Public Review Draft - Revised

I-5: Hayden Island Interchange Area Management Plan

Portland, Oregon

Oregon Department of Transportation

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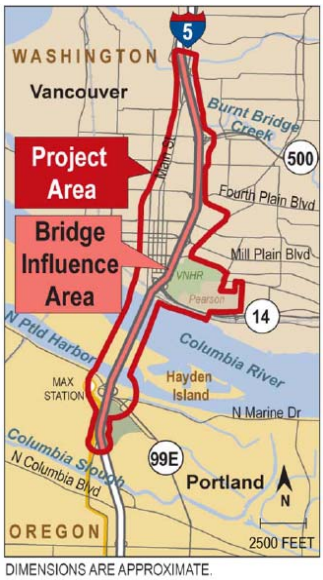


FIGURE 1. CRC Project Area (Source: CRC Draft EIS)

Introduction

The Hayden Island Interchange Area Management Plan (IAMP) has been prepared for the Columbia River Crossing (CRC) project, which would reconstruct the crossing over the Columbia River of Interstate 5 (I-5) between Oregon and Washington. The project area includes roughly a quarter mile on either side of the I-5 alignment, extending to the southern edge of Delta Park in the south, and north to Salmon Creek in Washington State (Figure 1). The project would remove the existing interchange on Hayden Island and replace it with a new one. Additional information regarding the CRC Project can be found in the draft environmental impact statement for the project.

The Hayden Island interchange is located in the City of Portland. It is the most northern interchange on I-5 in Oregon (Figure 2). It provides the only access to Hayden Island from the mainland of Portland across the Columbia Slough to the south and from Vancouver across the Columbia River to the north.

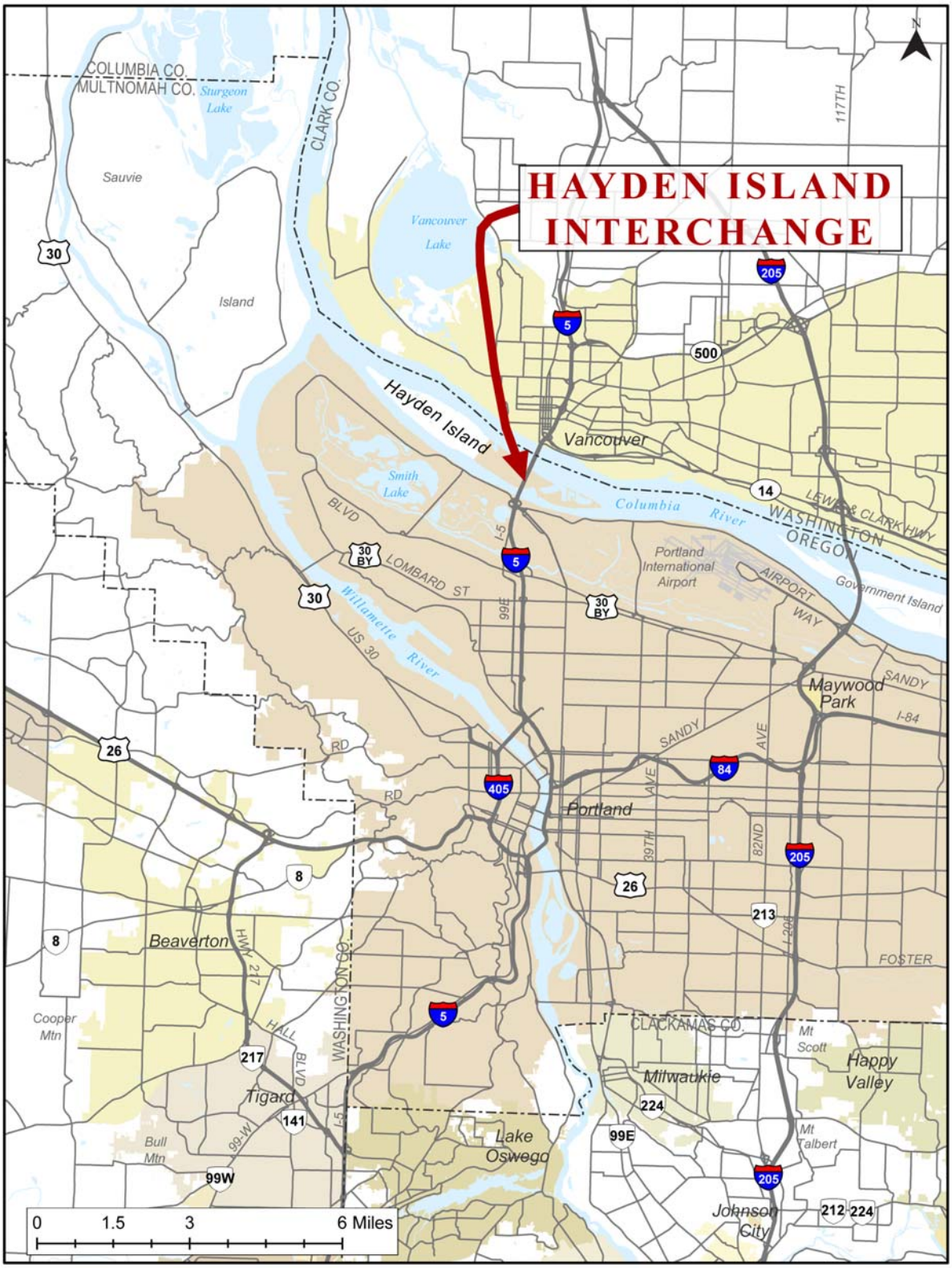


Figure 2. Hayden Island Interchange Vicinity Map.

IAMP Purpose

OAR 734-051-0155 requires that an IAMP be prepared for any new interchange and recommends an IAMP for significant modifications to existing interchanges. The purpose of an IAMP is to ensure safe and efficient operations between connecting roadways, to protect the function of the interchange, and to minimize the need for future major interchange improvements. Because new interchanges are very costly, state and local governments and citizens have an interest in ensuring that they function as intended and for as long a period as possible, while still supporting planned land use.

OAR 734-051-0155(7) requires an IAMP to comply with the following criteria, unless the plan documents why compliance with a criterion is not applicable:

a. Be developed no later than the time an interchange is designed or is being redesigned.
b. Identify opportunities to improve operations and safety in conjunction with roadway projects and property development or redevelopment and adopt policies, provisions, and development standards to capture those opportunities.
c. Include short, medium, and long-range actions to improve operations and safety within the designated study area.
d. Consider current and future traffic volumes and flows, roadway geometry, traffic control devices, current and planned land uses and zoning, and the location of all current and planned approaches.
e. Provide adequate assurance of the safe operation of the facility through the design traffic forecast period, typically 20 years.
f. Consider existing and proposed uses of all the property within the designated study area consistent with its comprehensive plan designations and zoning.
g. Be consistent with any applicable Access Management Plan, corridor plan or other facility plan adopted by the Oregon Transportation Commission.
h. Include policies, provisions, and standards from local comprehensive plans, transportation system plans, and land use and subdivision codes that are relied upon for consistency and that are relied upon to implement the Interchange Area Management Plan.

Problem Statement

The new I-5/Hayden Island interchange will be a high capacity design. For the interchange to function efficiently, it is essential for vehicles to be able to move between ramp locations. Therefore, the roads that connect the ramps are vital to the operation of the interchange. These connecting roads include N. Hayden Island Drive, N. Jantzen Drive, and N. Jantzen Avenue and are referred to collectively as the “horseshoe road” in this plan.

FIGURE 3. Interchange Design (Draft).

** The specific location and design of the interchange is still being developed by the CRC project. This map is illustrative and reflects a draft design as of November 25, 2009.*

For instance, a truck traveling northbound on I-5 to make a delivery to a business on the eastern part of the island would exit on the north end of the island, travel east on N. Hayden Island Drive, and then south on N. Jantzen Drive. To return to the freeway northbound, the truck would travel south on N. Jantzen Drive to the northbound entrance to the freeway (Figure 4). The roads—N. Hayden Island Drive and N. Jantzen Drive—connecting the northbound exit and northbound entrance function as a fundamental part of the interchange. Likewise, a vehicle traveling southbound on I-5 would exit on the south end of the island and follow a similar, but opposite path.

However, these roads are also an essential part of the local urban fabric. They provide direct access to businesses and residences on the island. To some extent, these two functions conflict. The primary concerns for interchange operations are safety and mobility, which are best served by minimizing the number of accesses and connections within the interchange influence area, particularly in locations closest to on- and off-ramps, and developing alternative access through the local street system where possible. In contrast, local businesses and residences prefer direct access to private property, multi-modal facilities, and frequent connections that minimize the need for out-of-direction travel on local trips. Additionally, limiting access and connections to the roads that serve the interchange can concentrate local traffic onto the local street system, creating a more auto-dominated character on those streets and negatively affecting the experience for the bicyclists and pedestrians who use them.

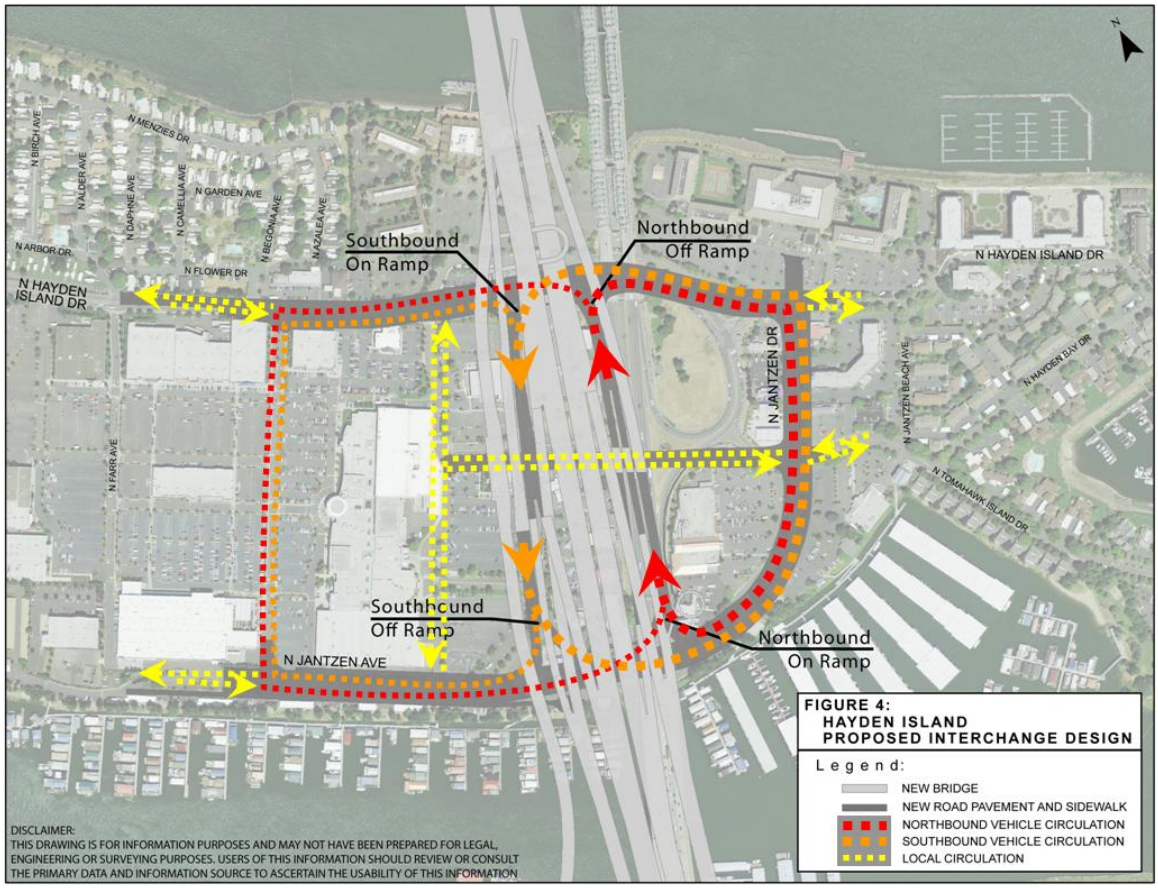


FIGURE 4. Interchange and Horseshoe Road Circulation Diagram.

The challenge for this IAMP is to find a balance between 1) limiting accesses that cause degradation in the safety and mobility of interchange operations, and 2) maintaining the accesses, local street connections, and multimodal environment that are important to the local community and businesses.

IAMP Goals and Objectives

The goals of the Hayden Island IAMP are to:

- Ensure safe and efficient operations between connecting roadways and to protect the function, operations, and safety of the interchange.
- Support the goals and objectives of the Columbia River Crossing project.
- Support the implementation of the City of Portland Hayden Island Plan.
- Establish that ODOT and the City of Portland will continue to coordinate development activities in the vicinity of the interchange.
- Support the goals and objectives established by the policies and standards of both ODOT and the City of Portland.

The objectives of the Hayden Island IAMP are to:

- Define the function of the interchange.
- Develop a street system and access management plan that assure safe and efficient operations in the interchange area. To the extent possible, meet Oregon Highway Plan mobility and access management spacing standards. To the extent possible, meet City of Portland transportation standards.
- Develop a local street network that provides for local connectivity, helps minimize the need for local travel using or traveling through the interchange, and helps minimize reliance on the horseshoe road for access.
- Ensure there is adequate capacity to meet projected demand in the interchange management area during the planning horizon.
- Develop a plan that is coordinated with the Columbia River Crossing project and City of Portland adopted plans.

Hayden Island IAMP Study Area

The Hayden Island IAMP has two study areas (Figure 5). The *traffic generation study area* encompasses the entire island, which constitutes the local area in the vicinity of the interchange that generates traffic affecting the interchange. The *interchange management study area* is where access and circulation may influence the safety and operation of the interchange. Within the interchange management study area, local circulation and access are considered and analyzed for effects and potential solutions. This area is also where environmental resources could be impacted by solutions recommended in the IAMP.

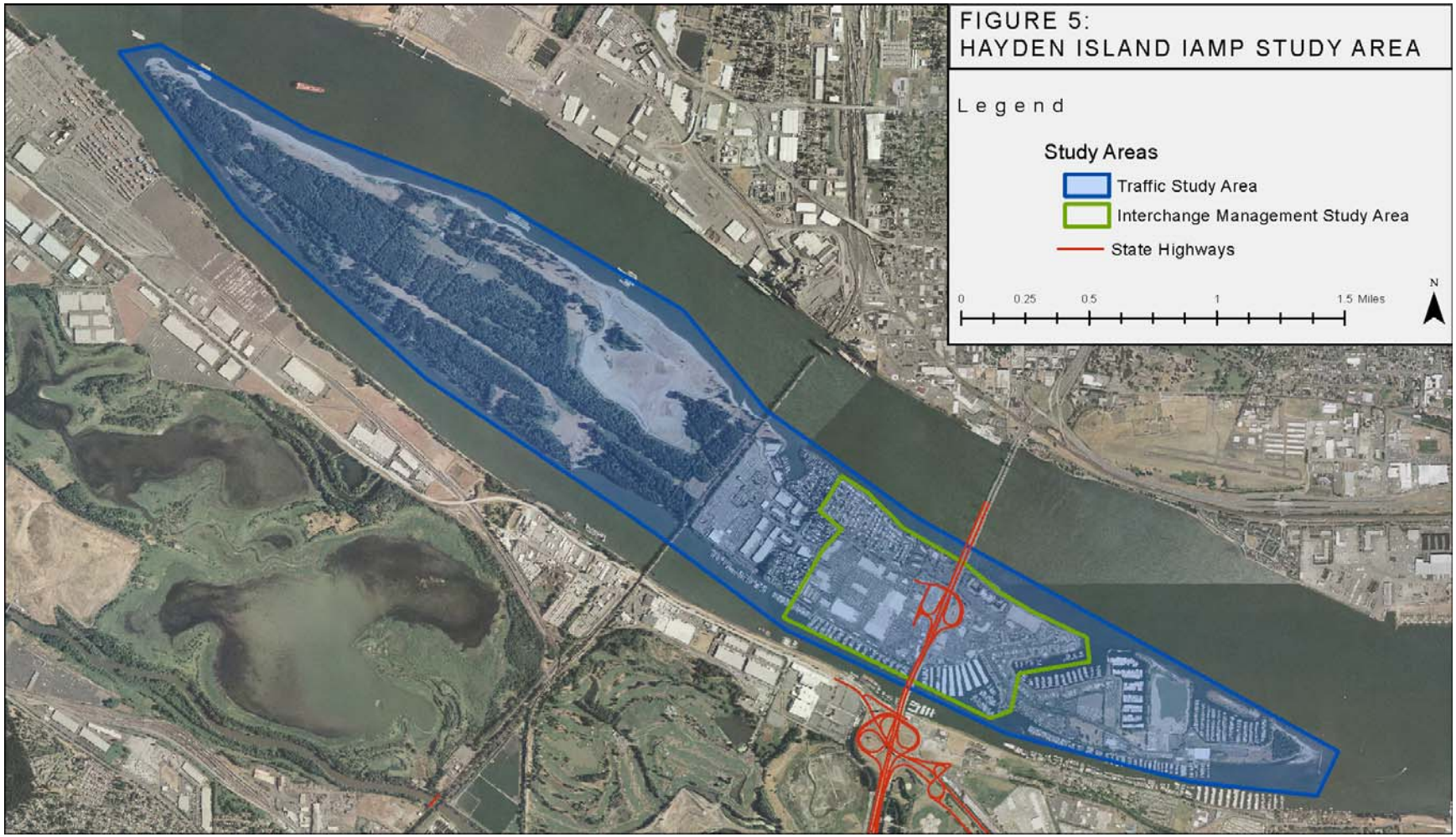


FIGURE 5. Hayden Island IAMP Study Area.

Land Use

Existing

East Hayden Island, located east of the BNSF railroad line, is located in the City of Portland and is mostly developed. The area includes 638 of the island's 1,450 acres and a mix of uses, with retail/commercial, industrial, and residential uses predominating (Table 1; Figure 6).

There are approximately 238 businesses in east Hayden Island, employing 2,952 persons. The primary retail/commercial development is the Jantzen Beach SuperCenter, located on 80 acres to the west of the current I-5 alignment. Other retail/commercial businesses include "big box" retailers, hotels, restaurants, gas stations, and a grocery store. Most of the island's businesses are auto-oriented, serving a mixture of community members and visitors. Industrial development includes auto wholesalers, manufacturing, and marine-related businesses.

The Hayden Island community has approximately 2,155 permanent residents, with roughly 5,000 boat owners visiting in the summer months. Condominiums make up the largest share of the island's housing units (43%), followed by manufactured (28%) and floating homes (23%).

TABLE 1. Existing land uses on Hayden Island.

Variety of Uses

East Hayden Island is largely developed and includes a variety of uses, which are summarized in the following table.

Use	Acres
Residential *	132
Floating homes*	49
Retail / Commercial	350
Industrial	193
Marinas**	122
Open space	1

* land based only
** water area only.

(Source: Hayden Island Plan, June 2009, p. 6)

West Hayden Island, the area west of the BNSF line, is undeveloped. It is planned for industrial development, but has not yet been annexed by the City of Portland and currently retains rural zoning. It is owned by the Port of Portland and will likely include a combination of industrial, port-related uses and habitat conservation areas in the future.

Planned

The City of Portland adopted the Hayden Island Plan in 2009. The plan applies to the portion of the island east of the BNSF line. It was coordinated with the Hayden Island interchange design and light rail station location developed by the CRC project, and it acknowledged the need for the development of the Hayden Island IAMP. The plan establishes the opportunity to transition from the "big box" retail currently at the Jantzen Beach SuperCenter to transit-oriented development (Figure 7). The plan also establishes a network of public streets and separate bicycle and pedestrian facilities, and locates a light rail station just to the west of the interchange on N Tomahawk Island Drive (Figure 8).

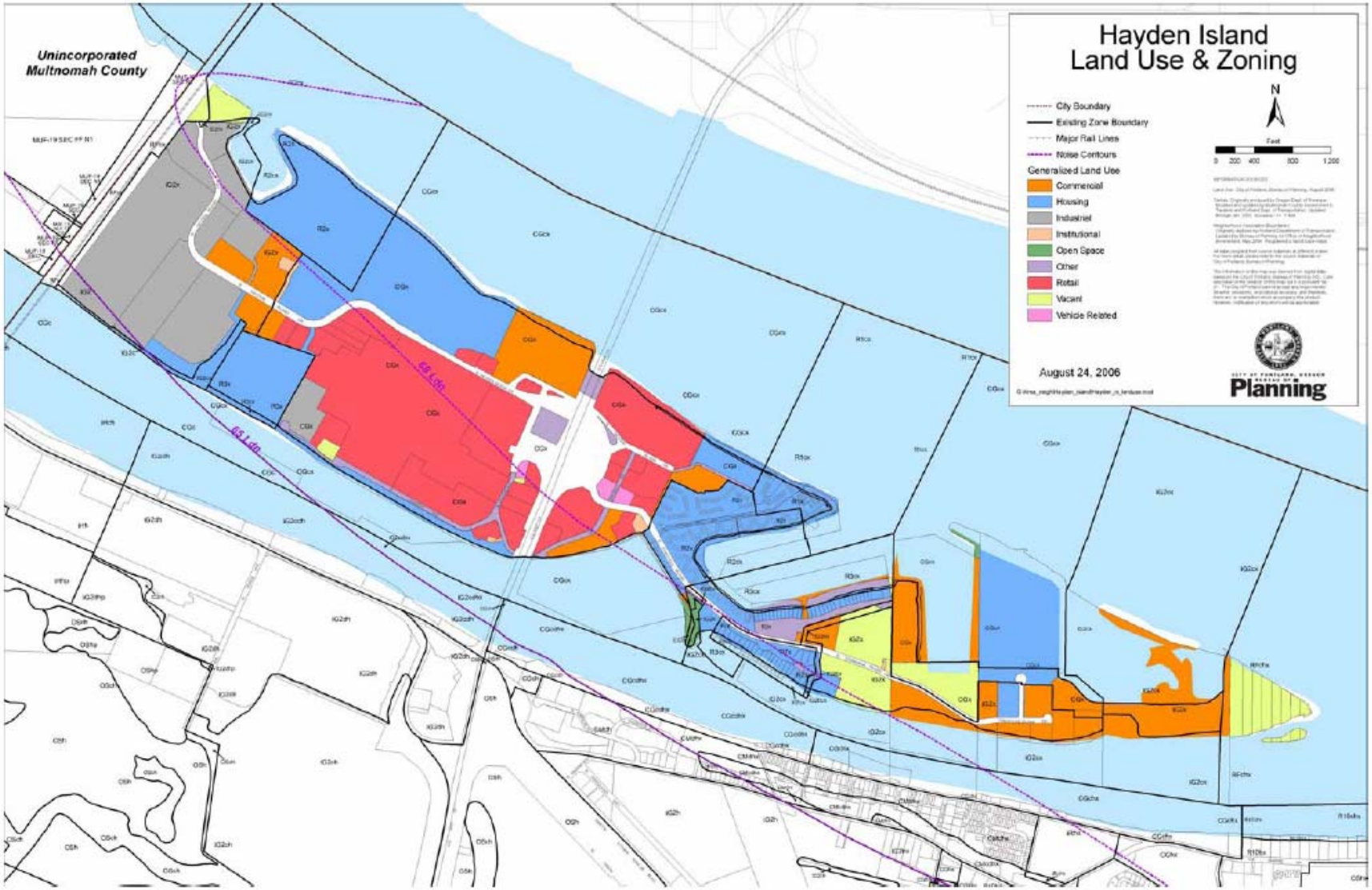


FIGURE 6. Hayden Island Land Use and Zoning. (Source: Hayden Island Plan, June 2009, Appendix B-1, p. 6)

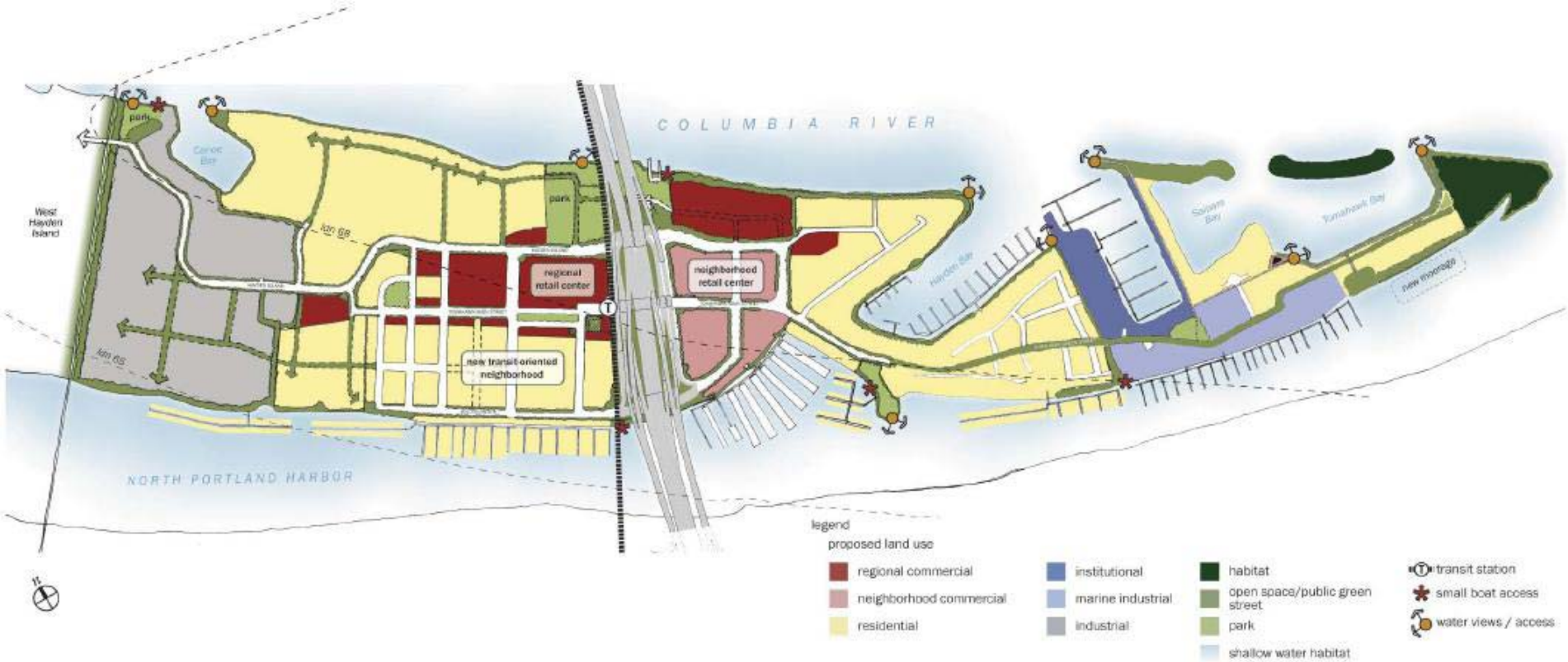


FIGURE 7. Hayden Island Concept Plan. (Source: Hayden Island Plan, June 2009, p. 12-13)

Alternatives Analysis

Future Land Use and Traffic Operations

Development of the Hayden Island Plan included a transportation analysis that compared existing development with three future land use scenarios: the Mature Existing, the Concept Plan, and the 2030 Baseline. (See Appendix A--Hayden Island Plan, 2009, Appendix C-1.)

The Mature Existing Scenario assumed that existing zoning designations would be retained and that future development would mostly mirror current land uses and recent development trends. It featured a higher level of development on the island, with a 23% increase in the number of housing units, an 80% increase in retail square footage, a 66% increase in industrial square footage, and a 20% increase in office square footage.

The Concept Plan Scenario assumed significant alteration to the mix of uses on the island, with a 238% increase in the number of housing units, a 40% decrease in retail square footage, and a 10% decrease in industrial square footage. This scenario featured transit-oriented residential and commercial/retail development in the Jantzen Beach SuperCenter site near the proposed light rail station. The land use pattern and pedestrian-oriented street grid in this scenario were intended to increase transit ridership.

The 2030 Baseline Scenario assumed more modest redevelopment than the Mature Existing Scenario, but likewise anticipated the continuation of existing zoning designations and current land uses. It assumed a 7% increase in the number of housing units, a 20% increase in retail square footage, a 32% increase in industrial square footage, and a 31% increase in office space.

The Concept Plan Scenario emerged from the collaboration between the City of Portland and Hayden Island residents, and it provided the basis of the transportation system plan adopted by the city as part of the Hayden Island Plan (Figure 8).The traffic analysis and evaluation of circulation and access alternatives presented in this IAMP use the land use and traffic estimates associated with the Concept Plan Scenario.

Existing vehicle-trip generation was modeled for existing conditions using the rates from Institute of Transportation Engineers (ITE) *Trip Generation, 7th Edition.* These rates were then adjusted downward to more closely match I-5 /Hayden Island interchange ramp counts, using three factors identified as affecting the island's trip rates: an accessibility factor (accounting for the difficulty of accessing and leaving the island during congested times), an internal factor (accounting for the share of trips internal to the island), and the transit mode split (accounting for the share of trips made on transit).

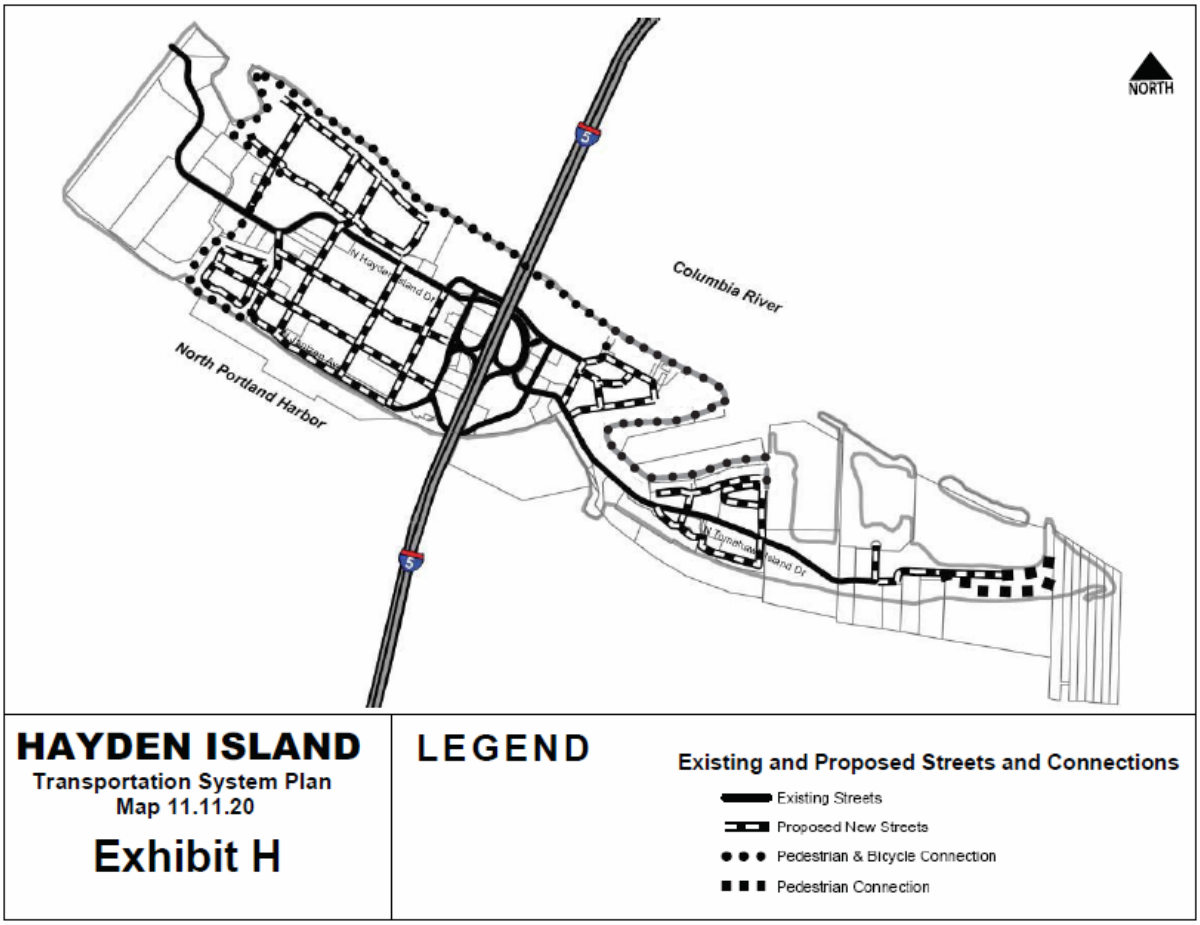


FIGURE 8. Hayden Island Transportation System Plan. (Source: Hayden Island Plan, June 2009, p. 32)

Future vehicle-trip generation for the Concept Plan Scenario was modeled using rates midway between ITE's rates and the existing rates, based on the assumption that improvements to I-5 and the Hayden Island interchange would reduce congestion and the degradation it causes in accessibility. (See Table 2 for trip generation estimates.) Traffic operations analysis based on the estimated trip generation predicted that in 2030 all island intersections would operate within both City and ODOT mobility standards (one intersection at LOS C, all others at B or A; all V/C ratios of 0.64 or less). Forecasts indicated that 95th percentile traffic queues would be relatively modest and would not spill back to adjacent intersections.*

TABLE 2. Trip generation for Hayden Island Concept Plan (adjusted vehicle trips).

	Weekday PM			Weekend Midday		
Trip Type	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Hayden Island Internal Trips	-	-	1,400	-	-	1,300
Public Transit Trips to/from I-5	220	120	340	240	110	350
Vehicle trips to/from I-5	1,850	2,000	3,850	2,530	2,310	4,840
Total Trips			**5,590**			**6,490**

Source: *David Evans and Associates, Parisi Associates*

Source: Hayden Island Plan, Appendix C-1, p. 13.

* For more information, see Appendix C-1 of the Hayden Island Plan and the *Hayden Island Traffic Access, Traffic Circulation, and HCT Station Location Special Technical Study Final Memorandum* (March 2007).

Local Street Circulation and Access Management

Process

A Project Management Team (PMT) was formed to examine local street circulation and access management options in the vicinity of the proposed new interchange. The team consisted of participants from the City of Portland, the Columbia River Crossing project office, and ODOT Region 1 office.

The PMT examined several alternatives for local circulation and access to properties. They requested and reviewed additional traffic analyses that included worst case traffic generation scenarios and evaluated the circulation options as described below. During the evaluation, each member coordinated with its respective agency

An evaluation matrix compared the final alternatives on the basis of the evaluation factors listed below, assigning ratings of *good, fair,* or *poor* for each factor on each alternative. Factors were not formally weighted to indicate priority within the matrix, which was intended as a tool to guide the PMT in their consideration of the circulation and access alternatives.

TABLE 3. ODOT and City standards affecting local circulation and access management.	
ODOT standards	• Restrict all access from abutting properties to I-5 and the Hayden Island interchange ramps. • Improve spacing and safety factors by moving in the direction of the access management spacing standards, with the goal of meeting or improving compliance with the access management spacing standards. Figure 9 illustrates how these standards apply to the Hayden Island Interchange. • A maximum v/c ratio of .85 at the ramp terminals as per Policy 1F.1 of the Oregon Highway Plan.
City of Portland standards	• Street connections no further than 530 feet apart, except where limitations exist • Pedestrian and bicycle connections no further than 330 feet apart, except where limitations exist • Streets and pedestrian connections should generally be at least 200 feet apart.
Evaluation factors established by the PMT	
• Meets OHP volume to capacity ratio standards (v/c of .85 at ramp terminals) or alternative mobility standard adopted by OTC at the ramp terminals, as well as HDM standards (v/c of .75 at ramp terminals) • Meets City of Portland performance standards (LOS D for signalized intersections, LOS E for stop-controlled intersections) as per Portland City Code • Extent to which ODOT access spacing standards are achieved • Efficient and safe movement of freight on locally designated truck access streets (out of direction travel; difficult turning radii) • Safe and convenient auto, bicycle and pedestrian movements (number of impediments; out-of-direction travel, consistent with local standards) • Degree to which system hierarchy is maintained • Number of businesses and jobs displaced; other negative business impacts • Number of residents displaced • Development opportunities (qualitative assessment of development potential consistent with the Hayden Island Plan) • Environmental Impacts (wetlands, water quality, threatened and endangered species, cultural, etc.) • Cost	

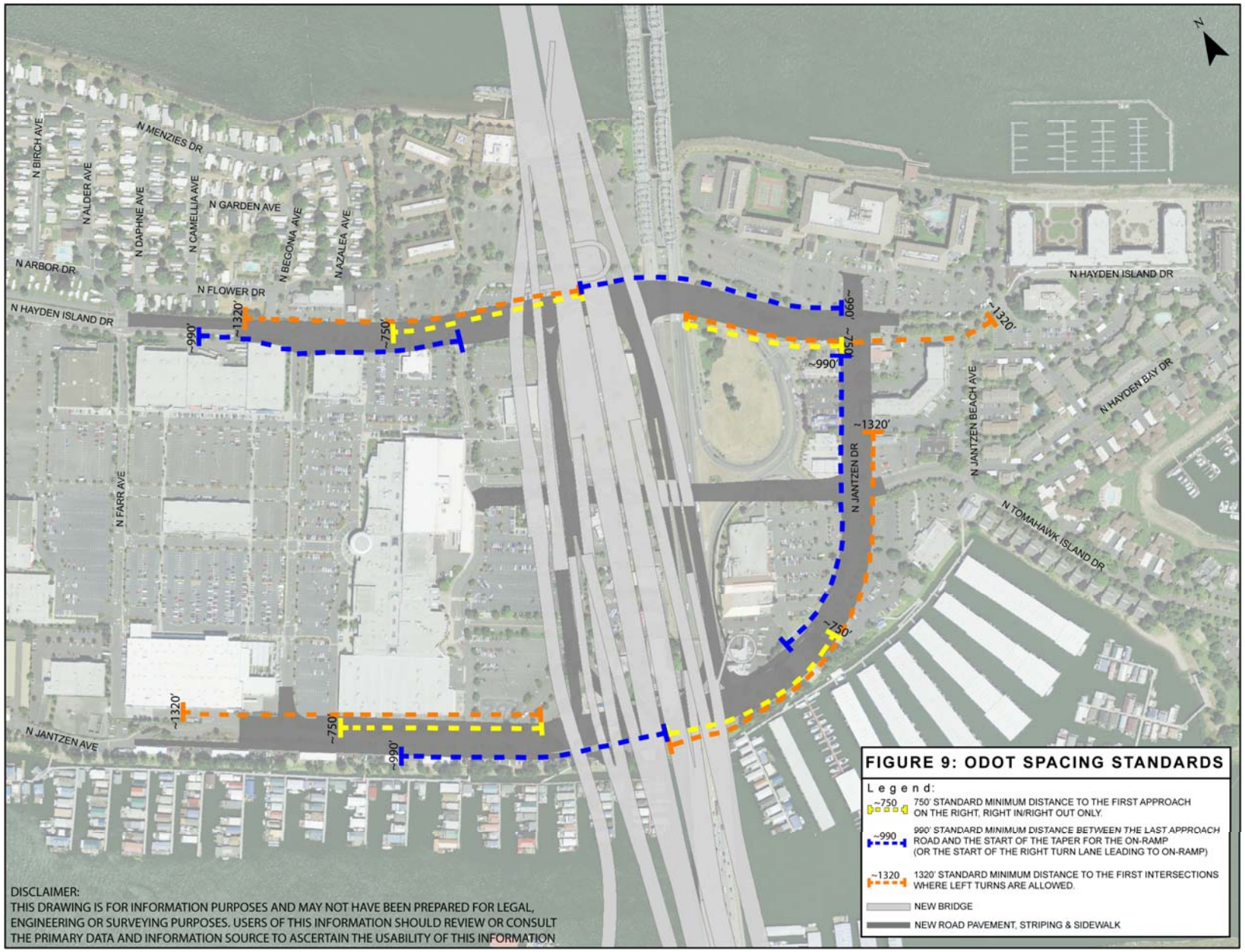


FIGURE 9. Approximate ODOT Spacing Standards Applied to the Horseshoe Road.

Local Street Circulation and Access Alternatives Evaluation

Since the Hayden Island interchange will be located in a built-up urban area, it is difficult to meet ODOT spacing standards (Figure 9) without significantly impacting nearby properties and the circulation patterns on the island. An illustration of an option that meets or exceeds spacing standards is shown in Figure 10. This alternative was not considered feasible because of the severity of impacts.

Additional traffic analysis was conducted for the IAMP to look at circulation alternatives that moved in the direction of meeting ODOT access management spacing standards and to evaluate the impacts of different traffic generation rates (see Appendix B). The analysis looked at several circulation scenarios using both the existing traffic generation rates and a "worst case" scenario based on ITE traffic generation values and a change in an existing hotel use located east of the Interchange to a 150,000 square foot retail use. Both of these scenarios bracketed the Concept Plan Scenario trip generation rates, which were set midway between the existing rates and ITE rates based on the assumption that improvements to I-5 and the Hayden Island interchange would reduce congestion and the degradation it causes in accessibility.

The traffic analysis did not expose any fatal flaws or significant differences among the scenarios, even with the worst case traffic assumptions. Hence, the circulation scenarios that most closely met ODOT access standards and were the most consistent with the Hayden Island Plan were further evaluated using the criteria listed in Table 3.

Based on this evaluation (see Appendix C) and on coordination with the City of Portland, the preferred circulation system is depicted in Figure 11. Table 4 below presents the seconds of delay, level of service (LOS), and volume-to-capacity ratios (V/C) for all intersections on the horseshoe road in the preferred circulation system. As the table shows, this option meets both ODOT mobility standards (V/C of 0.85 or less) and City of Portland performance standards (LOS D or better for signalized intersections, E or better for stop-controlled intersections).

The PMT also discussed access proposals for private driveways and street connections. Proposals from the City of Portland and ODOT staff are provided in Appendix D. Decisions on the specific location of driveways, the specific location of street connections, and the nature of the allowed turn movements will be coordinated with the final design of the interchange.

TABLE 4. Operation of horseshoe road intersections in preferred local circulation alternative.

	Delay (in seconds)	Level of service	Volume-to-capacity ratio
South ramp terminal - Center	17.9	B	0.46
North ramp terminal - Center	19.7	B	0.46
N Hayden Island Dr & N Jantzen Dr.	11.9	B	0.65
N Tomahawk Island Dr. & N Jantzen Dr.	26.3	C	0.76
N Hayden Island Dr & Main (Avenue B)	16.3	B	0.59
N Jantzen Ave & Main (Avenue B)	7.1	A	0.34

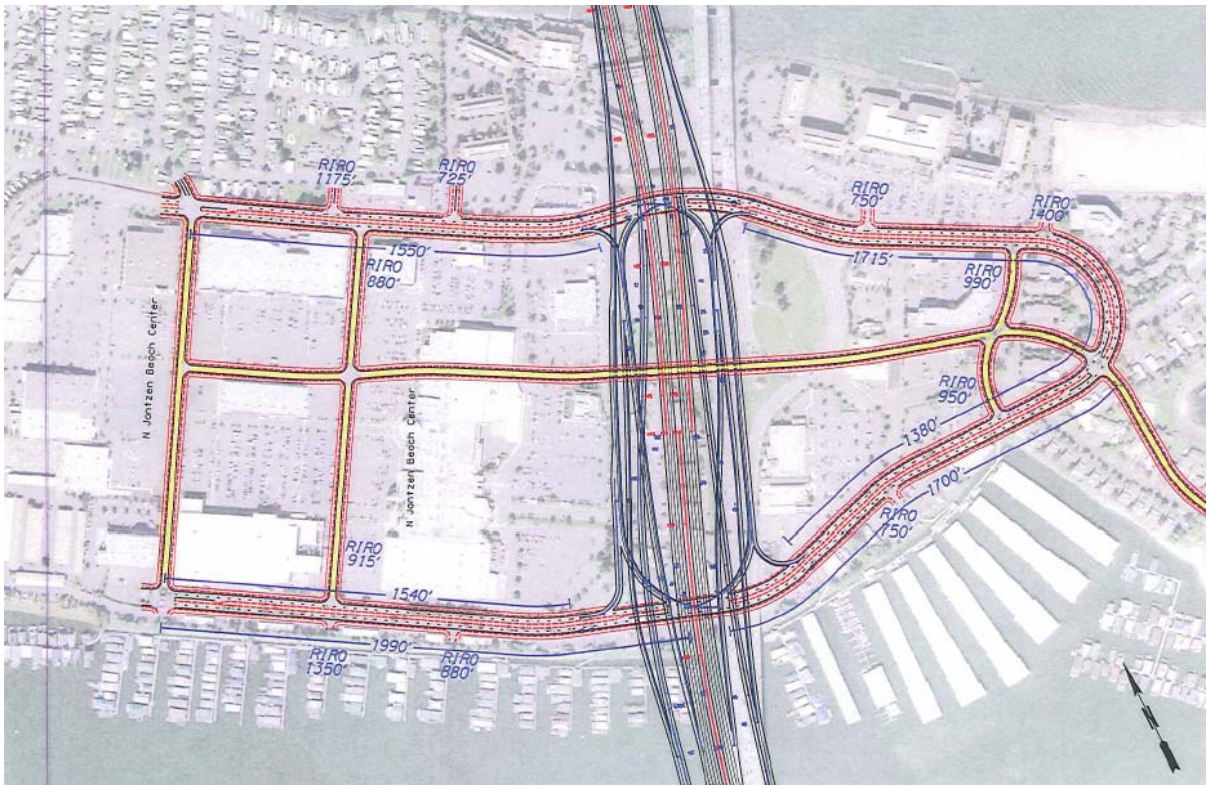


FIGURE 10. Local Circulation Alternative Meeting or Exceeding ODOT Spacing Standards. This alternative was not considered feasible because of the severity of impacts.

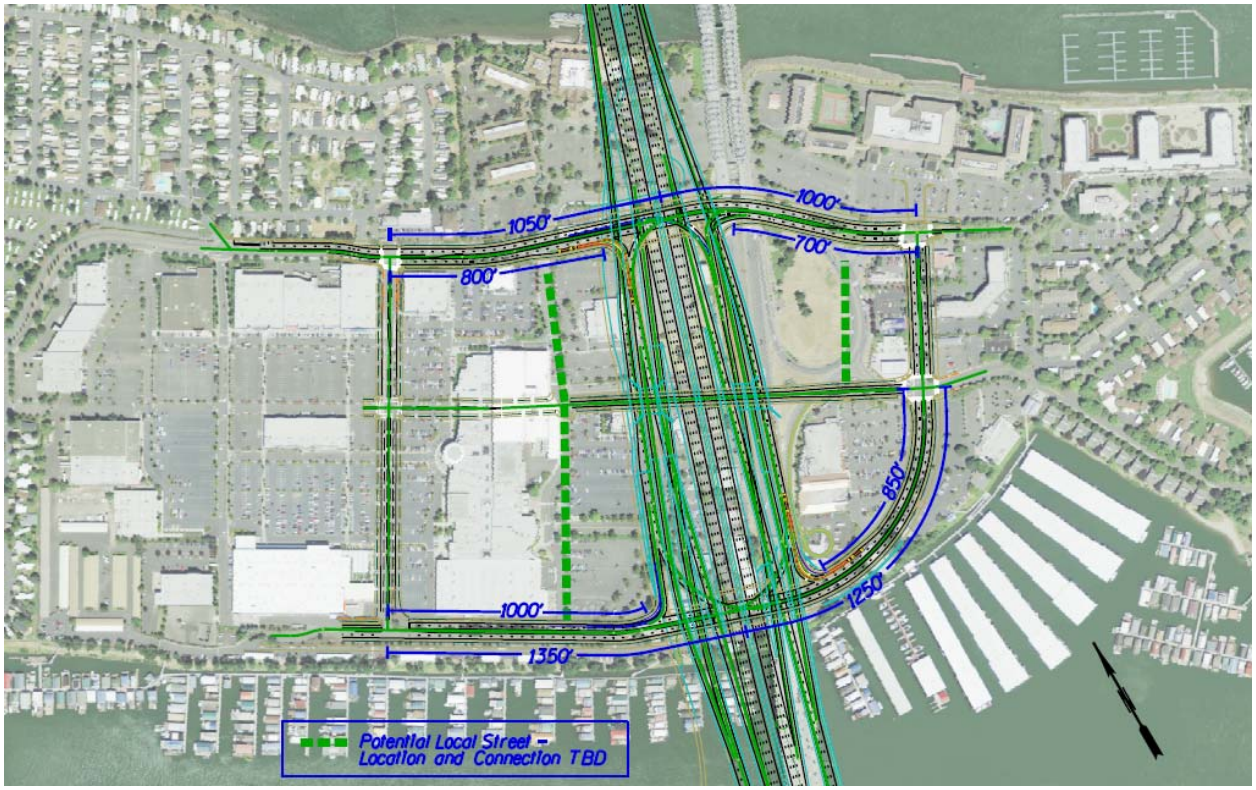


FIGURE 11. Preferred Local Circulation Alternative.

Interchange Area Management Plan

The IAMP consists of an interchange function statement, land use assumptions, and a circulation and access management plan.

Hayden Island Interchange Function Statement

I-5 is the only continuous interstate highway connection on the West Coast between the Canadian and Mexican borders. As such, I-5 is vital to local, regional, and national economies. In the metropolitan Portland-Vancouver area, I-5 serves large volumes of truck traffic associated with port facilities along the river, as well as commuter traffic to places of employment on both sides of the river. Currently, I-5 and the Hayden Island interchange provide the only roadway access to Hayden Island.

The function of the Hayden Island interchange is to serve existing land uses on Hayden Island and those provided for in the 2009 Hayden Island Plan. The Hayden Island Interchange is not intended to serve increased regional retail or more highway-oriented traveler services than are provided for in the 2009 Hayden Island Plan.

Land Use Assumptions

ODOT is relying on the Hayden Island Plan and its related zoning code language (see Appendix A) to implement the land use and local circulation plan in the interchange management area.

Circulation and Access Management Plan

Within the access management plan presented below and in the attached map, decisions regarding the specific locations of private approaches† will be determined by the CRC project in consultation with affected property and business owners and the City of Portland.

The Hayden Island interchange will be constructed in an already-developed urban area, making it difficult to meet ODOT access management standards in some areas. ***The overall goal of the circulation and access management plan is to provide for safe and efficient operations in the interchange area by balancing access management spacing standards while supporting the planned uses, pedestrian connectivity, and local street functions in the Hayden Island Plan.***

The access management plan addresses vehicular access only. Street network issues regarding other transportation modes, intersection and interchange configuration, street cross-sections, and dimension issues will be addressed by the CRC project during project development and resolved as part of the final design phase of the interchange project, in coordination with the City of Portland. As noted in the Hayden Island Plan, non-automobile modes are an important

† As per OAR 734, Division 51, an "approach" is a legally constructed approach road or private crossing recognized by ODOT as grandfathered or existing under a valid permit.

part of the island's accessibility and livability, and the project designs for local streets will need to address residents' need for multimodal access to the businesses and transit station in the interchange management area

A local street network will be developed over time consistent with the master street plan in the 2009 Hayden Island Plan. Public road approaches will be allowed, as per the master street plan in the Hayden Island Plan and the provisions listed below.

The following provisions are applicable to access decisions in the Hayden Island Interchange Management Area:

1. ODOT will acquire right-of-way for, and maintain jurisdiction of, the horseshoe road (Figure 12). (This will require agreements with the City of Portland where segments of the horseshoe road are currently city public rights-of-way, such as N. Hayden Island Drive.)
2. Prior to construction of the interchange, ODOT will purchase access control[‡] along the horseshoe road, except on N. Jantzen Drive between N. Hayden Island Drive and N. Tomahawk Island Drive. Reservations of access and permits may be provided consistent with these provisions, allowing property owners to have private approaches to the horseshoe road.
3. During development of the access management strategy (as determinations are made regarding location and type of approaches to ODOT right-of-way) and/or as properties redevelop over time, ODOT will seek to consolidate driveways on N. Jantzen Drive between N. Hayden Island Drive and N. Tomahawk Island Drive as needed to provide for safety and operations, allowing for reasonable access to accommodate business and development needs.
4. Typical configuration of the horseshoe road includes a raised center median with full turn movements only at signalized intersections.
5. Private approaches from properties to the horseshoe road may be allowed between signalized intersections where they do not present safety or operational issues.
6. Private accesses from properties to streets other than the horseshoe road are preferred.
7. Private accesses to city streets are subject to City of Portland approval.
8. Approaches to the horseshoe road and accesses to city streets should be avoided in intersection areas.
9. Decisions on the location of approaches in the interchange management area will be made with consideration of potential impacts to other approaches.

[‡] Access Control is a limitation of the legal (common law) right to access a specific roadway from a specific parcel. ODOT purchase of access control does not mean that access will not be allowed, but that property owners will need to apply for reservations of access and permits for private approaches to the roadway.

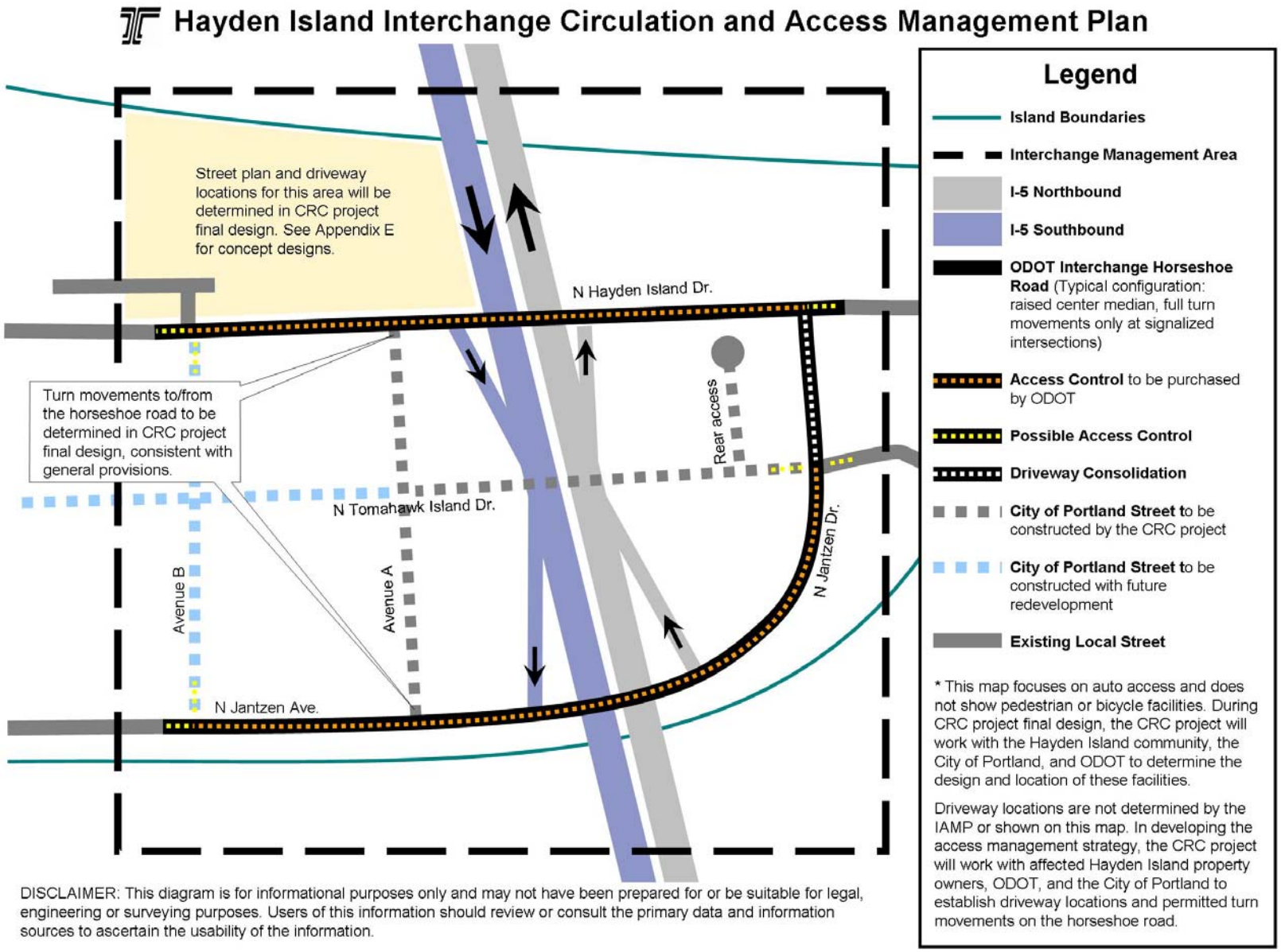


FIGURE 12. Hayden Island Interchange Circulation and Access Management Plan.

Implementation

ODOT is relying on the Hayden Island Plan and its related zoning code language to implement the land use and local circulation plan in the interchange management area.

As of April 2010, the CRC project continues to work with ODOT, the City of Portland, and the Hayden Island community and stakeholders to develop and/or refine designs for:

- The interchange,
- The local roads to be constructed by the project,
- Pedestrian facilities and crossing opportunities,
- Bicycle facilities, and
- Access concepts for properties whose approaches may be affected by project construction.

The IAMP is limited to higher-level policy decisions to allow the CRC project to continue its design process. The design of local streets, their connectivity, and pedestrian/bicycle accessibility are of high importance to the livability of the Hayden Island. ODOT will remain engaged during the community design process in order to ensure that the interchange and horseshoe road will function adequately and safely under proposed design refinements, as well as maintain the agency's awareness of the community interests and concerns that influence the final street designs. The CRC project anticipates that, during spring and summer of 2010, project stakeholders will continue to provide input on facility design options. In fall 2010, the CRC project intends to hold an open house or workshop where the public can review designs and offer feedback.

Because different street designs and alignments may have different private property impacts and provide different opportunities for safe private property access, ODOT, the City, and the CRC project have agreed that the CRC project will lead the development of the access concepts that will form the basis of the access management strategy (determination of location and type of approaches to ODOT right-of-way). During 2010, the CRC project will continue to work with ODOT, the City of Portland, and private property owners to identify opportunities for safe access. The CRC project will gather information on property ownership, legal access rights, and driveway permits in the interchange area. It is anticipated that the CRC project will develop a general access management strategy by the end of 2010 (approximately the same period when it is anticipated that CRC project final design will commence), identifying approach locations, turning movements to be permitted, and access rights to be purchased prior to project construction. The development of the access management strategy will take the following factors into consideration:

- Access and circulation needs of affected property owners, business owners, and residents,
- Design of the Columbia River Crossing project,

- State standards set forth in OAR 734-051,
- City standards related to intersection performance, provision of access, and connectivity,
- Design of roads in the interchange management area,
- Traffic volumes and characteristics,
- Impacts of access management alternatives on the local street system, and
- Other applicable plans and policies.

Meetings with affected property owners will continue until access rights have been purchased during the property acquisition phase, beginning at the earliest in 2011.

The access management strategy will be implemented in the following manner:

- ODOT will document the final access management strategy.
- The CRC project will purchase right-of-way and access rights necessary to enact the strategy.
- ODOT will issue access permits and establish reservations of access as needed to enact the strategy.
- During construction, the CRC project will make changes to private property approaches in accordance with the access management strategy.

ODOT will make future access decisions as properties with frontage on the horseshoe road redevelop, consistent with this plan and OAR 734-051. ODOT and the City of Portland will coordinate with each other through their respective access permitting, building permitting, and land use processes for accesses that fall within their respective jurisdictions. Affected property and business owners that are redeveloping will be required to apply for access permits on the horseshoe road within ODOT's jurisdiction (in accordance with OAR 734-051). Opportunities to move in the direction of access spacing standards will be explored where practical.

Refinements to Project Designs

In June 2009, the CRC Project Sponsors Council (PSC) directed project staff to analyze the project for potential refinements that could produce cost savings while maintaining the project's environmental, economic, transportation, and safety benefits. After five months of meetings with project partners and reviewing different refinements, the CRC staff prepared a draft recommendation that was presented to the Project Sponsors Council December 4, 2009 for consideration. During the meeting, PSC members heard testimony from dozens of people, asked for additional information and decided to continue the discussion on the recommendation at its January 22, 2010 meeting.

The draft recommendation, if adopted, would reduce the project's cost. The draft recommendation includes savings of up to $650 million to current highway plans (about 20 percent of the total highway cost), including a 10 lane bridge over the Columbia River. As a result of the cost-saving analysis and recent decisions on bridge design, officials now estimate the most likely cost of construction to be $3.2 billion, within a range of $2.6 to $3.6 billion. Previous estimates were $3.1 - $4.2 billion.

In addition to the cost-saving recommendations, project staff made design refinements to respond to community input regarding project impacts to the island, the scale of the interchange and horseshoe road, and multimodal accessibility needs on the island.

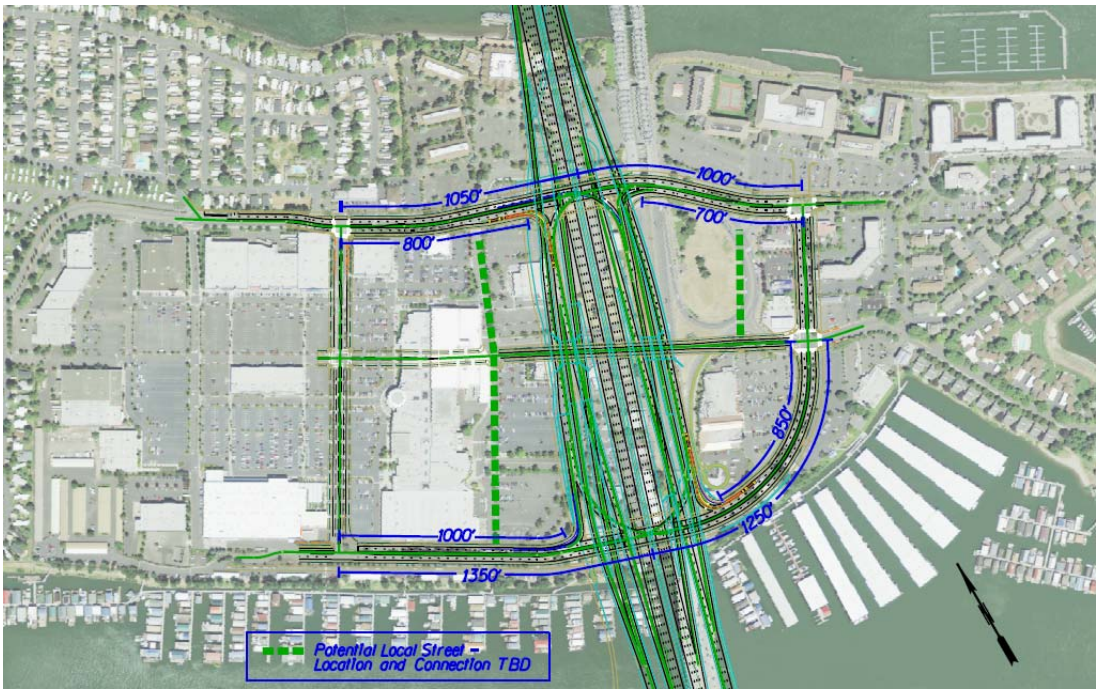
Figure 13 shows the project designs for the interchange and local roads as of November 2009, and Figure 14 shows design refinements under consideration in January 2010. On Hayden Island, the 2010 design refinement differs from the November 2009 designs in the following ways:

- It reuses the existing highway bridges over North Portland Harbor, shifting the location of the freeway and the interchange ramp terminals on Hayden Island, and changing the access spacing adjacent to the ramp terminals (when compared to a new bridge over North Portland Harbor).
- It eliminates some elevated structures over Hayden Island and lowers the profile of I-5.
- It reduces the number of lanes on N. Jantzen Drive and N. Hayden Island Drive.
- It reduces the number of lanes on the interchange exit ramps at the intersections of N. Jantzen Drive and N. Hayden Island Drive.
- It modifies the interchange from a Split-Single Point Urban Interchange to a Split-Diamond Interchange, increasing opportunities for signalized pedestrian crossings.
- It adjusts the vertical and horizontal alignment of the horseshoe road, N. Tomahawk Island Drive and the interchange ramps.

Figures 13 and 14 compare the proposed interchange design in November 2009 (above) to refinements of that design under consideration in January 2010 (below).

The November 2009 design and the 2010 design refinement function similarly. Local circulation will be largely the same under both designs, with the same movements permitted at most intersections. (See Figure 15 for more information.) Both the LPA design and the refinement function adequately within ODOT and City mobility standards for ramp terminals and intersections (see Appendix B). The policies established by the circulation and access management plan on the preceding pages are appropriate for both designs, despite the change in interchange alignment and the locations of the ramp terminals.

The IAMP does not adopt either design, but is meant to be compatible with either. The CRC project will likely continue to refine project designs after the IAMP has been adopted. Currently, project staff does not anticipate that design refinements will change the local circulation or cause the intersections or ramp terminals to fail to adequately meet either City or ODOT mobility standards. ODOT will continue to work with property owners, the City of Portland, and the CRC project to explore how different design refinements under consideration may affect safe access options for properties along the horseshoe road, within the circulation and access management policies established by the IAMP. Should the project select a design that substantially changes the interchange alignment, local circulation, or performance of the road network relative to the designs that are included in this IAMP, ODOT will work with the City of Portland and the CRC project to reevaluate the adopted IAMP and determine whether it needs to be amended.



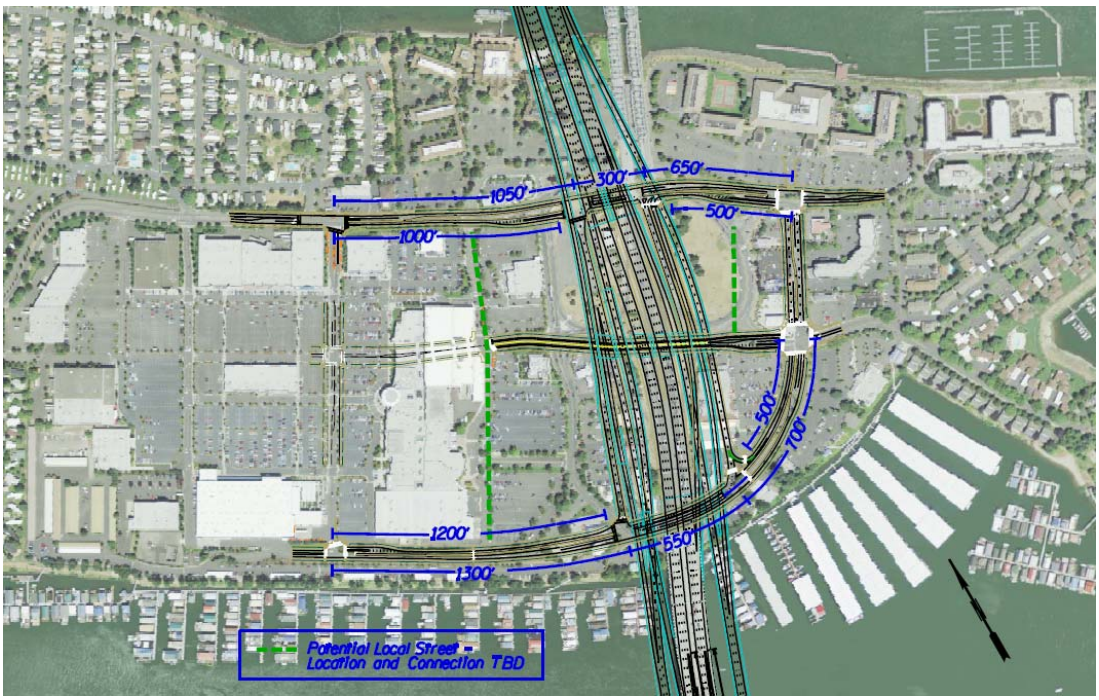


Figure 15. Preferred local circulation alternative under the January 2010 design refinement (below), shown with Figure 11 (above) to allow for comparison of spacing distances in the earlier design.

As Figure 15 shows, the design refinement increases the distance between the ramp terminals and the local street connections to the west of the interchange. This has increased the range of vehicular movements that can be considered for Avenue A, the local street connection planned between the interchange and Avenue B, the first full-movement connection to N Hayden Island Drive and N Jantzen Avenue on the west side of the interchange. Location of and turning movements at the Avenue A connection will be determined during project final design.