement option serves 28,400 PM peak trips which is significantly higher than the Supplemental option (with only 21,400). However, it is important to consider total throughout when assessing potential land use impacts. The replacement option (for the previously explained reasons related to HCT and tolling) actually accommodates less total throughout in the PM peak than the no-build option. More of the trips, however are able to travel during the peak periods. Exhibit A-11 below, shows that the percentage of trips that are able to travel during the peak periods, is higher with build options, and highest with the Replacement option. The number of trips that are accommodated in the peak is largely drawn from the trips that, under the no-build, had shifted to off-peak times in order to avoid the high levels of congestion in the corridor.

Exhibit A-11. Average Daily Traffic Peak and Off Peak Trips



Highway capacity increases provide, to the commuter, a savings in travel time. This savings is one of many factors with financial implications and which may influence locational decisions. The monetary cost of transportation (especially of the home to work commute) is also a factor. The travel time savings provided in the possible build scenarios (from I-84 to 179th Street) ranges from 15 to 18 minutes. These savings are likely offset by the costs of tolling.

For I-205 differences between alternatives are smaller than those for I-5. Southbound I-205 afternoon peak traffic demand growth forecasts are similar to morning northbound peak conditions, with small growth estimated throughout the I-205 corridor. Providing high-capacity transit and including tolls on I-5 would reduce overall southbound volumes for both I-205 and I-5 during the morning peak. Under the Replacement option, northbound traffic would increase only in the off-peak morning. These findings indicate a more balanced directional peak for the I-205 bridge. It is not likely that there would be any indirect impact to land use along the I-205 corridor.

The addition of highway capacity is unlikely to have a significant effect within the region as the travel savings of this improvement are a very small part of overall savings necessary to significantly shorten trip times between employment centers with the urban fringe or beyond. In some cases for southbound trips within the BIA, the build options actually increase travel times. Even in cases where mainline travel times may be significantly reduced, the total commute time (e.g. from northern Clark County, Battle Ground, etc to the Rode Quarter or Portland City Center) would be longer than an hour. Nevertheless, the round-trip commute in this example could be as much as 23 minutes

shorter. It is possible that such a travel time savings could influence locational decisions. However, as was repeatedly reported in the published literature, growth management plans, zoning, and economic conditions are more likely to control land use development.

The adopted growth management plans, laws and implementing ordinances, discussed at great length in Chapter 4, were crafted to achieve many goals including the control of sprawl, support for compact urban development, and the completion of a regional High Capacity Transit system. The CRC project provides High Capacity Transit to the urban core and subsequently supports compact mixed use development near the transit stations. However, it may also enable a long commute (by car) to occur more quickly. With the use of tolls, and the increased implementation of TDM strategies, it is not likely that the capacity increases will induce growth. Given that the pressure to sprawl is, at most, slight, it can be concluded that the adopted plans and implementing regulations will be able to manage the potential for change.

That the CRC project is unlikely to induce sprawling land use patterns is confirmed by the literature search section of the analysis. In interviews with senior staff from the City of Portland, City of Vancouver, and Clark County, these findings were generally supported.

A.2 Indirect Impacts Associated with High Capacity Transit Stations

A.2.1 The Connection between Transit and Development

A.2.1.1 Nationally

Transit options, such as Bus Rapid Transit (BRT) and Light Rail Transit (LRT) have a significant impact on both the urban landscape and the economy. The American Public Transportation Association (APTA) estimates that each dollar invested in public transportation generates $4 - 9 in local economic activity. Furthermore, every $10 million in capital investment generally produces a $32 million increase in business sales (APTA 2007). These figures support the argument that economic development opportunities have, and will continue to arise from investment in transit. Case studies of transit projects in the United States reveal that transit may increase both residential and commercial property values and attract future development. Increased pedestrian activity near transit stations can also improve economic vitality within transit corridors.

A study by the University of North Texas Center for Economic Development and Research found that locations near Dallas Area Rapid Transit (DART) lines experienced a 25 percent increase in value over comparable properties away from rail lines. Furthermore, the study suggests that DART light rail transit may have increased retail sales in the area. The Dallas central business district experienced a 36.2 percent growth in retail sales since DART service started (Weinstein 1999). By 2001, there was over $992 million in development near completed and planned light rail stations, including office, retail and residential units (MaryPIRG Foundation 2003).

Metro subway and light rail stations in downtown Baltimore have attracted an $800 million transit oriented development intended “to reshape a section of midtown. Washington, DC has experienced substantial development around its rail stations. On

Washington Metro Area Transit Authority (WMATA) owned-land, 54 developments worth more than $2 billion have been built thus far. Metro's success can also be measured by its effect on property values. Residential properties near WMATA stations cost $6 to $8 per square foot more than properties located at a greater distance from light rail stations (Light Rail Now 2006a). Lastly, development and real estate investment near MetroLink light rail stations in St. Louis have generated approximately $1 billion since its opening in 1993 (Cura 2003).

Because there are many more LRT systems in operation than BRT systems, particularly in the U.S., there is much more documentation about development around LRT stations. However, there are many examples of development around BRT stations in cities such as Adelaide and Brisbane, Australia; Ottawa, Canada; Curitiba, Brazil; as well as Boston and Pittsburgh (TCRP 2003). The Transit Cooperative Research Program Report 90, from 2003, includes case studies of numerous BRT systems. It noted that the Ottawa transitway has brought (in US dollars) $675 million in new construction investments near stations. It also states that there have been similar economic benefits from the Allegheny County Port Authority BRT projects, with $302 million in development, 80 percent of which was at stations (Levinson 2003). Due to limited project funding, Boston chose to use BRT instead of extending its subway line to the Seaport District in South Boston (Cervero 2004). Boston's Silver Line, the City's first BRT service, has driven $500 million in investment around transit stations (Swope 2006).

A.2.1.2 Locally

Portland's historic streetcar helped shape the development patterns of the City during the late nineteenth and early twentieth centuries, with the majority of new development occurring near rail lines. A recently completed study found that over 90 percent of the tax lots created between 1881 and 1930 occurred within one mile of historic streetcar routes (Cohen, Kinkley 2007). This trend has continued recently with similar development intensification along light rail and modern streetcar lines. Since the 1997 alignment of the first modern streetcar's path, over $2 billion has been invested within two blocks of the Portland Streetcar line (Portland Office of Transportation 2006). Since 1978, Portland's MAX light rail system has helped to generate over $6 billion in development within walking distance of rail lines. Construction of the Yellow Line, completed in 2004, attracted more than 50 new businesses to the area. The Eastside Blue Line was a catalyst for $4.7 billion in development and revitalization, especially in the City Center and Lloyd District (Tri-Met 2006). The precursor to the CRC project was the Portland-Vancouver I-5 Transportation and Trade Partnership (Partnership). The Partnership determined that the addition of Light Rail stations in Hayden Island and in downtown Vancouver would result in more mixed use and compact housing development around transit stations.

A.2.2 Differential impacts by Transit Mode

A.2.2.1 Related Factors

There is still limited documentation about the expected level of economic development around BRT and LRT stations, or whether one mode of transit will consistently induce more economic development than the other. A comparative analysis of the respective increases in development triggered by LRT versus BRT systems should take into account the local zoning, market forces, developer incentives, origin and destination points, and

public preference for mode of travel. These factors have been found to greatly affect the levels of economic development at transit stations (Thomas 2004; ECONorthwest 1998; Seskin 1996; and Cervero 2004, 1993). Since published literature has thus far been unable to control for factors such as TOD incentives and variations in zoning, a direct comparison of BRT and LRT's development impacts is not available.

In general, the development impacts of a transportation investment are the result of three factors—the characteristics of the infrastructure itself, the nature of land use and development policies in the vicinity, and the strength of markets. In this analysis, the long-term nature of the analysis makes an assessment of market conditions problematic. As for development policies, they are generally highly supportive in the vicinity of the proposed service. So the difference in the development potential of LRT and BRT would depend, somewhat, on the inherent qualities of the service each offers. This includes the effects of each on the accessibility of specific locations, the overall levels of boardings at stations, and other factors that affect the "attractiveness" of the service.

No studies have been identified that attempt to estimate the relative contribution of mode to development. Thus a direct comparison of BRT and LRT's development impacts is not available, and comparisons must be qualitative, and carefully qualified. The analysis that follows is an attempt to report a balanced view of the issue. In general, the evidence suggests that both BRT and LRT can be catalysts for economic development. There is evidence that LRT has a wider catchment area than BRT, which suggests that LRT stations are more likely to develop more intensely. In addition, LRT is perceived as a more attractive mode of travel, but the development consequence of this perception is difficult to determine, especially without reference to ridership forecasts.

A.2.2.2 Evidence and Opinions from Literature

One recent study (Currie, 2006) reported on a review of relevant literature and assessed the strengths and challenges of BRT (and local buses) compared to LRT in relation to transit-oriented development. One difference between the modes is that rail is generally associated with high-density/large-scale development and bus with low density/small-development. Some factors identified as challenges or weaknesses of BRT compared to LRT for TOD potential include the following:

- Industry TOD capabilities: there is some evidence that implementing successful bus transit-oriented development (BTOD) is more difficult than rail transit-oriented development (RTOD); Cervero et. al. (2004) found that only three percent of transit agencies engaged in BTOD had full-time staff to run BTOD programs versus 42 percent of rail agencies.
- Pedestrian access: high-quality, grade-separated direct walk access is generally considered to be more difficult to achieve for BRT than for LRT. Quality pedestrian access is a desirable part of successful TODs, but not necessarily essential.
- Noise and air pollution: even when alternative fuels are used, diesel buses result in more noise and air pollution than electric rail systems, which makes it more difficult for diesel-based BRT systems to result in a place where people want to live and work.

- Track record: BTOD does not have as many successful examples as RTOD and little is known about the impacts of BTOD. According to a recent survey, only 8 percent of U.S. TODs were BTOD (Cervero, 2004). Objective independent assessment of BTOD programs is rare, which could result in caution for potential developers.

Some factors identified as strengths of BRT compared to LRT for TOD potential include the following:

- Flexibility in choice: BRT can better mimic the many-to-many nature of suburban trip patterns better than rail and may be an attractive option where communities don't want high densities.
- Service frequency: BRT typically results in more frequent service than LRT.
- Transfers: BRTs that run to the suburbs then down a dedicated "trunk" busway can result in fewer passengers needing to transfer from one vehicle to another.

In summary, the article found that BRT had some significant weaknesses compared to LRT, but can provide an important complementary function in supporting RTOD and providing TOD benefits on a more comprehensive scale.

Another article by an author that has authored reports for the US Department of Transportation has found that the impact on land use and city livability is rated as "strong" for LRT and "some" for BRT (Vuchic, 2005). For heavy passenger volumes and direct service in pedestrian zones, LRT is usually superior to BRT.

In "Techniques of Urban Sustainability: Quality Transit" by Jeff Kenworthy, a number of issues are identified that suggest a higher level of economic and land development benefits associated with light rail as opposed to bus rapid transit systems. Additionally, the report identifies a number of preferential factors that encourage greater ridership and greater public acceptance of rail over bus systems.

Kenworthy asserts that where bus systems replace rail systems there is a significant decline in ridership, even in cities that have utilized exclusive busways and other BRT elements. Ottawa, he finds, has had declining transit since its commitment to a BRT system. And in San Diego he found that more people have shifted from auto modes to the new LRT system, something which the previous bus system was not able to do despite busways. In San Diego's northern corridor, with BRT and park and ride facilities, utilization is around 50 percent that of the park and ride stations on the LRT lines. Kenworthy relies on findings suggesting that factors which discourage residential and commercial development around bus stations include: insufficient speed and service; poorly understood routes and service; and the image of a bus station as being noisy, polluted, or with other environmental problems (Henry 1989). Headways for BRT in the CRC project will be high enough that the service will be easily understood and reliable. However, the perception of noise, pollution, and other environmental conditions will likely still be an issue.

A bus system is also perceived as representing a lower level of public commitment to transit and one whose permanence is not guaranteed because of the ease with which services can be altered or rerouted (Austin Planning and Growth Management

Department 1986). The better potential of rail to attract development also provides the possibility for governments to participate in joint development (Keefer 1985; Cervero et al 1992). Public-private partnership mechanisms are capable of yielding up-front capital contributions from the private sector, revenue from leasing of air rights, property rents, station connection fees, and other methods. These partnerships may also return to the public purse some of the windfall gains that can accrue to the private sector from public investment in transit, such as the rezoning of adjacent land to higher value land uses.

The United States General Accounting Office released a report in 2001 which highlighted many of the benefits of Bus Rapid Transit systems. The report confirmed other findings regarding potentially negative stigmas associated with bus systems: “Transit operators with experience in Bus Rapid Transit systems told us [GAO] that one of the challenges faced by Bus Rapid Transit is the negative stigma potential riders attach to buses regarding their noise, pollution, and quality of ride. The Study also confirmed the likelihood of Light Rail Transit to more positively impact economic development at stations (US GAO 2001). It attributed this different ability partly to the permanence of the investment with rail lines.

The report also included two somewhat unique findings. Firstly, that the images associated with LRT and BRT impact more than just the mode choices of potential riders. “Several city transit officials and transit consultants told us [GAO] that communities see Light Rail as a mark that a city is "world-class," and could help a city improve its image and ability to attract economic development.” Secondly, the report suggests that bus systems (including BRT) generally have more dispersed stops, and can leave the guideway. Light Rail systems, on the other hand, rely on centralized stops and stations which often become a node for increased development. Since BRT can leave the guideway, the economic development impact of Bus Rapid Transit may be more diffuse.

A.2.2.3 Case Studies and Representative Cities

A.2.2.3.1 Philadelphia

Philadelphia. Under the auspices of the Delaware Valley Citizens Council for Clean Air, a survey was conducted in June and July of 1991. The survey titled, “Survey of SEPTA light rail/bus rider behavior & perceptions: preliminary report of onboard survey secondary results,” was an onboard survey of riders of selected bus and light rail transit (LRT, or trolley) routes operated by the Southern Pennsylvania Transportation Authority (SEPTA).

The routes selected for surveying were SEPTA's Media and Sharon Hill LRT (trolley) lines and the Route 103 bus to Ardmore (which uses private busways in Ardmore and near the 69th St. Terminal). These routes were selected because of the relative homogeneity of their demographic areas and similarity of their types of service; features which present a rarely experienced opportunity to focus on mode-specific behavior and perceptions. All three lines extend from SEPTA's 69th St. Terminal into suburban communities, using a variety of alignments on public thoroughfares, reservations, and exclusive guideways.

The study found that LRT tends to attract a greater proportion of nonwork trips than bus for these generally equivalent types of transit service. It also found that bike and pedestrian access times to and from LRT stations/stops are significantly greater than those for bus for these similar types of service. This finding suggests that LRT patrons tend to be willing to walk (and possibly to bike) further to and from LRT services than is the case for bus, in this instance by a difference of nearly 3 minutes. This translates into the likelihood that development intensities and economic benefits for light rail would extend further from each transit station.

The City of Philadelphia also examined similar services of the Southeastern Pennsylvania Transportation Authority's (formerly Red Arrow) suburban trolley lines and the Ardmore busway. Curiously, the history of the Ardmore busway itself gives some corroboration to the case for the greater attractiveness of LRT, since, when the route was converted from trolleys to buses (i.e., LRT to BRT) in 1967, ridership dropped 15 percent—despite the replacement of older streetcar equipment by modern, air-conditioned buses on a newly paved-over private right-of-way.

A.2.2.3.2 Boston

TCRP (2007) reported on the results of a survey of Boston area developers which revealed that developers have seen a benefit in the connections to downtown provided by the city's new BRT Silver Line; however, some developers expressed a preference for rail because they had concerns about the transit agency's long-term commitment to BRT and its ability to link BRT to the entire system.

A.2.2.3.3 Ottawa

The City of Ottawa conducted a survey about the relative differences between LRT and BRT, including public preference for mode.

Ontario's BRT system has, for more than a decade, held the status of a model for BRT in North America. The Ottawa Transitway's status as a showcase for BRT is questioned by the City's officials and planners. Their Rapid Transit Expansion Study (Feb 2003) includes a section "Comparing Bus and Rail Technologies." In this section, Ottawa planners note some general comparative features between LRT and BRT.

Public sentiment, as reported in the City of Ottawa document, seems to favor LRT technology. In addition to its BRT system, Ottawa's transit agency has been operating a short self-powered light railway (called the O-Train), on a somewhat "experimental" basis since the fall of 2001. The public and stakeholder opinion included a perception that LRT will be more effective in achieving the smart growth objectives of intensification and redevelopment due to its sense of permanency and service reliability.

A.2.2.3.4 Washington D.C.

A survey of developers conducted in Washington DC reported a consensus opinion that investment along a LRT line would yield a higher return than would investment along a BRT line (WMATA, 2005). LRT is thought by some to attract more economic investment than BRT due to the higher visibility of rail lines and the fact that rail infrastructure is seen as a more permanent public investment. "Developers and home

buyers alike seem to be attracted to the permanence of rail transit" Dittmar and Poticha (2004). Since BRT utilizes a rubber tired bus, BRT vehicles could be diverted onto other corridors. LRT, however, can only run in corridors where the investment in rails has already been made (WMATA 2005).

A.2.3 Image and Appeal

There are also findings regarding the qualitative appeal of LRT. Rail based transit was found to project a more positive image to its passengers than in the case of similar bus service. LRT passengers found the LRT lines more understandable, more reliable regarding their schedules, more spacious, and more comfortable overall (producing less odors, fumes, and noise).

In the aforementioned City of Ottawa, Rapid Transit Expansion Study (Feb 2003) it was shown that public and stakeholder opinion included a perception that LRT will be more effective in achieving the smart growth objectives of intensification and redevelopment due to its sense of permanency and service reliability.

"Rail has a more positive image than bus" reported Dittmar and Poticha (2004). Many light rail supporters argue strongly that, for fundamentally equivalent types of transit service, light rail will attract more riders. In other words, the public tends to be drawn by certain specific attributes of LRT service—the permanence of the alignment, vehicle comfort, etc.—in a way and to a degree not exhibited for similar bus operations. The result is substantially higher LRT ridership for a given investment in higher-quality transit (bus or rail). "Because the locations of bus routes are not fixed or permanent, this greatly increases the risk of investing in transit-supportive land use development" California Department of Transportation (2002). BRT routes are more fixed than regular bus routes, but are not as permanent as rail investments.

The Light Rail Now Project is a charitable educational enterprise designed to support efforts both to develop and improve light rail transit (LRT) and other rail transit and mass transportation systems. They have a clear bias for light rail. Their article "American Public Says: Let's Have More Rail!" reports, that when asked which modes they like, 44 percent of respondents selected "commuter" trains (apparently referring to both local and regional rail transit). That was nearly double the 23 percent that opted for local bus service.

Though not measuring the different level of support for the two mode choices, support for light rail has also been found in surveys within the CRC project area. Completed by the Intercept Research Corporation of Tigard Oregon, and funded by the City of Vancouver, the survey included responses from 600 residents. On Tuesday August 21, 2007, the results of the survey captured the headline of the Columbian newspaper: "Light Rail gains support in Vancouver." The survey found that 65% of survey participants responded positively to the question: "Should light rail be brought to Vancouver." The October 2007 CRC open houses surveyed participants on a number of subjects, including HCT modal preferences. The results show a preference for light rail transit (over BRT).

Operationally, there may also be factors which contribute to the difference in public opinion regarding the two modes. Bus systems are considered less reliable and less clean

in terms of noise, air quality, etc. And, especially because most Americans have not experienced a BRT system, these opinions tend to taint the perception of BRT systems. When locational decisions are being made, residentially and commercially, perceptions become real factors in decision making.

Moreover, for this project, the perceived superior performance of light rail appears to be supported by analytical findings. The Noise and vibration analysis shows that BRT will have significant noise impacts. Most of these can be mitigated through improvements to windows and insulation. However, outdoor noise levels will remain higher with BRT than under the No-Build or LRT options. Additionally, the higher levels of noise associated with BRT contribute to its perceived lower quality of service. High noise levels can be detrimental in an urban environment, especially one like downtown Vancouver or in the potential lifestyle center developed on Hayden Island. These areas are destinations, which need to have positive pedestrian environmental, opportunities for outdoor dining, and (in downtown Vancouver) accommodations for events an concerts in public parks and plazas.

LRT also provides better travel times than BRT (Exhibit A-12). In addition, BRT buses travel with mixed traffic outside the project area, and are thus subject to congestion-induced delays before they enter the exclusive guideway in the project area. Such delays can cause the buses to miss their schedules and increase travel-times. This introduces an element of unreliability that deters ridership. Increasing the frequency of buses (Enhanced Transit) further reduces BRT travel times by placing so many vehicles in the guideway that the buses cause congestion and slow themselves down. The larger capacity of LRT trains allows lower overall frequencies while providing the same or greater capacity.

Exhibit A-12. Travel Times (minutes)

	BRT		LRT	
	Standard Transit[a]	Enhanced Transit[b]	Standard Transit	Enhanced Transit
Expo Center to Lincoln or Kiggins park & ride	13	25	12	12
Lombard Transit Center to Lincoln or Kiggins park & ride	25	34	18	18
Downtown Vancouver (7th St.) to Pioneer Square	35	33	32	32
Pioneer Courthouse to Lincoln or Kiggins park & ride	46	54	40	40

[a] "Standard Transit" includes longer headways between transit vehicles, and requires purchase and operation of fewer buses or trains. This has been paired with Replacement alternatives, but is an option for either river crossing.

[b] "Enhanced Transit" includes shorter headways between transit vehicles, and requires purchase and operation of fewer buses or trains. This has been paired with Supplemental alternatives, but is an option for the river crossing.

A.3 Summary

The following points are critical to the understanding of the indirect impact of HCT in the Columbia River Crossing Project.

1. Economic development, and land use intensification opportunities have, and will continue to arise from investment in high capacity transit. There is documented evidence of this occurring at both Light Rail and Bus Rapid Transit Stations. (APTA

2007, Cura 2003, Levinson 2003, Light Rail Now 2006a, MaryPIRG Foundation 2003, Weinstein 1999). This has also been found to be the case in the Portland Metropolitan Area. (Portland Office of Transportation 2006, Tri-Met 2006)

2. There is still limited documentation about the expected level of economic development around BRT and LRT stations, or whether one mode of transit will consistently induce more economic development than the other. Local zoning, market forces, developer incentives, origin and destination points, and public preferences have been found to greatly affect the levels of economic development at transit stations. (Cervero 2004, 1993, ECONorthwest 1998, Seskin 1996, Thomas 2004)

3. Ridership is directly correlated with transit oriented development (TOD) potential. LRT is preferred by riders because it is considered to provide better transit performance and because it is less associated with the noise, and pollutants of diesel based transit systems. (Currie, 2006, Dittmar and Poticha 2004, Henry 1989, Kenworthy 2000, Vuchic, 2005)

4. There is a perception amongst the public and among real estate developers that rail is a more permanent transit investment, and therefore more likely to encourage and sustain TOD. (Austin Planning and Growth Management Department 1986, California Department of Transportation 2002, Ottawa Rapid Transit Expansion Study 2003, TCRP 2007, WMATA 2005)

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