Appendix A: Hayden Island Plan

Hayden Island Plan

HAYDEN ISLAND

Portland's Only Island Community

Recommendation to City Council | June 2009

Acknowledgements

Hayden Island Plan Steering Group

Ed Garren, Co-chair,
Hayden Island Manufactured Home Park
Brad Howton, Co-chair, Columbia Crossings
Gwenn Baldwin/Tim Ramis, Salpare Bay LLC
Bruce Broussard, HINooN
Rick Buck, Rod Buck, Sundance Marine Group
Richard Carhart, HINooN
Tom Dana, HINooN
Pamela Ferguson, HINooN
Kevin Flanigan, Inland Sea Maritime
Melissa Freeman and Bruce Moret,
Jantzen Beach SuperCenter
Ray Gaddis, HINooN
Jeff Gerritson, HINooN
Rick Gill, HINooN
Don Gire, HINooN
Jim Hansen, Safeway Inc.
Timme Helzer, Friends of West Hayden Island
Frank Howatt, Hayden Bay Homes
Peg Johnson, HINooN
Gene Katke, HINooN
Kris Kruse, Columbia River Yacht Club
George Lari, Hayden Island Enterprises
Mary Leviner, Oxford Suites
Mark McCuddy, McCuddy's Marina
Jimmé Peters, HINooN
Jered Polivka and Jim Mumford,
Manheim Corp./Portland Auto Auctions
Evertt Roberts, HINooN
Bob Sallinger, Portland Audubon Society
Carol Schuler, HINooN
Elaine Smith, Columbia River Crossing/ODOT
Roger Staver, HINooN
Greg Theisen, Port of Portland
Mike Trudeau, Trudeau's Oregon
Steve Welch, HINooN
Trudy Weathers, HIBP Associates
Mark Whitlow, Perkins Coie/JBH Property Acquisitions
John Zupan, Zupan's

Technical Advisory Group

Susan Barthel, Bureau of Environmental Services
Kevin Cronin, Portland Development Commission
Tom Griffin-Valade,
Office of Neighborhood Involvement
Kathy Harnden, Bureau of Development Services
Erin Janssens, Portland Fire and Rescue
Colin McConnaha, Columbia River Crossing
Steffeni Mendoza Gray, Office of Government Relations
Shoshanah Oppenheim, Mayor Adams' Office
Elaine Smith, Oregon Department of Transportation
Greg Theisen, Port of Portland
Cherri Warnke, Water Bureau
Kathleen Wadden and David Yamashita,
Bureau of Parks and Recreation
Matt Wickstrom, Bureau of Development Services

Portland City Council

Sam Adams, Mayor
Nick Fish, Commissioner
Amanda Fritz, Commissioner
Randy Leonard, Commissioner
Dan Saltzman, Commissioner

Portland Planning Commission

Don Hanson, President
Amy Cortese, Vice President
Michelle Rudd, Vice President
André Baugh
Lai-Lani Ovales
Howard Shapiro
Jill Sherman
Irma Valdez

Bureau of Planning and Sustainability

Susan Anderson, Planning and Sustainability Director
Gil Kelley, Former Planning Director
Joe Zehnder, Principal Planner

Project Staff

Alice Ann Wetzel, Project Manager,
Bureau of Planning and Sustainability
Elisa Hamblin, Planning and Sustainability
John Gillam, Portland Bureau of Transportation (PBOT)

With additional assistance from:

Mark Raggett, Planning and Sustainability
Christine Rains, Planning and Sustainability
Jessica Richman, Planning and Sustainability
Patrick Sweeney, PBOT
Courtney Duke, PBOT
April Bertelsen, PBOT

Project Consultants

David Evans and Associates, Inc.
SERA Architects
Van Meter Williams Pollack
Kevin Gardiner and Associates
Glatting Jackson Kercher Anglin
Parisi Associates
Marketek
Nangeroni Designs
Zenn Associates/JLA Involve

DAVID EVANS AND ASSOCIATES INC.

City of Portland Bureau of
Planning and Sustainability
Sam Adams, Mayor | Susan Anderson, Director

Table of Contents

Planning Commission Recommendations

PLANNING COMMISSION RECOMMENDATIONS:

Recommended Hayden Island Plan Changes

The City of Portland Planning Commission in its decision to recommend this plan to the City Council made the following comments:

- The parcel at the eastern terminus of North Tomahawk Island Drive, owned by Columbia Crossings, in the height opportunity area permitting additional height to 80 feet, have a pedestrian walkway in the along the edge of the property adjacent to North Portland Harbor. This easement may be provided in the 25 foot setback from the river's edge.

- Once the Columbia River Crossing (CRC) improvements are constructed the transportation system will change in the vicinity of the new interchange. At that time, additional street designation amendments are warranted. These amendments are previewed in Appendix C-4, "Other Transportation System Plan Amendments", and displayed as Exhibits I through O. These amendments are not part of the plan to be adopted as part of the Comprehensive Plan at this time through the Hayden Island Plan process, but will be subject to a separate adoption process following the federal Record of Decision for the CRC project. These future amendments to the Transportation System Plan will be referred back to the Planning Commission for approval.

The Portland Planning Commission recommends that City Council take the following actions:

Adopt the ordinance that:
- Adopts the Hayden Island Plan (this report)
- Amends the Portland Comprehensive Plan Map and Zoning Map as shown in this report;
- Amends Title 33, Planning and Zoning Code, as shown in this report;
- Amends the Transportation System Plan, as shown in this report; and
- Adopts the commentary in the report, and the report itself, as further findings and legislative intent.

At the Portland City Council hearing on June 18, 2009, the Council recommended that the following changes be made to this document, all of which are included in the following text:

1. Change bullet points to numbers or letters.
2. Page 9, first bullet under "Provide for better access to and from Hayden Island" is changed to "Provide direct access to and from Hayden Island by the CRC without getting on the interstate."
3. Page 9, next bullet point down is changed to "Consider building a West Hayden Island bridge if found appropriate in the West Hayden Island planning process."
4. Page 35, changed the second bullet point under Leadership to " Work with stakeholders including Hayden Island Neighborhood Association, river community groups, environmental and business interests and the Port of Portland, to explore transportation connections to potential development on West Hayden Island."
5. The Office of Healthy and Working Rivers was added to the Accountability list under Leadership for each of the Implementation Actions on pages 34 and 35.
6. On page 57, the plan district code section 33.532.270 Drive-Throughs was amended to provide for drive-throughs as a permitted development on North Jantzen Drive.
7. On page 64, commentary was incorporated to explain that the replacement of manufactured homes does not trigger the upgrade to nonconforming development standards of manufactured home parks. Additional commentary was added to state that issue of noise insulation standards for land based manufactured homes will be addressed through the City of Portland and Port of Portland Airport Futures Project. This project will be investigating and determining appropriate noise mitigation for all areas impacted by Portland International Airport, including Hayden Island.
8. On page 65, section 33.470.050 adds regulations for manufactured housing parks that are severely damaged by natural disasters.
9. There are other changes throughout the code language, but they are improvements to clarity and consistency and do not change the effect or meaning of the regulations.

The Hayden Island Plan is a collaborative effort between the City of Portland and the community to improve accessibility, livability and sustainability of Hayden Island over the next 35 years. Focusing on the portion of Hayden Island within the City of Portland, the plan contains goals, objectives, comprehensive plan and zoning changes, and an implementation strategy to create:

a. A more walkable residential community that protects the quality of the existing residential neighborhoods of both land-based and floating homes.
b. A new neighborhood-serving business area east of Interstate 5.
c. New transit-oriented development adjacent to the proposed light rail station west of the interstate.
d. Continued support for marine businesses, and enhanced marine and terrestrial habitats so important to the Columbia River environment.

This plan was initiated as a mitigation measure for the development moratorium enacted by Portland City Council in September 2006 to address development on the island and at the congested Interstate 5 (I-5) interchange. Additionally, this plan is intended to provide guidance to the Columbia River Crossing (CRC) project, which is proposing to address congestion on I-5 with the construction of a new highway bridge and light rail line across the Columbia River along with the redevelopment of five interchanges. The Hayden Island Plan seeks to protect the interests of the island as well as ensure that the amount and type of development on Hayden Island would not overload the proposed freeway improvements.

CONTEXT

Hayden Island is approximately 1,400 acres on the Columbia River and is composed of two sections. East Hayden Island, which includes approximately 600 acres east of the BNSF railroad bridge in the City of Portland, is the focus of the plan. This area is heavily developed with a variety of uses— a manufactured home community, floating home communities, multifamily and single-family homes, regional and local shopping areas, marinas and industrial uses. The Hayden Island Neighborhood Network (HINooN) is the community coalition of the neighborhoods and businesses on the island.

West Hayden Island, which includes the approximately 800 acres west of the BNSF bridge, is outside of Portland city limits in unincorporated Multnomah County. The Port of Portland (the Port) owns most of West Hayden Island. The area is mostly undeveloped and contains wetlands, riverside forests and a Columbia River dredge material handling facility. West Hayden Island will be the subject of an upcoming planning process.

Hayden Island and surrounding area.

Hayden Island is located between the Columbia River and the North Portland Harbor. The Columbia River is an important navigation channel for interstate commerce and for recreational boating and fishing, and is home to numerous aquatic, avian, and terrestrial species of plants and animals. Protecting endangered and sensitive species such as salmon within the Columbia River is an important component of the Hayden Island Plan.

Hayden Island is the northern gateway to Portland and is the city's only island neighborhood. Access to the island is provided only by a severely congested I-5 corridor and bridges.

PLAN DEVELOPMENT AND PROCESS

In August 2007, the City of Portland and the Hayden Island community began a collaborative effort to develop a plan for the eastern half of the island. Through this process, participants developed goals for the next 30 years. These goals were the basis for the "Hayden Island Concept Plan," which was developed through a series of formal and informal community meetings, interviews and other opportunities for public input. The largest opportunity was a series of public workshops held on October 16 -20, 2007, at the Jantzen Beach SuperCenter. During the workshops, urban designers, city planners and traffic engineers worked with property owners and members of the community to begin formulating the goals of the community into a physical plan for East Hayden Island. The Hayden Island Concept Plan was developed from input published in January 2008 and discussed in January and February 2008 at neighborhood meetings and at a large public open house, and through a written survey completed by more than 145 people.

Introduction

The Hayden Island Concept Plan was accepted by the Portland Planning Commission in March 2008 and was used as the basis for the development of this Hayden Island Plan. Building on the concept plan, this plan further developed the specifics, including policies, new regulations, a street plan and transportation system plan. This plan was again developed with significant involvement from the community, Oregon Department of Transportation (ODOT), CRC and other key stakeholders.

BACKGROUND / HISTORY

Hayden Island was first recorded in 1792 by Lt. Broughton on his journey up the Columbia River. It has been called Menzies Island, Painted Image Island, and Hayden Island. Originally, there were two separate islands, Hayden and Tomahawk, which were joined when dredge material was deposited between the islands. The island was used for farming and grazing until the Interstate Bridge opened in 1917. The Jantzen Beach Amusement Park opened in 1928 and was a popular attraction on the island. It remained open until 1970, when construction began on the Jantzen Beach Shopping Center on the former amusement park site. The shopping center opened in 1972 and was remodeled in the mid-1990s in order to accommodate new big-box retail development. East Hayden Island and Tomahawk Island were incorporated incrementally into the City of Portland in the 1980s and early 1990s.

West Hayden Island has been owned at various times by Portland General Electric, Western Transportation Company and the Port of Portland, its current owner. A number of utilities have long-established transmission towers and power lines on this site. Metro brought West Hayden Island into the urban growth boundary in 1983 for marine industrial use and also designated a special habitat area. The Port purchased the western half of Hayden Island in 1994 for future marine industrial development. From 1995 to 2000, the Port took a number of steps to implement a comprehensive development program and annexation to Portland. Earlier development programs also focused on the protection and enhancement of natural resource lands and allowed for public recreation areas. Changing market conditions and a lack of community support were major factors that led to the Port's withdrawal of the property from the annexation process in 1999. Since 2000, the Port has held the property as marine strategic reserve land, while addressing property management issues and undertaking environmental enhancement projects.

Within the last ten years, transportation—specifically the ability to access the Island from I-5—has become a major issue for businesses and residents of the island. As a result of the I-5 corridor congestion, the states of Oregon and Washington formed a bi-state commission and later a steering group to direct the CRC project to address the safety and congestion in the area of the Columbia River bridge. In light of the proposed new highway infrastructure and potential development on Hayden Island, Portland City Council adopted a six-month development moratorium on Hayden Island in October 2006, with the provision that Hayden Island would begin a neighborhood planning process.

EXISTING CONDITIONS

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

The Hayden Island community has approximately 2,155 permanent residents, increasing in the summer when the roughly 5,000 boat owners moored at the island visit and take advantage of the marine experience. Permanent residents live in a variety of housing types 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.

Multi-Family Condos

Single Family Homes

Yacht Club Units

Floating Homes

Manufactured Housing

Housing Type & Number of Dwellings on Hayden Island

Housing Type	Units	Percent of total
Single-family homes	54	3
Condominiums	677	43
Manufactured homes	440	28
Floating homes	360	23
Part-time units in yacht clubs	50	3
Total	**1581**	**100**

The primary commercial/retail development is the Jantzen Beach SuperCenter, which contains approximately 875,000 square feet and 3,100 parking spaces on 80 acres, 68 acres of which is under single ownership. While Hayden Island supports a large number of visitors to its marine and shopping facilities, the island's permanent population is too small to support the retail and other services its residents desire. The owners have proposed major redevelopment of the Jantzen Beach SuperCenter, which would include integration of the new light rail station that is proposed as part of the CRC project, as well as a transit-supportive design.

Hayden Island has many large industrial facilities. The uses include automobile auction and service, boat building, service, sales and storage, public marinas, distribution warehouses and a large cabinetmaking business. A multi-tenant commercial office building is located east of the interstate. There are approximately 238 businesses, employing 2,952 persons, on the island.

Zoning on East Hayden Island (See page 38-39) is primarily commercial, with pockets of low- and medium-density residential zones located along Hayden Bay and to the west of the Jantzen Beach SuperCenter. The western portion of the project area near the railroad bridge is zoned for general industrial uses. Hayden Island is on the western flight path to Portland International Airport; an airport overlay zone covers all of East Hayden Island, which restricts some types of development that are sensitive to noise from the Portland International Airport. New residential housing is not permitted in areas that were not zoned for housing before 1981.

The island has one public park, which is approximately one acre in size. This area is underserved by parks. On the eastern tip of the island, there are several parcels of undeveloped land that are providing important natural habitat for both aquatic and terrestrial species. Public access to the river and beaches does not exist and is of concern to the community.

Getting to Hayden Island by vehicle is only possible via I-5 through the existing Hayden Island interchange. This interchange is an obsolete design and is frequently the site of accidents. North Hayden Island Drive, North Tomahawk Island Drive and North Center Avenue are the only public roads on the Island. The rest are private streets and are maintained by the adjacent properties. Sidewalks vary in location, and there are no painted or designated bike lanes. As a result, there is no consistent pedestrian or bicycle network and, where it does exist, it is circuitous, requiring out-of-direction travel for walking or cycling.

Vision, Goals and Themes

The Hayden Island Plan is based on a vision statement, themes and goals. They were developed in community meetings from July to October 2007 and were based on the Neighborhood Plan document drafted by community residents in 2006.

VISION STATEMENT

Hayden Island is a gateway to Portland and to Oregon. The Island residents live in a variety of housing styles both on the water and the land. They are connected to regional and local businesses and industries by a network of streets and paths that sustainably treat stormwater and protect the greatest of the Island's assets, the Columbia River. On Hayden Island there is access to the River for the many boaters, and protected habitat for avian, aquatic and terrestrial life.

THEMES AND GOALS

This plan is based on an overarching goal of developing a sustainable future for Hayden Island. This direction was originally expressed in the previous "East Hayden Island Neighborhood Plan," which was authored by community members. That document focused on the built and natural environment and called for using a sustainable and integrated approach to creating a more livable place. Building on the neighborhood plan and identified objectives—some general and some specific—this Hayden Island Plan was developed and is organized around three themes: Island Community, Getting Around, and Environment and Open Space.

ISLAND COMMUNITY

Create a shared community identity and sense of place by creating physical space and building form that has a mix of uses and community open space that focuses on the transit station as a community amenity. Within this community, promote a variety of housing types that are affordable to a wide range of residents. Preserve the diverse character of the community through continuation of the existing residential communities, the marine commercial uses near Canoe and Tomahawk Bays, and the industrial uses on the west end of the neighborhood.

a. Strengthen the shared community identity and sense of place.
b. Support safe, connected and healthy neighborhoods.
    - Allow no more housing units under the noise contours than are permitted by the X overlay zone.
c. Provide for a mix of housing types and affordability.
    - Provide for residential development near Hayden and Tomahawk Bays.
d. Provide for a mix of retail that meets the needs of the local community.
    - Provide for neighborhood commercial in the area immediately east of the interstate.
e. Provide commercial and employment areas.
    - Retain industrial land near the BNSF railroad tracks.
    - Provide for continued marine industrial uses near Canoe and Tomahawk Bays.
f. Develop a transit-oriented community in the station area.
    - Provide for a mix of housing and commercial, office and retail development in the transit-oriented community.
    - Make the transit station a focal point of the community.
    - Develop a community open space plaza adjacent to the transit station that is fronted by commercial uses.
g. Provide a network of safe streets to connect the community.
h. Encourage a bike-friendly and walkable community, with easy access to the transit station.
i. Work to develop a system of trails across East Hayden Island.

GETTING AROUND

More than any other existing condition, the constraints on mobility within the island and access to it define East Hayden Island. The community envisions a transportation system that provides for a neighborhood where residents can walk to a light rail station and a boat moorage; where streets accommodate all modes of transportation; and where residents and business benefit from access to the island that is provided by local access lanes or a new bridge.

a. Provide for better access to and from the island.
   - Provide direct access to and from Hayden Island by the Columbia River Crossing bridge without getting on the interstate.
   - Consider building a West Hayden Island Bridge if found appropriate by the West Hayden Island planning process.
   - Work with CRC to facilitate access to Hayden Island for all forms of transport.
   - Extend the light rail network to Hayden Island and Vancouver, Washington.

b. Produce an integrated transportation network and better connectivity on the island that provide for public transportation, vehicles, cycles, and pedestrians.
   - Provide easy access to the transit station.
   - Extend Tomahawk Island Drive as a "Main Street" through the shopping center and future Jantzen Beach transit-oriented development.

c. Work to develop temporary boat moorage access to the island.

ENVIRONMENT AND OPEN SPACE

Hayden Island residents value the aesthetic and environmental values of the Columbia River and North Portland Harbor. Yet access to the river is very difficult, open space is scarce and critical shallow water habitat is limited and degraded in most places. The community envisions additional parks, a trail system that enhances access, recovery for the island's riparian areas, and a "green philosophy" that applies to all private development and public infrastructure development on the island.

a. Protect and conserve ecological systems.

b. Protect and restore Columbia River habitat, including shallow water habitat and water quality.
   - Replant riparian areas in native species, and remove rip-rap and set back banks where possible.

c. Embrace "green philosophy" and practices.
   - Develop an enhanced system of green streets to provide for stormwater management.
   - Manage CRC stormwater in a "green," state-of-the-art manner.
   - Use green technology to enhance the island environment and provide a sustainable community.

d. Develop new parks and open spaces for habitat.

An Island Community Concept

This Hayden Island Plan builds on the elements that the residents and businesses on the island value most – the river lifestyle, a close-knit community, access to the water and improved access to the mainland. It also envisions growth in ways that create a resident population that is large enough to support local-serving businesses and amenities. This plan accomplishes this vision by preserving existing uses while promoting new mixed-use development to meet the future needs of the community.

RIVER LIFESTYLE COMMUNITY

Residential Development

The plan preserves the variety of residential communities on the island, including single-family, multifamily, floating and manufactured homes. Building on this diverse residential flavor, the plan provides for residential development on vacant lots on the eastern portion of the island with proposed zoning changes. The plan seeks to help preserve the large manufactured home community on the island. The only changes for the floating home communities on the south shore would be some reduction in the number of homes in the Jantzen Beach Moorage as a result of the construction of the CRC project.

Two new residential communities are proposed for the eastern end of the island on land owned by Columbia Crossings, with plans for approximately 800 new dwelling units. As part of the planning for these residential areas, additional height is being recommended. With the added height, a pedestrian walkway will be required on the south side of the Tomahawk Bay Development site. This walkway will be located at the top of the bank along North Portland Harbor.

Industrial Development

There is a range of industrial uses on the island, including transportation-related businesses for the auto auction facility and shipping facilities. Most of the industries on Hayden Island are located there in order to be close to the water and are marine-related, including boat building and sales, boat repair and storage, and boating supplies and marinas. The island contains industrial uses and land on its western edge that would be unchanged in this Hayden Island Plan.

New Transit-Oriented Development

The plan works with the proposal by Jantzen Beach SuperCenter to modernize and improve the center while incorporating long-term options for more intense mixed-use development. In the first phase, the existing mall would be demolished, and new retail outlets that are designed around an urban grid street pattern would be constructed. This new street grid would provide for a walkable block pattern that over time would allow the center to become a mixed use, mid-rise center with residential retail and commercial uses. An additional 2,000 new dwelling units could be constructed under the proposed development pattern.

The plan for the Jantzen Beach SuperCenter responds to the future light rail station that would be built as part of the CRC project. Redeveloping the shopping center in a fashion that supports transit-oriented development and incorporates the new light rail station creates an opportunity for a plaza and gateway, both physical and symbolic, to Hayden Island. It is important that the new station is constructed to be a landmark along the highway and to serve as a focal point of Hayden Island.

A New Center

A walkable mixed-use community needs a center. Today, Hayden Island's center is filled by freeway and ramps. With the proposed CRC construction of the new freeway and new interchange, there will be land east of I-5 that could become available for redevelopment. This plan calls for the land to be used for a neighborhood retail center that will serve the local community and be accessible via new sidewalks and a better local street system.

In the new center, roads providing for freeway access will be north and south of a new local east/west main street in the alignment of Tomahawk Island Drive. The freeway-related road will loop around the center, with Tomahawk Island Drive bisecting the center to provide a Hayden Island main street. Two eastern alignments for this loop road were considered—one through the neighborhood retail center using North Jantzen Drive, and a second around the eastern edge of the center on a new road. The community expressed a clear preference for the first option, which places the freeway-related road farther away from existing residences, although there are unresolved freeway design issues regarding the minimum distance between freeway ramps and local roads and driveways.

Two road networks were proposed for the east neighborhood; one coming through the center shown on the left, A, and the second alternative, B, on the right, showing the road circling the neighborhood on a new road to the outside.

New Parks

The community desires access to the river for viewing, swimming and boating. To the west, adjacent to Grandma's or Canoe Bay and the railroad tracks, a park with beach access to the Columbia River could be developed.

A new park should be developed west of the highway on the Columbia River. This new park should be designed to provide for a diversity of unstructured and structured recreational opportunities for both residents and visitors to the island. To enhance the park's potential recreational attractions and to limit some of the costs, park planners should consider developing a restaurant/café or similar visitor-related commercial enterprise that makes the park active year-round. The new park could extend eastward under the new bridge, if the crossing allows adequate air and light, and is not too noisy.

Facilities for docking motorized and nonmotorized boats (kayaks and canoes) could be provided at new parks. These facilities could provide residents and nonresidents with opportunities to access the island's marine-related businesses. These facilities would need to obtain the proper permits.

On Hayden Island, there are private walkways that are not part of a connected system and that also do not connect to the public roads. The plan recommends that these walkways be connected into a system of trails providing viewpoints of the Columbia River and the Cascades. Connecting these walkways would be accomplished with easements as land redevelops for the Hayden Island community. Although some of these paths currently exist, some of the land owners were concerned about expanding this system, and others were interested in having such a system. Path systems provide a means of active recreation that is convenient and sustainable for communities.

GETTING AROUND

Getting to and from Hayden Island could change dramatically in the next several years. The only access to the island is via I-5, which is congested for a large part of the day. New bridges across North Portland Harbor and the Columbia River, along with a new interchange for I-5 at Hayden Island, are proposed as part of the CRC project. The Hayden Island Plan's proposals for new development on the island take into account the additional traffic that future development on Hayden Island could generate. Transportation modeling indicates that the additional traffic will meet ODOT standards and will not congest the interchange.

CRC-Related Changes

The CRC bridge as currently proposed would include access for Hayden Island residents to Marine Drive without having to get on the highway, an option that is not currently available. The CRC project also includes a light rail connection from the Expo Center in the south to Vancouver in the north that will offer greater flexibility in how Hayden Island residents and visitors travel. The new light rail bridge will also provide for shared pedestrian and bike paths from Marine Drive to Vancouver, Washington. The CRC plan also proposes improvements to the existing path system that include expanded pedestrian and bicycle connections to Bridgeton and the 40-Mile Loop trail.

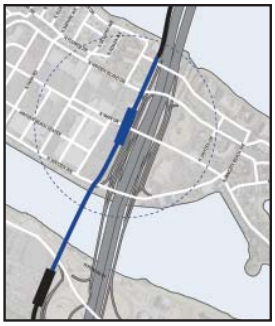
An "Enhanced Local Green Street" Network

The plan proposes a network of local streets that would have sidewalks and bike paths. Many streets would have on-street parking. Each of the streets would be designed to be an *enhanced green street*, which would provide for stormwater runoff into planters to protect the Columbia River, landscaped settings for walking and new habitat areas. This design would enhance the local connectivity and the Hayden Island environment. It would make it possible for residents to walk to local businesses, thereby reducing car trips, promoting exercise and reducing fuel use—all elements of the community's vision for making Hayden Island more sustainable.

Connections to Light Rail

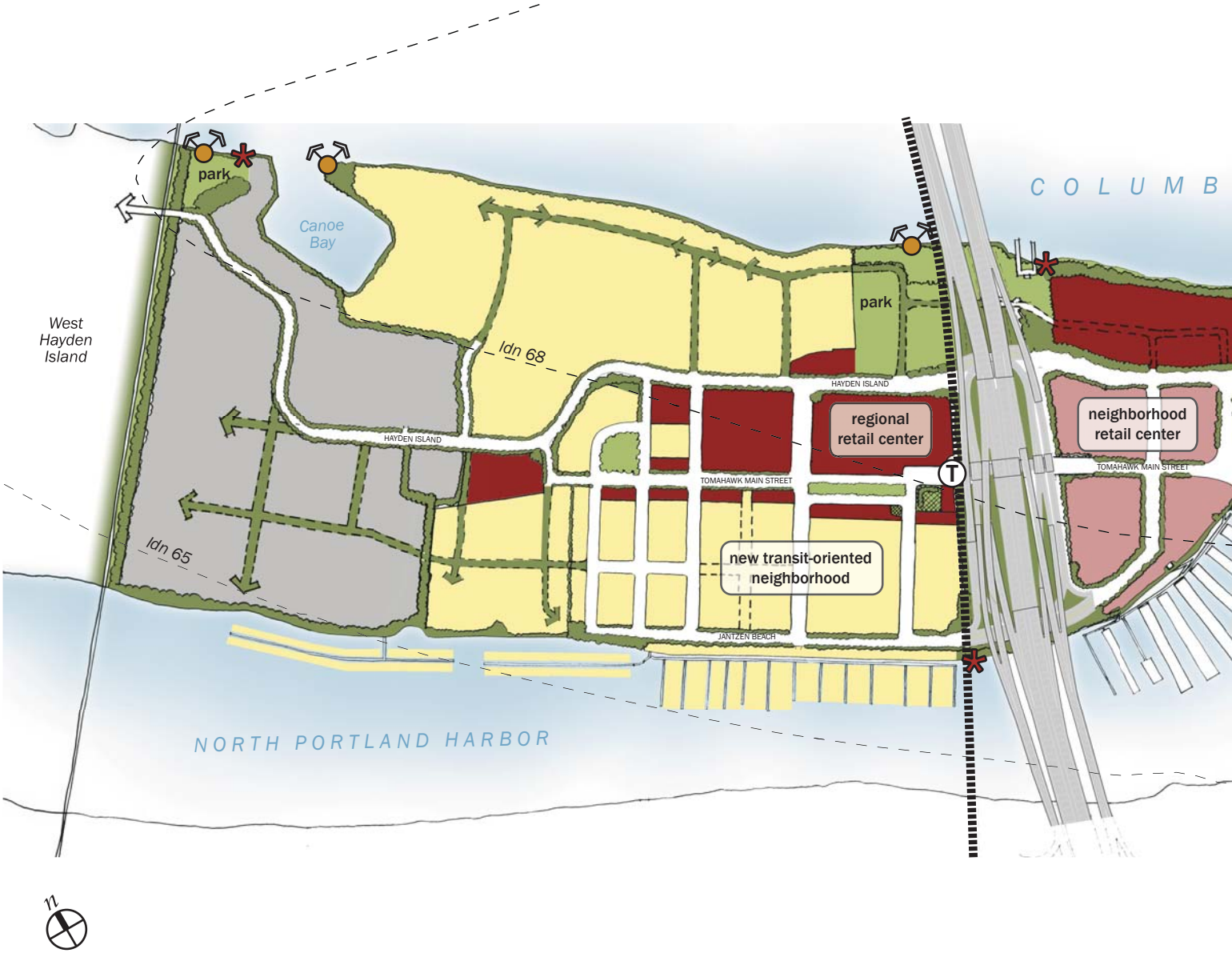
A major part of the CRC project is the extension of light rail from the Expo Center to Vancouver, with a new station on Hayden Island. The design workshops in October 2007 originally explored three future light rail alignments. Public input, the community design workshops and CRC analysis identified the alignment adjacent to I-5 and a station at Tomahawk Island Drive as the preferred alternatives. This station location would best serve the near-term and long-term needs of the island, is the most central to the island's resident population, and would require displacement of fewer floating homes than the other alternatives.

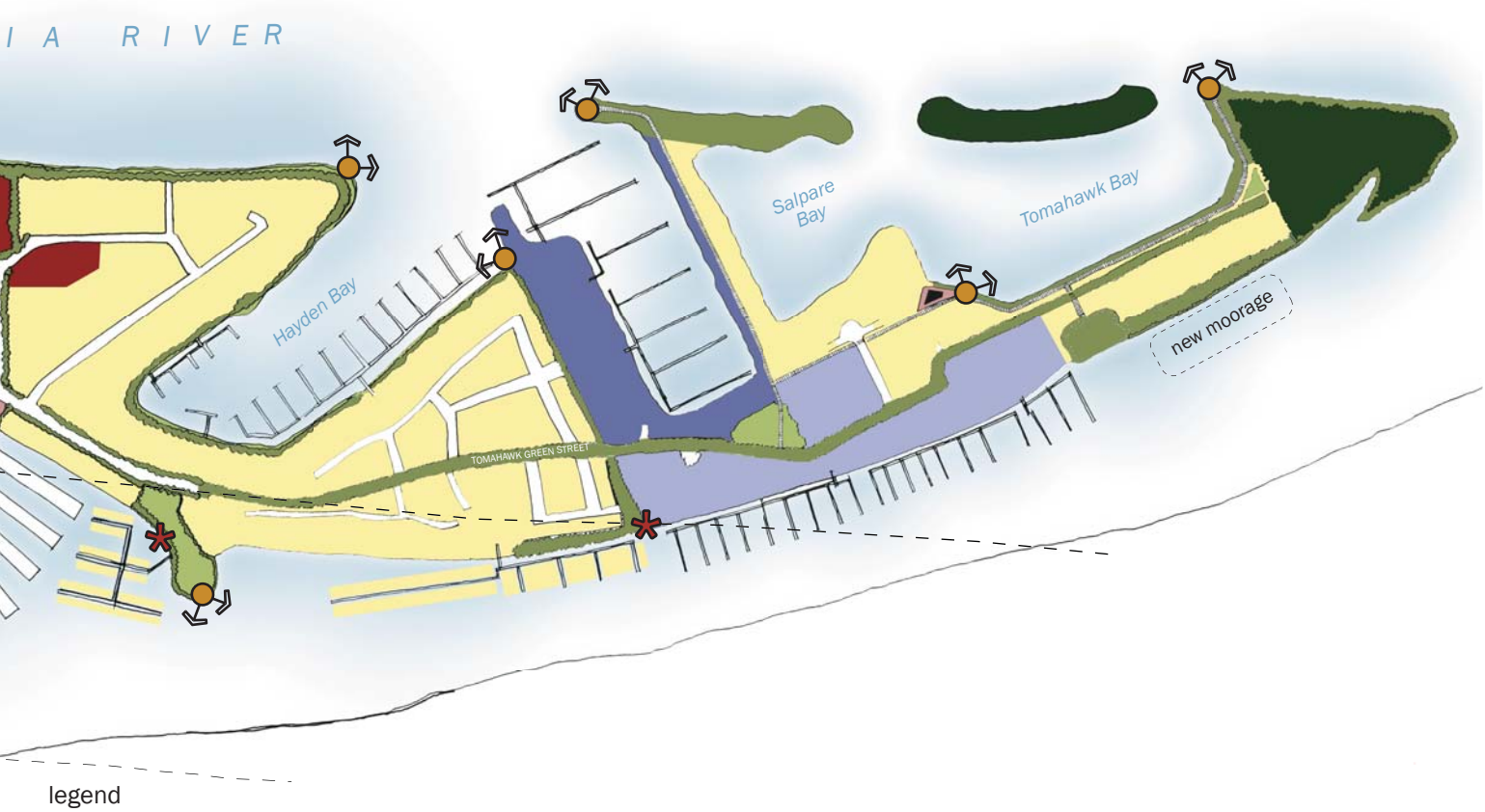
As already described, this station location would support transit-oriented redevelopment of the shopping center in the long term and station-related improvements in the near term. The plan includes a new open space and a collection of shops integrated into the Jantzen Beach SuperCenter as part of the design for the light rail station.



Preferred location for the light rail.

Concept Plan





legend

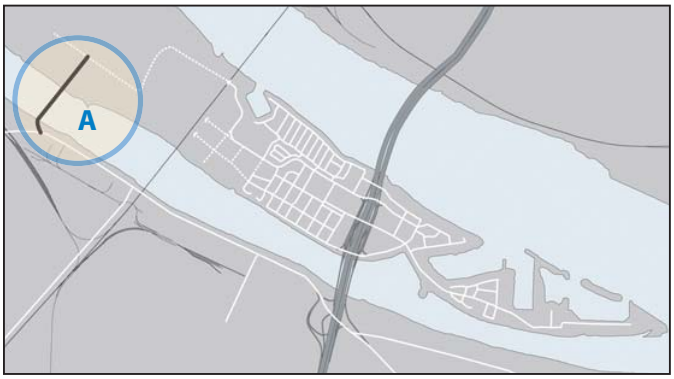
proposed land use

- regional commercial
- neighborhood commercial
- residential
- institutional
- marine industrial
- industrial
- habitat
- open space/public green street
- park
- shallow water habitat
- transit station
- small boat access
- water views / access

An Island Community Concept

An Additional Bridge

The community has long been interested in a second arterial bridge between Hayden Island and the mainland. Several options were discussed as part of this planning process. This Hayden Island Plan includes a recommendation for provision of such a bridge as part of development on West Hayden Island, if it is determined through the West Hayden Island planning process that development of this portion of the island is an appropriate location for a bridge. A second bridge could provide improved access to and from the island for residents, as well as a direct route for trucks going to and from any potential development on West Hayden Island, thereby avoiding truck traffic in residential areas on the eastern half of the island. Bridge location and options for the bridge's construction will be addressed as part of a larger analysis of redevelopment and related transportation issues.



Two arterial bridge options were explored during the design workshops and through the community conversation; Location A on West Hayden Island was preferred.

ENVIRONMENT AND OPEN SPACE

Over the history of Hayden Island, the Columbia River has bisected, flooded, and flowed past the island on its journey to the Pacific Ocean. As a major navigation channel for the Ports of Portland and Vancouver USA, it is an important river in the Pacific Northwest. The river is an environmental and recreational treasure for the region.

Salmon, steelhead and lamprey migrate past Hayden Island to upstream spawning grounds; their offspring migrate back to the Pacific Ocean. During this migration, which varies in season, salmon depend on the off-channel and shallow water habitat on the shores of Hayden Island. Other salmon use the river year-round, inhabiting Hayden Island's off-channel and shallow water habitat.

Birds and other wildlife use the Columbia River corridor. Hayden Island is part of a habitat complex that includes Smith and Bybee Wetlands, Ridgefield Wildlife Refuge and the Lower Columbia River Estuary. More than 100 species of birds are attracted to this area, including bald eagles that have been sighted nesting on both the eastern and western ends of the island. The protection of aquatic, avian and terrestrial species, including endangered species, is important for the Columbia River, Hayden Island and the City of Portland.

To protect this vital asset, it is important to know that Hayden Island is in the Columbia River watershed. All runoff from Hayden Island drains into the Columbia River. In order to protect the river's water quality, it is imperative that water drained from the island is as clean as it can be before it enters the river.

Protecting the Columbia River habitat for the many animals, birds, fish and plants of Hayden Island is one of the goals of the plan. To achieve this goal, the plan proposes that the banks of the river are restored and protected; enhanced green streets are the standard as redevelopment takes place; and new habitat and parks spaces are provided on Hayden Island. Additionally, the Hayden Island Plan is proposing to protect areas of shallow water habitat surrounding the island and its riparian and upland areas.

Enhanced Green Streets

The Hayden Island Plan proposes that as streets are redeveloped they are designed to an "enhanced green street" standard intended to filter stormwater runoff into the Columbia River order to protect its water quality. These green streets are streets designed so that the stormwater moves to swales and other structures, where soils and plants reduce pollutants. Green streets also reduce impervious surface so that stormwater can infiltrate to recharge groundwater and surface water. The streets will become a linear system of open space across the island.

River Banks and Beaches

As part of the Hayden Island Plan, it is proposed that areas of shallow water habitat surrounding the island are protected. This shallow water habitat, including beaches, is home to young fish and is vital in providing for the protection and re-population of endangered species. The plan proposes replanting native species along the banks of the Columbia River to further filter runoff and provide habitat for terrestrial and aquatic species. Riparian areas should be protected from further rip-rap or hardening and, where possible, rip-rap should be removed.

One of the actions proposed in the plan is a habitat-based replanting plan for the banks of the river and a list of plants to add to gardens to enhance the natural environment on Hayden Island. This replanting plan will apply, where it is appropriate, to new sections of the trail system.

Natural Area Protection

Open space for habitat, which is not used by people, must be protected in order to restore the balance needed for protecting endangered species that use Hayden Island and the Columbia River for habitat. The eastern tip of the island is a habitat area that the plan seeks to protect in perpetuity. The island contains areas for protection that are identified in the City of Portland's natural resource inventory and environmental review regulations. These areas include critical shallow water habitats. The environmental zones on East Hayden Island will be updated based on an updated natural resource inventory as part of the West Hayden Island planning process.

Freeway-Related Transportation Issues

THE COLUMBIA RIVER CROSSING PROJECT

The I-5 Columbia River Crossing project is a multimodal project focused on improving safety, reducing congestion, and increasing mobility of motorists, freight, transit riders, bicyclists and pedestrians along a five-mile section of the I-5 corridor connecting Vancouver, Washington, and Portland, Oregon. The project area stretches from State Route 500 (SR 500) in northern Vancouver, south through downtown Vancouver and over the I-5 bridges across the Columbia River to just north of Columbia Boulevard in North Portland. Hayden Island's location in the middle of the Columbia River puts it in the center of the CRC project.

I-5 is the only continuous north-south interstate highway on the West Coast, linking the United States, Canada and Mexico. In the Portland-Vancouver region, I-5 is one of two major north-south highways that provide interstate connectivity and mobility. I-5 directly connects the central cities of Vancouver and Portland. Traffic conditions on I-5 crossing over the Columbia River are influenced by the five-mile section of I-5 between SR 500 in Vancouver and Columbia Boulevard in Portland. This section includes six interchanges that connect three state highways and several major arterial roadways. These interchanges serve a variety of land uses and provide access to downtown Vancouver, two international marine ports, industrial centers, residential neighborhoods, retail centers and recreational areas.

The purpose of the CRC is to improve I-5 traffic flow by addressing current and future travel demand and mobility needs in the Columbia River Crossing Bridge Influence Area (BIA). The BIA extends from approximately Columbia Boulevard in the south to SR 500 in the north. Relative to the no-build alternative, the proposed action is intended to achieve the following objectives: (a) improve travel safety and travel operations on the I-5 crossing's bridges and associated interchanges; (b) improve connectivity, reliability of travel times and operations of public transportation modal alternatives in the BIA; (c) improve highway freight mobility and address interstate travel and commerce needs in the BIA; and (d) improve the I-5 river crossing's structural integrity.

The CRC must address the following problems:

Growing travel demand and congestion: Existing travel demand exceeds capacity in the I-5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion during both the morning and afternoon peak periods and when traffic accidents, vehicle breakdowns or bridge-lifts occur.

Impaired freight movement: I-5 is the most important freight freeway on the West Coast, linking international, national and regional markets in Canada, Mexico and the Pacific Rim with destinations throughout the western United States.

Limited public transportation operation, connectivity and reliability: Due to limited public transportation options, a number of transportation markets are not well served, including trips between Portland, Vancouver and Clark County.

Safety and vulnerability to incidents: The I-5 river crossing and its approaches experience crash rates nearly 2.5 times higher than statewide averages for comparable facilities.

Substandard bicycle and pedestrian facilities: The bicycle and pedestrian facilities on the Columbia River bridges are narrow and are located extremely close to traffic lanes, with poor connectivity to the adjacent bicycle and pedestrian networks.

Seismic vulnerability: The existing I-5 bridges are located in a seismically active zone, do not meet current seismic standards and are vulnerable to failure in an earthquake.

During the preparation of the Hayden Island Plan, the CRC project was of primary consideration for both its impact to the island and how the island can be better planned to take advantage of it. With the CRC project, there is the ability to increase connectivity, first through joining portions of the island with the extension of Tomahawk Island Drive and second through the completion of light rail connecting Hayden Island to both downtown Portland and Vancouver.

Before the Hayden Island planning process began, the CRC public involvement process, although thorough, was still mainly about project-level engineering and environmental impacts. The Hayden Island planning process has allowed for a community-based assessment about the CRC project and informs the CRC project development process regarding design elements and features important to Hayden Island. The Hayden Island Plan has been prepared using an interactive land use/transportation approach. The CRC staff has participated in and been supportive of the Hayden Island Plan development.

The Hayden Island Plan's "themes" helped provide general guidance on assessing CRC alternatives and design features. Public engagement as part of the April 2008 Hayden Island Concept Plan development has provided more specific guidance on the CRC project. The large-scale recommendations for the CRC project deriving from the Hayden Island Plan are:

a. Light Rail Transit (LRT) is the high capacity transit mode that will effectively support a station community.
b. The LRT alignment adjacent to the freeway is preferred over a separated alignment in order to minimize the barrier effect of the CRC project as a whole.
c. The CRC project must provide the capability to access local street systems south of North Portland Harbor without using the freeway.

Columbia River Crossing conceptual drawing, looking south, showing the new bridge with light rail access along the west (lower right in drawing) side.

The more specific recommendations transmitted to CRC based on the Hayden Island Plan are:

a. The CRC project must provide a LRT station of ultra high-quality architectural design on Hayden Island to provide a community focal point. Safe, attractive and accessible pedestrian and bicycle facilities should be incorporated into the station area design.

b. CRC project arterial streets providing access to the interchange will also serve community needs, and provide bicycle and pedestrian facilities and street trees. Smaller scale arterial streets than currently indicated in the Draft Environmental Impact Statement (DEIS) should be considered.

c. The western termini of the CRC project arterial street improvements on Hayden Island Drive and Jantzen Beach Drive should be extended to the planned primary north-south future public street (approximately 600 feet west of the freeway ramp intersections).

d. The extension of Tomahawk Drive under the freeway will be designed as a community main street, highlighting the needs of pedestrians and bicyclists and local traffic access. Design issues to be resolved include the provision of acceptable vertical and horizontal clearances, property access, stormwater management and creation of an attractive and safe environment under the freeway.

e. The CRC project is encouraged to allow for the reuse of areas north of Hayden Island Drive that are disrupted by construction or used for construction activities as open space and for stormwater management and habitat restoration.

f. The CRC project, ODOT and the City of Portland shall work cooperatively in the development and adoption of the required Interchange Area Management Plan (IAMP). The IAMP will consider the principles of IAMP standards, balanced with current and future property access and in coordination with a master street plan for Hayden Island.

THE INTERCHANGE AREA MANAGEMENT PLAN (IAMP)

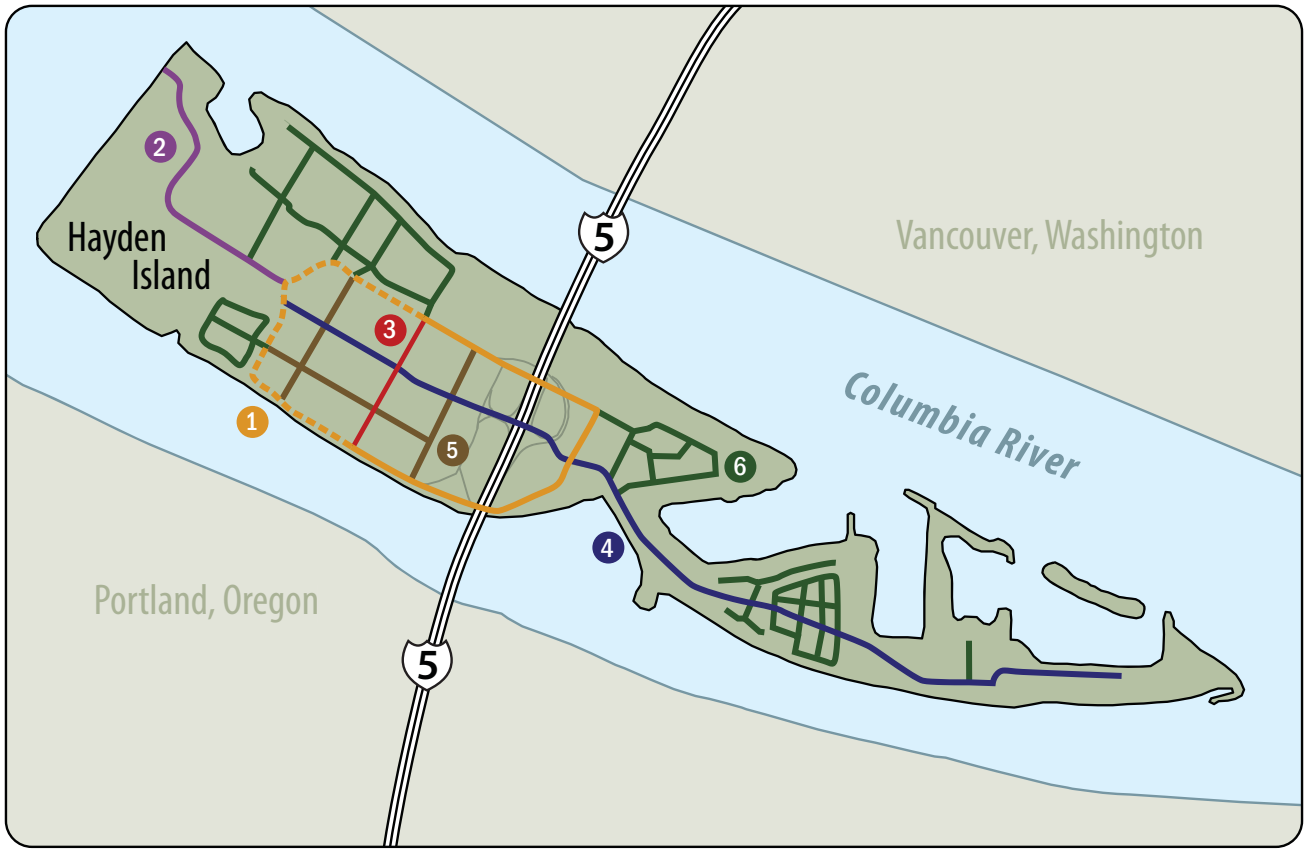
As part of any Oregon highway improvement, including CRC, the Oregon Highway Plan (OHP) and Oregon Administrative Rule 734-051 require preparation of an IAMP before a new highway interchange can be constructed. These requirements call for the IAMP to identify opportunities to improve operations and safety that can be undertaken as part of the construction project, and to develop policies, provisions and development standards to capture the identified opportunities. Short-, medium- and long-range actions are to be identified that improve operations and safety within the study area and ensure safe operations over the transportation planning period of 20 years.

The IAMP must consider existing and proposed uses of all property within the study area based upon the comprehensive plan designations and zoning, and address current and future traffic volumes, road geometry, traffic control devices, and the location of existing and planned approach roads. The IAMP must include policies, provisions and standards from the local comprehensive plan and other implementing plans, ordinances and codes that will be relied upon to implement the plan. The IAMP also must be consistent with any Access Management Plan, corridor plan or other facility plan already adopted by the Oregon Transportation Commission.

During the development of the Hayden Island Plan, the interchange requirements and the amount of traffic the interchange could handle were assumptions that dictated the future land use capacity. These were major determinants for the land use considerations on the island and their impacts on travel and the traffic each generated. They were also determinants in the layout of the street plan, street widths and the uses ascribed to each street.

Although the IAMP for Hayden Island is not complete, the goals of the plan and its policies to protect the capacity or I-5 and its ramps are addressed in the Hayden Island Plan. The City will continue to coordinate with ODOT and the CRC to confirm that the Hayden Island Concept Plan is consistent with the IAMP.

Local Street Network

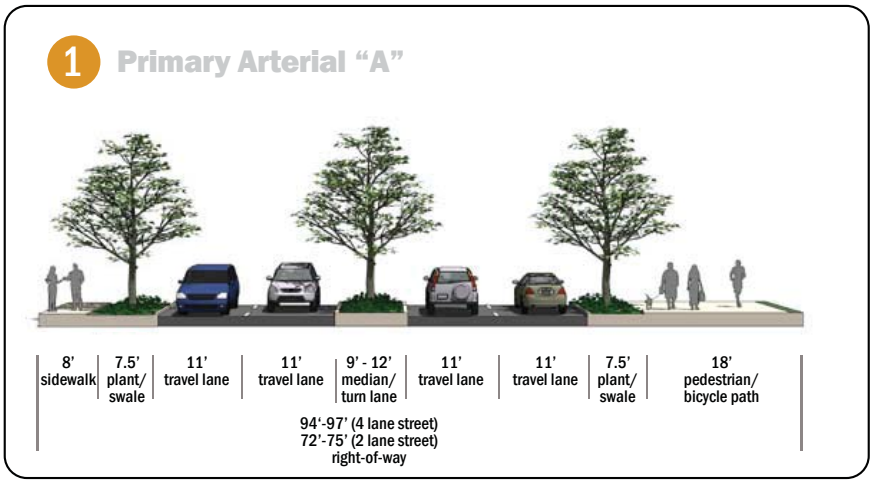


LOCAL STREET NETWORK

Given the unique characteristics of Hayden Island and the goals and themes of the Hayden Island Plan, a specialized local street network and set of street types are proposed. These street types respond to the general City policies regarding the development of a multi-modal transportation system and are consistent with all modal classifications as identified in Exhibits A through G under the Plan's discussion of the City's Transportation System Plan.

The intent of the local street network and various street types is to provide logical circulation for all modes and suitable access to planned land uses. The local street network is compatible with the planned Columbia River Crossing (CRC) interchange improvements and traffic analyses prepared by the City for the Plan. Sustainable storm water management applications and facilities are employed on all streets.

The proposed street types are not being adopted as part of the Hayden Island Plan. These streets reflect potential designs to accommodate modal needs and provide guidelines for right-of-way requirements. The local street designs will be subject to a public review process with final determination by the City Engineer, and in coordination with ODOT for CRC project improvements.



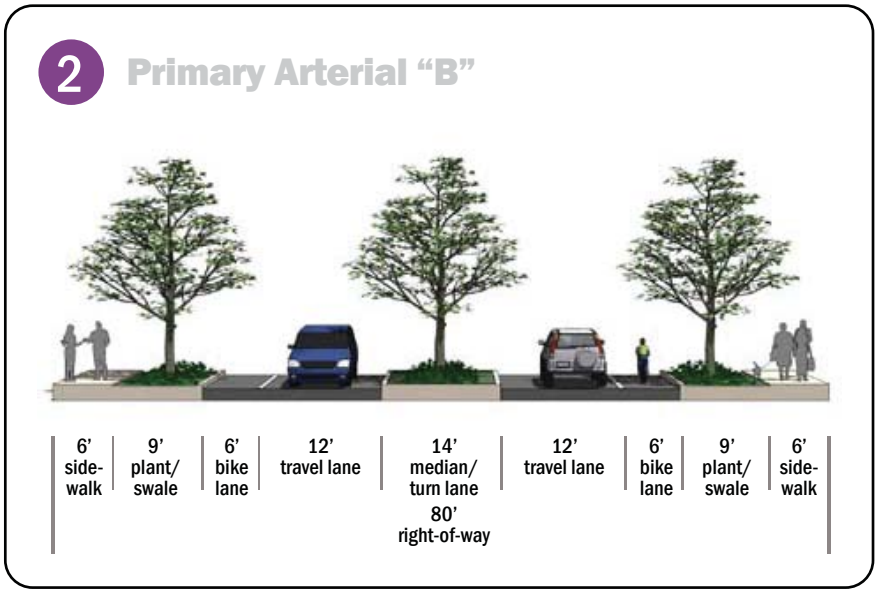
PRIMARY ARTERIAL STREET "A"

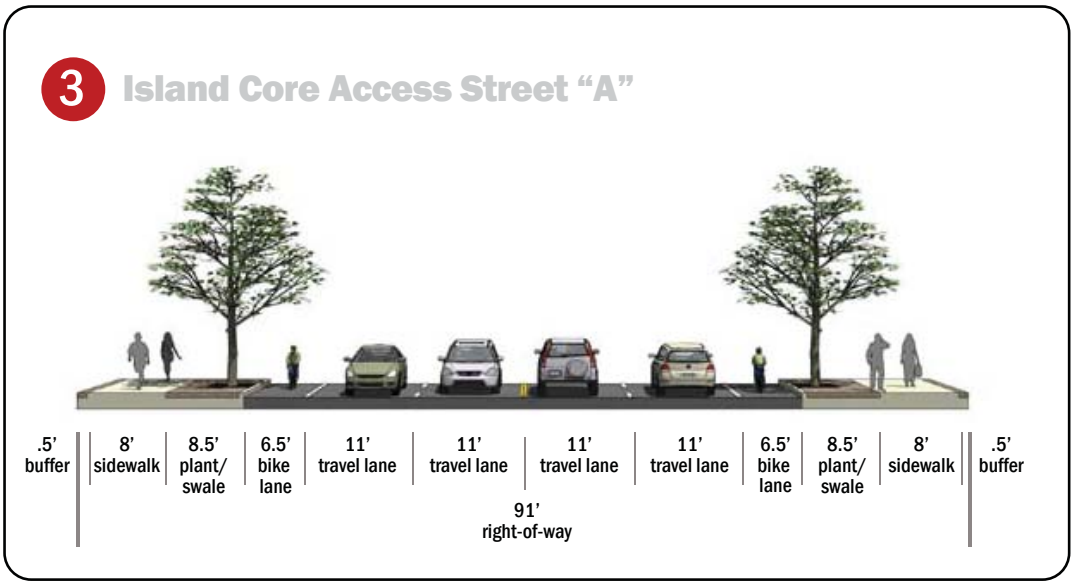
Segments of Hayden Island Drive and Jantzen Avenue are identified as primary arterials which provide the backbone of the road system on the island, connecting the local street system to the regional system. These also function as transit access streets or community transit streets, depending on location. These roads are generally larger in scale than other streets on the island with two 11-foot travel lanes in both directions. In locations further away from the interchange, where lesser traffic volumes are likely, a single travel lane in both directions would be provided. All other modal elements are the same.

An 18-foot wide multi-use pathway for pedestrian and bicycle access is provided on one side of the road and an 8-foot sidewalk is provided on the opposite side. Pedestrians and bicycles are separated from vehicles by planting strips and/ or a swale, which is provided on both sides of the roadway. A center median of a 9-foot width provides street trees except at major intersections where a 12-foot turn lane would be provided. Primary arterials do not include on-street parking. Right-of-way is approximately 72 to 97 feet, depending on the number of travel lanes and median width.

PRIMARY ARTERIAL STREET "B"

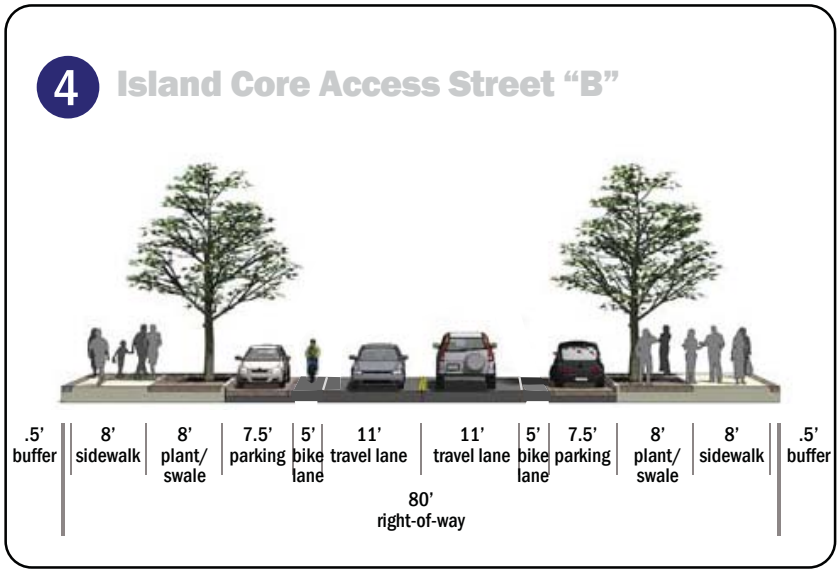
North Hayden Island Drive is located west of the curve along Jantzen Avenue and provides the most direct connection to West Hayden Island, which is owned by the Port of Portland and does not currently permit vehicles past the railroad bridge. The road is also designated as a community transit street. This primary arterial street provides one 12-foot travel lane and one 6-foot bike lane in both directions, and a 14-foot-wide planted median, replaced with left-turn refuges where needed. Planted swales separate the six-foot-wide sidewalks that are located on both sides of the road from the bicycle and vehicle travel lanes. North Hayden Island Drive does not include on-street parking. Right-of-way is approximately 80 feet.





ISLAND CORE ACCESS STREET "A"

The island core access street A provides direct north-south access through the core of the shopping area and future mixed-use area linking Jantzen Avenue and Hayden Island Drive. It provides the primary vehicular access for destinations in this area. It is a larger scale road with higher traffic volumes than all streets other than the primary arterial streets. It also provides a central connection through the proposed transit-oriented development block system. This is also a multi-modal street with pedestrian, bicycle and landscape design elements. The commercial core street has two 11-foot travel lanes in both directions and bicycle lanes on both sides of the street. Eight-foot sidewalks are located on both sides of the street and are separated from the vehicle and bicycle lanes by 8.5-foot planting strips. No on-street parking is provided. Right-of-way is approximately 91 feet.



ISLAND CORE ACCESS STREET "B"

The island core access Street B provides direct east-west connectivity through the core of the shopping area and future mixed-use area to the west of I-5 and also to the commercial area on the east side of I-5. This street is intended to provide a community access function with a significant design identity. It also provides the primary community street link to the light rail transit station. The island core access street provides an extended link to the community toward the east side of the island by connecting to Tomahawk Island Drive on the east side of I-5. Unlike the primary arterial streets that connect to the freeway ramps, this street is intended to be smaller in scale with calmed and lesser traffic volumes. This street is a transit access and community transit street and is also one of the primary pedestrian streets in the area. The island core access street has one 11-foot travel lane in each direction, with on-street parking on both sides of the street. Five-foot bicycle lanes are provided in the roadway. Eight-foot-wide sidewalks are located on both sides of the street and are separated from the vehicle lanes by 8-foot planting strips. Right-of-way width is approximately 80 feet.

5 Typical Mixed Use Street

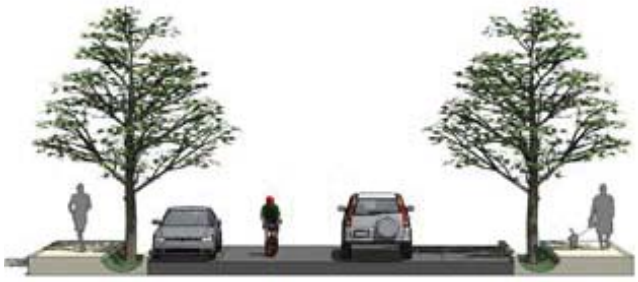
1.5' buffer	6' side-walk	4' plant/ swale	7.5' parking	11' travel lane	11' travel lane	7.5' parking	4' plant/ swale	6' side-walk	1.5' buffer

60' right-of-way

TYPICAL MIXED-USE STREET

Typical mixed-use streets are located within the central core of the site, which is currently the Jantzen Beach SuperCenter. Mixed-use streets are designed to distribute local traffic and provide access to local residences or commercial uses. Mixed-use streets have one 11-foot travel lane in both directions, with parking provided on both sides of the street. Bicycles share the travel lanes with vehicles. As with the other street sections, the sidewalks are separated from the travel lanes by a planting strip/swale but the on-street parking provides an additional buffer. Right-of-way is approximately 60 feet.

6 Local Green Street



.5' buffer	6' side-walk	4' plant/ swale	6.5' parking	10' travel lane	10' travel lane	6.5' parking	4' plant/ swale	6' side-walk	.5' buffer

54' right-of-way

LOCAL GREEN STREET

Local Green Streets are designed to support low-traffic residential areas outside of the commercial core, and as such are the narrowest streets of the proposed street system. Local Green Streets would provide one 10-foot travel lane in both directions and on-street parking on both sides of the roadway. Planting strips or swales would be located on both sides of the road and are integrated into the road design to provide on-site storm water detention and treatment. Right-of-way width is approximately 54 feet.

TRANSPORTATION SYSTEM PLAN —COMPREHENSIVE PLAN AMENDMENTS

Several new transportation policies of the City's Comprehensive Plan will be added or amended through the adoption of the Hayden Island Plan. These amendments assure that the appropriate transportation infrastructure and services will be provided to sustain the goals and themes of the Hayden Island Plan. The transportation recommendations have been confirmed by analyses and findings and support the Comprehensive Plan Map amendments and Zoning Code amendments proposed by the Hayden Island Plan.

The transportation policies of the City are contained in the Transportation System Plan (TSP). The TSP is a comprehensive, multi-modal and long-range plan that coordinates land use planning and transportation planning. The TSP is the transportation component of the City's Public Facility Plan.

Sections of the TSP that are adopted as part of the Transportation Element of the Comprehensive Plan include Chapter 2, which are the policies and objectives of Goal 6 - Transportation, and Chapter 3, the policies and objectives of Goal 11B - Public Rights-of-Way.

TSP CHAPTER 2, GOAL 6 – TRANSPORTATION

Amendments are recommended for the North Transportation District policies to respond to key functional changes for Hayden Island. These include the extension of light rail transit to serve the island, the future construction of Columbia River Crossing highway and interchange improvements and implementation of the proposed Hayden Island Street Plan.

Amendments are also recommended to the street classification designations for all modes of transportation on Hayden Island, as displayed in Exhibits A through G. These street designation changes are intended to provide policy direction for developing a complete and functional multi-modal transportation system for Hayden Island, which does not exist today.

Once the Columbia River Crossing (CRC) improvements are constructed the transportation system will change in the vicinity of the new interchange. At that time, additional street designation amendments are warranted. These amendments are previewed in Appendix C.4, "Other Transportation System Plan Amendments", and displayed as Exhibits I through O. These amendments are not adopted as part of the Comprehensive Plan at this time through the Hayden Island Plan process, but will be subject to a separate adoption process following the federal Record of Decision for the CRC project.

Amendments to TSP Chapter 2, Goal 6 – Transportation that are recommended as part of the Hayden Island Plan are listed below.

Chapter 2, Goal 6 – Transportation

Policy 6.35 North Transportation District

Amend Objective F., as follows:

Develop light rail transit on North Interstate and to Hayden Island ~~the Exposition Center;~~ place stations at major arterials where good feeder bus service can be provided; capitalize on redevelopment opportunities that support light rail; and mitigate potential negative impacts of diversion of automobile traffic onto nearby Neighborhood Collectors and Local Service Traffic Streets.

Add an Objective Q., as follows:

Implement the Hayden Island Street Plan to provide for new street connections and off-street paths as site development occurs.

Add an Objective R., as follows:

Integrate City multi-modal infrastructure improvements on Hayden Island with improvements undertaken as part of the Columbia River Crossing project.

Add an Objective S., as follows:
Coordinate with the Oregon Department of Transportation in the joint preparation of an interchange area management plan for the Hayden Island and Marine Drive interchange improvements.

Policy 6.35 North District – Map 6.35.1, Map 6.35.2, Map 6.35.3, Map 6.35.4, Map 6.35.5, Map 6.35.6, Map 6.35.7
Amend the Transportation District Boundary to include all of Hayden Island to be within the North District.

Policy 6.36 Northeast District – Map 6.36.1, Map 6.36.2, Map 6.36.3, Map 6.36.4, Map 6.36.5, Map 6.36.6, Map 6.36.7
Amend the Transportation District Boundary to include all of Hayden Island to be within the North District.

Policy 6.35 North District – Map 6.35.1, and Policy 6.36 Northeast District – Map 6.36.1
Amend Traffic Classifications on Hayden Island, as displayed in Exhibit A.

Policy 6.35 North District – Map 6.35.2, and Policy 6.36 Northeast District – Map 6.36.2
Amend Transit Classifications on Hayden Island, as displayed in Exhibit B.

Policy 6.35 North District – Map 6.35.3, and Policy 6.36 Northeast District – Map 6.36.3
Amend Bicycle Classifications on Hayden Island, as displayed in Exhibit C.

Policy 6.35 North District – Map 6.35.4, and Policy 6.36 Northeast District – Map 6.36.4
Amend Pedestrian Classifications on Hayden Island, as displayed in Exhibit D.

Policy 6.35 North District – Map 6.35.5, and Policy 6.36 Northeast District – Map 6.36.5
Amend Freight Classifications on Hayden Island, as displayed in Exhibit E.

Policy 6.35 North District – Map 6.35.6, and Policy 6.36 Northeast District – Map 6.36.6
Amend Emergency Response Classifications on Hayden Island, as displayed in Exhibit F.

Policy 6.35 North District – Map 6.35.7, and Policy 6.36 Northeast District – Map 6.36.7
Amend Street Design Classifications on Hayden Island, as displayed in Exhibit G.

TSP CHAPTER 2, GOAL 11B – PUBLIC RIGHTS OF WAY
Amendments are recommended to the City's Master Street Plan to recognize and include the Hayden Island Street Plan. This includes the adoption of Exhibit H which improves the planned network of interconnected local streets and pedestrian and bicycle pathways as development occurs on Hayden Island. Currently no street plan exists for Hayden Island and the level of local street connectivity is poor and does not meet standards.

TSP Policy 11.11 – Street Plans states: "Promote a logical, direct and connected street system through the development of street plans." Consistent with City of Portland and regional policies, a master street plan has been prepared to support the proposed land uses in the Hayden Island Plan. Adoption of the Hayden Island Street Plan, as displayed in Exhibit H, is recommended as part of the adoption of the Hayden Island Plan. Direct connections to State facilities are subject to ODOT approval.

As discussed above regarding the street classification designations, the planned CRC improvements will change the transportation system in the vicinity of the new interchange. At that time, relatively minor changes in the adopted street plan will be required as displayed as Exhibit I in Appendix C.4, "Other Transportation System Plan Amendments." Amendments to the street plan will be required to be consistent with the Interchange Area Management Plan and will be subject to a separate adoption process following the federal Record of Decision for the CRC project.

Chapter 2, Goal 11B – Public Rights-Of-Way

Policy 11.11 Street Plans

Amend Policy 11.11 Street Plans to add an Objective R., as follows:
Implement the Hayden Island Street Plan as site development occurs as shown on Map 11.11.20.

Amend Policy 11.11 Street Plans to a new Map 11.11.20 titled Portland Master Street Plan *Hayden Island,* as displayed in Exhibit H.

TSP CHAPTER 3, TRANSPORTATION SYSTEM IMPROVEMENTS

The State Transportation Planning Rule requires local TSPs to identify a list of planned transportation improvements over a 20-year timeframe that are needed to implement the Comprehensive Plan. Amendments to TSP Chapter 3 are recommended to support the adoption of the Hayden Island Plan.

A minor revision to an existing TSP project and the addition of a new project is proposed in order to identify new street plan improvements that are needed. The cost figures are considered placeholder amounts and timeframes are general in nature. A majority of the major transportation system improvements for Hayden Island will be implemented as part of the CRC project. Most of the new local streets, off-street paths and some frontage improvements on arterial streets will constructed as a part of land development.

Chapter 3, Transportation System Improvements

North District - Map 3.4, and Northeast - Map 3.5

Amend the Transportation District Boundary to include all of Hayden Island to be within the North District.

North District - Map 3.4

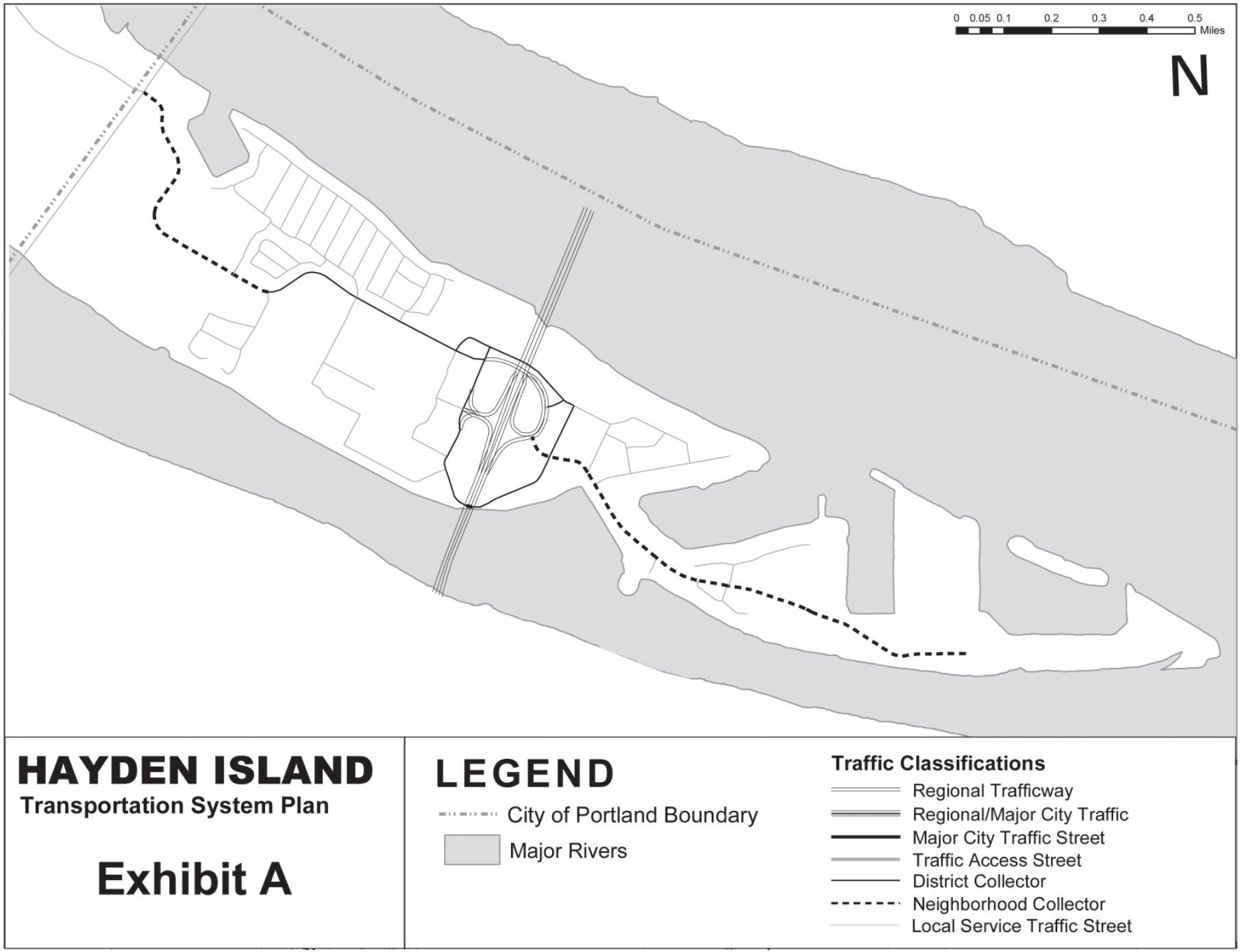
Amend the improvement category and symbol for Project 30018 from Street Segment Improvements to Area Wide Improvements.

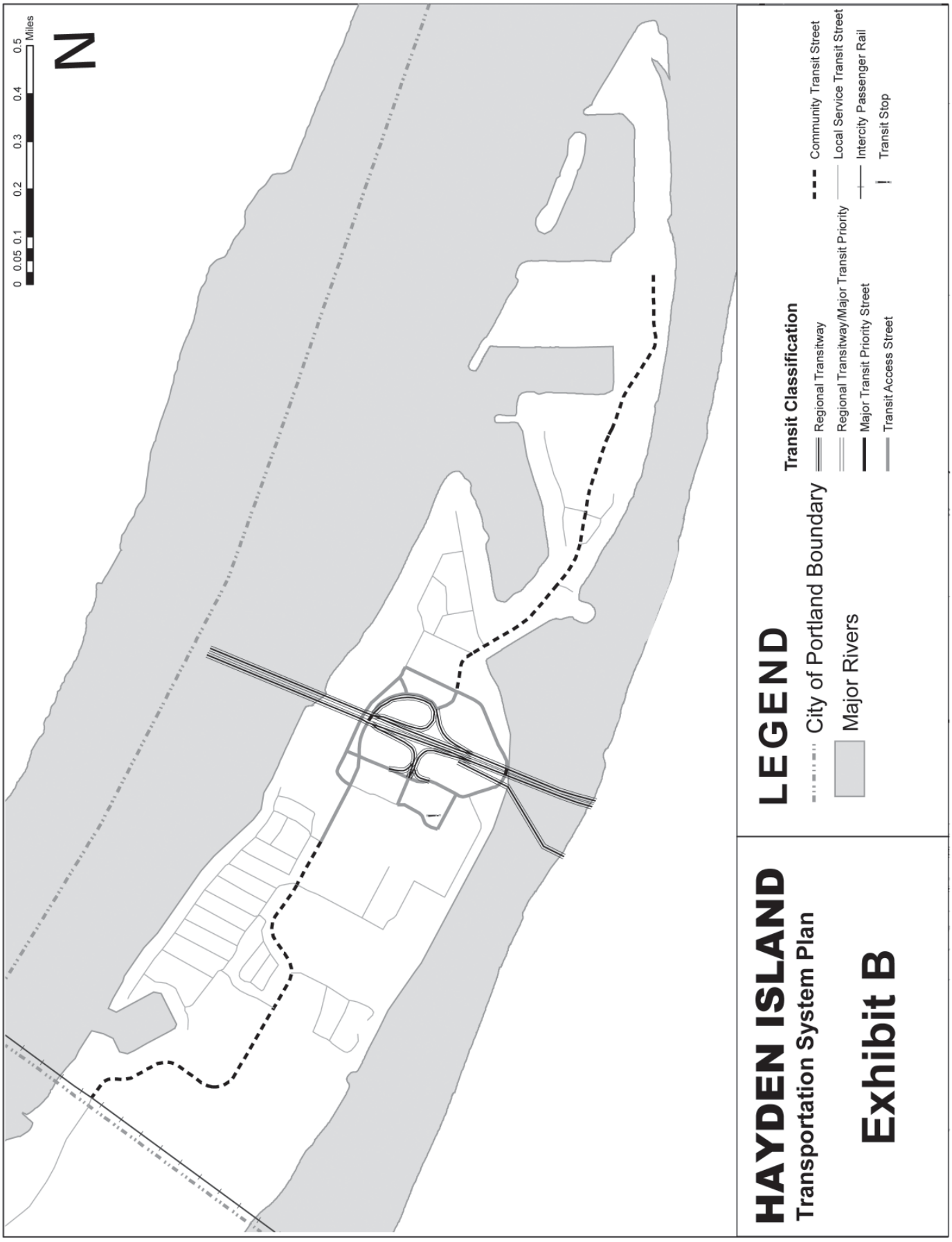
Add a new Project 30083 with the improvement category and symbol for Area Wide Improvements.

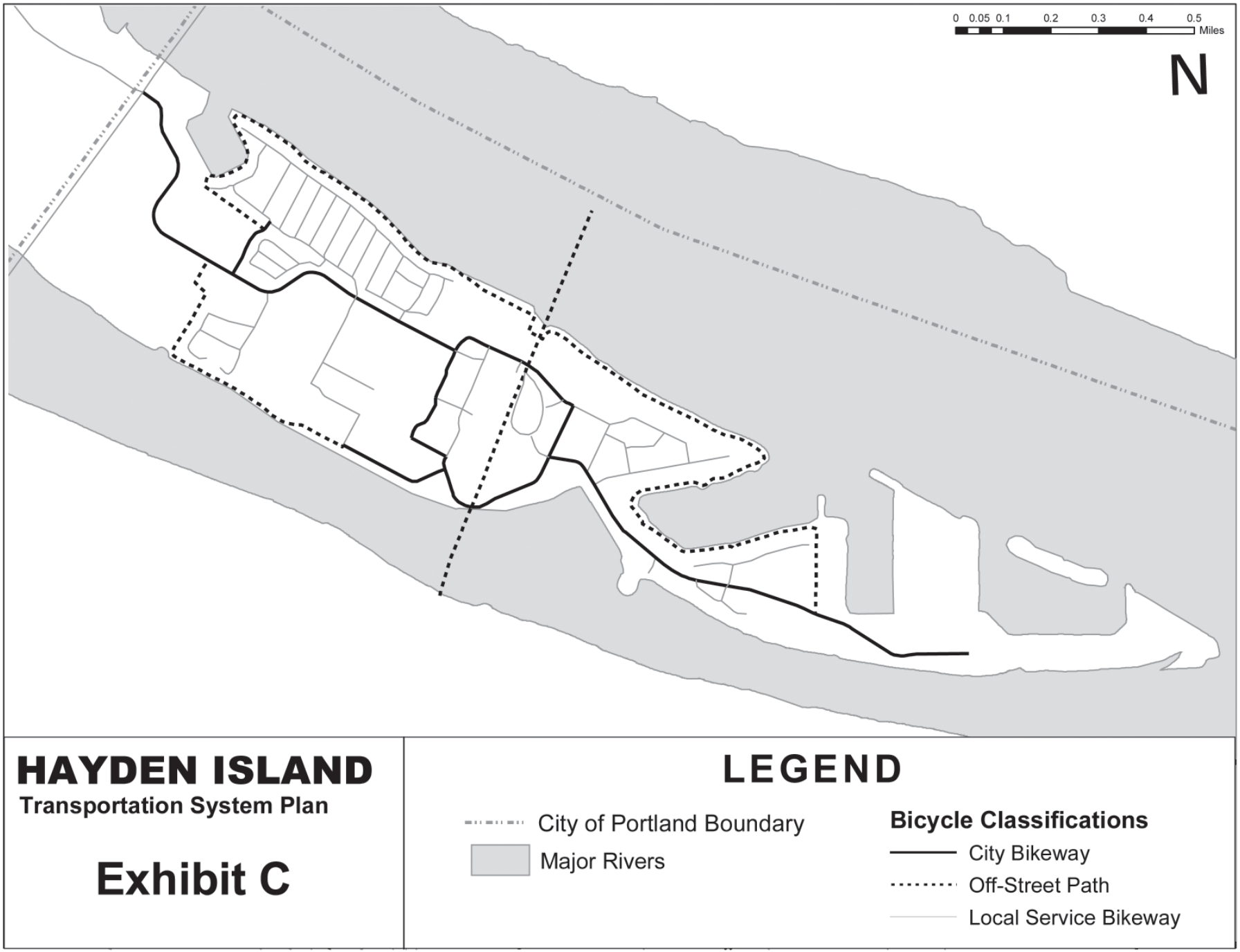
North: Major Transportation Improvements

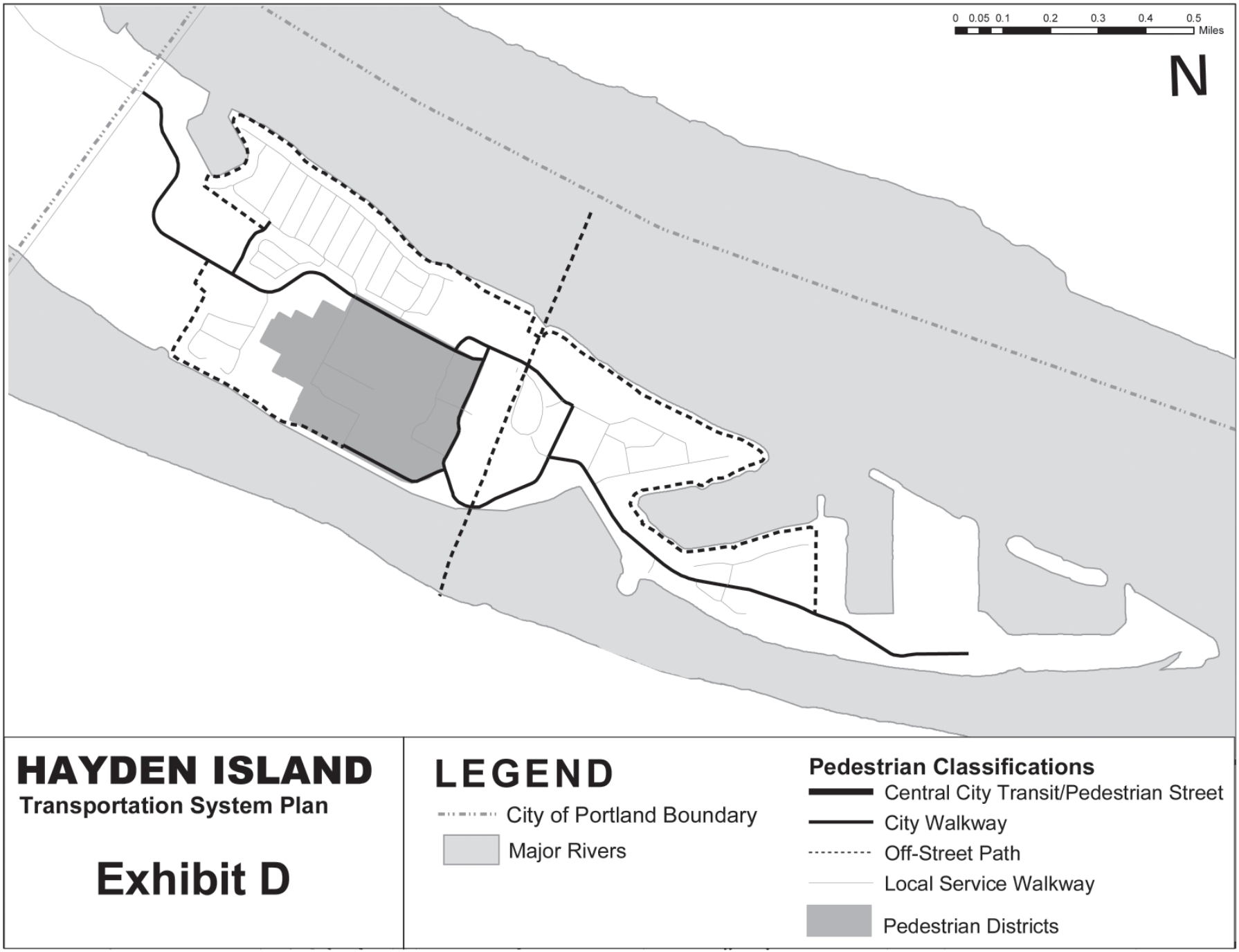
Amend Project 30018 title, description and timeframe, as follows:
Hayden Island, N: Street Network Improvements, Phase 1
Implement street plan for Hayden Island to improve circulation and access for all modes.
Portland $2,000,000 (Years 6-10)

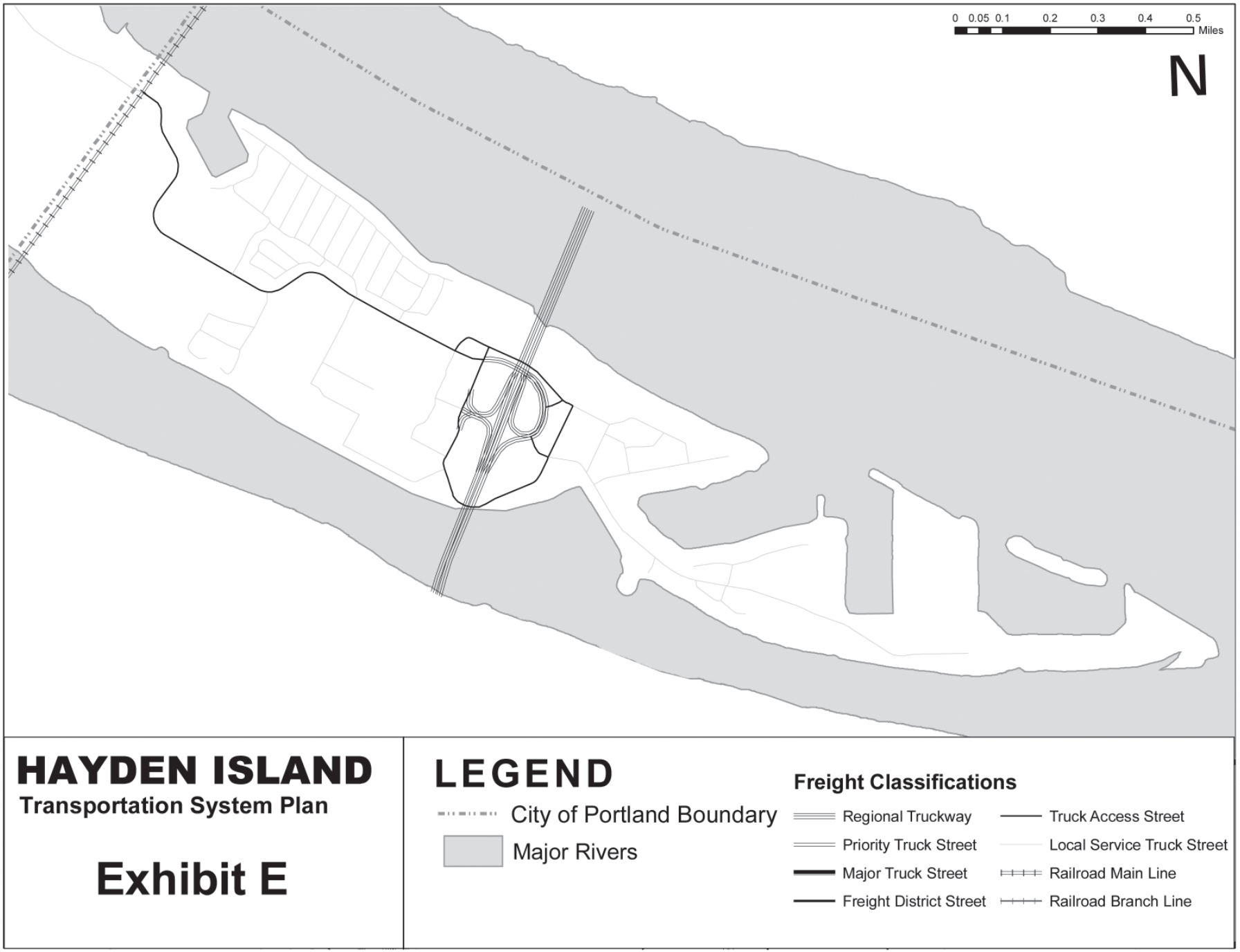
Add a new Project 30083 with title, description, estimated cost and timeframe, as follows:
Hayden Island, N: Street Network Improvements, Phase 2
Implement street plan for Hayden Island to improve circulation and access for all modes.
Portland $2,000,000 (Years 11-20)

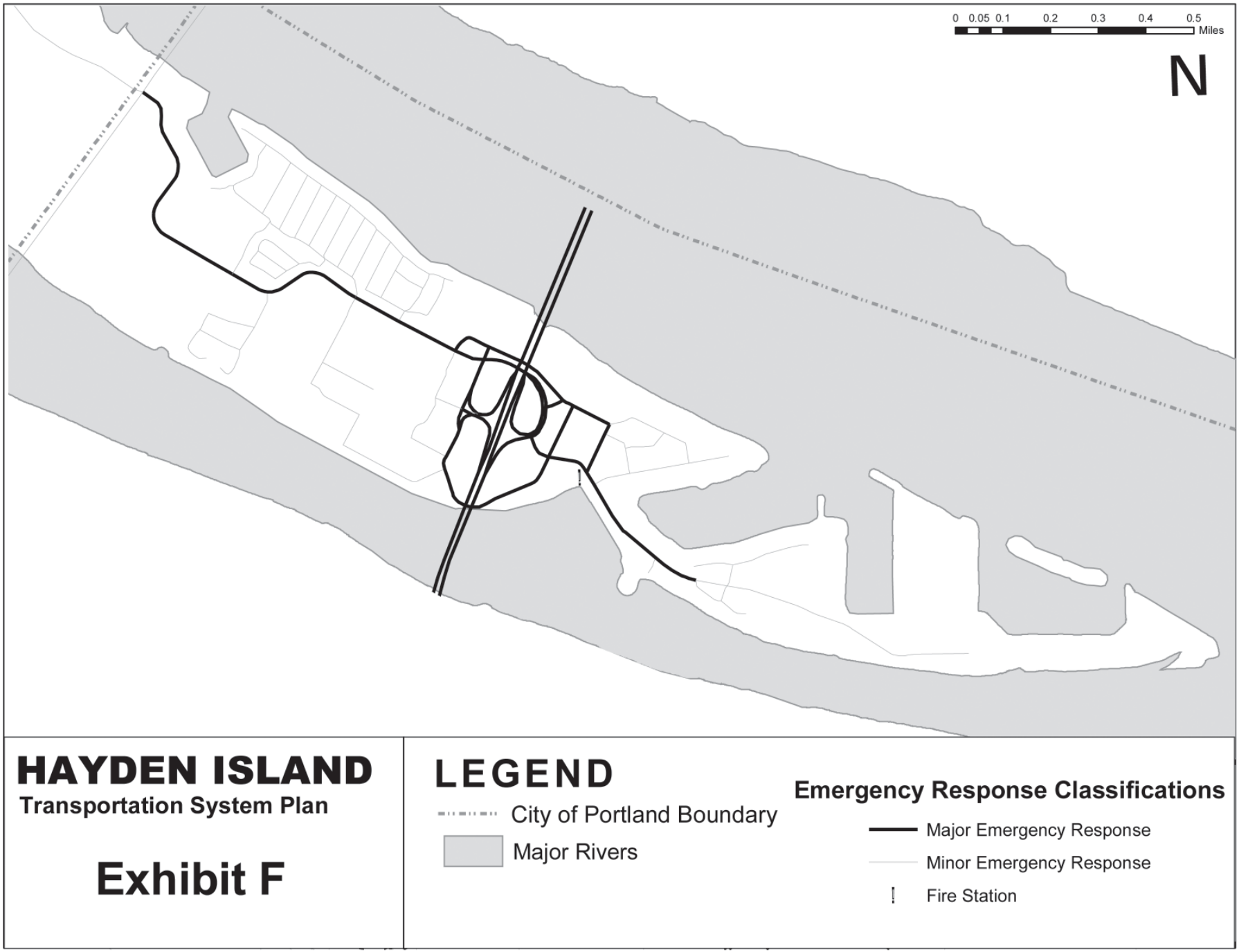

0 0.05 0.1 0.2 0.3 0.4 0.5
Miles
N
HAYDEN ISLAND
Transportation System Plan
Exhibit A
LEGEND
City of Portland Boundary
Major Rivers
Traffic Classifications
Regional Trafficway
Regional/Major City Traffic
Major City Traffic Street
Traffic Access Street
District Collector
Neighborhood Collector
Local Service Traffic Street

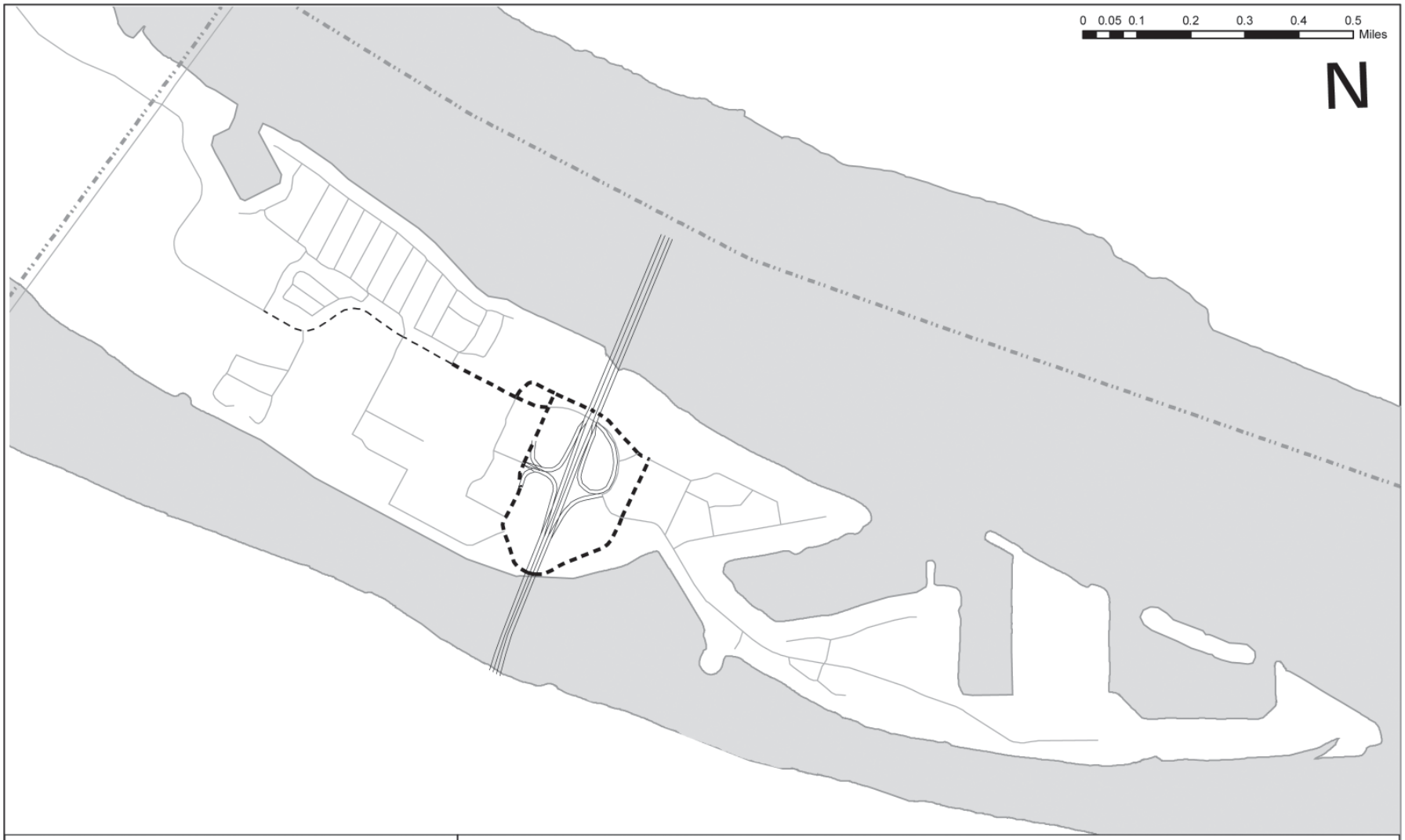

N
0 0.05 0.1 0.2 0.3 0.4 0.5 Miles
HAYDEN ISLAND
Transportation System Plan
Exhibit B
LEGEND
City of Portland Boundary
Major Rivers
Transit Classification
Regional Transitway
Regional Transitway/Major Transit Priority
Major Transit Priority Street
Transit Access Street
Community Transit Street
Local Service Transit Street
Intercity Passenger Rail
Transit Stop


0 0.05 0.1 0.2 0.3 0.4 0.5
Miles
N
HAYDEN ISLAND
Transportation System Plan
Exhibit C
LEGEND
City of Portland Boundary
Major Rivers
Bicycle Classifications
City Bikeway
Off-Street Path
Local Service Bikeway


0 0.05 0.1 0.2 0.3 0.4 0.5
Miles
N
HAYDEN ISLAND
Transportation System Plan
Exhibit D
LEGEND
City of Portland Boundary
Major Rivers
Pedestrian Classifications
Central City Transit/Pedestrian Street
City Walkway
Off-Street Path
Local Service Walkway
Pedestrian Districts


0 0.05 0.1 0.2 0.3 0.4 0.5
Miles
N
HAYDEN ISLAND
Transportation System Plan
Exhibit E
LEGEND
City of Portland Boundary
Major Rivers
Freight Classifications
Regional Truckway
Priority Truck Street
Major Truck Street
Freight District Street
Truck Access Street
Local Service Truck Street
Railroad Main Line
Railroad Branch Line


0 0.05 0.1 0.2 0.3 0.4 0.5
Miles
N
HAYDEN ISLAND
Transportation System Plan
Exhibit F
LEGEND
City of Portland Boundary
Major Rivers
Emergency Response Classifications
Major Emergency Response
Minor Emergency Response
Fire Station



HAYDEN ISLAND
Transportation System Plan

Exhibit G

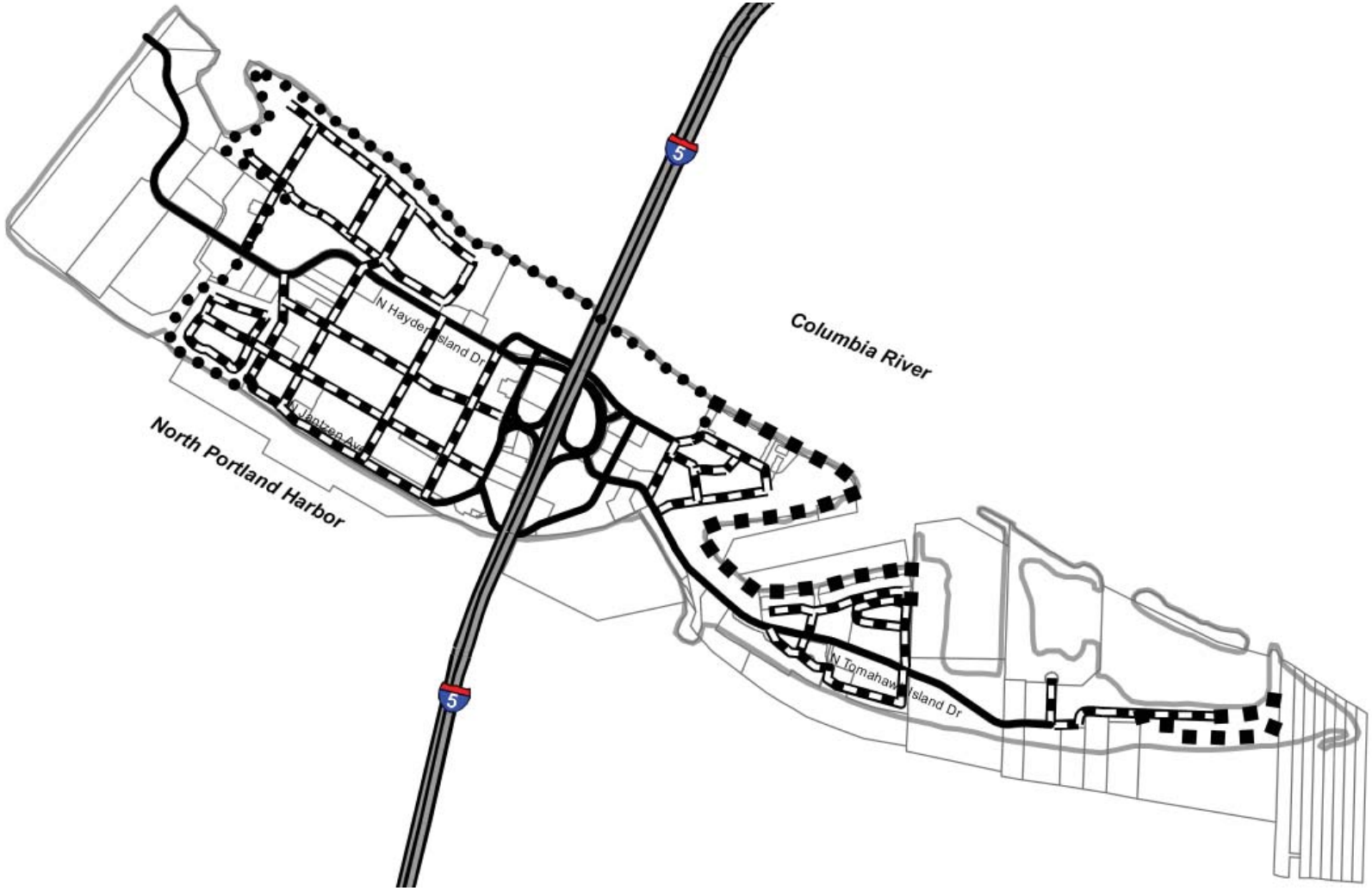
LEGEND

City of Portland Boundary

Major Rivers

Street Design Classifications

- Urban Throughway
- Urban Highway
- Regional Main Street
- Community Main Street
- Regional Corridor
- Community Corridor
- Urban Road
- Local Service



HAYDEN ISLAND

Transportation System Plan
Map 11.11.20

Exhibit H

LEGEND

Existing and Proposed Streets and Connections

- Existing Streets
- Proposed New Streets
- Pedestrian & Bicycle Connection
- Pedestrian Connection

IMPLEMENTATION STRATEGIES

The Hayden Island neighborhood has developed its vision for the community, but visioning is just the beginning of a successful neighborhood plan. The hard part is having the will and the resources to implement the plan.

There are specific public actions that can make a real difference in the implementation of a neighborhood vision. Still, it is important to remember that public interventions are just one of the conditions needed to create a successful neighborhood. The cooperation of key property owners—in particular, the Jantzen Beach Shopping Center—is essential. The likelihood of success also will be much enhanced by a collaborative partnership among property owners and the ODOT and TriMet.

In general, the public interventions available for the Hayden Island Plan fall into three categories: regulatory, infrastructure investment and leadership.

PUBLIC INTERVENTIONS

Regulatory The city's zoning code, building code and development standards regulate private development. The regulations address allowed uses, natural resources protection, structure height, setback, building bulk and many other development conditions. From the community's perspective, these regulations help achieve development that is consistent with community preferences and provide public amenities.

Regulations can help facilitate desired development in several ways. Zoning and development regulations can be changed to improve financial feasibility, such as by raising the building height limit to allow for more square footage or units. They can also be tailored to fit the needs of a peculiar site or a specific geographic area through a plan district or other zoning tool, so that development may meet multiple objectives such as access to transportation facilities and natural resource restoration.

Infrastructure Investment Infrastructure—streets and sidewalks, water and sewer pipes, parks and natural areas, bicycle paths, and transit—are the public bones of a community. The quality, location and character of infrastructure influence the cost feasibility of development. A park or natural area is an amenity that increases the value of adjacent land and provides other benefits for stormwater management, public health and improved neighborhood livability. Streets that provide access to property and connections to transit enhance the marketability of commercial and residential development.

Leadership A type of public intervention that is broadly applicable to the neighborhood plan is leadership. Public agencies and public officials are in a unique position to provide leadership that achieves the neighborhood vision. They have the institutional responsibility to advocate for the interests of the community.

IMPLEMENTATION ACTIONS

IMPLEMENTATION ACTIONS

The Hayden Island Plan is organized around three vision themes—Island Community, Getting Around, and Environment and Open Space. The actions needed to implement the plan are listed under each of these vision statements.

Island Community Vision Theme

Regulatory

a. Implement plan district zoning and development standards that achieve the following:
   - Encourages the development of transit-oriented mixed-use, including residential units, adjacent to the transit station as well as dedication of portions of a site for a public plaza.
   - Provides for and protects the neighborhood commercial uses in the area immediately east of I-5 in the area envisioned in the plan for local-serving retail uses.
   - Provides for and protects industrial zoning on the west end of the neighborhood adjacent to the BNSF rail line.
   - Provides for no net gain in residential development under the current (68 Ldn) noise contour.

b. Review and update the natural resources inventory, environmental analysis and existing resource protection to determine appropriate levels of environmental protection for Hayden Island and its riparian areas.

c. Modify the environmental zones for Hayden Island as needed based on the environmental analysis to meet the City of Portland's watershed health goals and regulatory obligations.

d. Designate the area within one-quarter mile of the station as eligible for the city's transit-oriented development tax exemption program, when funding is secured for the light rail station.

Accountability: Bureau of Planning and Sustainability, Office of Healthy Rivers

Leadership

a. Work with Jantzen Dynamic Corporation and landowners surrounding the transit station to make the station a focal point through development of a public plaza and the development of mixed-use residential development adjacent to the station location.

b. Provide for residential development near Hayden and Tomahawk Bays by working with Columbia Crossings to develop residential communities.

c. Work with private property owners to complete a system of trails across East Hayden Island.

d. Work with property owners to restore riverbanks by reducing the steepness of the bank, removing riprap and planting native vegetation.

Accountability: Portland Bureaus of Planning and Sustainability, Transportation, Development Services, Environmental Services, Office of Healthy Working Rivers, Oregon Department of Transportation

Infrastructure

a. Implement the new street master plan to provide for a safe, connected and healthy neighborhood.

b. Implement new special right-of-way standards that will promote walking and bicycling and easy access to the transit station.

c. Improve on the existing trail system as funding becomes available through capital projects, safety projects and projects by private development.

d. Provide parks and preserve natural areas.

Accountability: Portland Bureaus of Transportation, Planning and Sustainability, Parks and Recreation, Office of Healthy Working Rivers

Getting Around Vision Theme

Infrastructure

a. Implement new, special right-of-way standards that will promote walking and bicycling in the area.
b. Provide local access lanes on a redesigned bridge and interchange that connect Hayden Island with Bridgeton and Vancouver, Washington.
c. Extend the light rail network to Hayden Island and Vancouver, Washington.
d. Develop a boat moorage for temporary docking in connection with the Columbia River Crossing project that, when permitted, avoids and minimizes impacts to the natural resource functions including shallow water habitat.
e. Extend Tomahawk Island Drive as a "Main Street" through the shopping center and future Jantzen Beach transit-oriented development.

Accountability: Bureau of Planning and Sustainability, Portland Bureau of Transportation, Office of Healthy Working Rivers

Leadership

a. Work with the CRC project to incorporate the infrastructure improvements that address mobility and access issues and natural resource issues for Hayden Island.
b. Work with the stakeholders, including Hayden Island Neighborhood Association, river community groups, environmental and business interests, the Office of Healthy Rivers, and the Port of Portland to explore joint use of a new bridge serving potential development on West Hayden Island.

Accountability: Bureau of Planning and Sustainability, Portland Bureau of Transportation, Office of Healthy Working Rivers

Environment and Open Space Vision Theme

Regulatory

a. Review and update the natural resources inventory, environmental analysis and existing resource protection to determine appropriate levels of environmental protection for Hayden Island and its riparian areas.
b. Modify the environmental zones for Hayden Island as needed based on the environmental analysis to meet the City of Portland's watershed health goals and regulatory obligations and to provide appropriate environmental protection for the Columbia River, shallow water habitat, riparian areas and uplands.
c. Implement new, special right-of-way standards that will provide additional areas for stormwater management.

d. Apply rigorous standards for water quality to all surface infrastructure, including the CRC project and local streets.

Accountability: Bureau of Planning and Sustainability, Portland Bureau of Transportation, Bureau of Environmental Services, Bureau of Development Services , Office of Healthy Working Rivers

Infrastructure

a. Develop new parks and natural areas for habitat through acquisition of land for recreation, natural resource protection and restoration.

Accountability: Bureau of Parks and Recreation, Office of Healthy Working Rivers

Leadership

a. Protect and conserve ecological system through creation of a Hayden Island planting guide.
b. Undertake a planting day annually to restore the Hayden Island banks and replant with native species.
c. Work with property owners to restore riverbanks by reducing the steepness of the bank, removing riprap and planting native vegetation.
d. Work with Portland Parks, and Recreation, the CRC project and other partners to acquire and redevelop land for recreation and natural resource protection and restoration.
e. Work with the CRC project to develop and implement an enhanced stormwater management system that is a "green," state-of-the-art project.

Accountability: Bureau of Planning and Sustainability, Bureau of Environmental Services, Bureau of Parks and Recreation, Hayden Island Neighborhood Network, Office of Healthy Working Rivers

Comprehensive Plan and Zoning Code Amendments

The Hayden Island Plan will amend both the policy map that guides land use and development in the City (the Comprehensive Plan Map) and the actual zoning that implements the policy through land use regulations (Portland Zoning Map). The maps on page 22-23 show both the previous and proposed zoning designations in the Hayden Island Plan.

This section includes:
a. How to read the zoning map
b. Summary of the proposed zoning
c. Summary of the zoning use and development standards (matrix)
d. Map of existing zoning

HOW TO READ THE ZONING MAP

The current zoning for East Hayden Island was adopted in 1991 and was based on the Multnomah County zoning that was in place when Hayden Island was annexed into the City of Portland. The proposed zoning map contains the following zone abbreviations and overlay designations:

CG	General Commercial
CN2	Neighborhood Commercial
IG2	General Industrial
OS	Open Space
R1	Medium-density, multi-dwelling, Residential
R2	Low-density, multi-dwelling, Residential
R3	Low-density, multi-dwelling, Residential
R7	Single-dwelling, Residential
R10	Single-dwelling, Residential
RF	Residential Farm/Forest
(c)	Environmental Conservation Overlay Zone
(x)	Portland International Airport Noise Impact Overlay Zone

See Zoning Map pages 38 and 39.

Environmental Conservation (c) Overlay Zone

Environmental zones protect resources and functional values that have been identified by the City of Portland as providing benefits to the public. The environmental regulations encourage flexibility and innovation in site planning and provide for development that is carefully designed to be sensitive to the site's protected resources. The environmental regulations also carry out Comprehensive Plan policies and objectives.

The Environmental Conservation zone conserves important resources and functional values in areas where the resources and functional values can be protected while allowing environmentally sensitive urban development. The Environmental Conservation overlay zone is applied wherever the city determines that significant resources and functional values are present. The Environmental Conservation overlay zone is shown on the Official Zoning Maps with the "c" symbol. On Hayden Island, the "c" zone is applied to the banks of the island to protect the Columbia River and the land adjacent to it. No changes are proposed to this overlay zone at this time, although a thorough analysis of the island's environment will be undertaken as part of the West Hayden Island Plan. If determined appropriate, there may be alterations proposed for the eastern half of the island.

Portland International Airport Noise Impact (x) Overlay Zone

The Portland International Airport Noise Impact overlay zone reduces the impact of aircraft noise on development within the noise impact area surrounding the Portland International Airport. The zone achieves this by limiting residential densities and by requiring noise insulation, noise disclosure statements and noise easements. With the exception of the southwest corner of the eastern half of Hayden Island adjacent to the railroad tracks and a portion of the industrial land, all the rest of Hayden Island has the "x"overlay applied. This overlay zone limits the number of residential dwellings permitted to be developed and is addressed in the proposed changes to the zoning code. No changes are proposed to this overlay zone.

SUMMARY OF THE PROPOSED ZONING

The proposed zoning embraces the Hayden Island Plan's overall concept for the island as an island community with a range of housing choices and commercial and industrial areas to support residents and the marine industries, while creating a walkable community to support the proposed extension of light rail. The following are summaries of the proposed zoning.

General Commercial (CG) is the most prevalent zone on Hayden Island, because it provides for the flexibility to develop residential units supporting transit-oriented development and to build a sizable residential community to support local commercial enterprises. This plan proposes to change the eastern half of the manufactured home park from CG to R2 to reflect the residential nature of the existing development and to protect an affordable housing choice on the island. There are no changes proposed for the zoning of Jantzen Beach and Lotus Isle floating home moorages. The moorage is considered a multi-dwelling use and is permitted in the CG zone.

Neighborhood Commercial (CN2) is proposed for the area east of I-5 north of North Tomahawk Island Drive, currently zoned CG, to encourage neighborhood commercial uses within walking distance of a large portion of Hayden Island's residential community and within the pedestrian district.

General Industrial (IG2) is the most typical industrial zone on Hayden Island. The only proposed change to industrial zoning is on sites proposed for residential development where there are existing residential development rights under the x-overlay provisions. These sites are small and isolated for industrial use and facilitate more appropriate waterfront development. Some of the floating home moorages are zoned IG2, which allows for floating homes as a conditional use. At this time, no changes for the zoning of West Hayden Island and Tomahawk Bay moorages are proposed.

Open Space (OS) is proposed for Lotus Isle Park and the tennis court park on North Fir Avenue adjacent to the manufactured home park.

Medium-density, Multi-dwelling, Residential (R1) remains on the Columbia Point condominiums property. Columbia Point West Condominiums is proposed to be zoned R2 to reflect its current development density.

Low-density, Multi-dwelling, Residential (R2) remains for the western half of the manufactured home park and the lot at the northwest corner of the island at the end of North Hayden Island Drive. The R2 zone is proposed for the eastern half of the park, as described in the CG description. Columbia Point West, Waterside, Jantzen Beach Village, Riverhouse and Riverhouse East Condominiums are proposed to be zoned R2 to reflect the current development density of 5 to 20 dwelling units per acre.

Low-density, Multi-dwelling, Residential (R3) remains on the southern portion of the manufactured home park and is proposed for the Hayden Bay Condominiums.

Single-dwelling, Residential (R7) remains for the Lotus Isles Homes.

Single-dwelling, Residential (R10) is proposed for the Hayden Bay Marina homes. This is a change from R3 and is being proposed to reflect the current development density.

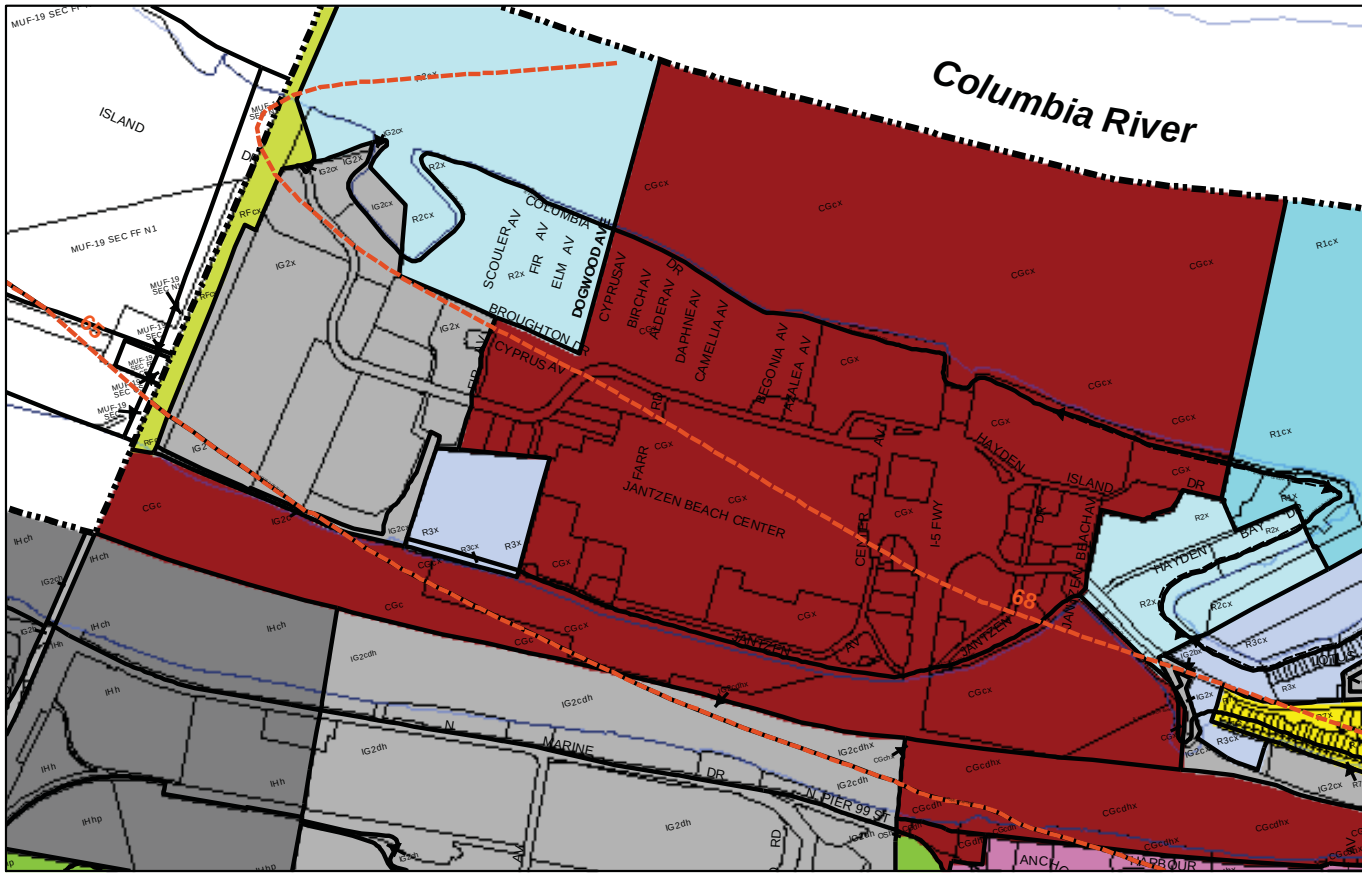
Residential Farm/Forest (RF) remains for the eastern tip of island and along the railroad corridor.

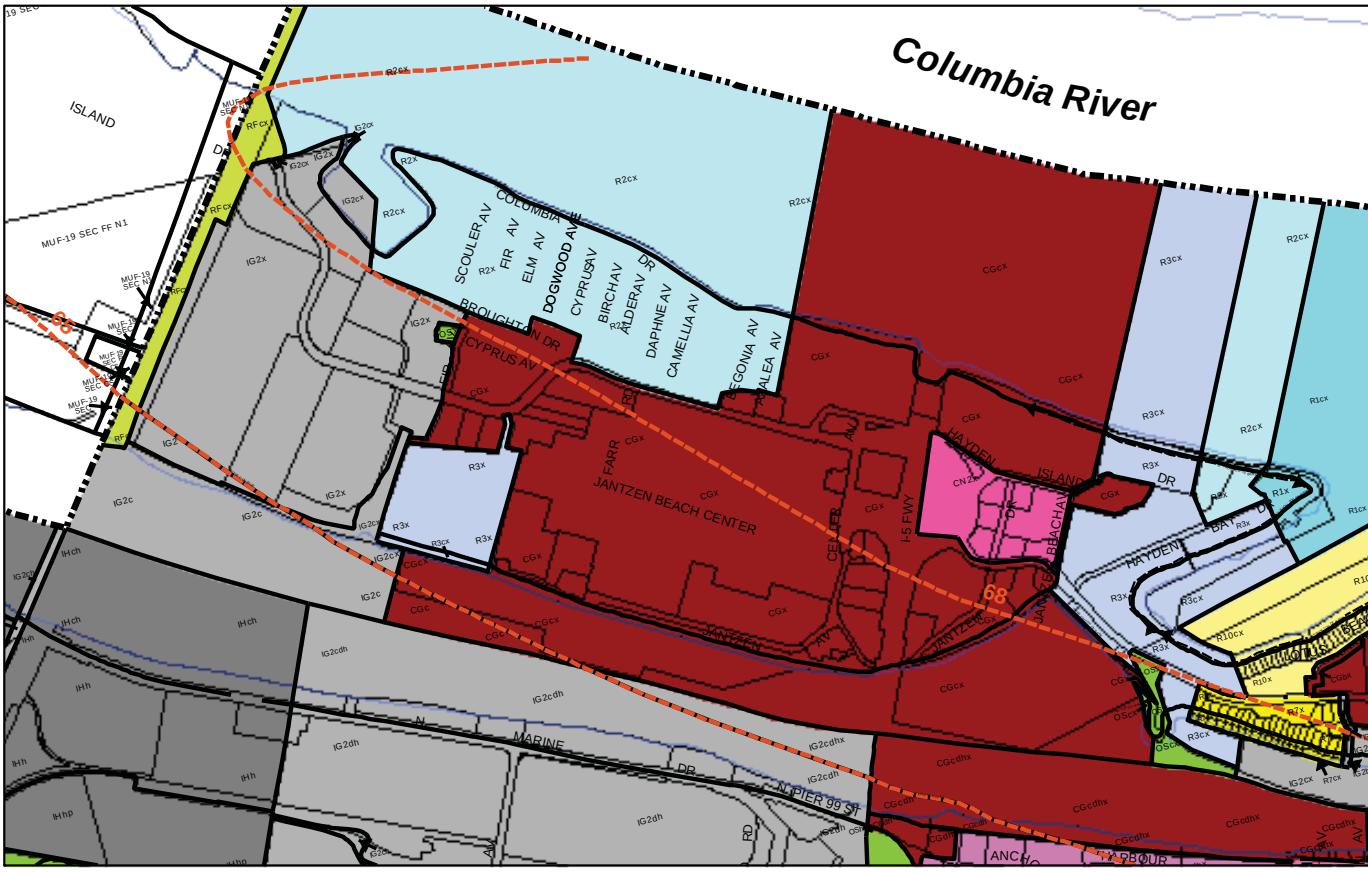
Changes in Land Use >

The table at right indicates the changes in land use from what is the existing land use pattern on Hayden Island to the proposed changes in the Comprehensive Plan and Zoning Map

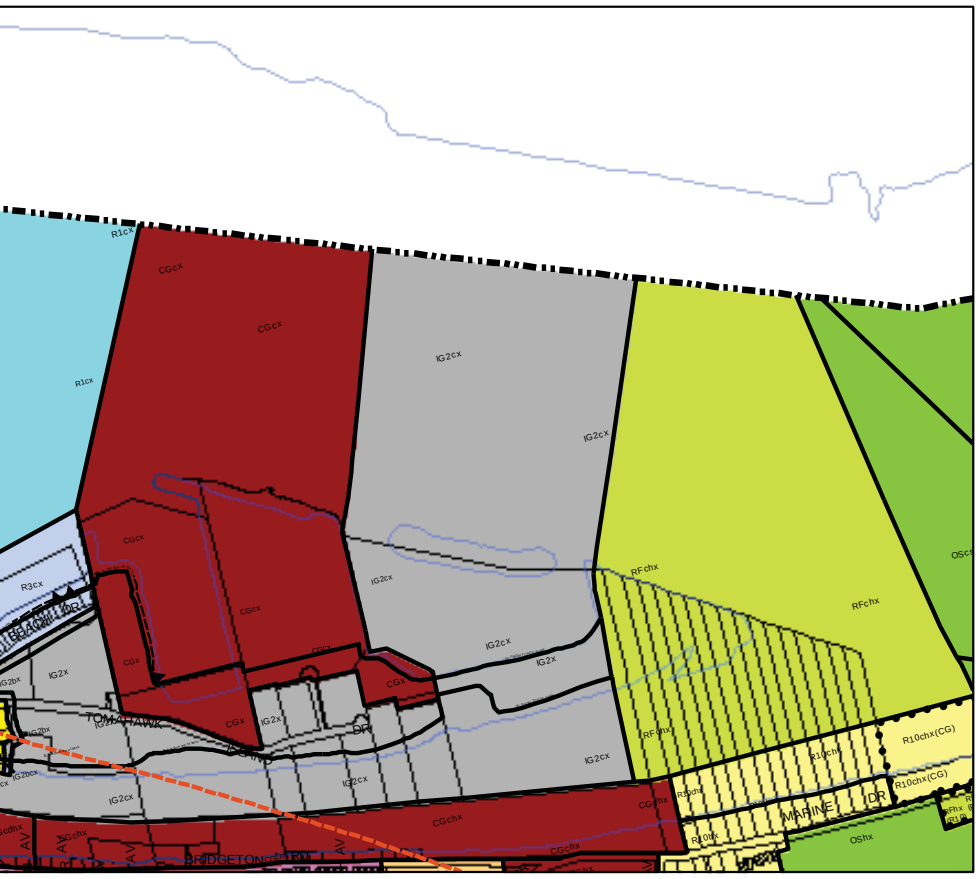
Zoning Classification	Existing Zoning Total Area (square feet/acres)	Existing Zoning Total Area (acres rounded)	Proposed Zoning (square feet)	Proposed Zoning (acres rounded)
CG	14,323,999	328	14,310,595	328
CN2			476,091	11
IG2	8,390,218	192	4,835,865	111
R1	202,347	5	68,176	2
R2	905,416	21	3,112,510	71
R3	1,851,883	43	1,991,171	46
R7	300,713	7	300,713	7
R10		0	839,357	19
RF	432,229	10	432,229	10
OS			40,097	1
TOTAL	26,406,805	606	26,406,804	606

Zoning Map

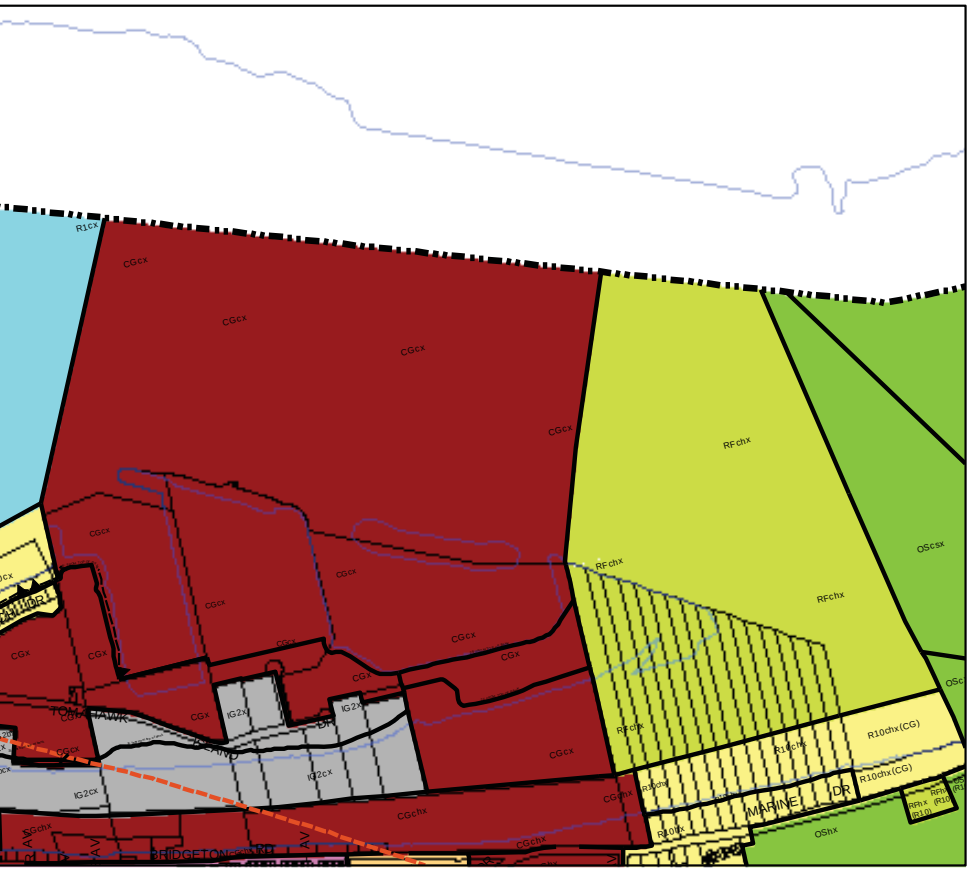




G:\area_neigh\hayden_island\exist_prop_zone_17x11.mxd



EXISTING



PROPOSED

City of Portland
Bureau of Planning
GIS

December 9, 2008

East Hayden Island Zoning

Zoning Designations

- Open Space
- Residential Farming
- Single Dwelling Residential 10,000
- Single Dwelling Residential 7,000
- Multi-Dwelling Residential 3,000
- Low Density Multi-Dwelling Residential 2,000
- Medium Density Multi-Dwelling Residential 1,000
- Institutional Residential
- Neighborhood Commercial 2
- Mixed Commercial
- General Commercial
- Central Commercial
- General Industrial 2
- Heavy Industrial
- Noise Contours
- City Boundary

N

0 400 800 1,600
Feet

Hayden Island Code + Commentary
Proposed Amendments to
Title 33: Planning and Zoning

INTRODUCTION

The proposed amendments to the Zoning Code will implement the goals of the Hayden Island Concept Plan and Hayden Island Final Plan as described in this document. This section shows proposed code revisions, employing several conventions:

a. Odd-numbered pages show Zoning Code language with the changes proposed by this project.
b. Even-numbered pages contain commentary on the proposed changes. This commentary is more descriptive and indicates the legislative intent of the proposed Zoning Code changes.
c. Language to be added to the Zoning Code is underlined.
d. Language to be deleted from the Zoning Code is shown in ~~strikethrough~~.

33.532.010 Purpose

Hayden Island is unique in Portland. It has special opportunities coupled with unusual restraints on development. As the only island community in Portland, it has significant environmental resources and potential, and much of the housing stock floats. However, access to and from the Island is constrained by Interstate 5, while the proximity to the Portland Airport limits housing potential. The creation of a Hayden Island plan district addresses many of the issues of this unique community, while still allowing for its development and improvement. Hayden Island will ultimately be characterized by an integrated transportation network, a station area community, a range of housing types and densities, appropriate transitions between zones, and good public access.

While this plan district does not address the environmental resources of the Island, the environmental overlay zone applied to much of the plan district does do so.

33.532.020 Where These Regulations Apply

The plan district includes only the portion of Hayden Island east of the BNSF Railroad, as that is the only area that is within the City Limits

Chapter 33.532
Hayden Island Plan District

Sections

General
33.532.010 Purpose

The regulations in this chapter will preserve and enhance both the character and opportunities of Hayden Island to:

- Create a transportation network that provides for all modes, and allows people to easily move from one mode to another;
- Focus higher intensity, mixed-use development near the Light Rail Station;
- Provide opportunities for a range of housing types, and encourage mixed-use development, including commercial uses, to serve the residential uses; and
- Ensure transitions between residential and nonresidential zones and neighborhoods.
- Recognize the current function of the Jantzen Beach Super Center as an auto-oriented shopping mall and its long-term potential for more intense development that is less auto-oriented and more pedestrian-friendly resulting from major investments in the transportation system.

The environmental zoning that applies to much of the plan district will preserve and restore the unique and valuable natural resources of the island, such as the shallow water habitat.

33.532.020 Where These Regulations Apply

The regulations of this chapter apply to the Hayden Island plan district. The boundaries of the plan district and subdistrict are shown on Map 532-1 at the end of this chapter, and on the Official Zoning Maps.

33.510.030 Application of Regulations Relating to Future Rights-of-Way and Transit Stations

Several of the regulations in the plan district are based on distances from streets or Transit Stations that are not yet built. This provision clarifies that, if the street or Transit Station has not been built, the distance is measured from the location shown on the Hayden Island Master Street Plan, which is part of the Transportation Element of Portland's Comprehensive Plan.

33.510.030 Application of Regulations Relating to Future Rights-of-Way and Transit Stations

Regulations of this chapter that are based on the location of a right-of-way or Transit Station apply as follows:

A. If the right-of-way or Transit Station has been improved or dedicated, the regulation applies based on the actual location of the right-of-way, tract, or easement.

B. If the right-of-way or Transit Station has not been improved or dedicated, the regulation applies based on the location of the right-of-way or Transit Station as shown on the Master Street Plan for the area that has been accepted by City Council. The multi-modal street plan is maintained by the Portland ~~Office~~ Bureau of Transportation and is documented in the Transportation Element of Portland's Comprehensive Plan.

33.532.110 Additional Regulations in the OS Zone

Retail Sales and Service uses are a conditional use in the Open Space zone. This regulation limits the potential size of such a use, which assures that the park will have enough space to fulfill the needs traditionally associated with a park, such as active and passive recreation.

This size limit was chosen because, while the commercial use should not dominate the open space, such uses may contribute to the Island atmosphere and the setting of an urban neighborhood. This regulation also will apply to any open space that is both near the Transit Station and the Columbia River, providing opportunities for additional activity on the river.

The maximum parking limit ensures that some parking is available for users of both the commercial and parks uses, while encouraging users to walk or use mass transit.

B. Where these regulations apply.

A distance of 1,500 feet meets the goals of having a transit-oriented community within walking distance of the Transit Station. This meets the goals of the Hayden Island Concept Plan, including creating a complete Island community.

Note: The Zoning Code defines "Transit Station" as "a location where light rail vehicles stop to load or unload passengers. For purposes of measuring, the Transit Station consists of the station platform." (33.910)

33.532.210 Maximum Building Height

B.2. Height Opportunity Areas.

On portions of the Island where a change in grade or arrangement of uses would limit the negative impact of taller structures, offering more height in exchange for much lower building coverage increases flexibility and may produce better design. These portions are shown on Map 532-2 as Height Opportunity Areas.

B.3. Jantzen Beach Subdistrict.

Increased building heights adjacent to the light rail station and the freeway interchange facilitate taller and more intensive development, emphasizing these locations as the most active sites on the island with the highest density development. As building heights increase so does the visual prominence of these buildings and projects that exceed typical heights in commercial zones necessitate additional review to ensure that quality, well-designed development occurs.

Development Standards

33.532.110 Additional Regulations in the Open Space Zone

A. Purpose. More intense activities may be appropriate in OS-zoned sites near the Transit Station. Allowing these uses can both provide space for outdoor activities that are appropriate in an urban setting, and increase desirable activity within and near open space.

B. Where these regulations apply. The regulations of this section apply to sites in the OS zone that are within 1,500 feet of the Transit Station.

C. Retail Sales And Service.

1. Up to 10,000 square feet of floor area in Retail Sales And Service uses or 10 percent of the area of the site, whichever is less, may be requested through a Conditional Use Review. This maximum applies to the cumulative floor area of all Retail Sales And Service uses on a site.

2. Maximum parking. The maximum parking allowed for Retail Sales And Service uses is 1 space per 250 square feet of floor area.

33.532.210 Maximum Building Height

A. Purpose. The regulations of this section:.

- Allow taller buildings near the Light Rail Station to encourage mixed-use and transit-oriented development;
- Increase opportunities for creative design to encourage development of interesting buildings that help create a sense of place;
- Recognize the prominent location of Hayden Island as a gateway to Oregon and the potential for visually interesting development to welcome visitors and residents, while mitigating for potential impacts through excellent design, articulation and step-backs, and the use of quality materials.

B. Maximum building heights.

1. Generally. The maximum building heights are shown on Map 532-2.

2. Height Opportunity Areas. In the Height Opportunity Areas shown on Map 532-2:

   a. Height may be increased to 90 feet if the maximum building coverage is 25 percent or less;

   b. Height may be increased to 80 feet if the maximum building coverage is 20 percent or less;

   c. Adjustments and modifications the standards of this paragraph are prohibited.

3. Jantzen Beach subdistrict. In the Jantzen Beach subdistrict, adjustment may be requested to increase height to the maximum height limit shown on Map 532-2. Heights above the maximum height limit shown on Map 532-2 are prohibited.

33.532.220 Minimum and Maximum Floor Area

C Floor area used for parking is not counted towards the maximum floor area. This removes a disincentive to providing structured parking. Structured parking is more desirable than surface parking in an area intended for high-intensity, pedestrian-oriented development, and underground parking is not feasible on the Island.

D Provides for mixed use building coverage across the subdistrict, while also ensuring that there is continuity of development in the subdistrict. The intention is to prevent large areas of surface parking with one or few tower type development. To implement this development minimum the site has been divided into 2 subdistricts.

33.532.220 Minimum and Maximum Floor Area

A. Purpose. These regulations encourage dense, mixed-use development in the pedestrian district, and reinforce the Jantzen Beach subdistrict as a transit-supportive, mixed-use neighborhood.

B. Where these regulations apply. The regulations of Subsection C apply in the pedestrian district outside of the Jantzen Beach subdistrict to sites where the proposal will result in an increase of at least 2,000 square feet of floor area on the site. The regulations of Subsection D apply in the Jantzen Beach subdistrict.

C. Maximum FAR in the pedestrian district outside Jantzen Beach subdistrict. In the pedestrian district outside of the Jantzen Beach subdistrict, floor area used for parking is not counted toward maximum floor area. Floor area in residential uses is counted toward maximum floor area.

1. Generally. Except as specified in C.2, the maximum FAR is 0.75:1.
2. Residential bonus.
   a. For each square foot of floor area developed as housing, a bonus of 1 square foot of additional floor area is earned, up to an additional floor area ratio of 3:1. The 3:1 is in addition to the 0.75.
   b. The bonus floor area must be in residential use. The bonus floor area is not eligible for a bonus.
   c. The property owner must execute a covenant with the City ensuring continuation and maintenance of the bonus floor area in housing by the property owner. The covenant must comply with the requirements of 33.700.060.

D. Minimum and maximum floor area in Jantzen Beach subdistrict. In the Jantzen Beach subdistrict, floor area used for parking is not counted toward minimum or maximum floor area. Floor area in residential uses is counted toward minimum and maximum floor area. Transfers of floor area between subareas is prohibited.

1. Purpose. These regulations ensure that development is distributed throughout the Jantzen Beach subdistrict to maximize the positive benefits of pedestrian-friendly, properly-scaled development without the negative impacts of over-sized buildings surrounded by large surface parking lots.
2. West subarea. In the West subarea of the Jantzen Beach subdistrict:
   a. Minimum. The minimum amount of the West subarea that must be covered with buildings is 300,000 square feet;
   b. Maximum. The maximum amount of floor area allowed is 1,152,000 square feet;
3. East subarea. In the East subarea of the Jantzen Beach subdistrict:
   a. Minimum. The minimum amount of East subarea that must be covered with buildings is 300,000 square feet;
   b. Maximum. The maximum amount of floor area allowed is 1,052,000 square feet;
4. Residential bonus.
   a. This bonus is available only for residential floor area. For each square foot of floor area developed as residential, a bonus of 1 square foot of additional floor area is earned.
   b. The bonus floor area must be in residential use, and must be built within the Jantzen Beach subdistrict. The bonus floor area is not eligible for a bonus.
   c. The property owner must execute a covenant with the City ensuring continuation and maintenance of the bonus floor area in residential use by the property owner. The covenant must comply with the requirements of 33.700.060.

33.532.220 Minimum and Maximum Floor Area, cntd.

E Increases beyond what is allowed in this chapter require confirmation that the transportation infrastructure is adequate to handle proposed development.

F Because development allowed in the Jantzen Beach subdistrict is based on building square footage allowed rather than FAR , it is necessary to identify a specified amount of that building square footage when ownership is transferred.

33.532.220 Minimum and Maximum Floor Area, ctnd.

E. Adjustments to maximum floor area or maximum FAR. Adjustments to the maximum floor area or FAR regulations of this Chapter must meet the following approval criterion in addition to the approval criteria of Chapter 33.805: The transportation system is capable of supporting the proposal in addition to the existing uses in the area. Evaluation factors including capacity of Interstate 5 on and off ramps on Hayden Island.

F. Land Divisions in the Jantzen Beach Subdistrict.

1. Supplemental application requirement. Applications for land divisions in the Jantzen Beach subdistrict must specify how the minimum and maximum floor area required by this chapter will be allocated to each lot, parcel, and tract.
2. Supplemental approval criterion. the allocation of minimum and maximum floor area to each lot, parcel, and tract must be found to still meet the requirements of this chapter.
3. The applicant must execute a covenant with the City which is attached to and recorded with the deed of each lot, parcel, and tract. The covenant must identify the minimum and maximum floor area designated for each lot, parcel and tract.

33.532.230 Transition Between Zones

Throughout the Hayden Island planning process, people, living adjacent to commercial or industrial zones, raised concerns about the potential impacts of development in those zones. Several of the established residential areas are low in density and scale, and are unlikely to redevelop for some time. Conversely, many of the Island's C-or I-zoned sites are expected to redevelop or transition to higher intensity building forms.

The regulations of this section will reduce the potential negative impacts of this development pattern by creating a transition: buildings in the non-residential zones will step down to the residential areas rather than overshadowing residential buildings.

33. 532.230 Transition Between Zones

A. Purpose. These regulations limit some of the negative impacts of larger-scale development in commercial or industrial zones on buildings in adjacent residential zones. Requiring development to step down near the residential zones avoids having an abrupt transition between the zones, as does the limitation on large blank walls facing residential sites.

B. Where these regulations apply. The regulations of this section apply to sites in commercial and industrial zones.

C. Maximum building height.

1. Sites abutting a residential zone. On the portion of a site within 30 feet of a residential zone, the maximum building height is 25 feet. See Figure 532-1.

2. Sites across a street from a residential zone. On the portion of a site within 15 feet of the lot line across the street from a residential zone, the maximum building height is 25 feet. See Figure 532-2.

D. Required windows above the ground floor.

1. Sites abutting a residential zone. On the portion of a site within 30 feet of a residential zone, at least 15 percent of the area of the façade above the ground level must be windows. This requirement is in addition to any required ground floor windows.

2. Sites across a street from a residential zone. On the portion of a site within 15 feet of the lot line across the street from a residential zone, at least 15 percent of the area of the façade above the ground level must be windows. This requirement is in addition to any required ground floor windows.

Figure 532-1 Height limits on sites abutting R zones

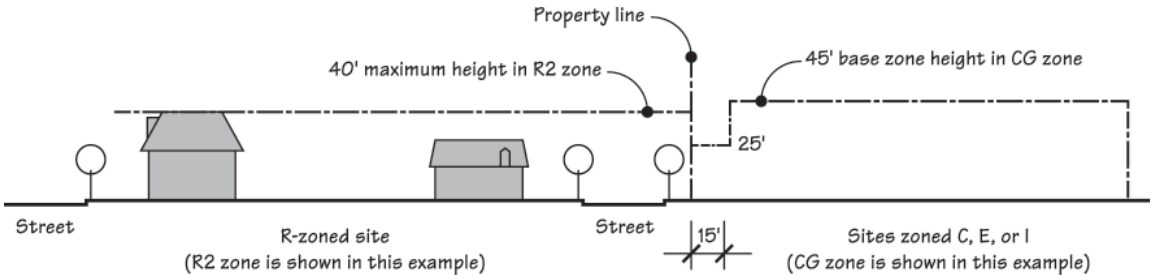
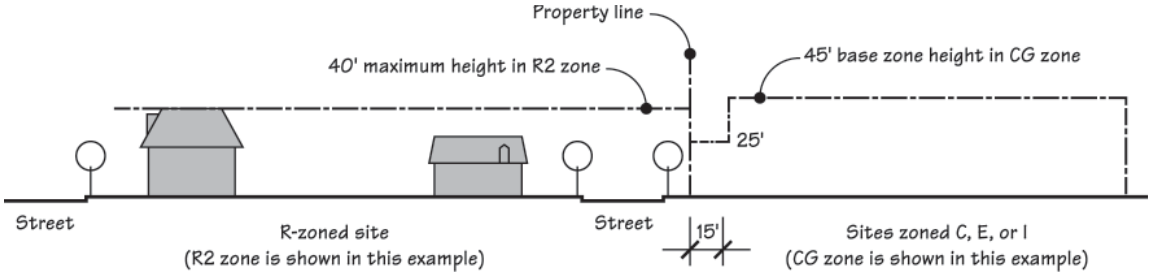


Figure 532-2 Height limits on sites across a street from R zones



33.532.240 Transfer of Residential Density

Residential density on Hayden Island is determined by a complicated set of regulations in the "x"' overlay (the airport noise zone). The "x" overlay implements federal guidelines. Under the provisions of the "x" overlay, residential density on each site is based on several factors, including historic Comprehensive Plan designations and how much airplane noise a property is subject to. The determination of how much noise a property is subject to is based on a 1990 analysis that mapped the noise levels. The areas with different noise levels are called "noise contours" and regulations vary, depending on whether a site is within the 65 Ldn noise contour or the 68 Ldn noise contour.

This section allows property owners to transfer residential density from one site to another, which increases development flexibility and could result in more residential development near the Transit Station. However, the transfers must be limited so that the total number of dwelling units allowed in the plan district does not increase, and the number of dwelling units allowed in each noise contour does not increase. Allowing such increases would not meet the Federal guidelines.

33.532.240 Transfer of Residential Density

A. Purpose. Residential density is limited by the Portland International Airport Noise Impact Overlay Zone (the "x" overlay zone), which applies to much of the plan district. In some instances, residential development is tied to previous Multnomah County Comprehensive Plan designations. Allowing transfers of residential density provides development flexibility while adhering to the limits of the overlay zone.

B. Density transfers. Residential density may be transferred among sites in the plan district if all of the following are met:

1. The receiving sites must be located within the same or lesser noise contour of the x overlay as the sending sites;

2. The receiving site must be in a C or R zone;

3. The maximum density allowed on the receiving site, including transferred density, is 1 dwelling unit per 700 square feet of site area; and

4. The property owners of both sending and receiving sites must execute a covenant with the City that is attached to and recorded with the deeds of both the sending and receiving sites reflecting the respective increase and decrease of potential density. The covenant must meet the requirements of Section 33.700.060.

33.532.250 Maximum Setbacks in Commercial Zones and 33.532.255 Main Entrance

Placing buildings close to the street helps create a pedestrian-friendly environment, which in turn can increase the use of light rail and lead to an increase of biking and walking on the island. Orienting main entrances to the street also helps create a pedestrian-friendly environment by offering easy access to the building for those arriving on foot. Where a site has frontage on an Island Core Street or Commercial Core Street, orienting to that street is preferred; the Island Core and Commercial Core Streets will become main streets for the community, and these regulations will reinforce that character.

33.532.245 Maximum Setbacks in Commercial Zones

The maximum setbacks that apply to sites in Commercial zones in Pedestrian Districts apply to all sites in Commercial zones in the plan district.

33.532.250 Main Entrance

A. Purpose. Locating the main entrance to a use near the street provides convenient pedestrian access between the use and public sidewalks and transit facilities, and so promotes walking and the use of transit.

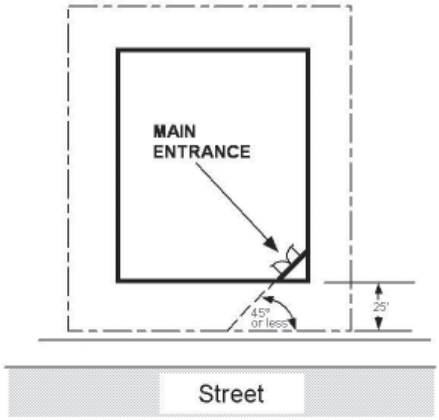
B. Where these regulations apply. The regulations of this section apply to sites in commercial zones. If a site has frontage on more than one street, and one of the streets is an Island Core Access Street, the main entrance must face the Core Street. If the site has frontage on two Core Access Streets, or on two non-Core Access Streets, this standard must be met on only one of the frontages. Island ~~Main~~ Core Access Streets are shown on Map 532-3.

C. Location. For each building, at least one main entrance must:

1. Be within 25 feet of a street;
2. Allow pedestrians to both enter and exit the building; and
3. Either:
   a. Face the street; or
   b. Be at an angle of up to 45 degrees from the street, measured from the street property line, as shown in Figure 532-3, below.

D. Unlocked during regular business hours. The main entrance that meets the standards of Subsection C, above, must be unlocked during regular business hours.

Figure 532-3 Main Entrance



33.532.255 Internal Accessways

Internal accessways provide flexibility to site large retail stores within the shopping center and encourage the creation of an activie streetscape and transit-supportive development. Internal accessways also break up large blocks within the shopping center so that they more closely resemble a typical Portland 200-foot by 200-foot block. The use of this provision provides an alternative means of supporting pedestrian and transit oriented retail.

33.532.255 Buildings Fronting on Internal Accessways

A. Purpose. Internal accessways allow an alternative for larger retail buildings on very large sites to provide functional pedestrian connections, building locations, and main entrance placement without meeting the standards of the base zone. These larger retail buildings can still meet the intent of the base zone regulations and be transit-supportive and pedestrian-friendly by requiring the building to meet standards associated with transit streets on the internal accessway. These accessways provide a finer network of street and pedestrian connectivity linking development to public streets.

B. Where these regulations apply. The regulations of this section apply to buildings in the Jantzen Beach subdistrict where a single use occupies over 60,000 square feet of floor area in a single story.

C. Building regulations. Buildings which front on an internal accessway are exempt from the maximum building setback, ground floor windows and transit street main entrance standards of the base zone and the Hayden Island plan district if the buildings meet the base zone standard for maximum building setback, ground floor windows and transit street main entrance along an internal accessway. The internal accessway must meet the requirements for Subsection D.

D. Internal accessways. The internal accessway must meet the following:

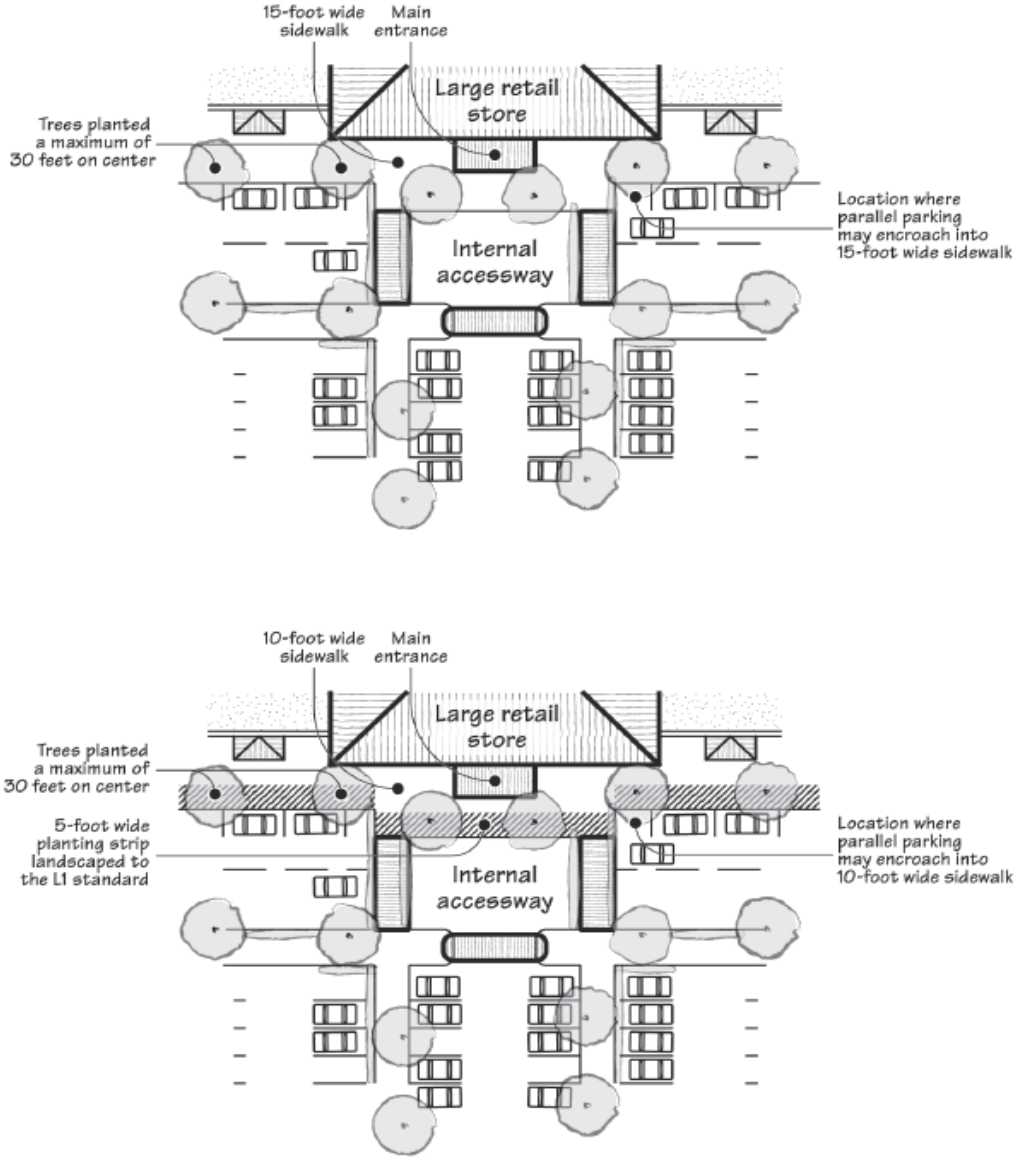
1. The internal accessway must have at least one auto travel lane, curbs, and an unobstructed sidewalk which separates the building from the curb.
2. The drive aisle may be up to 25 feet wide, and must provide a direct connection to an Island commercial core street or to a Transit Station.

Zoning Commentary

33.532.255 Buildings Fronting on Internal Accessways, ctnd.

3. One of the following must be met, as shown in Figure 532-4:
   a. The sidewalk must be at least 15 feet wide and planted with trees a maximum of 30 feet on center. Trees must be planted in the center of unpaved tree wells at least 18 square feet, with a minimum dimension of 3 feet. The unpaved area may be covered with a tree grate. Tree wells must be adjacent to the curb, and must be located so there is at least 6 feet of unobstructed sidewalk; or
   b. The sidewalk must be at least 10 feet wide. There must be a planting strip at least 5 feet wide. The planting strip must be between the curb and the sidewalk, and be landscaped to at least the L1 standard, except that trees cannot be grouped.
4. Parallel parking is allowed between the sidewalk and the drive aisle provided if it is at least 50 feet from the main entrance. Parallel parking may reduce the width of the sidewalk to 10 feet with trees a maximum of 30 feet on center or 6 feet with a 4-foot wide planting strip.

Figure 532-4 Main Entrance



33.532.260 Street Connectivity

A street master plan for Hayden Island will ensure creation of an integrated street grid over time. Currently there are only two public streets on Hayden Island, with the rest being private and not built to City standards. With an established street plan, future development will take into consideration a complete pattern of streets, and the connections throughout the island. This will help meet the goals outlined in the Hayden Island Concept Plan.

33.532.270 Drive-Through Facilities

Limiting drive-through facilities near the Transit Station improves pedestrian-friendliness and avoids auto-oriented uses. To provide ample space for drive-through lanes and maneuvering within the site, drive-through facilities cause building to be set far back from the street. Areas further from the Transit Station are more appropriate for auto-oriented uses.

In other areas of Portland, drive-through facilities have been limited around Transit Stations to reinforce the use of public transit and pedestrian facilities.

Areas further from the Transit Station and outside of the pedestrian district are more appropriate for auto-oriented uses, including drive-throughs. The existing businesses with drive-throughs serve both those in autos and those on foot, both those passing through the area and Island residents, so it is appropriate to preserve the area east of Center Avenue for such businesses.

33.532.260 Street Connectivity

A. Purpose. The connectivity requirement ensures that adequate street and pedestrian/bicycle connections will be provided for local access to development and access for emergency vehicles. This regulation implements the Hayden Island Master Street Plan and improves vehicular, pedestrian, and bicycle movement throughout the plan district, while reducing congestion. Where full street connections are not feasible, pedestrian and bicycle connections provide access for those users most sensitive to the lack of direct connections.

B. Requirements.

1. The Portland Bureau of Transportation determines the location and widths of rights-of-way and extent and timing of street improvements based on the Hayden Island Master Street Plan in the Transportation Element of the Comprehensive Plan.

2. New street alignments as identified in the Hayden Island Master Street Plan are regulated by Chapter 17.88.

33.532.270 Drive-Through Facilities

A. Purpose.

1. In the area west of Center Avenue which is designated as a pedestrian distrcit, these regulations discourage development that adversely affects the peestrian environment, and limits auto-oriented uses.

2. The area east of Center Avenue is not designated as a pedestrian district and is appropriate for auto-oriented uses, based on the current uses and the proximity to the bridge; these uses serve both those in autos and those on foot. These regulations preserve the ability of existing and future businesses to have drive-through facilities.

B. Regulation.

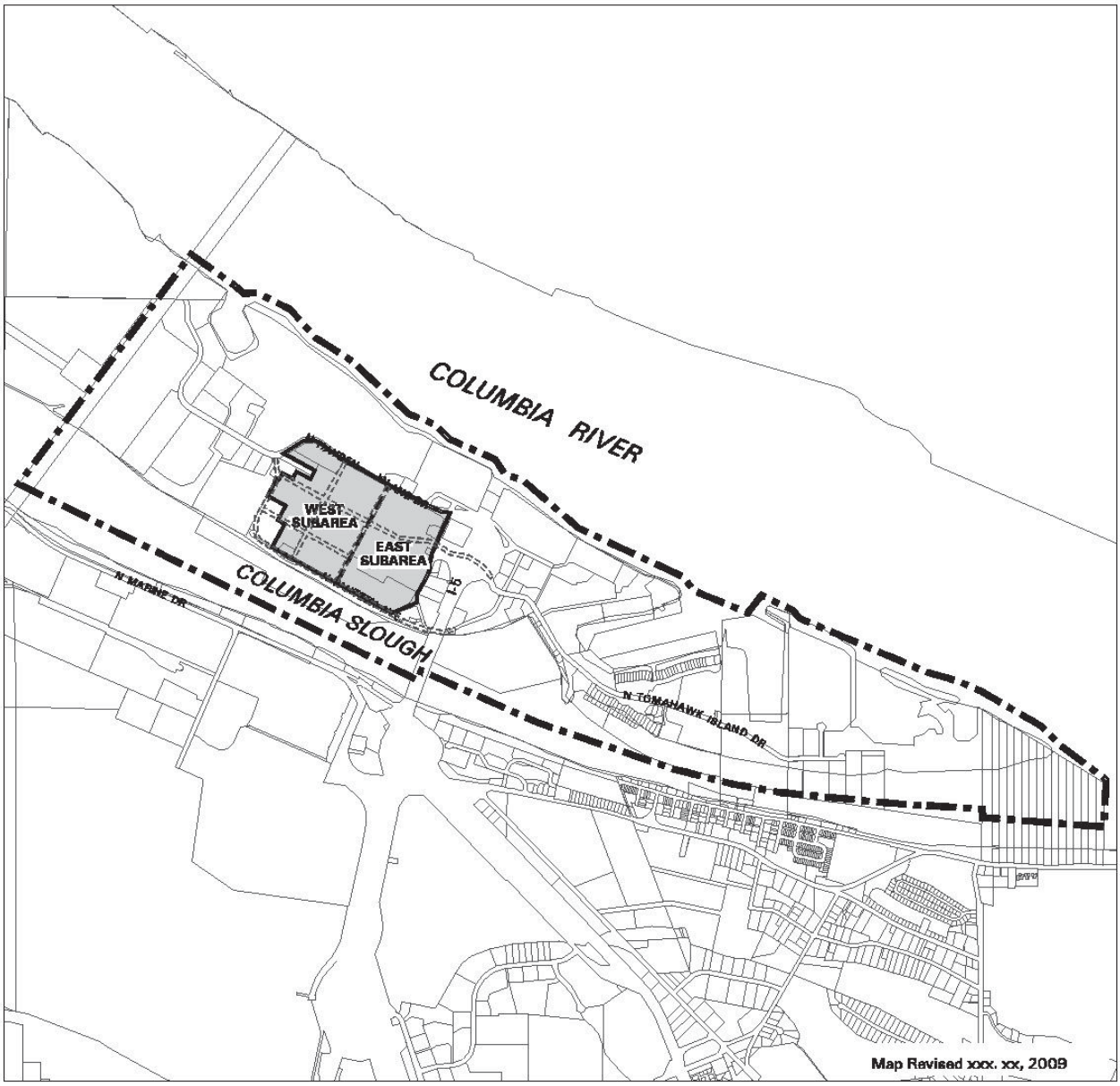
1. West of Center Avenue, drive-through facilities are prohibited on the portion of a site within a pedestrian district. This prohibition includes curb cuts and driveways used for access to the drive-through facility, stacking lanes for queuing vehicles, and the facility itself, such as the drive-up window or gas pump island.

2. East of Center Avenue, drive-through facilities are allowed on the portion of a site within a CN2 zone. Access must be from N. Jantzen Drive, but location is not otherwise limited to particular streets.

Zoning Commentary

Map 532-1

Map 532-1 simply shows the boundaries of the plan district and subdistrict.



NORTH

0' 1500' 3000'

Scale in Feet

Plan District Boundary

Proposed right-of-way

Map 532-1

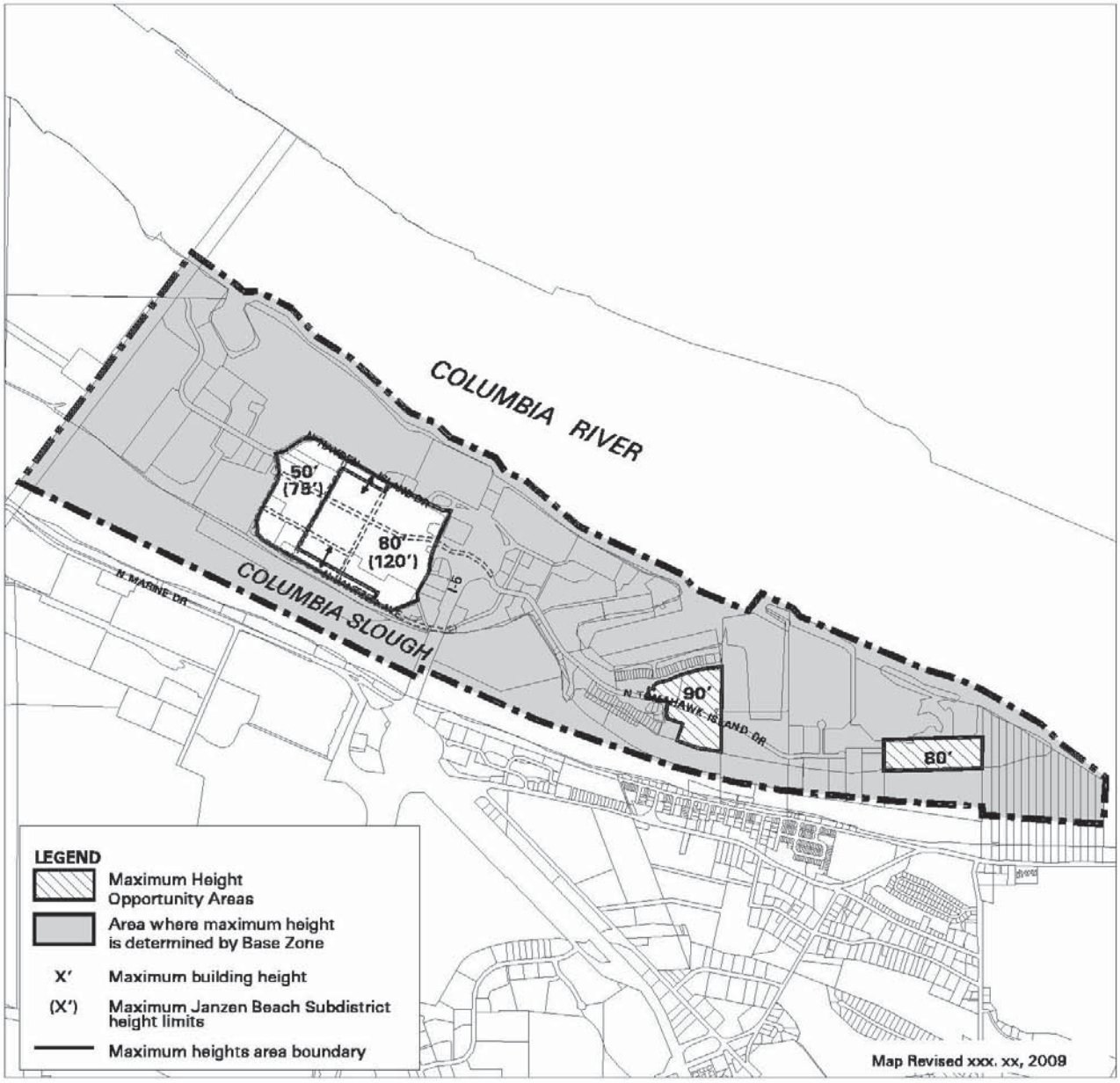
Hayden Island Plan District and Jantzen Beach Subdistrict

Bureau of Planning • City of Portland, Oregon

Zoning Commentary

Map 532-2

Map 532-2 shows maximum building heights allowed.



NORTH

0' 1500' 3000'

Scale in Feet

Plan District Boundary

Proposed right-of-way

Map 532-2

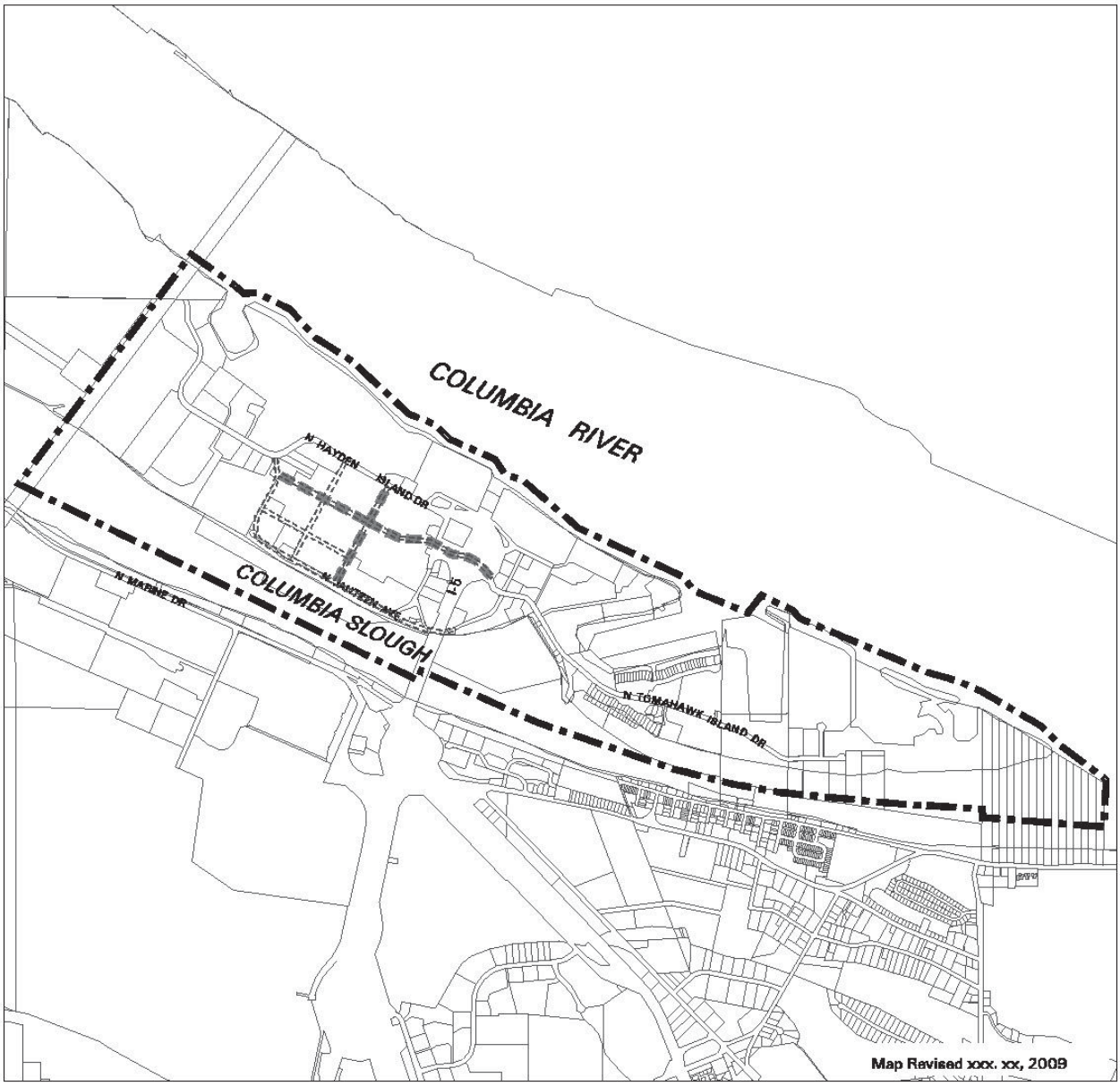
Hayden Island Plan District

Maximum Heights

Bureau of Planning • City of Portland, Oregon

Map 532-3

Map 532-3 identifies the Island Core Access Streets.



NORTH

0' 1500' 3000'

Scale in Feet

Plan District Boundary

Island Core Access Street

Proposed right-of-way

Map 532-3

Hayden Island Plan District

Island Core Access Streets

Bureau of Planning • City of Portland, Oregon

Chapter 33.470, Portland International Airport Noise Impact Zone

33.470.050 Additional Residential Regulations

The only substantive change to this section is to allow transfer of residential density in the Hayden Island Plan District, as outlined in section 33.532.240. However, we have significantly rewritten it to improve clarity without changing the content or effect of the regulations.

A.1.b Replacement housing. This language is now in .050.A.2.

Natural Disasters. This language is added to address the potential impact of a large natural disaster. Here damage to multiple units and the infrastructure in the community is adversely impacted, the replacement of manufactured dwelling units in a manufactured home park requires finding new dwelling units--and their owners--to occupy the spaces. Based on a similar situation in Florida, where a park was destroyed by a hurricane, 15 years is a reasonable length of time.

A.1.c. Exemption. There has been some question about the Multnomah County F2 zone, which applied to portions of Hayden Island on January 1, 1981. Specifically, there is concern about whether it is a " County Residential Comprehensive Plan designation or zoning." Planning staff research, confirmed by Multnomah County planning staff, County Counsel, and Portland's City Attorney has established that the F2 zone was indeed a County Residential Comprehensive Plan designation or zone.

Note: The issue of noise insulation standards for land based manufactured homes will be addressed through the City of Portland and Port of Portland Airport Futures Project. This project will be investigating and determining appropriate noise mitigation for all areas impacted by Portland International Airport, including Hayden Island.

Amend Chapter 33.470, Portland International Airport Noise Impact Zone

33.470.050 Additional Residential Regulations

A. Restrictions on residential use and density.

1. ~~Prohibition of new residential uses w~~Within the Ldn 68 noise contour. Where any part of a site is within the Ldn 68 noise contour, it is subject to the following:

a. New residential uses prohibited. New residential uses are prohibited within the Ldn 68 or higher noise contour, except as allowed specifically by this subsection. If a site is divided by an Ldn 68 noise contour, ~~divides a residential property, the building site including~~ all dwelling units, accessory structures, and required side and rear setbacks must be located entirely outside the Ldn 68 noise contour. .

b. Replacement housing.

(1) Existing housing within the Ldn 68 noise contour may be replaced within 5 years if it is damaged or destroyed by fire or other causes beyond the control of the owner. A houseboat that is intentionally removed from its slip by the owner may be replaced within 5 years. A manufactured dwelling that is intentionally removed from a manufactured dwelling park may be replaced within 5 years

(2) Natural disasters. The replacement time of 5 years is extended to 15 years for manufactured dwelling parks on Hayden Island if:

- Manufactured dwelling units are damaged or destroyed by a natural disaster such as a flood, earthquake, fire or other causes beyond the control of the manufactured dwelling park owner.
- At least 30 percent of the manufactured dwelling units in the manufactured dwelling park are either destroyed or significantly damaged. A unit is significantly damaged if the repair cost is 75 percent of the value of the unit.

c. Exemption. Sites that had a Farm and Forest, Limited Single Family, Low Density Single Family, or Medium Density Single Family Comprehensive Plan Map designation on January 1, 1981 or a County Residential Comprehensive Plan designation or zoning on that date ~~is~~ are exempt from this prohibition ~~requirements~~. Dwelling units added to these sites must meet the requirements of this chapter for residential development within the Ldn 65 contour.

33.470.050 Additional Residential Regulations, cntd.

Note: There has been some discussion of whether replacing a manufactured dwelling unit would trigger upbrades to nonconforming development in manufactured dwelling parks. The current threshold is $ 131,050 and the typical value of a permit to replace a unit is approximately $ 10,000 based on the value of the site preparation work. It is highly unlikely--and certainly not intended--that replacement of individual units would trigger upgrades. The threshold is adjusted annually for inflation.

Note: While some state statutes use the term "floating home," the term "houseboat" is used in Portland's Zoning Code. If we use the term "houseboat" in this chapter, we are inconsistent with state terminology, but if we use the term "floating home" we will be inconsistent with other parts of the Zoning Code, including Chapter 33.236, Floating Structures. Because of the scope of this project, we will continue to use the term "houseboat" in this chapter, but note that a code-wide revision to "floating home" should be made in the future.

33.470.050 Additional Residential Regulations, cntd.

~~2. Exceptions to the restrictions on residential use and density. Existing housing within the Ldn 68 noise contour may be replaced within 5 years if it is damaged or destroyed by fire or other causes beyond the control of the owner. A houseboat that is intentionally removed from its slip by the owner may be replaced within 5 years. A manufactured dwelling that is intentionally removed from a manufactured dwelling park may be replaced within 5 years. Replacement housing must meet the requirements of this chapter for residential development within the Ldn 65 contour.~~

2. Within the Ldn 65 noise contour. Where a site is within the Ldn 65 noise contour, it is subject to the following:

~~3. Density restriction for new residential uses.~~

a. ~~All property between the Ldn 65 and the Ldn 68 noise contours that currently has~~ Sites that have a residential Comprehensive Plan Map designation ~~on the Comprehensive Plan Map is~~ are prohibited from being developed at a density higher than that of the R10 zone.

b. Except as provided in subparagraph A.3, all property between the Ldn 65 and the Ldn 68 noise contours that currently has Sites that have a commercial Comprehensive Plan Map designation on the Comprehensive Plan Map is ~~are~~ prohibited from being developed at a density higher than that of the R1 zone.

3. In the Hayden Island plan district, residential density may be transferred as specified in 33.532.240.

Hayden Island Plan

RECOMMENDED PLAN | June 2009

City of Portland Bureau of
Planning and Sustainability
Sam Adams, Mayor | Susan Anderson, Director

DAVID EVANS
AND ASSOCIATES INC.

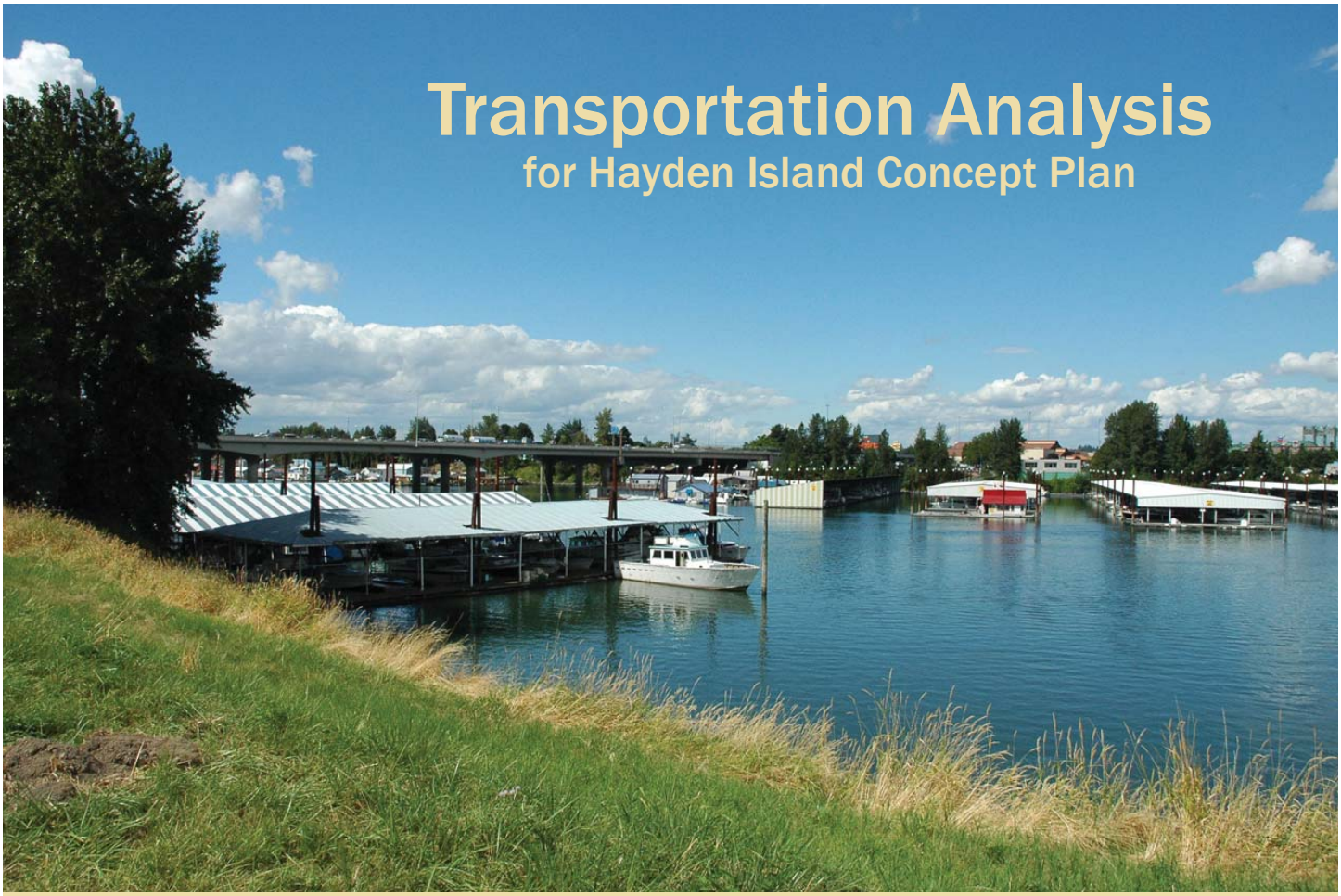
Hayden Island Final Plan

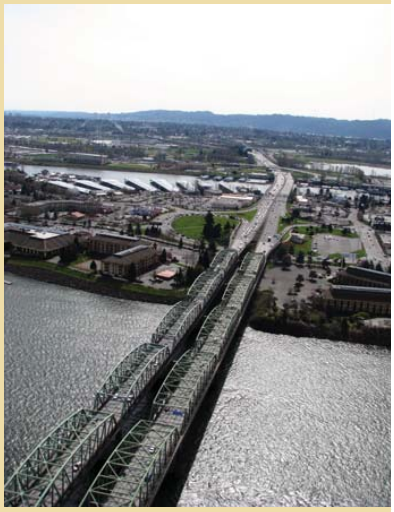
APPENDICES

Section C-1

—Transportation Analysis on the Concept Plan *(Parisi)*

Transportation Analysis
for Hayden Island Concept Plan





DAVID EVANS AND ASSOCIATES INC.

Parisi ASSOCIATES transportation consulting

CITY OF PORTLAND BUREAU OF PLANNING

Prepared for
City of Portland, Bureau of Planning

Prepared by
David Evans and Associates
Parisi Associates

July 2008

Transportation Analysis for Hayden Island Concept Plan

Prepared for:

City of Portland, Bureau of Planning

Prepared by:

David Evans and Associates, Inc.

and

Parisi Associates

July 2008

Table of Contents

Table of Tables

Table of Figures

Executive Summary

The Hayden Island Concept Plan is the result of the planning process undertaken by a partnership of residents and businesses on Hayden Island, staff members of several bureaus at the City of Portland, and other public agencies. The goal of the Concept Plan is to create a vibrant, livable community on Hayden Island that promotes diverse land uses, is integrated with the natural environment, and has safe and reliable transportation options.

This technical report details the development of and results of the transportation analysis of the Concept Plan. It describes the underlying assumptions that affected the development of the Concept Plan and provides some background for ongoing and previously completed transportation work on Hayden Island. Additional data is presented to further describe existing conditions – land use, trip generation, and traffic operations. The final section on background information compares the land use assumptions for three scenarios: the existing conditions; a previously evaluated land use scenario; and the preferred land use developed for the Concept Plan.

The traffic analysis for the Concept Plan uses a process that accounts for 1) trip generation, 2) trip distribution; 3) modal choice; and 4) traffic assignment. This report describes the assumptions and methodology for each of these steps. Results of the traffic operational analysis are presented for two scenarios involving different access spacing for the east side of the interchange. The results of the overall analysis are evaluated and a set of conclusions is drawn and described. A series of next steps to further refine the analysis is presented.

In addition, a street classification scheme is proposed that identifies roads that would function as primary vehicle, transit and freight routes and those which would serve secondary functions. Routes that would best serve pedestrians and bicycles are also identified.

Finally, the potential traffic impacts are discussed for a possible arterial bridge between Marine Drive and Hayden Island. The process of selecting the most appropriate location for the bridge is also described, along with a summary of why other alternatives have been rejected.

1. INTRODUCTION

1.1. Purpose

This report describes the transportation analysis conducted for the proposed Hayden Island Concept Plan. It provides information on the assumptions, methodology, and traffic operations analyses of the Concept Plan, and compares the results against existing conditions and previously studied plans. An analysis of possible locations of an arterial bridge to Hayden Island is included in the report. In addition, the report proposes a preliminary street classification for the Concept Plan.

1.2. Relationship to Other Work

The information presented in this report draws upon previously completed analyses and the ongoing work of the Columbia River Crossing (CRC) project. Key studies specific to Hayden Island are summarized below, beginning with the most recent.

The *Existing Conditions Report for Hayden Island*, completed by David Evans and Associates and Parisi Associates in February 2008 as part of the Hayden Island Concept Plan process, contained a street and parking inventory of the island. The report also summarized information about existing travel demand, vehicle origin-destination patterns, local street operational performance, and freeway operational performance for I-5 in the vicinity of the Hayden Island interchange.

The *Traffic Access, Traffic Circulation and HCT Station Location Special Technical Study*, completed by David Evans and Associates, Parisi Associates, and Parsons Brinckerhoff for the Portland Department of Transportation (PDOT) in March 2007, examined the traffic impacts of three potential land use scenarios for the 2030 time period.

The *Hayden Island Technical Memorandums (Summarizing Capacity Analysis of I-5 Freeway in Vicinity of Hayden Island, Hayden Island Intersection and Ramp Terminal Queuing Capacity Analysis,* and *I-5 Crash History in Vicinity of Hayden Island)*, completed by David Evans and Associates and Parisi Associates for PDOT in August 2006, examined the operational performance of the Hayden Island local street network and provided information about the performance of I-5 on Hayden Island. The analysis was used by the Portland City Council to support the need for a temporary development moratorium for Hayden Island.

The *Port of Portland's West Hayden Island Transportation Analysis*, prepared by Parametrix, Inc. and published in 1999, presented an analysis of several marine-oriented facility options for West Hayden Island. A section of the Port's study examined the trip generation characteristics of the different marine-oriented operations. The study also looked at options for a bridge between Marine Drive and Hayden Island and other opportunities to improve railroad access to the island.

1.3. Contents of this Report

The four main sections of this report present information related to:

- Existing conditions, including information on current land uses, the transportation network and traffic operations;
- A comparison of the existing land use with two possible future scenarios: one based on the current plan and a second based on the preferred development scenario presented by the new Hayden Island Concept Plan;
- A more detailed transportation analysis of the development scenario from the Hayden Island Concept Plan including recommendations for a transportation system to serve that development concept; and
- An evaluation of four proposed arterial bridge connections and traffic operations under the preferred arterial bridge location.

2. DOCUMENTATION OF EXISTING CONDITIONS

This section summarizes existing conditions including information on the transportation network, land uses, and traffic operations.

2.1. Hayden Island Road Network

Vehicular access to Hayden Island is only possible via I-5 through the existing Hayden Island interchange. The street network on Hayden Island is illustrated in **Figure 1**.

The existing interchange is of an obsolete design. The southbound ramps terminate at a signalized intersection on the west side of I-5 at North Center Avenue opposite one of the principal entrances to the Jantzen Beach SuperCenter. The northbound ramps terminate on the east side of I-5 at a signalized intersection with North South Hayden Island Drive and North Tomahawk Island Drive.

There are three major public roads on the island: North Hayden Island Drive, North Tomahawk Island Drive, and North Center Avenue. The majority of streets on Hayden Island are privately owned and maintained. Some of the private roads are accessible to the general public; others are reserved for the residents who live in the gated communities to which the roads provide access.

Most Hayden Island roads, both public and private, are classified by the City of Portland as local service streets for all five classification categories: Traffic, Transit, Freight, Pedestrian, and Bicycle.

The City of Portland has higher designations for major streets and specific sections of major streets on Hayden Island. North Center Avenue is designated as a District Collector, a Community Transit Street, and a City Walkway. The city classifies most sections of North Hayden Island Drive as a District Collector and a Major Truck Street. North Jantzen Drive and North Tomahawk Island Drive function as Neighborhood Collectors and City Walkways.

On Hayden Island, the most common posted speed is 25 miles per hour including all the streets designated as collector streets. Private roads in both sections of the manufactured home park and the internal circulation roads through the Jantzen Beach SuperCenter are posted at 10 and 15 miles per hour, respectively. There are a few locations where there is no speed limit posted.

Most streets have two travel lanes, although North Center Avenue has a four-lane cross-section for some of its length. North Hayden Island Drive has a center turn lane for part of its length, but otherwise this feature is not present on any other street.

Public streets and those adjacent to the interchange generally have lanes meeting the standard width of 12 feet. Private streets generally feature narrower lanes.

Many of the residential and business streets allow on-street parking. Roadways near the interchange generally do not allow on-street parking or restrict it to one side of the street.

The existence and attributes of sidewalks vary considerably. They range from sidewalks on both sides of the street to sidewalks on one side to a complete absence of facilities for pedestrians. Width varies from a standard five-foot width to two-foot wide sidewalks. No streets on Hayden Island have marked on-street bike lanes. Pedestrian and bicycle routes on the island are circuitous, requiring substantial out-of-direction travel for these modes.

Appendix A presents more detailed information about the existing Hayden Island street network including their jurisdiction, street classification, posted speed, and key physical features.

2.2. Hayden Island Development and Land Use

Hayden Island encompasses about 1,450 acres with vastly different levels of development. Hayden Island is bisected by the Burlington Northern Santa Fe Railway (BNSF) line that parallels I-5 to the west. The rail line is used as the delineator between "west" and "east" Hayden Island.

The west side of Hayden Island (825 acres) is currently undeveloped and is owned by the Port of Portland. West Hayden Island lies within Portland's urban growth boundary. Though West Hayden Island is under Multnomah County's jurisdiction, planning functions are administered by the City of Portland under a complex intergovernmental agreement.

East Hayden Island (638 acres) is within the City of Portland and is developed with a mix of residential, retail, commercial, and industrial uses. Residential uses include a manufactured home park, houseboats, floating home moorages, single family homes, and condominiums. Commercial uses on east Hayden Island are primarily auto-oriented. They include the Jantzen Beach SuperCenter mall, "big box" retailers, hotels, restaurants, gas stations, and a grocery store. Industrial development includes auto wholesalers, manufacturing, and marine-related businesses.

Several parcels are currently vacant and various redevelopment proposals are being actively pursued or considered by property owners. For example, the Jantzen Beach SuperCenter is proposing a remodeling project, and there was interest in building a new, big box store on the site of the closed Thunderbird Hotel. The potential impact of development and redevelopment is discussed in further detail in subsequent sections of this report.

2.3. Hayden Island Vehicle-Trip Generation

A variety of unique factors shape transportation to, from and within Hayden Island. First and foremost, Hayden Island is unusual because I-5 provides the only vehicular access to the island. In addition, I-5 experiences over seven hours of level of service (LOS) 'F' congestion during weekdays in the vicinity of the Hayden Island interchange, making it difficult for motorists to access the island during these times.

The Institute of Transportation Engineers' (ITE) publication, *Trip Generation, 7th Edition,* is the standard reference for the trip generation characteristics of a wide variety of land uses. Based on thousands of studies conducted across the country, *Trip Generation* provides vehicle-trip generation rates for scores of uses (e.g., residences, retail stores, schools, industrial uses) using a variety of independent variables (e.g. housing units, square feet, students, employees). Using the procedures and methodology in *Trip Generation,* vehicle-trip generation estimates were prepared for Hayden Island's existing land uses. The initial estimates applied ITE's trip generation rates to each existing occupied land use. The results of the initial estimates, when applied to the I-5 ramps, were significantly higher than the I-5 ramp volumes for both the weekday PM and weekend midday time periods. In other words, the existing developments on Hayden Island produce and attract far fewer vehicle-trips than the averages observed from across the country. Previous work completed for the *Traffic Access, Traffic Circulation, and HCT Station Location Special Technical Study* for PDOT identified three factors affecting the number of trips produced by and attracted to Hayden Island.

The three factors identified include: 1) an accessibility factor; 2) an internal trip factor; and 3) a transit mode split factor. The accessibility factor takes into account the difficulty of accessing and leaving

Hayden Island during heavily congested times, such as weekday afternoons or midday during the weekends, and the absence of alternative route choices. The internal trip factor is used to account for the percentage of generated trips that are internal to the island, i.e., vehicle trips from one point to another on Hayden Island that do not use I-5. Finally, the transit mode split accounts for the existing number of bus riders during the peak periods.

Because the I-5 ramps provide the only access to the island and the ramp volumes are known, the initial trip generation estimates using standard rates from *Trip Generation* may be adjusted or calibrated to account for Hayden Island's unique characteristics using the three factors identified above.

The accessibility factor represents the percentage of traffic generated by a particular development relative to the national averages for that same type of development. An accessibility factor of 0.85, for example, means that the subject development produces only 85 percent of the trips predicted by applying the national averages.

Hayden Island's accessibility factors differ by time of day and by day of week in response to the varying levels of congestion on I-5 and at the interchange. Due to recurring weekday congestion along I-5 at and near its ramps, Hayden Island's accessibility factor is lower for the weekday PM peak hour than for the Saturday midday peak hour. From calibration modeling conducted during previous work, the overall accessibility factor for the weekday PM hour was found to be 0.50 for retail trips and 0.65 for all other land uses on the island. For the weekday midday peak, the overall accessibility factor was determined to be 0.70 for retail trips and 0.85 for non-retail trips.

It should be noted that these accessibility factors apply to the total of all retail and non-retail uses. Individual developments may have higher or lower factors, but the combined uses average the factors discussed above.

Similar to the accessibility factor, the internal trip factor varies according to the level of congestion on I-5, with different values by time of day and day of week. During periods of high congestion, motorists are more likely to make additional linked trips by successively visiting on-island destinations. Based on ITE methods completed for the special technical study, it was estimated that on average about 35 percent of the island's weekday PM peak hour trips are internal to the island and about 25 percent of the Saturday peak period trips are internal.

Based on bus ridership data provided by Trimet in 2006, it was determined that during the weekday PM period transit mode split is four percent of island traffic; during the weekend midday, the transit mode split is 2.5 percent. In other words, motor vehicle trips account for 96 percent of the weekday peak traffic and 97.5 percent of the weekend midday traffic.

By applying these three factors (accessibility, internal trips, and transit mode split) to the existing land uses on Hayden Island, the estimated vehicle-trip generation results closely matched the I-5 ramp counts at the interchange, thus accounting for the characteristics of development on Hayden Island and the transportation system serving it. **Table 1** shows a comparison between the estimated vehicle-trips and the actual I-5 ramp counts.

Table 1. Comparison of Factored Trip Generation vs. Actual Ramp Counts

	Weekday PM Peak Hour			Weekend MD Peak Hour		
	In	Out	Total	In	Out	Total
Estimated Vehicle-trips	1,086	1,232	2,318	2,110	1,954	4,065
Actual Trips	1,085	1,295	2,380	2,040	1,960	4,000
% Difference	**0.1%**	**-4.9%**	**-2.6%**	**3.5%**	**-0.3%**	**1.6%**

Source: *David Evans and Associates, Parisi Associates*

These factors can be used to help predict the transportation impacts of new development and redevelopment of Hayden Island, as well as and the implications of changes in the transportation system, including the CRC project.

2.4. Existing Hayden Island Traffic Conditions

Previous analyses completed for PDOT summarized in the *Existing Conditions Report for Hayden Island* have identified the following traffic issues related to Hayden Island:

- Severe congestion (level of service 'F') on the I-5 mainline for at least three hours in the southbound direction during the AM peak hours (6 AM to 9 AM);
- Severe congestion (level of service 'F') on the I-5 mainline for at least four hours in the northbound direction during the PM peak hours (3 PM to 7 PM); and
- Vehicle queues that extend to the upstream intersection at several of the closely spaced intersections near the Hayden Island interchange during the weekday midday peak hours, the weekend midday peak hours, and the PM peak hours. The length of these queues degrades the performance of the upstream intersections and significantly reduces the operations of the entire interchange area's street network.

3. COMPARISON OF EXISTING, MATURE EXISTING AND CONCEPT PLAN LAND USE SCENARIOS

This section provides a comparison of the existing development on Hayden Island with two possible future scenarios: the Mature Existing scenario and the Concept Plan scenario.

3.1. Overview of the Scenarios

Existing land uses and the current transportation network were described in the previous section. The Mature Existing scenario was developed as part of the *Traffic Access, Traffic Circulation and HCT Station Location Special Technical Study*, which examined the transportation impacts of potential land uses in the 2030 time period. The Concept Plan scenario was developed through a collaborative planning process which involved the City of Portland Bureau of Planning, several consultant teams which focused on transportation, architecture, public outreach and other areas of expertise, and the input of the local community and businesses on Hayden Island.

The Mature Existing scenario would feature a higher level of development on Hayden Island. The Concept Plan would see a significant increase in the number of housing units, a 40 percent decrease in overall retail square footage, and little to no change in other land uses. The alternative future scenarios reflect the potential for development and redevelopment and the expectation that the transportation system will be enhanced by the Columbia River Crossing project, which is discussed in greater detail in the next section. Both scenarios take into account the zoning restrictions on residential development on land affected by the noise contour created by flights to and from Portland International Airport.

Table 2 provides an overview of the development levels on Hayden Island using broad categories of land uses. It directly compares the existing, mature existing and concept plans scenarios. The explanation of the two future scenarios follows the table.

Table 2. Comparison of Existing Land Use and 2030 Land Use Scenarios for Hayden Island

Land Use	Units	Existing	Mature Existing	Concept Plan
Retail	Sq. Ft.	1,000,000	1,800,000	600,000
Hotel	Rooms	600	600	600
Industrial	Sq. Ft.	750,000	1,250,000	675,000
Office	Sq. Ft.	50,000	60,000	50,000
Housing	Units	1,300	1,600	3,100
Marina	Berths	2,200	2,200	2,200

Source: *Traffic Access, Traffic Circulation and HCT Station Location Special Technical Study*

3.2. Mature Existing Scenario

The Mature Existing scenario assumes that existing zoning designations will be retained and that future development will mostly mirror current land uses and recent development trends.

This scenario assumes most growth on Hayden Island would be big box or shopping mall-type retail concentrated in the commercially zoned land near the I-5 interchange. As shown in **Table 2**, the Mature Existing scenario represents a future with substantially more retail and industrial uses than exist today, but with little change in housing or other land uses.

Although Portland's "CG" zoning allows a variety of uses, retail was assumed because it represents current land use patterns. It was assumed that retail buildings would be single story and parking would be in surface lots. In addition, new industrial development would be added to vacant and underutilized parcels in areas with "IG" zoning. Residential uses would be the same as today with the addition of two new condominium developments that have been proposed. These general growth projections for the eastern portion of the island were created by the City of Portland.

Development assumptions for West Hayden Island were based on the Port of Portland's *West Hayden Island Transportation Analysis* study. The development scenario used for the Hayden Concept Plan study was based on the Port's 'Build-out, Option 2.' This option assumed: a 270-acre automobile distribution facility, an intermodal rail yard, and a bulk terminal employing 45 people.

The Mature Existing scenario was evaluated to determine its potential vehicle-trip generation and effects on traffic capacity at the Hayden Island/I-5 interchange. The impact of this increased level of development would greatly increase the number of trips going to and from the island. Without transportation system improvements, the Mature Existing scenario would exacerbate existing transportation problems. Even with the proposed improvements to the Hayden Island interchange area with the Columbia River Crossing (CRC) project, including a high capacity transit station and local street improvements, the Mature Existing scenario would produce over 30 percent more traffic than the system could accommodate. The full results of the transportation impacts of the Mature Existing scenario may be found in the *Traffic Access, Traffic Circulation and HCT Station Location Special Technical Study.*

3.3. Concept Plan Scenario

The Hayden Island Concept Plan scenario represents a significantly different future for Hayden Island. As illustrated in **Table 2**, the Concept Plan scenario assumes significantly greater residential development than either the Existing or Mature Existing Scenarios and less retail and industrial use.

The Concept Plan scenario seeks to replace the existing mix of land uses with a new mix that moves toward a balance of residences, employment, and shopping that take advantage of and reinforce the presence of each other. The Concept Plan scenario is also designed to take advantage of the Columbia River Crossing's planned high capacity transit corridor with a transit station on Hayden Island.

Structurally, the Concept Plan is designed to feature an interconnected pedestrian-oriented circulation network and land use pattern that supports community-building and increases transit ridership. The proposed transit station, street system, and greenways would link land uses and take advantage of the site's proximity to the Columbia River and North Portland Harbor. Commercial development on the island is envisioned to be a mixture of "lifestyle" retail similar to Bridgeport Village near Tualatin, Oregon, with local retail and some conventional large-format commercial development. Parking is anticipated to be provided ithrough a mix of surface lots and structured parking facilities.

A grid street network aims to avoid most existing buildings so that redevelopment could be implemented in phases. A grid street network would also seek to avoid concentrating traffic on wide streets that inhibit pedestrian activity between adjacent uses and to and from the transit station.

The development of West Hayden Island under the Concept Plan scenario is identical to that assumed for the Mature Existing scenario. Both use a combination of industrial uses planned by the Port of Portland.

The transportation impacts of the Concept Plan are detailed in the next section.

4. DOCUMENTATION OF CONCEPT PLAN SCENARIO

This section summarizes information on the transportation network, travel demand model development, and traffic operations for the Concept Plan scenario.

4.1. Transportation System for Concept Plan

4.1.1. Future Transportation System Assumptions

The Hayden Island Concept Plan traffic analysis is based on the assumption that the Columbia River Crossing replacement bridge alternative will have been constructed along with a new high capacity transit corridor. Further explanation of the Columbia River Crossing and other key transportation elements are discussed below.

4.1.2. Interchange Features

A key element of the Columbia River Crossing project is the rebuilding of the I-5 Hayden Island interchange as a split Single Point Urban Interchange (SPUI). The design of the new Hayden Island interchange would split the I-5 ramp terminals between the north and south end of the island, one located on North Hayden Island Drive and the other on North Jantzen Drive. The on- and off-ramps would have two lanes each at their terminals with dual left-turn lanes for vehicles entering and exiting the on- and off-ramps.

The new interchange would have a smaller footprint than the existing one, allowing development to occur in the right-of-way currently occupied by curvilinear ramps and adjacent streets. The new interchange is assumed to provide direct access ramps that allow vehicles to travel between Hayden Island and Marine Drive, in both directions, without vehicles being required to enter and exit the I-5 mainline.

The anticipated configuration of the interchange would provide for three east-west connections beneath I-5: North Hayden Island Drive at the north; North Jantzen Avenue at the south; and North Tomahawk Island Drive in the middle. Besides allowing connections between the east and west sides of the island, North Hayden Island Drive would provide the connections to southbound I-5 and from northbound I-5. North Jantzen Avenue would provide the connections to northbound I-5 and from southbound I-5. North Tomahawk Island Drive would not connect directly with I-5, but would connect the east and west side of the island for motorists, bicyclists, and pedestrians.

A key feature of the interchange is the use of ramp meters to control traffic flow onto the I-5 mainline in both directions. The ramp meters are anticipated to be active only during the peak periods in the direction of peak traffic flow on I-5. For example, the northbound on-ramp would only operate during the weekday PM peak period. The ramp meters are planned to operate at a maximum rate of 1,400 vehicles per hour. It is assumed that neither ramp meter would be operational during the weekend midday peak period, as traffic volumes on I-5 are low enough to not merit metering on-ramp traffic flows.

4.1.3. Local Road Network

The details of the future local road network on Hayden Island were determined based on the results of this traffic analysis. General guidance from both the Hayden Island planning process and the Columbia River Crossing project serves as a starting point. A map of the street network can be seen in **Figure 2**.

The planned Hayden Island street network seeks to reinforce the existing street network by introducing additional streets in a grid pattern, particularly on the west side of I-5,. The new streets suggested to

reinforce the grid pattern are depicted in **Figure 2** and have been assigned placeholder names: North Sunrise Avenue, North Main Street, North Sunset Avenue and North Jules Verne.

North Hayden Island Drive, North Main Street, and North Jantzen Drive are predicted to carry the highest volumes of traffic on the island. They would form a five-lane cross-section ring road that surrounds the highway interchange. Major intersections with these five-lane roads would be signalized.

Oregon Department of Transportation (ODOT) access control requirements limit the spacing of interchanges and restrict some of the movements in close proximity to interchange ramp terminals. In general, ODOT requires ¼ mile spacing between an interchange ramp terminal and the nearest full-movement signalized intersection and restricts closer intersections to right-in, right-out movements. For example, ODOT would likely require the intersection of North Jantzen Avenue and North Sunrise Avenue to be right-in, right-out configuration, if an intersection would be allowed at that location.

The remaining roadways on the island are assumed to have either two or three lanes depending upon driveway and intersection spacing and whether vehicle turning volumes are high. Separate left-turns lanes would be provided where moderate to high turn volumes are expected. As indicated above, most intersections with North Hayden Island Drive, North Jantzen Drive and North Main Street would be expected to be signalized; the remaining intersections on the island are proposed to be stop sign-controlled. These decisions will be determined later in the process in consultation between the City of Portland and ODOT.

Many design details, such as the presence or absence of on-street parking and intersection spacing, remain to be decided based on further study including information on the adjacent land uses, building placement, and design requirements.

4.1.4. High Capacity Transit

The Columbia River Crossing project would also provide new high capacity transit service to Hayden Island. Two options for providing high capacity transit are still under consideration at this time. Both options are predicted to substantially increase the use of public transit on Hayden Island relative to existing conditions. The first option would extend the existing light rail transit MAX Yellow Line north from the Expo Center to Hayden Island, then over the Columbia River to Vancouver, Washington. The second option would be to provide a Bus Rapid Transit between the Expo Center, Hayden Island and Vancouver. The Columbia River Crossing preferred option will be chosen and identified as the Locally Preferred Alternative (LPA) during the summer of 2008. It is noted that the Hayden Island Concept Plan and the City of Portland's preferred option for high capacity transit is light rail transit, with the alignment immediately adjacent to the west side of I-5.

4.1.5. High Capacity Transit Station Location

Several factors are germane to the location of the high capacity transit station on Hayden Island. Key factors considered include: 1) the need to meet ODOT access control requirements for the roads intersecting the ramp terminals for the new interchange; 2) the location of existing roadways; 3) the desire to provide lot sizes that would be conducive to appropriate development adjacent to the station; and 4) the need for the high capacity transit facility to match the elevation of the new I-5 bridge or be part of the new bridge while avoiding excessive grades.

Based on these constraints, the Hayden Island Concept Plan assumes that the high capacity transit station on Hayden Island would be located west of and adjacent to I-5. This location creates lots and land use

patterns conducive to the types of development envisioned in the Concept Plan. The station is assumed to be elevated above the surrounding area because this would eliminate at-grade crossings, allow easier grades for the high capacity transit vehicles, and provide the best opportunity for an east-west circulation road from one side of I-5 to the other that is independent of the I-5 ramp.

4.1.6. Facilities for Non-Motorized Travel

Another element of the planned Columbia River Crossing project is a substantially improved transportation system for pedestrians and bicyclists. To enhance the system for pedestrians and bicyclists, the Columbia River Crossing project will include a new, modern facility adjacent to the high capacity transit alignment along the entire corridor from Marine Drive to Vancouver. This facility would include improved connections to the local and regional pedestrian and bicycle networks at Marine Drive, Hayden Island, downtown Vancouver, and other locations.

Multiple connections between Hayden Island and the non-motorized system for the Columbia River Crossing project are anticipated. Facilities will comply with the provisions of the Americans with Disabilities Act (ADA), and the emphasis will be on creating inviting, easy-to-use facilities that promote these alternatives and integrate with the high capacity transit system. Details will be further developed with the selection of the LPA for the Columbia River Crossing project and the subsequent design phase.

The network of facilities for non-motorized travel on Hayden Island is envisioned to include sidewalks on all streets and an interconnected multi-use pathway system integrating parks and public spaces. Details of the pathway system will be more fully developed in subsequent studies as the planning and design processes are further refined and development occurs.

4.2. Concept Plan Travel Demand Model Development

Due to the extent of the redevelopment and the importance of protecting the function of the proposed interchange and the capacity of the I-5 mainline, a systematic approach was employed to evaluate the Concept Plan scenarios for transportation needs.

The evaluation employed the traditional four-step process for transportation analysis: trip generation, trip distribution, mode split, and traffic assignment. The predicted traffic volumes were used to assess traffic operations and features needed to accommodate traffic, including the type of traffic control and number of lanes for key roadways. The analysis culminated with recommendations for the street network and suggestions for additional analyses as more detailed development plans become available.

4.2.1. Trip Generation

SERA Architects developed the land use assumptions for the Concept Plan. Transportation analysis zones were developed as shown in **Figure 3**. Based on input from the community design workshops and working within the overall planning context, SERA proposed land uses for each subarea, using categories from ITE's *Trip Generation, 7th Edition*. For each particular land use, the level of development was calculated with specific details such as the number of units of residential, square feet of retail, or acres of park.

The nature of the vast majority of retail land uses on Hayden most resembles that of a large shopping center, as defined by *Trip Generation.* There are several reasons for this: most of the retail properties are located adjacent to each other on the west side of I-5; access to all properties can only arise from the I-5 interchange; the geography of Hayden Island naturally captures internal trips; and the congestion on I-5 in

combination with many complementary businesses creates an environment of pass-through trips and trip-chaining shopping journeys. Thus, using total gross square footage as the independent variable, the number of trips generated by the shopping center was calculated. A few individual high trip-generation retail establishments were calculated individually and then added to the new retail trip generation.

A similar procedure was used for all light industrial properties. A trip generation rate, based on square footage, was used to estimate the number of aggregate trips produced for all light industrial properties. Trips were then assigned to each individual property based on its percentage contribution to the total gross square footage.

Trip generation for residential land uses was based upon the number and type (e.g. single-family, apartment, manufactured homes) of units of housing. Hotel trip generation was based on the total number of rooms each property contained. Trips generated by marinas were based upon the number of berths in each marina. Trip generation for parks was determined by the number of acres of parkland. Development assumptions for West Hayden Island in the Concept Plan were exactly the same as for the previously described Mature Existing scenario.

Table 3 summarizes the trip generation of the Concept Plan development scenario for the two time periods used i the transportation analysis. Detailed information on trip generation by subarea is included in **Appendix B**. **Table 3** presents the unadjusted trip generation predicted by application of the standard trip generation rates from ITE's *Trip Generation* from the national averages. Explanation of the application of adjustments is in the next section.

Table 3. Trip Generation for Hayden Island Concept Plan (Unadjusted Vehicle Trips)

	Weekday PM			Weekend Midday		
Area	**In**	**Out**	**Total**	**In**	**Out**	**Total**
West Hayden Island	63	93	156	128	152	280
East Hayden Island, west of I-5	1,809	2,074	3,883	2,035	1,719	3,754
East Hayden Island, east of I-5	1,593	1,387	2,980	1,720	1,540	3,260
Total Trips	**3,465**	**3,554**	**7,019**	**3,883**	**3,411**	**7,294**

Source: *David Evans and Associates, Parisi Associates*

4.2.2. Application of Adjustment Factors

Similar to the trip generation for the existing conditions analysis, the Concept Plan development scenario requires the same three adjustment factors for accessibility, internal trips, and transit mode split. **Table 4** shows the accessibility factors, internal trip factors, and transit mode percentages for both the weekday PM and midday weekend peak periods for Existing Conditions and the Concept Plan. The factors in **Table 4** were used to adjust the trip generation predicted in **Table 3**.

Table 4. Trip Generation Adjustment Factors for Existing Land Use and Concept Plan

	Weekday PM		Weekend Midday	
Factor	**Existing**	**Concept Plan**	**Existing**	**Concept Plan**
Accessibility				
Retail	50.0%	75.0%	70.0%	85.0%
Non-Retail	65.0%	82.5%	85.0%	92.5%
Internal Capture	35.0%	25.0%	25.0%	20.0%
Mode Split				
Inbound	4.0%	10.6%	2.5%	8.5%
Outbound	4.0%	5.8%	2.5%	4.6%

Source: *Traffic Access, Traffic Circulation and HCT Station Location Special Technical Study, David Evans and Associates, Parisi Associates*

Based on the expectation that the Columbia River Crossing project would significantly improve the I-5 mainline congestion problem and that the interchange would have substantially increased capacity, the accessibility factor is assumed to increase for Hayden Island in the Concept Plan. The internal trip factor is similarly expected to decrease due to the increased mobility resulting from the CRC project and the increase in mixed-use development. Both the accessibility and internal trips factors for the Concept Plan have been increased to a level that is halfway between existing conditions and 100 percent.

The public transit mode split on Hayden Island is expected to increase dramatically for the Concept Plan scenario with the construction of a high capacity transit station and the proposed transit-supportive land use mix. Either light rail transit or bus rapid transit service would substantially increase the attractiveness and use of public transit in the I-5 corridor and on Hayden Island. Consistent with Trimet's methodology for forecasting ridership, weekend mode split is calculated to be about 80 percent of weekday ridership.

The traffic volumes at the on- and off-ramps at the Hayden Island interchange and number of internal trips are calculated after the accessibility factor, the internal capture factor, and the mode split factor are applied to the theoretical number of trips from the initial trip generation step. The adjusted volumes can be seen in **Table 5**.

Table 5. 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*

4.2.3. Traffic Assignment

A computer-based, regional transportation model[1] is employed for the traffic assignment step for regional traffic forecasting, but for the Hayden Island Concept Plan scenario, traffic assignment was done by hand. This trip assignment technique used similar methods to the regional model, but took full advantage of the trip generation predicted from each subarea and a system of individual streets including local streets not included in the regional model.

The traffic assignment process accounted for trips coming to and going from Hayden Island from I-5. Trips from the I-5 ramps were routed toward their destinations on the island. Likewise, the outbound trips produced in each subarea and destined for locations off the island were routed toward the respective on-ramps. Data on trip origins and destinations from the regional model were used to determine which on-ramps (northbound or southbound) would be used and in what proportions.

Traffic was manually assigned to the street network based on the assumption that motorists would choose the most direct route, minimizing travel time. Parking was assumed to be located close to building locations. Internal trips were assigned to the arterial and local streets, and not to the ramps, because internal trips were those that originated and terminated on the island.

Pedestrian and bicyclist activity was assigned to the majority of street network on Hayden Island in order to assess their impact on traffic operations at the signalized intersections. The number of pedestrians and bicyclists crossing streets in the Concept Plan ranged from 10 to 45 per hour, depending on location. The heaviest volumes of non-motorized traffic were assigned to North Tomahawk Island Drive and along North Main Street, which were expected to be the most attractive routes for walking and cycling.

4.3. Concept Plan Traffic Operations Analysis

Using the information described in the previous sections, the Concept Plan street network was evaluated using Synchro/SimTraffic, a computer software program that models traffic operations. These traffic analysis tools use the traffic volumes, lane configurations, and signal timing to assess the traffic operations and provide key indicators of performance including level of service, volume-to-capacity ratios, and the amount of queuing at intersections. Both signalized and unsignalized intersections were analyzed. **Figures 2** and **4** show the lane configurations and traffic control for each intersection.

The performance of the street network was evaluated for both the PM weekday peak hour and the midday weekend peak hour. The level of service is based upon the ranges defined in the Highway Capacity Manual and listed in **Table 6**. Intersection Capacity Utilization (ICU) and volume-to-capacity (V/C) are measurements of intersection capacity.

[1] Metro, the Metropolitan Planning Organization (MPO) for the Portland region, is responsible for the ownership, development and maintenance of the regional travel demand model used for travel forecasting in the Portland area.

Table 6. Intersections Level of Service Standards

	Control Delay (seconds/vehicle)	
Level of Service	**Signalized**	**Unsignalized**
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Source: *Highway Capacity Manual, 2000.*

The results of the Syncho/SimTraffic model for the Hayden Island intersections for the weekday PM peak hour are summarized in **Table 7**. The results for the weekend midday peak hour are summarized in **Table 8**. Both tables were based on full build-out of the Hayden Island Concept Plan and year 2030 traffic on I-5.

Table 7. Traffic Operations Results Summary
Weekday PM Peak Hour - Hayden Island Concept Plan - 2030

Intersection	Approach / Movement	Delay (Seconds)	LOS	ICU / V/C[1]
South Ramp Terminal - Center	***Overall Intersection***	17.4	B	0.44
South Ramp Terminal - East	***Overall Intersection***	16.1	B	0.21
South Ramp Terminal - West	***Overall Intersection***	3.6	A	0.27
Hayden Island Dr and Jantzen Dr	***Overall Intersection***	9.2	A	0.49
North Ramp Terminal - East	Northeast Right	2.5	A	0.63
North Ramp Terminal - Center	***Overall Intersection***	20.9	C	0.34
North Ramp Terminal - West	***Overall Intersection***	7.5	A	0.26
Hayden Island Dr and Sunrise	Northbound Right	5.9	A	0.12
Hayden Island Dr and Main	***Overall Intersection***	19.5	B	0.58
Hayden Island Dr and Sunset	Northbound Left/Thru/Right	8.4	A	0.22
Hayden Island Dr and South Shore Ave	Northbound Left/Right	5.8	A	0.17
Tomahawk Island Dr and Main	***Overall Intersection***	9.9	A	0.57
Tomahawk Island Dr and Sunrise	Westbound Left/Thru	7.4	A	0.32
Tomahawk Island Dr and Sunset	Northbound Left/Thru/Right	6.8	A	0.14
Tomahawk Island Dr and South Shore Ave	Westbound Left/Right	3.4	A	0.03
Jules Verne and Main	***Overall Intersection***	9.4	A	0.46
Jules Verne and Sunrise	Northbound Left/Thru	5.2	A	0.14
Jules Verne and Sunset	Northbound Left/Thru/Right	5.4	A	0.15
Jules Verne and South Shore Ave	Westbound Left/Right/Thru	3.9	A	0.04
Jantzen Ave and Main	***Overall Intersection***	6.9	A	0.36
Jantzen Ave and Sunset	Southbound Left/Right	7.1	A	0.10
Jantzen Ave and Sunrise	Southbound Right	5.4	A	0.02
Tomahawk Island Dr and Jantzen Dr	***Overall Intersection***	18.2	B	0.64

Note 1: *The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.*
Source: *David Evans and Associates, Parisi Associates*

Table 8. Traffic Operations Results Summary
Weekend Midday Peak Hour - Hayden Island Concept Plan – 2030

Intersection	Approach/Movement	Delay (Seconds)	LOS	ICU / V/C[1]
South Ramp Terminal - Center	***Overall Intersection***	17.9	B	0.46
South Ramp Terminal - East	***Overall Intersection***	13.6	B	0.28
South Ramp Terminal - West	***Overall Intersection***	3.0	A	0.33
Hayden Island Dr and Jantzen Dr	***Overall Intersection***	11.9	B	0.65
North Ramp Terminal - East	Westbound Thru	2.3	A	0.79
North Ramp Terminal - Center	***Overall Intersection***	19.7	B	0.46
North Ramp Terminal - West	***Overall Intersection***	4.6	A	0.27
Hayden Island Dr and Sunrise	Northbound Right	7.2	A	0.19
Hayden Island Dr and Main	***Overall Intersection***	16.3	B	0.59
Hayden Island Dr and Sunset	Northbound Left/Thru/Right	7.1	A	0.21
Hayden Island Dr and South Shore Ave	Northbound Left/Right	7.4	A	0.19
Tomahawk Island Dr and Main	***Overall Intersection***	11.9	B	0.49
Tomahawk Island Dr and Sunrise	Westbound Left/Thru	8.9	A	0.45
Tomahawk Island Dr and Sunset	Southbound Left/Thru/Right	6.0	A	0.17
Tomahawk Island Dr and South Shore Ave	Westbound Left/Right	4.6	A	0.10
Jules Verne and Main	***Overall Intersection***	9.5	A	0.41
Jules Verne and Sunrise	Northbound Left/Thru	5.8	A	0.24
Jules Verne and Sunset	Northbound Left/Thru/Right	5.1	A	0.16
Jules Verne and South Shore Ave	Westbound Left/Right/Thru	4.2	A	0.06
Jantzen Ave and Main	***Overall Intersection***	7.1	A	0.34
Jantzen Ave and Sunset	Southbound Left/Right	8.8	A	0.13
Jantzen Ave and Sunrise	Southbound Right	3.6	A	0.06
Tomahawk Island Dr and Jantzen Dr	***Overall Intersection***	26.3	C	0.76

Note 1: *The ICU is used for signalized intersections. The V/C is used for the identified movement(s) at unsignalized intersections.*
Source: *David Evans and Associates, Parisi Associates*

As indicated in **Tables 7** and **8**, all of the intersections are predicted to operate very well in the year 2030. The poorest LOS is predicted to be 'C', which meets the City of Portland's operational standard of LOS 'D'. The v/c ratios of the ramp terminal intersections are better than ODOT's maximum allowable v/c standard of 0.85 specified in the Oregon Highway Plan (OHP) for ramp terminals.

Figures 5 and **6** show the extent of the 95th percentile queues during the PM weekday and midday weekend peak periods, respectively. The 95th percentile vehicle queue represents the distance of which 95 percent of all queues will be shorter than or equal to. The 95th percentile queue is used to estimate whether storage lanes can adequately accommodate typical queue length variations during a peak traffic period without spilling over into adjacent travel lanes or into another intersection. Forecast traffic queues are relatively modest, and do not spill back into adjacent intersections. Queue storage should be easily accommodated during the design of the street network and intersections on Hayden Island. A complete list of 95th percentile queues for all movements at all study intersections may be viewed in **Appendix C.**

4.3.1. North Jantzen Drive Alignment

One of the issues that needed to be addressed during the evaluation of the Concept Plan was the proximity of planned street intersections on the east side of I-5 to access spacing with the ramp terminals of the new interchange. The issue arises because ODOT's access management spacing calls for the nearest full access intersection to be 1,320 feet from an interchange ramp terminal or to move in the direction of such spacing.

On the east side of I-5, the ODOT access management spacing standards could affect the alignment of North Jantzen Drive, which determines the distance between the ramp terminals and the nearest intersections. Two basic alignments were considered for North Jantzen Drive: the version preferred by the residents of Hayden Island and the City of Portland (shown in **Figure 2**) and a version that realigns North Jantzen Drive further east (shown in **Figure 4**).

The preferred alignment of North Jantzen Drive from the perspective of the Hayden Island community would provide a cluster of neighborhood commercial around the intersection of North Jantzen Drive and North Tomahawk Island Drive. Among other attributes, this configuration would allow residents of the far easterly portion of Hayden Island to access parts of this commercial area without crossing North Jantzen Drive.

The second alternative, which realigns North Jantzen Drive further to the east, would provide somewhat greater separation between the I-5 northbound off-ramp terminal and the intersection of North Hayden Island Drive and North Jantzen Drive. It would also increase the distance between the northbound ramp terminal and the intersection of North Tomahawk Island Drive and North Jantzen Drive. This change in configuration moves closer to the intersection spacing specified in ODOT's access management standard. In terms of land use and development, this easterly alignment for North Jantzen Drive would shift the planned neighborhood commercial areas to the "inside" of the ring road around the interchange. Most of the neighborhood commercial area would be accessible only by residents to the east by crossing North Jantzen Drive.

Traffic patterns are slightly different for the two versions of the North Jantzen Drive alignment. The Concept Plan's preferred alternative (shown in **Figure 2**) would result in slightly higher volumes of traffic on the easterly approach of North Tomahawk Island Drive and slightly lower volumes on the westerly approach at the intersection with North Jantzen Drive. The effect on traffic operations was determined to be minimal and would be confined to this single intersection.

Further analysis of the impacts of the access control that might be imposed by ODOT may be undertaken during development of the Interchange Area Management Plan.

5. HAYDEN ISLAND ARTERIAL BRIDGE

This section summarizes an evaluation of four proposed arterial bridge connections and their effect on traffic operations on Hayden Island.

5.1. Arterial Bridge Options

Alternative access from Hayden Island to the remainder of Portland has been under consideration for years. The general concept has been to provide an arterial roadway connection to Hayden Island supplementing the existing connection that currently depends upon and impacts I-5. As a result of discussions held during the community design workshops and the planning process for the Concept Plan, a new arterial bridge evaluation was conducted for Hayden Island.

Four arterial bridge options were considered, including a West Hayden Island Bridge location, about ½ mile west of the BNSF railroad line, that is specified in both the City of Portland's Transportation System Plan (TSP) and Metro's Regional Transportation Plan (RTP). The other three locations were: near the Portland Auto Auction about a mile west of I-5; along the North Force Avenue alignment about ½ mile west of I-5; and at Lotus Isle Park about ¾ mile east of I-5. The approximate locations of the arterial bridges evaluated in this study are illustrated in **Figure 7**.

All four bridge options were evaluated using the following criteria established by the City of Portland:

- Access to Portland street network
- Access to Hayden Island street network
- Impact to Hayden Island residents
- Impact on other community residents
- Access to potential Port of Portland facilities
- Impact to Marine Drive
- Impact to Expo Center
- Potential for joint development
- Pedestrian and bicycle facilities
- Island continuity
- Other

The full assessment matrix for the arterial bridge options studied by the City of Portland as part of planning process for the Concept Plan may be seen in **Appendix D**.

The Lotus Isle Park location suffers from many negative attributes. It would adversely affect residents on the east side of Hayden Island and in the Bridgeton neighborhood with truck traffic. In addition, houseboat moorage space on the south side of North Portland Harbor would be impacted. This option would be the least accessible to the Port of Portland facilities on Hayden Island and would not provide an opportunity for joint development with the Columbia River Crossing project. The option would disrupt island continuity and would eliminate the only existing park on Hayden Island. Based upon the ability of the Lotus Isle Park location to meet the assessment criteria, the City of Portland dismissed this alternative from further consideration.

The Portland Auto Auction alignment would adversely affect West Hayden Island Moorage houseboat residents and the residents of the Hayden Island Manufactured Home Park with truck traffic. Current land use does not provide an opportunity for access or construction of this option. Based upon the ability of the Portland Auto Auction location to meet the assessment criteria, the City of Portland dismissed this alternative from further consideration.

After surviving the initial assessment by the City of Portland, further analysis was conducted to address some of the engineering challenges associated with a potential bridge in the Force Avenue corridor. Many issues arise with the North Force Avenue corridor associated with providing appropriate clearances over the North Portland Harbor that separates Hayden Island from Portland. The North Portland Harbor is a navigation channel, which means the Coast Guard is ultimately the authority in regard to vertical clearance.

For the purposes of evaluating a possible bridge, it was assumed that clearances (35 to 40 feet depending on location) would match those planned for the Columbia River Crossing project for the I-5 mainline. Providing this clearance in the Force Avenue corridor would require raising the grade of the streets that would connect to the new bridge and those connecting with them. The elevation of Marine Drive and North Force Avenue would need to be raised by as much as 18 feet. Roadways on Hayden Island, including North Jantzen Avenue, would require similar elevation changes. Accommodating the elevation increase would require substantial land acquisitions, tall retaining walls, or a combination of both. Several driveways and some streets would need to be cut off or other access acquired. Other issues include changes to the levees along Marine Drive and relocation of the multi-use path on the south side of the North Portland Harbor. Based on these factors, the North Force Avenue corridor was dismissed from further consideration.

Ultimately, there was consensus by the participants in the Hayden Island Concept Plan process that the most appropriate location for a new arterial bridge, if one was to be provided, would be west of the BNSF alignment on West Hayden Island as specified in the both the Portland TSP and Metro RTP.

5.2. Concept Plan with West Hayden Island Bridge

As described in the previous section, the Portland TSP and Metro's RTP include the West Hayden Island Bridge as a connection between Hayden Island and Portland. The southern connection would terminate at Marine Drive, an important freight route in Portland, connecting I-5 with Port of Portland facilities located at Terminals 4, 5, and 6. Marine Drive also provides access to the Rivergate Industrial District west of I-5, and to the Columbia Corridor Industrial Area located on both the east and west sides of the highway. Marine Drive also provides access to 99E and NE MLK Jr. Boulevard, both freight routes into Portland.

The Columbia River Crossing project proposes to rebuild and reconfigure the Marine Drive interchange. The new interchange is proposed to be a modified SPUI, with the eastbound Marine Drive to northbound I-5 connection constructed as a flyover ramp. This movement would carry the heaviest traffic volumes of the PM peak period and cause significant congestion on Marine Drive. Marine Drive itself would be reconstructed, realigned slightly south from its current location, and be raised above the proposed high capacity transit alignment west of I-5. The design of the interchange has not been finalized and the City of Portland is working with the Columbia River Crossing project to study several alternative alignments at and near the interchange.

The potential impact of the West Hayden Island Bridge was evaluated in connection with the Hayden Island Concept Plan. The analysis focused on the PM peak period for the 2030 build-out period and sought to assess the impact of diverting traffic from the Hayden Island interchange and the impact of that diversion to Marine Drive and to the Marine Drive interchange.

It was assumed that most of the traffic generated from the Port of Portland marine terminal on West Hayden Island would use the new bridge for access and egress because the bridge would provide the fastest and most direct freight route. In addition, it was assumed that 10 percent of traffic on the island originating from or destined for the area west of the I-5 interchange would use the bridge based on vehicle-trip origin and destination patterns. Traffic east of I-5 was assumed to not use the bridge because of the additional travel time that would be incurred by drivers taking that route. The total amount of traffic using the bridge would be approximately 290 vehicles during the PM peak hour, with a fairly even split between inbound and outbound vehicles.

The net effect of the West Hayden Island Bridge would be a fairly minor reduction in traffic volumes at the Hayden Island interchange. This would cause a corresponding marginal improvement in level-of-service and volume-to-capacity ratio at the ramp terminals. In addition, there would be slightly less traffic on the local street network west of the I-5 interchange. However, there would be a very small increase in traffic volumes west along Hayden Island Drive towards the West Hayden Island Bridge and a very small increase in certain turning movements in the neighborhood. The slight increase in traffic volumes would occur along roads that carry little traffic. Therefore this would not have a significant affect on overall intersection performance.

During the weekday PM peak period in 2030, the northbound on-ramp to I-5 at Marine Drive would carry nearly 1,600 vehicles per hour. The West Hayden Island Bridge would increase this volume by approximately four percent. This increase in traffic would slightly increase delays at the ramp meter, extend the queue of vehicles on the on-ramp, and increase volume traveling east on Marine Drive to the interchange. Similar increases in volume would occur for other movements at the interchange. These increases would not significantly impact the traffic operations at the Marine Drive interchange because the increase in volume is quite small. If volumes were to grow to the point where there would be a larger increase in delay, it is likely that vehicles would divert back to using the Hayden Island interchange, until an equilibrium in travel time was reached between the two interchanges.

6. PRELIMINARY STREET CLASSIFICATION

In the TSP, the City of Portland describes the function of streets according to their function in seven different categories. **Table 9** (following page) summarizes a preliminary identification of the functional classification of Hayden Island's streets to meet the needs of the Concept Plan.

The street classification descriptions from the City of Portland describe the types of automobile, transit, bicycle, pedestrian, and truck use that should be emphasized on each street and how future street improvements and public and private development should relate to those uses.

In general, the street classification scheme assigns the ramp terminals and five-lane ring road a more intense level of usage. These roads also form the major truck and transit routes on Hayden Island. North Tomahawk Island Drive serves as the primary pedestrian and bicycle route connecting the east and west sides of the island. The majority of local streets west of the interchange are given the lowest level of classification, functioning as local service streets.

Table 9. Hayden Island Concept Plan Preliminary Street Classification

	City of Portland Street Classification				
Street	**Traffic**	**Transit**	**Freight**	**Bicycle**	**Pedestrian**
N. South Shore Ave	Local Service	Local Service	Local Service	Local Service	Local Service
N. Sunset Ave	Local Service	Local Service	Local Service	Local Service	Local Service
N. Main Street to N. Jantzen Drive	District Collector	Minor City Transit Street	Major Truck Route	City Bikeway	City Walkway
N. Sunrise Ave	Local Service	Local Service	Local Service	Local Service	Local Service
N. Hayden Island Dr					
West Hayden Island to N. Main St	District Collector	Local Service Street	Major Truck Route	City Bikeway	City Walkway
N. Main St to N. Jantzen Dr	District Collector	Minor City Transit Street	Major Truck Route	City Bikeway	City Walkway
N. Jantzen Dr to N. Hayden Bay Dr	Local Service	Local Service	Local Service	Local Service	Local Service
N. Tomahawk Island Dr					
N. South Shore Ave to N. Main St	Local Service	Local Service	Local Service	City Bikeway	City Walkway
N. Main St to N. Jantzen Dr	Neighborhood Collector	Minor City Transit Street	Local Service	City Bikeway	City Walkway
N. Jantzen Dr to end	Local Service	Local Service	Local Service	City Bikeway	City Walkway
N. Jules Verne	Local Service	Local Service	Local Service	Local Service	Local Service

Source: *David Evans and Associates, Parisi Associates*

7. CONCLUSIONS

The goal of the Hayden Island Concept Plan is to create a vibrant, livable community on Hayden Island that promotes diverse land uses, is integrated with the natural environment, and has safe and reliable transportation options. The Concept Plan seeks to replace the existing land uses with a new mix that moves toward a balance of residences, employment, and shopping that take advantage of and reinforce the presence of each other. The Concept Plan is also specifically designed to take advantage of the existence of the Columbia River Crossing's planned high capacity transit corridor with a transit station on Hayden Island by including substantial increases in housing.

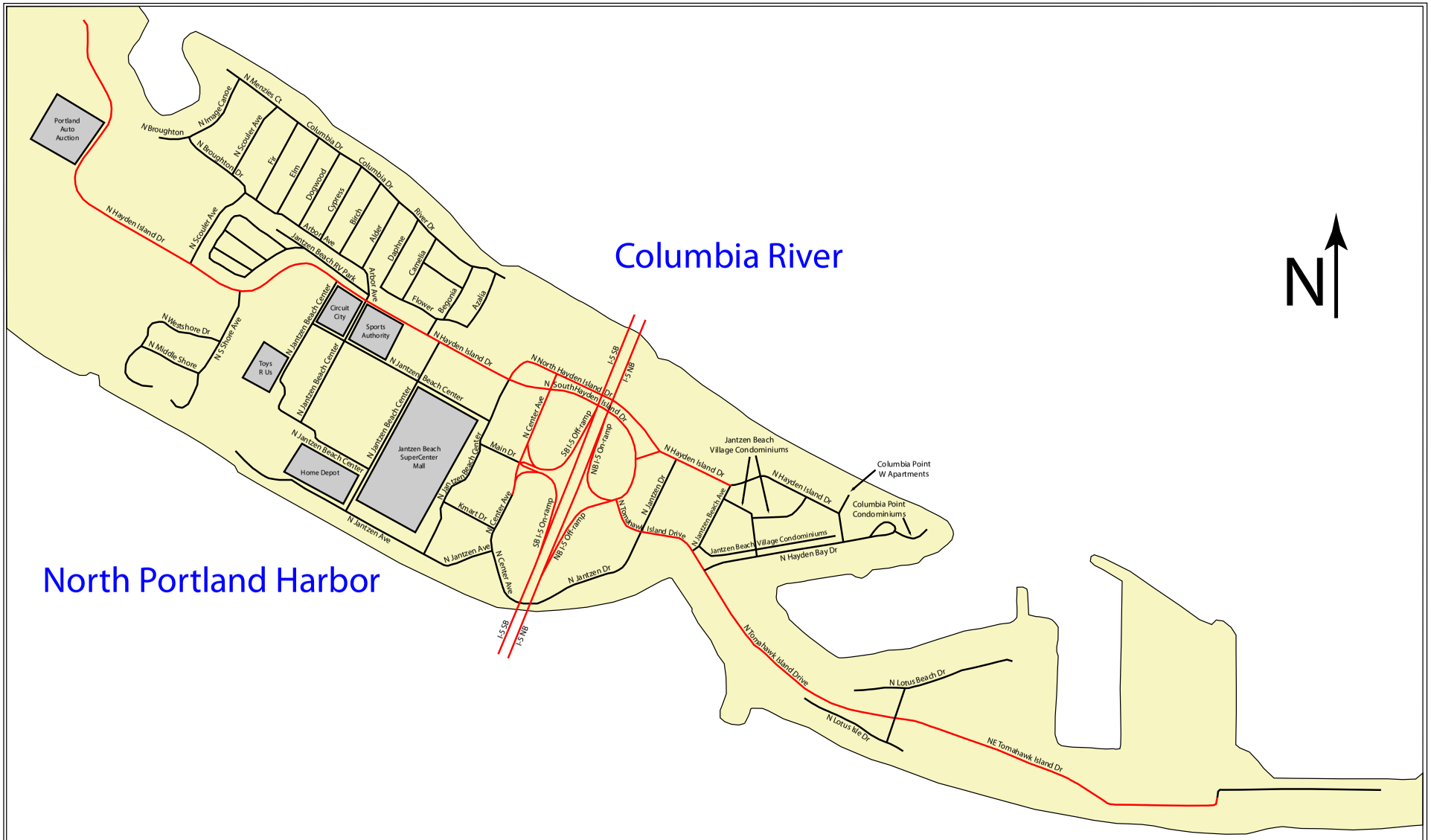
The Concept Plan scenario for Hayden Island was developed as a less auto-intensive alternative to the Mature Existing scenario, which would be a continuation of current land development trends. Unlike the Mature Existing scenario, which would provide for increased development consistent with current plan designation and zoning, the Concept Plan scenario could require some new designations and zoning changes.

The new Hayden Island interchange planned as part of the Columbia River Crossing replacement bridge alternative in combination with a reconfigured street network on Hayden Island, is calculated to solve existing deficiencies and operational problems and would provide additional capacity beyond what exists today. The estimated number of vehicle-trips generated with the Concept Plan's mixed-use scenario would be greater than the number of vehicle-trips on the island today, but could be accommodated by the proposed highway and local street infrastructure, especially with the presence of the high capacity transit corridor.

The street system proposed in connection with the Concept Plan seeks to develop a grid system that is more integrated with the proposed mixed-use concept. It also would serve non-auto users, including pedestrians and bicyclists and those accessing the planned transit station adjacent to the interchange. The street system proposed with the Concept Plan proposes a connection between the east and west sides of I-5 that does not intersect with the new interchange's ramp terminals.

The West Hayden Island Bridge, of the four bridge location studied, would provide the greatest benefit and access to Hayden Island residents, businesses and to a proposed Port of Portland marine development on West Hayden Island. This alternative would have the least impact on traffic patterns and existing land uses on Hayden Island and Marine Drive. The West Hayden Island Bridge would also provide opportunity for public agency cooperation on construction costs.

Specific elements of the Concept Plan deserve additional evaluation and study. Though the basic street network has been identified and the system has been shown to provide adequate capacity to meet operational needs and standards, design elements need additional consideration. Among these are the provision of on-street parking, center turn lanes, driveway spacing, and the degree of pedestrian emphasis. Many of these street elements will depend specifically on the adjacent land uses and will need to be determined when more is known about the developments and uses.



DAVID EVANS AND ASSOCIATES INC.

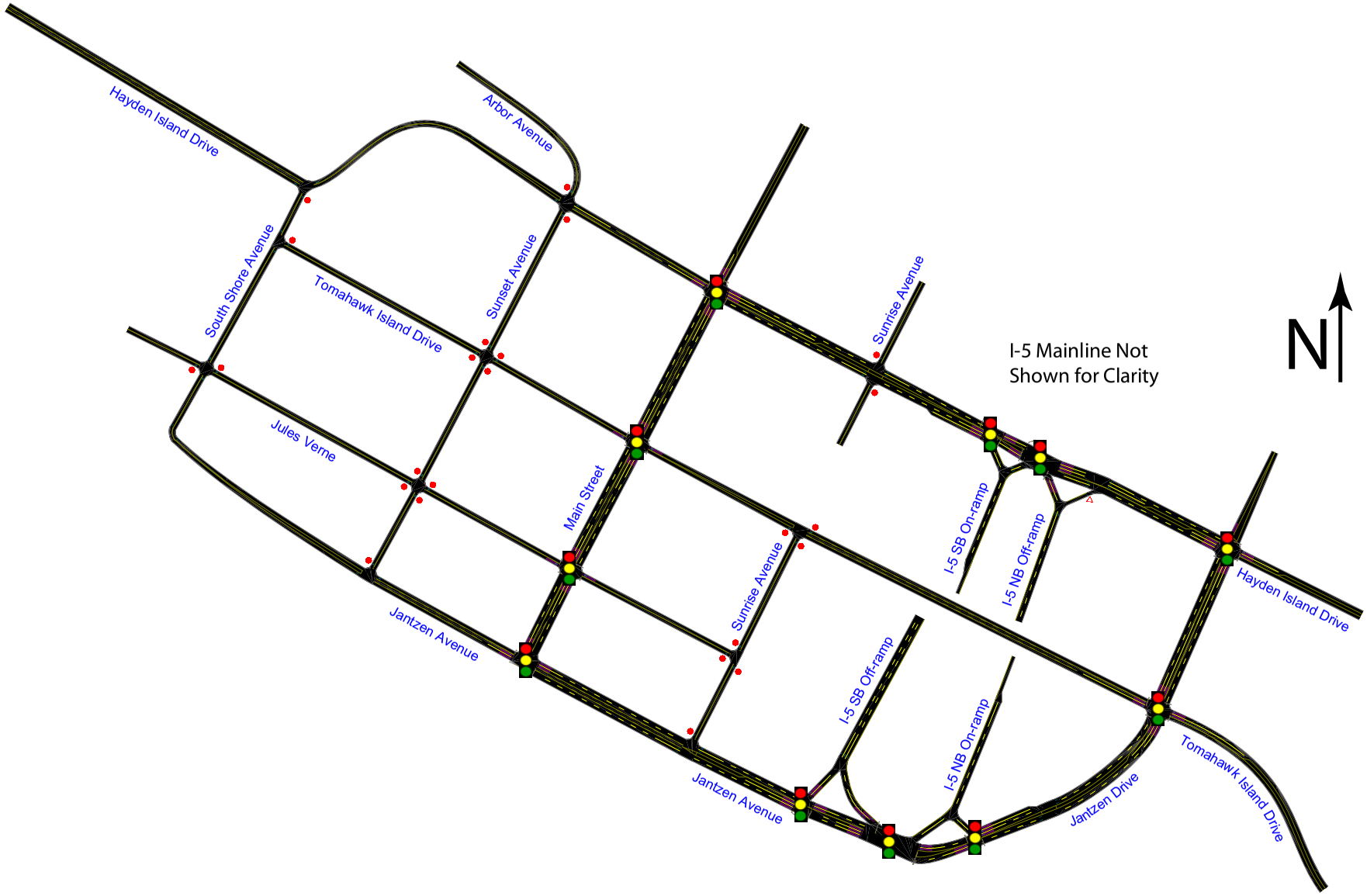
Parisi ASSOCIATES transportation consulting

Transportation Analysis for Hayden Island Concept Plan

Legend
- Public street
- Private street

Figure 1

Hayden Island Street Network - 2008



DAVID EVANS AND ASSOCIATES INC.

Parisi ASSOCIATES transportation consulting

Transportation Analysis for Hayden Island Concept Plan

Legend
- Stop control
- Signal control
- Yield control

Figure 2

Concept Plan
Street Network

Data Sources: City of Portland GIS, Metro RLIS
Not to scale

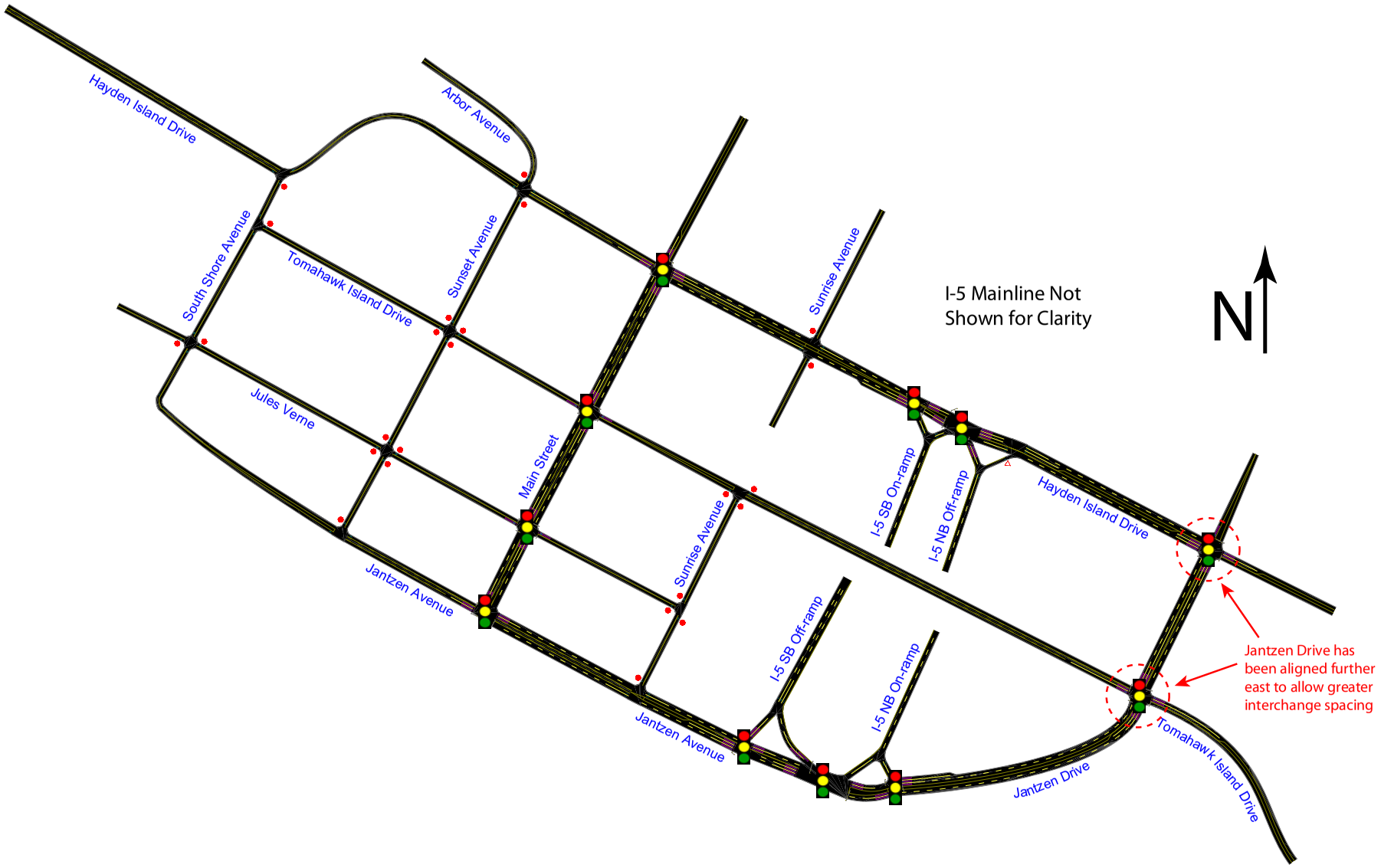
DAVID EVANS AND ASSOCIATES INC.

SERA

Transportation Analysis for Hayden Island Concept Plan

Parisi ASSOCIATES transportation consulting

Figure 3
Hayden Island Concept Plan Subarea Map



DAVID EVANS AND ASSOCIATES INC.

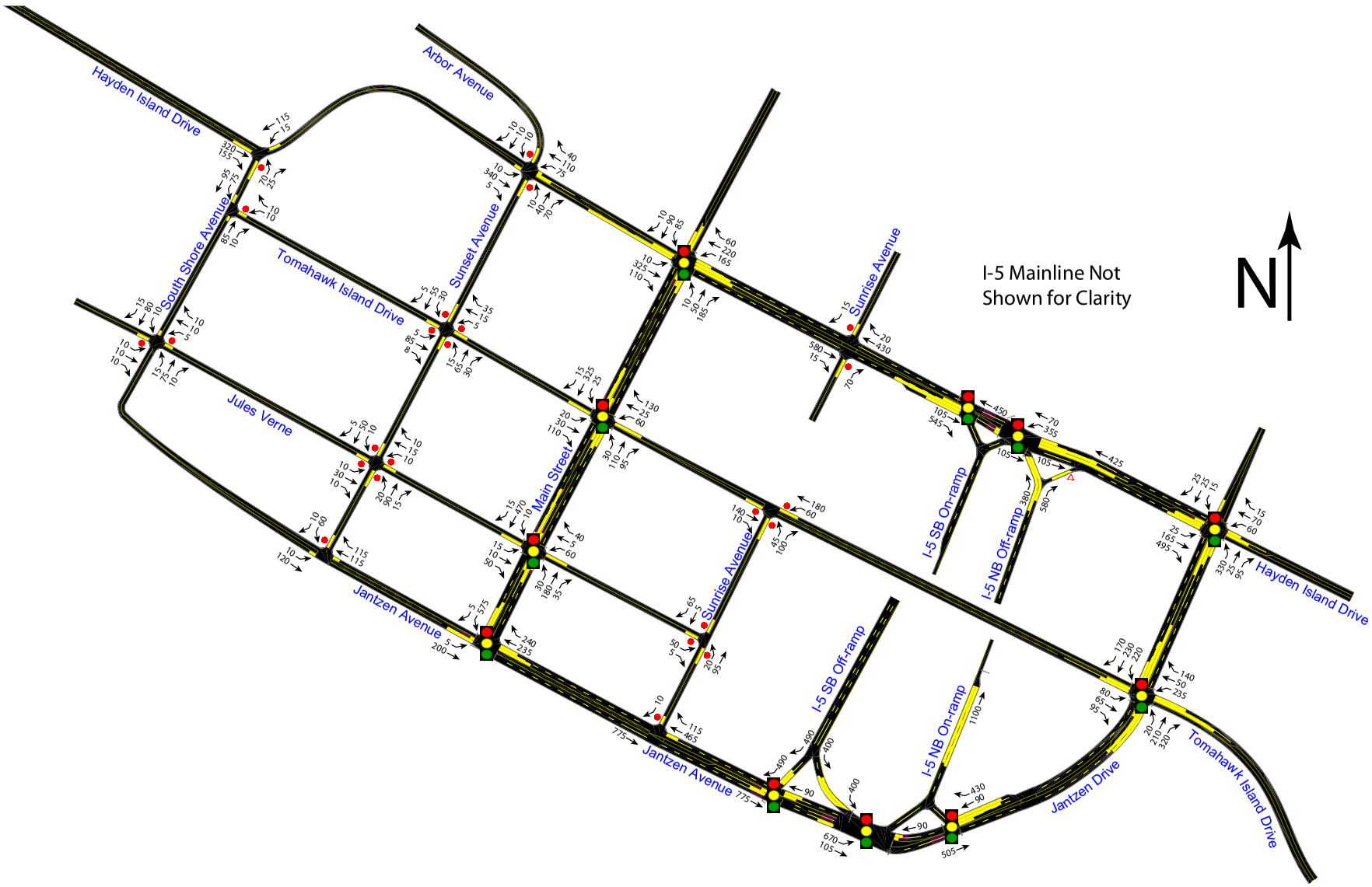
Parisi ASSOCIATES transportation consulting

Transportation Analysis for Hayden Island Concept Plan

Legend
- Stop control
- Signal control
- Yield control

Figure 4

Jantzen Drive
Eastern Alignment



DAVID EVANS AND ASSOCIATES INC.

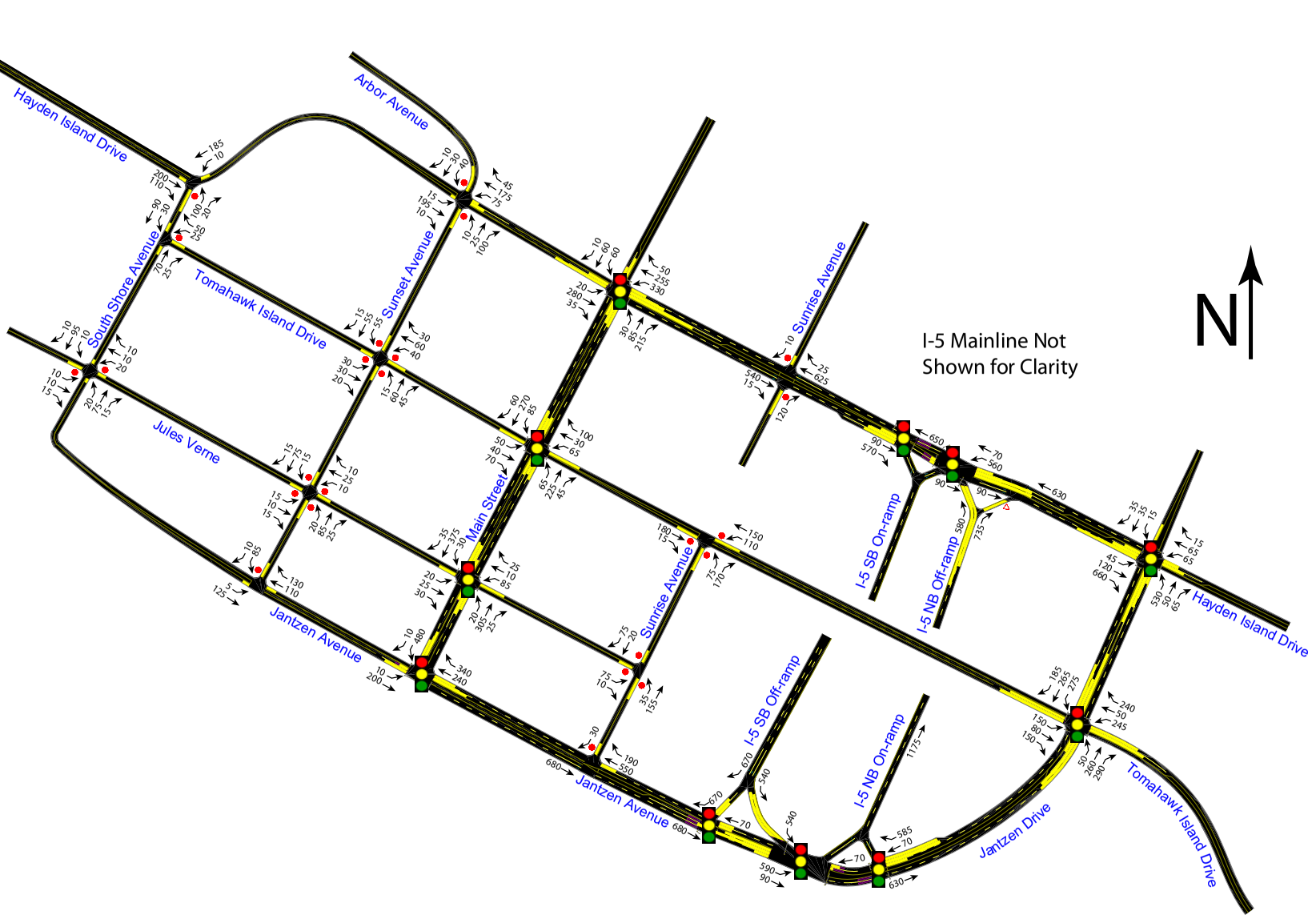
Parisi ASSOCIATES transportation consulting

Transportation Analysis for Hayden Island Concept Plan

Legend
- Stop control
- Signal control
- Yield control
- Extent of 95th Queue

Figure 5

PM Peak Period Queuing Results



DAVID EVANS AND ASSOCIATES INC.

Parisi ASSOCIATES transportation consulting

Transportation Analysis for Hayden Island Concept Plan

Legend
- Stop control
- Signal control
- Yield control
- Extent of 95th Queue

Figure 6

Weekend Peak Period Queuing Results

DAVID EVANS AND ASSOCIATES INC.

Parisi ASSOCIATES transportation consulting

Transportation Analysis for Hayden Island Concept Plan

Legend

— Proposed Bridge Location

Figure 7

Proposed Arterial Bridge Locations

Appendix A: 2007 Roadway Inventory - Hayden Island - City of Portland, Oregon

Street	Jurisdiction	ODOT Classification	City of Portland Street Classification				
			Traffic	Transit	Freight	Bicycle	Pedestrian
Image Canoe Ave	Private	Local Road	Local Service				
N Scouler Ave	Private	Local Road	Local Service				
Fir	Private	Local Road	Local Service				
Elm	Private	Local Road	Local Service				
Dogwood	Private	Local Road	Local Service				
Cypress	Private	Local Road	Local Service				
Birch	Private	Local Road	Local Service				
Alder	Private	Local Road	Local Service				
Daphne	Private	Local Road	Local Service				
Camelia	Private	Local Road	Local Service				
Begonia	Private	Local Road	Local Service				
Azalia	Private	Local Road	Local Service				
N Broughton Ct	Private	Local Road	Local Service				
N Broughton Dr	Private	Local Road	Local Service				
Arbor Ave	Private	Local Road	Local Service				
N Menzies Dr	Private	Local Road	Local Service				
Columbia Dr	Private	Local Road	Local Service				
River Dr	Private	Local Road	Local Service				
Garden Ave	Private	Local Road	Local Service				
Flower Ave	Private	Local Road	Local Service				
Janzen Beach RV Park	Private	Local Road	Local Service				
N S Shore Ave	Private	Local Road	Local Service				
N Westshore Dr	Private	Local Road	Local Service				
N Middle Shore St	Private	Local Road	Local Service				
N Jantzen Beach Center							
Between Circuit City and Toys R Us	Private	N/A	N/A				
Between Circuit City and Copeland's Sports	Private	N/A	N/A				
Immediately west of SuperCenter Mall	Private	N/A	N/A				
Immediately east of SuperCenter Mall	Private	N/A	N/A				
North of Home Depot	Private	N/A	N/A				
North of SuperCenter Mall	Private	N/A	N/A				
N Jantzen Ave	Private	Local Road	Local Service				
N Center Ave							
Main Dr to N North Hayden Island Dr	ODOT	Local Road	District Collector	Community Transit Street	Major Truck Street	Local Service Bikeway	City Walkway
Main Dr to beginning on southbound I-5 on-ramp	ODOT	Local Road	District Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
K-Mart Dr to N Jantzen Dr	Private	Local Road	District Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Main Dr	Private	Local Road	Local Service Street	Community Transit Street	Major Truck Street	Local Service Bikeway	Local Service Walkway
Kmart Dr	Private	Local Road	Local Service Street	Community Transit Street	Local Service Truck Street	Local Service Bikeway	Local Service Walkway
N Hayden Island Drive							
Portland Auto Auction property to end	PDOT	Local Road	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
Portland Auto Auction property to N S Shore Ave	PDOT	Local Road	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
N S Shore Ave to end of center median	PDOT	Rural Major Collector	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
Center median end to N Jantzen Beach Center (Between Circuit City and Sports Authority)	PDOT	Rural Major Collector	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway

City of Portland Recommended Speed Limit	Speed Limit (mph)	# of Travel Lanes	Travel Lane Type	Center Turn Lane	On-street Parking	Street Trees	Sidewalks	Bike Lanes	Comments
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	West side	No	No	No	
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	No	No	No	No	
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	Yes	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
20-25	Not posted	2	Standard	No	No	No	No	No	
20-40	25	4	Standard	No	No	West side	West side	No	
20-40	25	2	Standard	No	No	West side	West side	No	
20-40	25	2	Standard	No	No	No	No	No	
20-25	15	4	Standard	No	No	North side	North side	No	
20-25	15	2	Standard	No	South side	North side	North side	No	
20-40	25	2	Standard	No	Yes[1]	South side	Yes	No	[1] No parking along south side of street for 700' north of Portland auto auction entrance
20-40	25	2	Standard	No	Yes	Yes[2]	Yes	No	[2] Street trees are also located in the median
20-40	25	2	Standard	No	Yes	Yes[3]	Yes	No	[3] Street trees are also located in the median
20-40	25	2	Standard	Yes	Yes	South side	South side	No	

Appendix A: 2007 Roadway Inventory - Hayden Island - City of Portland, Oregon

Street	Jurisdiction	ODOT Classification	City of Portland Street Classification				
			Traffic	Transit	Freight	Bicycle	Pedestrian
N Jantzen Beach Center (Between Circuit City and Sports Authority) to N Jantzen Beach Center (Immediately east of SuperCenter Mall)	PDOT	Rural Major Collector	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
N North Hayden Island Dr to N Jantzen Dr	PDOT	Local Road	District Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N South Hayden Island Dr to Jantzen Dr	ODOT	Local Road	Regional Trafficway	Community Transit Street	Major Truck Street	Local Service Bikeway	Local Service Walkway
N Jantzen Dr to N Jantzen Beach Ave	PDOT	Local Road	District Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	Local Service Walkway
N Jantzen Beach Ave to N Hayden Bay Dr	Private	Local Road	District Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	Local Service Walkway
N Jantzen Dr							
N Center Ave to N Tomahawk Dr	Private	Local Road	Neighborhood Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Tomahawk Dr to N Hayden Island Dr	Private	Local Road	Neighborhood Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Jantzen Beach Ave	Private	Local Road	Local Service				
N Tomahawk Island Dr							
N Hayden Island Dr to N Jantzen Dr	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Jantzen Dr to N Jantzen Beach Ave	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Jantzen Beach Ave to access road to Lotus Beach Dr and Lotus Isle Dr	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Access road to Lotus Beach Dr and Lotus Isle Dr to NE Tomahawk Island Dr	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
NE Tomahawk Island Dr							
Marine Works to Sundance Marine	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Sundance Marine to end	Private	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Jantzen Beach Village Condominiums							
N Jantzen Beach Ave to N Hayden Bay Dr	Private	Local Road	Local Service				
N Jantzen Beach Ave to N Hayden Island Dr	Private	Local Road	Local Service				
Jantzen Beach Village Condominiums to N Hayden Island Dr	Private	Local Road	Local Service				
Columbia Point W Condominiums	Private	Local Road	Local Service				
Columbia Point Condominiums	Private	Local Road	Local Service				
N Hayden Bay Dr	Private	Local Road	Local Service				
N Lotus Beach Dr	Private	Local Road	Local Service				
N Lotus Island Dr	Private	Local Road	Local Service				

Data Sources

Field Observation

Aerial photos. Metro RLIS, http://maps.google.com, and http://maps.live.com

PortlandMaps.com. Data provided by the City of Portland and Multnomah County

Oregon Transportation Map Showing Functional Classification of Roads. (7) Portland Quad. ODOT

Hayden Island Plan. City of Portland

Transportation System Plan. City of Portland

City of Portland Recommended Speed Limit	Speed Limit (mph)	# of Travel Lanes	Travel Lane Type	Center Turn Lane	On-street Parking	Street Trees	Sidewalks	Bike Lanes	Comments
20-40	25	2	Standard	Yes	No	South side	Yes	No	
20-40	25	2	Standard	Yes	No	North side	No	No	
40-55	25	3	Standard	No	No	No	No	No	
20-40	25	2	Standard	No	No	Yes	South side	No	
20-40	25	2	Narrow	No	North side	South side	South side	No	
20-35	25	2	Standard	No	No	Yes	East side	No	
20-35	25	2	Standard	No	Yes	No	Yes	No	
20-25	Not posted	2	Standard	No	No	No	No	No	
20-35	25	2	Standard	No	No	South side	Yes	No	
20-35	25	2	Standard	Yes	No	South side	Yes	No	
20-35	25	2	Standard	No	No	Yes	Yes[4]	No	[4] There is only a sidewalk on the south side of the street until about 500' west of access road to Lotus Beach Dr and Lotus Isle Dr. At that point, there is a sidewalk only on the north side of the street
20-35	25	2	Standard	No	Yes	Yes	North side	No	
20-35	25	2	Narrow	No	Yes	Yes	North side	No	
20-35	25	2	Narrow	No	No	Yes	North side	No	
20-25	Not posted	2	Narrow	No	No	No	No	No	
20-25	Not posted	2	Narrow	No	No	No	No	No	
20-25	Not posted	2	Narrow	No	No	No	No	No	
20-25	Not posted	2	Narrow	No	No	No	East side	No	
20-25	Not posted	2	Narrow	No	No	No	No	No	
20-25	25	2	Narrow	No	Yes	North side	No	No	
20-25	Not posted	2	Narrow	No	No	No	No	No	
20-25	Not posted	2	Narrow	No	No	No	No	No	

Appendix B: Hayden Island Concept Plan Trip Generation

							Theoretical Trip Generation					
								Weekday PM			Weekend Peak	
Letter	#	Subarea	ITE	Land use	Size	Units	Trips	In	Out	Trips	In	Out
A	1	1	-	Port of Portland development	270	Acres	156	63	93	280	128	152
B	2	2	110	General light industrial	180,120	Gross sq. ft	208	25	183	25	12	13
	3	3	110	General light industrial	273,553	Gross sq. ft	315	38	277	38	18	20
		3	230	Residential condominium/townhouse	47	Units	32	22	11	56	30	26
		3	-	Combination of office/light industrial	86,542	Gross sq. ft	194	29	165	22	11	11
C	4	4	416	RV Park	166	Sites	61	42	19	61	42	19
		4	240	Mobile home park	352	Units	222	138	84	164	87	77
		4	820	Shopping center	9,240	Gross sq. ft	35	17	18	48	25	23
		4	912	Drive-in bank	4,840	Gross sq. ft	221	111	111	179	92	88
D	5	5	240	Mobile home park	79	Units	95	59	36	48	25	23
	6, 8	50	310	Hotel	74	Rooms	44	23	21	55	31	24
		50	820	Shopping center	37,577	Gross sq. ft	144	69	75	197	102	94
		51	230	Residential condominium/townhouse	35	Units	25	17	8	53	29	24
		52	411	City park	1	Acres	10	5	5	10	5	5
		53	220	Apartment	60	Units	51	33	18	44	28	15
		54	230	Residential condominium/townhouse	22	Units	17	12	6	49	26	23
		55	230	Residential condominium/townhouse	16	Units	13	9	4	47	26	22
		56	220	Apartment	40	Units	40	26	14	36	23	12
		57	220	Apartment	60	Units	51	33	18	44	28	15
		57	820	Shopping center	15,000	Gross sq. ft	58	28	30	79	41	38
		58	220	Apartment	60	Units	51	33	18	44	28	15
		58	820	Shopping center	22,000	Gross sq. ft	84	41	44	115	60	55
	9	59	820	Shopping center	25,000	Gross sq. ft	96	46	50	131	68	63
		59	820	Shopping center	52,000	Gross sq. ft	200	96	104	272	142	131
		60	220	Apartment	60	Units	51	33	18	44	28	15
		60	820	Shopping center	17,000	Gross sq. ft	65	31	34	89	46	43
		61	220	Apartment	40	Units	40	26	14	36	23	12
		62	220	Apartment	40	Units	40	26	14	36	23	12
		63	220	Apartment	60	Units	51	33	18	44	28	15
		63	820	Shopping center	16,000	Gross sq. ft	61	29	32	84	44	40
	7	7	230	Residential condominium/townhouse	96	Units	58	39	19	70	38	32
E, G	10, 12	64	220	Apartment	60	Units	51	33	18	44	28	15
		64	411	City park	0.5	Acres	5	2	3	5	3	2
		64	820	Shopping center	16,000	Gross sq. ft	61	29	32	84	44	40
		65	220	Apartment	40	Units	40	26	14	36	23	12
		66	220	Apartment	40	Units	40	26	14	36	23	12
		67	220	Apartment	60	Units	51	33	18	44	28	15
		67	411	City park	0.5	Acres	5	2	3	5	3	2
		67	820	Shopping center	15,000	Gross sq. ft	58	28	30	79	41	38
		68	820	Shopping center	49,000	Gross sq. ft	188	90	98	256	133	123
		68	820	Shopping center	120,000	Gross sq. ft	461	221	240	628	327	301
		69	220	Apartment	80	Units	62	40	22	52	34	18
		69	411	City park	0.5	Acres	5	2	3	5	3	2
		69	820	Shopping center	27,000	Gross sq. ft	104	50	54	141	73	68

F	11	72	411	City park	12	Acres	120	60	60	120	60	60
H, J	13	13	820	Shopping center	24,000	Gross sq. ft	126	60	65	173	90	83
		13	820	Shopping center	62,000	Gross sq. ft	324	156	169	446	232	214
	14	14	820	Shopping center	29,000	Gross sq. ft	152	73	79	209	109	100
		14	820	Shopping center	36,500	Gross sq. ft	191	92	99	263	137	126
	16	16	310	Hotel	200	Rooms	118	63	55	142	80	63
		16	820	Shopping center	18,000	Gross sq. ft	94	45	49	130	67	62
	20	20		Hayden Island Fire Station	4,896	Gross sq. ft	5	3	2	5	2	3
		20	420	Marina	539	Berths	102	61	41	146	64	81
I	15	15	310	Hotel	318	Rooms	188	99	88	224	125	98
K	17	17	710	General office building	47,242	Gross sq. ft	132	22	109	20	11	9
	18	18	230	Residential condominium/townhouse	144	Units	81	54	27	84	46	39
	19	19	230	Residential condominium/townhouse	280	Units	140	94	46	124	67	57
	21	21	230	Residential condominium/townhouse	73	Units	46	31	15	64	34	29
	22	22	230	Residential condominium/townhouse	99	Units	60	40	20	71	39	33
L	23	23	210	Single family detached	54	Units	62	39	23	59	37	22
		23	230	Residential condominium/townhouse	70	Units	45	30	15	63	34	29
	24	24.1	420	Marina	305	Berths	58	35	23	82	36	46
		24.1	220	Apartment	133	Units	91	59	32	74	48	26
		24.1	220	Apartment	133	Units	91	59	32	74	48	26
		24.1	230	Residential condominium/townhouse	133	Units	76	51	25	81	44	37
		24.2	110	General light industrial	32,540	Gross sq. ft	38	5	33	5	2	2
		24.2	420	Marina	343	Berths	65	39	26	93	41	52
	25	25	230	Residential condominium/townhouse	206	Units	109	73	36	102	55	47
		25	420	Marina	195	Berths	37	22	15	53	23	29
	26	26	110	General light industrial	103,210	Gross sq. ft	119	14	105	14	7	8
		26	220	Apartment	133	Units	91	59	32	74	48	26
		26	220	Apartment	133	Units	91	59	32	74	48	26
		26	230	Residential condominium/townhouse	163	Units	90	60	30	90	49	41
		26	420	Marina	792	Berths	150	90	60	214	94	120
		26	411	City park	1	Acres	10	5	5	10	5	5

Theoretical Trip Generation Totals	**7,018**	**3,464**	**3,554**	**7,295**	**3,884**	**3,411**
Calibration Factors Retail trips	2,724	1,312	1,412	3,602	1,871	1,731
25%/15% factor	681	328	353	540	281	260
Calibrated retail	**2,043**	**984**	**1,059**	**3,062**	**1,590**	**1,471**
Non-Retail trips	4,294	2,152	2,142	3,693	2,013	1,680
17.5%/7.5% factor	751	377	375	277	151	126
Calibrated non-retail	**3,542**	**1,776**	**1,767**	**3,416**	**1,862**	**1,554**
Total calibrated trips	**5,586**	**2,760**	**2,826**	**6,477**	**3,452**	**3,025**
Internal Capture 25%/20% weekday PM	1,396	690	706	1,295	690	605
Mode Split 10.6% in, 5.8% out	342	219	123	346	235	111
Total trips at I-5 ramps	**3,847**	**1,850**	**1,997**	**4,836**	**2,527**	**2,309**

Appendix C: Queuing Results

Hayden Island Concept Plan - Queuing Results - Weekday PM Peak Hour

Intersection	Approach/Movement	Available Storage	Queue Length
South Ramp Terminal - Center	Eastbound Left	400	250
	Eastbound Thru	600	200
	Westbound Thru	185	35
	Southbound Left	150	100
South Ramp Terminal - East	Westbound Thru	730	200
	Westbound Right	200	165
South Ramp Terminal - West	Westbound Thru	200	65
	Southbound Right	120	55
Hayden Island Dr and Jantzen Dr	Eastbound Left	100	35
	Eastbound Thru	445	90
	Eastbound Right	445	140
	Westbound Left	150	70
	Westbound Thru/Right	485	65
	Northbound Left	250	135
	Northbound Left	550	80
	Northbound Thru/Right	550	65
	Southbound Left/Thru/Right	365	65
North Ramp Terminal - East	Northbound Right	80	50
North Ramp Terminal - Center	Eastbound Thru	530	25
	Westbound Left	280	165
	Westbound Thru	570	110
	Northbound Left	1,045	170
North Ramp Terminal - West	Eastbound Thru	1,065	100
	Eastbound Right	150	95
Hayden Island Dr and Sunrise	Northbound Right	240	60
	Southbound Right	325	40
Hayden Island Dr and Main	Eastbound Left	150	55
	Eastbound Thru/Right	550	60
	Westbound Left	350	135
	Westbound Thru/Right	550	110
	Westbound Right	550	40
	Northbound Left	150	25
	Northbound Thru	540	55
	Northbound Right	540	95
	Southbound Left	100	80
	Southbound Thru/Right	630	75
Hayden Island Dr and Sunset	Northbound Left/Thru/Right	560	65
	Southbound Left/Thru/Right	670	45
Hayden Island Dr and South Shore Ave	Northbound Left/Right	160	70
Tomahawk Island Dr and Main	Eastbound Left/Thru/Right	550	85
	Westbound Left/Thru/Right	590	125
	Northbound Left	150	55

	Northbound Thru	455	80
	Northbound Right	455	60
	Southbound Left	150	75
	Southbound Thru	540	200
	Southbound Right	540	30
Tomahawk Island Dr and Sunrise	Eastbound Left/Thru	590	65
	Westbound Thru/Right	1,365	80
	Northbound Left/Right	450	65
Tomahawk Island Dr and Sunset	Eastbound Left/Thru/Right	800	55
	Westbound Left/Thru/Right	550	55
	Northbound Left/Thru/Right	470	55
	Southbound Left/Thru/Right	560	55
Tomahawk Island Dr and South Shore Ave	Westbound Left/Right	800	40
Jules Verne and Main	Eastbound Left/Thru/Right	550	50
	Westbound Left/Thru/Right	600	85
	Northbound Left	150	55
	Northbound Thru	295	95
	Northbound Right	295	40
	Southbound Left	150	35
	Southbound Thru	455	230
	Southbound Right	455	25
Jules Verne and Sunrise	Eastbound Left/Right	600	50
	Northbound Left/Thru/Right	300	50
	Southbound Thru/Right	450	45
Jules Verne and Sunset	Eastbound Left/Thru/Right	815	50
	Westbound Left/Thru/Right	550	50
	Northbound Left/Thru/Right	310	60
	Southbound Left/Thru/Right	470	45
Jules Verne and South Shore Ave	Eastbound Left/Thru/Right	290	45
	Westbound Left/Thru/Right	815	40
	Northbound Left/Thru/Right	215	15
	Southbound Left/Thru/Right	470	15
Jantzen Ave and Main	Eastbound Left	100	25
	Eastbound Thru	565	105
	Westbound Thru	600	125
	Westbound Right	600	80
	Southbound Left	295	125
	Southbound Left/Right	295	110
Jantzen Ave and Sunset	Southbound Left/Right	310	55
Jantzen Ave and Sunrise	Southbound Right	300	35
Tomahawk Island Dr and Jantzen Dr	Eastbound Left	250	95
	Eastbound Thru/Right	1,365	115
	Westbound Left	300	190
	Westbound Thru/Right	870	115
	Northbound Left	150	70
	Northbound Thru	480	170
	Northbound Right	480	160
	Southbound Left	300	210
	Southbound Thru	550	135
	Southbound Right	550	70

Appendix C: Queuing Results

Hayden Island Concept Plan - Queuing Results - Weekend Midday Peak Hour

Intersection	Approach/Movement	Available Storage	Queue Length
South Ramp Terminal - Center	Eastbound Left	400	210
	Eastbound Thru	600	80
	Westbound Thru	185	30
	Southbound Left	150	150
South Ramp Terminal - East	Westbound Thru	730	275
	Westbound Right	200	195
South Ramp Terminal - West	Westbound Thru	200	60
	Southbound Right	120	70
Hayden Island Dr and Jantzen Dr	Eastbound Left	100	60
	Eastbound Thru	445	105
	Eastbound Right	445	210
	Westbound Left	150	70
	Westbound Thru/Right	485	70
	Northbound Left	250	200
	Northbound Left	550	235
	Northbound Thru/Right	550	55
	Southbound Left/Thru/Right	365	75
North Ramp Terminal - East	Northbound Right	80	70
North Ramp Terminal - Center	Eastbound Thru	530	25
	Westbound Left	280	215
	Westbound Thru	570	140
	Northbound Left	1,045	150
North Ramp Terminal - West	Eastbound Thru	1,065	115
	Eastbound Right	150	115
Hayden Island Dr and Sunrise	Northbound Right	240	85
	Southbound Right	325	30
Hayden Island Dr and Main	Eastbound Left	150	45
	Eastbound Thru/Right	550	200
	Westbound Left	350	225
	Westbound Thru/Right	550	120
	Westbound Right	550	45
	Northbound Left	150	45
	Northbound Thru	540	75
	Northbound Right	540	115
	Southbound Left	100	70
	Southbound Thru/Right	630	60
Hayden Island Dr and Sunset	Northbound Left/Thru/Right	560	65
	Southbound Left/Thru/Right	670	65
Hayden Island Dr and South Shore Ave	Northbound Left/Right	160	65
Tomahawk Island Dr and Main	Eastbound Left/Thru/Right	550	100
	Westbound Left/Thru/Right	590	140
	Northbound Left	150	80

	Northbound Thru	455	85
	Northbound Right	455	100
	Southbound Left	150	85
	Southbound Thru	540	90
	Southbound Right	540	110
Tomahawk Island Dr and Sunrise	Eastbound Left/Thru	590	95
	Westbound Thru/Right	1,365	120
	Northbound Left/Right	450	115
Tomahawk Island Dr and Sunset	Eastbound Left/Thru/Right	800	55
	Westbound Left/Thru/Right	550	65
	Northbound Left/Thru/Right	470	50
	Southbound Left/Thru/Right	560	60
Tomahawk Island Dr and South Shore Ave	Westbound Left/Right	800	55
Jules Verne and Main	Eastbound Left/Thru/Right	550	70
	Westbound Left/Thru/Right	600	100
	Northbound Left	150	50
	Northbound Thru	295	80
	Northbound Right	295	85
	Southbound Left	150	55
	Southbound Thru	455	95
	Southbound Right	455	105
Jules Verne and Sunrise	Eastbound Left/Right	600	55
	Northbound Left/Thru/Right	300	65
	Southbound Thru/Right	450	45
Jules Verne and Sunset	Eastbound Left/Thru/Right	815	45
	Westbound Left/Thru/Right	550	50
	Northbound Left/Thru/Right	310	60
	Southbound Left/Thru/Right	470	50
Jules Verne and South Shore Ave	Eastbound Left/Thru/Right	290	45
	Westbound Left/Thru/Right	815	45
	Northbound Left/Thru/Right	215	20
	Southbound Left/Thru/Right	470	10
Jantzen Ave and Main	Eastbound Left	100	35
	Eastbound Thru	565	95
	Westbound Thru	600	110
	Westbound Right	600	90
	Southbound Left	295	120
	Southbound Left/Right	295	110
Jantzen Ave and Sunset	Southbound Left/Right	310	55
Jantzen Ave and Sunrise	Southbound Right	300	45
Tomahawk Island Dr and Jantzen Dr	Eastbound Left	250	165
	Eastbound Thru/Right	1,365	210
	Westbound Left	300	250
	Westbound Thru/Right	870	280
	Northbound Left	150	75
	Northbound Thru	480	175
	Northbound Right	480	240
	Southbound Left	300	290
	Southbound Thru	550	200
	Southbound Right	550	190

Appendix D: Assessment of Arterial Bridge Options

Assessment of Arterial Bridge Options*				
Assessment Criteria	**Lotus Isle Park**	**Force Avenue**	**Portland Auto Auction**	**West Hayden Island**
Access to Portland Street Network	Bridge would connect to North Harbor Drive and then to Marine Drive east of I-5 and would provide access to Portland street network to the south via MLK	Bridge would connect to Marine Drive at Force Avenue intersection and would provide access to Portland street network to the south via Force Avenue and Expo Drive.	Bridge would connect to Marine Drive west of Force Avenue intersection and would provide access to Portland street network to the south via Force Avenue and Expo Drive.	Bridge would connect to Marine Drive west of the railroad tracks and would provide access to Portland street network to the south via North Portland Road, Force Avenue and Expo Drive.
Access to Hayden Island Street Network	Access to Hayden Island would be from North Tomahawk Island Drive	Access to Hayden Island would be from an extension of Force Avenue with an intersection at North Jantzen Beach Drive and then extending to North Hayden Island Drive	Access to Hayden Island would be from a new road through the industrial area at the west end of East Hayden Island connecting with North Hayden Island Drive.	Access to Hayden Island would be from a new road through part of West Hayden Island that connects to the western end of North Hayden Island Drive.
Impact on Hayden Island Residents	Would adversely impact East Hayden Island residents with potential truck traffic going through the residential portions of the Island on both the east and west sides of I-5.	Would adversely impact Jantzen Beach moorage residents by requiring relocation and would adversely impact Hayden Island Manufactured Home Park and West Hayden Island moorage with additional traffic on this side of the Island, including potential truck traffic.	Would adversely impact West Hayden Island moorage residents by requiring relocation and would adversely impact Hayden Island Manufactured Home Park and West Hayden Island moorage with additional traffic on this side of the Island, including potential truck traffic.	There would be no impact on Hayden Island residents by increased traffic to Hayden Island. Only residential traffic would use the local streets after crossing the bridge.
Impact on Other Community Residents	Would impact Bridgeton residents with additional traffic and potential loss of house boat moorage on the south side of North Portland Harbor.	No impact on other Portland residential communities. There is a moorage on the south side of North Portland Harbor.	No impact on other Portland residential communities.	No impact on other Portland residential communities.
Access to Potential Port Facilities	Would be the least accessible route and cause the most impact on	Would provide access to Port facilities while having a significant impact on the	Would provide access to Port facilities while having an impact on the western	Would provide most direct access to Port facilities and have no impact or

* Each of the bridge proposals assumes a bridge 30 feet above North Portland Harbor to provide for boat navigation. This assessment assumes that there is only one arterial bridge constructed for Hayden Island.

Source: City of Portland

Appendix D: Assessment of Arterial Bridge Options

Assessment of Arterial Bridge Options*				
Assessment Criteria	**Lotus Isle Park**	**Force Avenue**	**Portland Auto Auction**	**West Hayden Island**
	other residential and commercial properties.	western half of East Hayden Island.	half of East Hayden Island. Current land use does not provide an opportunity for access or construction of this option on Hayden Island.	limited impact on the western half of East Hayden Island.
Impact to Marine Drive	Would intersect with Marine Drive in Bridgeton and may impact the network	Would intersect with Marine Drive west of Expo Center and may impact the network in close proximity to the Marine Drive interchange Expo Drive is a two-lane road with limited capacity	Would intersect Marine Drive just east of the railroad bridge and may impact the network	Would intersect Marine Drive west of the railroad bridge and may impact the network
Impact to Expo Center	No impact	Potential impact	No impact	No impact
Pursue Joint Development	No opportunity	Possible CRC opportunity	Possible CRC opportunity	Possible CRC and Port of Portland opportunity
Pedestrian/Bike Facilities	Can be incorporated into the project. Good connections with Bridgeton and for Hayden Island	Can be incorporated into the project. May be connected to Expo Center	Can be incorporated into the project. Not very conducive to connections south of North Portland Harbor	Can be incorporated into the project. May provide good access to future environmental enhancement area.
Island Continuity	Would disconnect the eastern edge of the Island with increased traffic	Would create southern barrier along Jantzen Beach Drive and further separate the Jantzen Beach moorage from the Island	Would not impact Island continuity	Would not impact Island continuity
Other	This location would eliminate most of the only existing park on the Island. Would be a good location for a pedestrian and bicycle only bridge – which could provide emergency only access.			

Source: City of Portland

Hayden Island Final Plan

APPENDICES

Section C-2

—Transportation Technical Memorandums

- System Demand and Operations
- Parking Survey
- Street Inventory Survey

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: January 31, 2008

TO: John Gillam, Portland Department of Transportation

FROM: David Knowles, David Parisi, PE, TE; Ryan LeProwse, PE; Zachary Horowitz

SUBJECT: **Hayden Island System Demand and Operations**

PROJECT: Hayden Island Existing Conditions Demand and Operations Study

PROJECT NO: PDXX0000-0139

Purpose

This memorandum addresses the methodology and findings of the vehicle origin-destination, mode split, and I-5 freeway interchange and local street operations for Hayden Island.

Origin-Destination Methodology

Vehicle trip origins and destinations were estimated using the Portland-Vancouver regional travel demand model, which was developed by Metro using the VISUM software application. Within the model, six sub-regions were demarcated: Hayden Island, Washington, Rivergate/St. Johns area, North Portland, Northeast Portland and downtown Portland. The sub-regions were chosen because, taken individually and as a group, they constitute a significant percentage of the trip origins and destinations pairs that travel to and from Hayden Island. A map of the sub-regions can be viewed in **Exhibit 1**.

The Washington sub-region (area A) consists of all transportation analysis zones (TAZs) within Washington. The Hayden Island area sub-region consists of the four TAZs on the island (area B). The Rivergate/St. Johns sub-region (area C) is bounded by the Columbia and Willamette rivers and includes areas west of the BNSF railroad cut through St. Johns, north of Columbia Boulevard and west of I-5. The North Portland sub-region (area D) contains the remaining area west of I-5 and east of the Willamette River. The Northeast Portland sub-region (area E) is bounded by I-5, the Columbia River, I-205 and I-84 and includes Portland International Airport. The downtown Portland sub-region (area F) incorporates the area between I-405 and the west bank of the Willamette River.

With VISUM, traffic flows between Hayden Island and the other five sub-regions were estimated for three time periods: the four-hour AM peak, a one-hour midday peak, and the four-hour PM peak. The first set of estimates used Hayden Island as the trip origin and the other five sub-regions as the trip destinations. In the second set of estimates, Hayden Island served as the trip destination and the other sub-regions as trip origins.

2100 SW River Parkway Portland Oregon 97201 Phone: 503.223.6663 Facsimile: 503.223.2701

Origin-Destination Findings

Exhibit 2 displays the origin-destination results. The travel demand for each origin and destination pair, including data for "elsewhere" (which includes trips outside of the five sub-regional pairs), is given. In addition, the travel demand for each origin-destination pair is displayed as a percentage of the total on- and off-ramp demands, as the I-5 interchange provides the only access point for vehicles to travel to Hayden Island.

Travel demand between Hayden Island and Washington constitutes the largest percentage of trips to and from the island. Hayden Island produces and attracts more trips during the afternoon/evening peak period than during the morning. Origin-destination pair trip percentages are generally similar across all time periods, except for trips between Hayden Island and Washington during the afternoon/evening, which is significantly higher than the midday and morning peak periods. Several of these findings are likely related to the large number of retail businesses on the island, and the home addresses and travel patterns of their principal patrons. Approximately one-third of the travel demand to and from Hayden Island occurs between other parts of the Portland metropolitan region that were not included as a separate sub-region.

Mode Split Methodology

Mode split is the third step of the 4-step travel demand model and seeks to estimate the percentage of the total trip demand that each specific mode, for example: single occupant vehicle, high occupancy vehicle, bus, bicycle, walk, etc. constitutes. Mode split estimates for Hayden Island were estimated using a four-step procedure. First, the average auto occupancy of vehicles passing through the Hayden Island I-5 interchange was estimated. Next, the total number of daily bus boardings and alightings on Hayden Island were counted. Then, using 24-hour vehicle count data for the Hayden Island on- and off-ramps in conjunction with the average vehicle occupancy as a multiplier, the total number of people entering and leaving Hayden Island by vehicle was estimated. Finally, the resulting mode split was calculated based upon the percentage of persons traveling in vehicles versus those riding buses.

Mode Split Findings

The results of the mode split analysis may be seen in **Exhibit 3**. A total of about 37,080 vehicles travels to and from Hayden Island on weekdays, with an average auto occupancy equal to 1.20 persons per vehicle. There are 1,105 daily bus boardings and alightings. A total of about 45,600 daily person-trips are made to and from Hayden Island. These results show that the majority of people, 97 percent, travel to and from Hayden Island primarily by vehicles. Buses carry approximately 2.4 percent of all persons to and from Hayden Island.

I-5 Interchange Analysis Methodology

Traffic operations are often quantified by describing the level-of-service (LOS) for a given roadway facility. For freeway operations, LOS is based on the density of the particular freeway segment using procedures from the *2000 Highway Capacity Manual* (HCM)[1]. The following sections are excerpts taken from the HCM.

---

[1] *Highway Capacity Manual*. Transportation Research Board, National Research Council, Washington, D.C., 2000.

Measuring Freeway LOS and LOS Thresholds (Ch. 23)

The measure used to provide an estimate of level of service is density. The three measures of speed, density, and flow or volume are interrelated. If values for two of these measures are known, the third can be computed.

LOS thresholds for basic freeway segments are summarized below.

LOS	*Density Range (pc/mi/ln)*
A	*0-11*
B	*> 11-18*
C	*> 18-26*
D	*> 26-35*
E	*> 35-45*
F	*> 45*

The upper value shown for LOS E (45pc/mi/ln) is the maximum density at which sustained flows at capacity are expected to occur … failure, breakdown, congestion, and LOS F occur when queues begin to form on the freeway. Density tends to increase sharply within the queue and may be considerably higher than the maximum value of 45 pc/mi/ln for LOS E.

LOS Descriptions (Ch. 13)

Although speed is a major concern of drivers as related to service quality, freedom to maneuver within the traffic stream and proximity to other vehicles are equally noticeable concerns. These qualities are related to the density of the traffic stream. Unlike speed, density increases as flow increases up to capacity, resulting in a measure of effectiveness that is sensitive to a broad range of flows.

LOS A describes free-flow operations. Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The effects of incidents or point breakdowns are easily absorbed at this level.

LOS B represents reasonably free flow, and free-flow speeds are maintained. The ability to maneuver within the traffic stream is only slightly restricted, and the general level of physical and psychological comfort provided to drivers is still high. The effects of minor incidents and point breakdowns are still easily absorbed.

LOS C provides for flow with speeds at or near the free-flow speed of the freeway. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Minor incidents may still be absorbed, but the local deterioration in service will be substantial. Queues may be expected to from behind any significant blockage.

LOS D is the level at which speeds begin to decline slightly with increasing flows and density begins to increase somewhat more quickly. Freedom to maneuver within the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort levels. Even minor incidents can be expected to create queuing, because the traffic stream has little space to absorb disruptions.

At its highest density value, LOS E describes operation at capacity. Operations at this level are volatile, because there are virtually no usable gaps in the traffic stream. Vehicles are closely spaced, leaving little room to maneuver within the traffic stream at speeds that still exceed 49 mi/h. Any disruption of the traffic stream, such as vehicles entering from a ramp or a vehicle changing lanes, can establish a disruption wave that propagates throughout the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate even the most minor disruption, and any incident can be expected to produce a serious breakdown with extensive queuing. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded the driver is poor.

LOS F describes breakdowns in vehicular flow. Such conditions generally exist within queues forming behind breakdown points. Breakdowns occur for a number of reasons:

- *Traffic incidents can cause a temporary reduction in the capacity of a short segment, so that the number of vehicles arriving at the point is greater than the number of vehicles that can move through it.*
- *Points of recurring congestion, such as merge or weaving segments and lane drops, experience very high demand in which the number of vehicles arriving is greater than the number of vehicles discharged.*
- *In forecasting situations, the projected peak-hour (or other) flow rate can exceed the estimated capacity of the location.*

Note that in all cases, breakdown occurs when the ratio of existing demand to actual capacity or of forecast demand to estimated capacity exceeds 1.00. Operations immediately downstream of such a point, however, are generally at or near capacity, and downstream operations improve (assuming that there are no additional downstream bottlenecks) as discharging vehicles move away from the bottleneck.

LOS F operations within a queue are the result of a breakdown or bottleneck at a downstream point. LOS F is also used to describe conditions at the point of the breakdown or bottleneck and the queue discharge flow that occurs at speeds lower than the lowest speed for LOS E, as well as the operations within the queue that forms upstream. Whenever LOS F conditions exist, they have the potential to extend upstream for significant distances.

Calculating Density (Ch. 7 & Ch. 22)

Density is the number of vehicles occupying a given length of a lane or roadway at a particular instant. For the computations in this manual, density is averaged over time and is usually expressed as vehicles per mile (veh/mi) or passenger cars per mile (pc/mi).

Direct measurement of density in the field is difficult, requiring a vantage point for photographing, videotaping, or observing significant lengths of highway. Density can be computed, however, from the average travel speed and flow rate, which are measured more easily. Equation 7-5 is used for undersaturated traffic conditions.

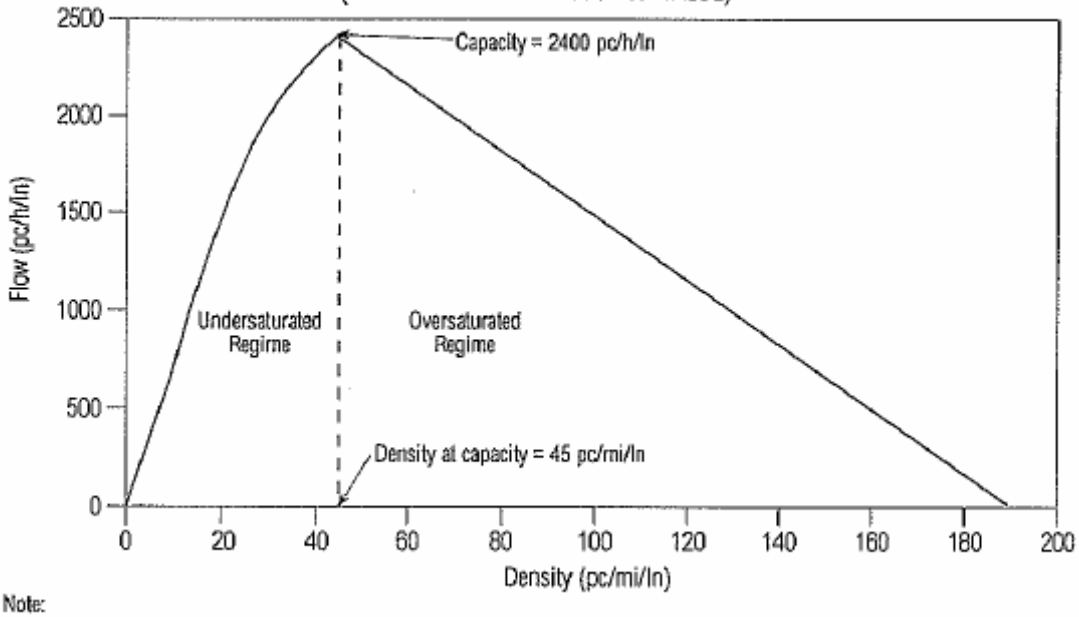
$$D = \frac{V}{S} \qquad \textit{(Equation 7-5)}$$

Where: *D = density (veh/mi)*
V = flow rate (veh/h), and
S = average travel speed (mi/h)

Density is a critical parameter for uninterrupted-flow facilities because it characterizes the quality of traffic operations. It describes the proximity of vehicles to one another and reflects the freedom to maneuver within the traffic stream.

For oversaturated conditions, calculations use a simplified linear flow-density diagram in the congested region. Exhibit A22-5 shows this flow-density diagram for a segment having a free-flow speed of 75 mi/h. For other free-flow speeds, the corresponding capacities in Chapters 23 through 25 should be used.

EXHIBIT A22-5. SEGMENT FLOW-DENSITY FUNCTION
(SEE FOOTNOTE FOR ASSUMED VALUE)



Note:
Assumption: FFS = 75 mi/h.

I-5 Interchange Analysis Findings

Density and level-of-service were calculated for both the AM and PM four-hour peak periods between the Hayden Island off-ramp and the Hayden Island on-ramp. **Exhibits 4 and 5** show the calculations for both the southbound and northbound directions, respectively. For undersaturated conditions (density less than 45 veh/mi/lane), Equation 7-5 from the HCM was used to estimate density. For oversaturated conditions, a graph similar to Exhibit A22-5 was used for a free flow speed of 60 miles per hour.

During weekdays I-5 in the vicinity of Hayden Island operates at LOS F for at least three hours in the southbound direction and for at least four hours in the northbound direction. LOS F conditions describe breakdowns in vehicular flow downstream or at the point of the bottleneck. In other words, I-5's travel demands in the vicinity of Hayden Island exceed the freeway's capacity.

Intersection Operations Methodology

A total of ten intersections, which includes both the southbound and northbound ramp terminals at the I-5 interchange of Hayden Island were included in the intersection operations analysis. Traffic volume data and turning movements counts at these intersections were collected for a two-hour weekday period during the morning peak between 7 and 9 a.m., a two-hour midday peak between 12 and 2 p.m., an afternoon peak period between 4 and 6 p.m., and a weekend three-hour afternoon peak period between 1 and 4 p.m. A map of the ten intersections can be seen in **Exhibit 6**. Peak hour factors were calculated from this data and the peak hour determined for each of the four time periods.

Several different factors are estimated in the process of evaluating traffic operations. At intersections, the two primary operational measures are average delay per vehicle and queue length. The average delay per vehicle at an intersection is translated into a level of service (LOS). Six standards have been established ranging from LOS A, where traffic is relatively free flowing, to LOS F, where the street system is totally saturated with traffic and movement is very difficult. The intersections were evaluated using the methodology outlined in the *2000 Highway Capacity Manual* (HCM) prepared by the Transportation Research Board. The table below summarizes the level of service criteria for both signalized and unsignalized intersections based on the manual's criteria.

	Control Delay (seconds/vehicle)	
Level of Service	**Signalized Intersections**	**Unsignalized Intersections**
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

Note: The LOS criteria are based on control delay, which includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Source: Transportation Research Board, Highway Capacity Manual, 2000, p. 16-2 for signalized intersections and p. 17-2 for unsignalized intersections.

Signalized intersections may reflect LOS E or F conditions for some movements even though the volume-to-capacity (v/c) ratios for these movements may be well below 1.0. This situation generally occurs at intersections that have long cycle lengths, usually 100 seconds or more. With longer cycle lengths, some movements experience long delays because they receive only a small amount of total cycle green time. Although the green time allotted to these movements may be adequate to process the traffic demand in a single cycle, the average delay for each vehicle reflects the time spent waiting for the signal to turn green. This condition occurs most often for left-turn movements but may sometimes occur for other movements, particularly on the lower volume streets.

For traffic signal analysis and coordination, the Synchro analysis software package was chosen to evaluate intersection operations for the closely spaced intersections within the study area. Synchro is a macroscopic model similar to the Highway Capacity Software (HCS), and like the HCS, is based on the 20*00 Highway Capacity Model*.

The Synchro model explicitly evaluates traffic operations under coordinated and uncoordinated systems of signalized and unsignalized intersections. Synchro calculates traffic arrival types, right-turn-on-red capacity, and

queue lengths. It also determines delays, LOS, and v/c ratios based on the methodology in the *2000 Highway Capacity Manual*.

SimTraffic animates traffic flow based on input volumes and signal timing. Traffic flow under saturated traffic may be viewed to observe conditions where queues may spill over from one intersection to another. Different arrival patterns can be used to determine how sensitive the traffic operations are to subtle variations in traffic flows. SimTraffic is particularly effective at evaluating closely spaced intersections.

The LOS calculations presented in this document are based on the average delays calculated from the SimTraffic model. The model was run five times for all peak hour (AM, midday, PM, and weekend midday) conditions using a stochastic seeding function of SimTraffic. The delays from each of the five model runs were averaged to reflect how minor variations in traffic patterns affect the operations in the corridor.

SimTraffic was used to generate the 95th percentile queue lengths. As a microsimulation model, SimTraffic is capable of calculating the effects of traffic flow under saturated traffic conditions where traffic may spill out of left-turn storage bays or spill over from one intersection to another. Similar to the LOS calculations, 95th percentile queues were calculated from the averaged results of five model runs. All output from the Synchro and SimTraffic models reflect hourly intersection operations, which is consistent with the City of Portland's measures of effectiveness.

Intersection Operations Findings

Exhibit 7 displays the intersection operations analysis results for Hayden Island for the four time periods modeled. Each intersection number corresponds to the intersections identified on the map in **Exhibit 2**. For signalized intersections, delays for all movements are calculated together and the approach/movement columns states "Overall Intersection". For unsignalized intersections, only the critical movement or approach is examined. This movement is not necessarily the same for a given intersection in all time periods. The three performance measurements are displayed: delay in seconds, the corresponding level-of-service from the Control Delay table previously shown above, and the 95th percentile queue lengths which exceed the available storage length.

During the morning peak hour, all ten intersections including the two ramp terminals operate at LOS A, and no significant queuing is observed. During the midday peak period, conditions at all intersections degrade. Two intersections operate at LOS D. Queuing exceeds available storage at a total of five intersections: two near the Jantzen Beach SuperCenter Mall property, two in the vicinity of the northbound I-5 ramp terminal, and at the southbound ramp terminal.

In the afternoon/evening peak hour, operational analysis shows that one intersection is operating at LOS D. Queuing is improved over the midday peak, with only three intersections experiencing spillback conditions.

Traffic conditions on Hayden Island are the most congested during the weekend midday peak hour. Two intersections operate at LOS D. The northbound approach at Hayden Island Drive and Jantzen Drive operates at LOS F. Four intersection experience queues that spillback to upstream intersections.

Exhibit 1: Origin-Destination Study Sub-Regions

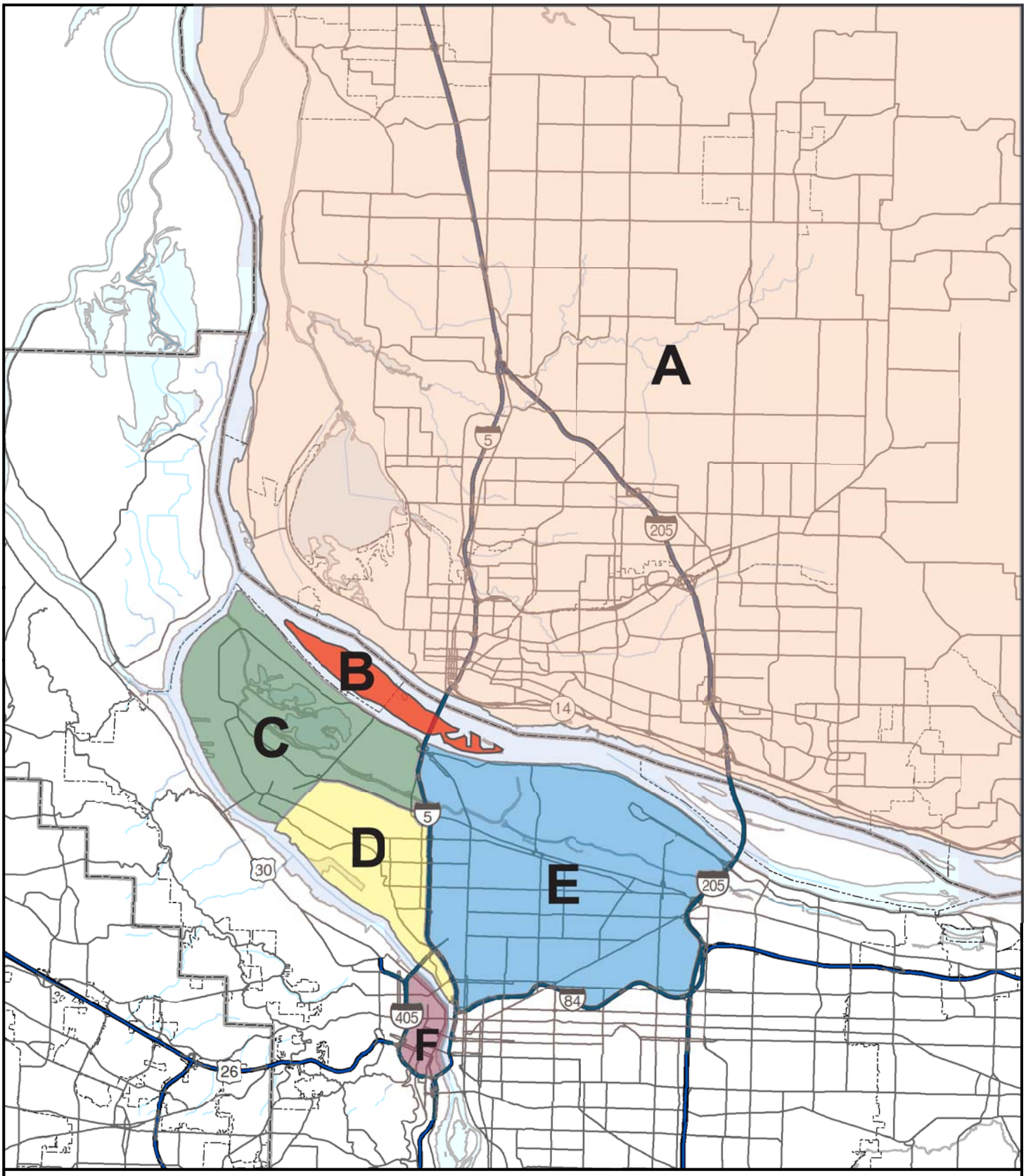


Exhibit 2: Existing Conditions Origin-Destination Results for Hayden Island

Origin Hayden Island	Peak Period					
	4-Hour AM		1-Hour Midday		4-Hour PM	
Destinations	O-D Volume	% of Total Ramp Volume	O-D Volume	% of Total Ramp Volume	O-D Volume	% of Total Ramp Volume
Washington	469	21.9%	351	35.0%	2236	42.5%
Rivergate/St Johns	111	5.2%	52	5.2%	195	3.7%
North Portland	225	10.5%	91	9.1%	457	8.7%
Northeast Portland	397	18.6%	164	16.3%	733	13.9%
Downtown Portland	158	7.4%	42	4.2%	126	2.4%
Elsewhere	779	36.4%	304	30.3%	1510	28.7%
Total on-ramp volume	**2139**	**100.0%**	**1004**	**100.0%**	**5257**	**100.0%**

Destination Hayden Island	Peak Period					
	4-Hour AM		1-Hour Midday		4-Hour PM	
Origins	O-D Volume	% of Total Ramp Volume	O-D Volume	% of Total Ramp Volume	O-D Volume	% of Total Ramp Volume
Washington	1013	29.4%	456	39.0%	1665	36.9%
Rivergate/St Johns	149	4.3%	47	4.0%	190	4.2%
North Portland	336	9.7%	97	8.3%	423	9.4%
Northeast Portland	566	16.4%	190	16.2%	759	16.8%
Downtown Portland	49	1.4%	36	3.1%	167	3.7%
Elsewhere	1336	38.7%	344	29.4%	1311	29.0%
Total off-ramp volume	**3449**	**100.0%**	**1170**	**100.0%**	**4515**	**100.0%**

Exhibit 3: Mode Split Calculations and Results for Hayden Island

Calculation Steps:

Step 1: Estimate Average Auto Occupancy

AM (Both Directions)	1.17
PM (Both Directions)	1.23
Average Auto Occupancy	**1.20**

Step 2: Estimate Average Hayden Island Weekday Bus Boardings and Alightings

Daily Boardings	538
Daily Alightings	568
Total Daily Boardings and Alightings	**1105**

Step 3: Estimate Average Weekday Daily Volumes

	Vehicles	Occupancy	Total People
Northbound I-5 Hayden Island Off-ramp	10,300	1.20	12,360
Northbound I-5 Hayden Island On-ramp	9,500	1.20	11,400
Southbound I-5 Hayden Island Off-ramp	7,390	1.20	8,870
Southbound I-5 Hayden Island On-ramp	9,890	1.20	11,870
Average Weekday Daily Volumes	**37,080**		**44,500**

Step 4: Calculate Mode Split

	Total People	Mode Split
Vehicles	44,500	**97.6%**
Bus	1,105	**2.4%**
Totals	**45,605**	**100.0%**

Exhibit 4: Southbound LOS and Density Calculations

Southbound	AM				PM			
	6-7	7-8	8-9	9-10	3-4	4-5	5-6	6-7
Number of Lanes	3	3	3	3	3	3	3	3
Flow Rate (veh/hr)	4,755	4,525	4,795	3,995	3,170	3,315	3,520	2,870
Flow Rate (veh/hr/lane)	1,585	1,508	1,598	1,332	1,057	1,105	1,173	957
Average Speed (mi/hr)	32	15	27	49	51	51	51	51
Density (veh/mi/lane)	> 45 (90)	> 45 (90)	> 45 (90)	27	21	22	23	19
Level-of-Service	**F**	**F**	**F**	**D**	**C**	**C**	**C**	**C**

Exhibit 5: Northbound LOS and Density Calculations

Northbound	AM				PM			
	6-7	7-8	8-9	9-10	3-4	4-5	5-6	6-7
Number of Lanes	3	3	3	3	3	3	3	3
Flow Rate (veh/hr)	2,075	2,785	2,895	2,490	3,905	4,390	4,820	4,565
Flow Rate (veh/hr/lane)	692	928	965	930	1,302	1,463	1,607	1,522
Average Speed (mi/hr)	56	56	56	56	12	15	17	30
Density (veh/mi/lane)	12	17	17	15	> 45 (105)	> 45 (95)	> 45 (90)	> 45 (95)
Level-of-Service	**B**	**B**	**B**	**B**	**F**	**F**	**F**	**F**

Exhibit 6: Hayden Island Intersections

Exhibit 7: Synchro/SimTraffic Existing Conditions Results for Hayden Island

AM Peak Hour: 8:00 - 9:00

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	Storage Length	95% Queue (ft)
1	Hayden Island Drive and Jantzen Beach Center	Westbound Left/Thru/Right	1.4	A		
2	Hayden Island Drive South and Center Ave	***Overall Intersection***	7.5	A		
3	Hayden Island Drive North and Center Ave	Westbound Left/Thru	1.3	A		
4	Hayden Island Drive South and Hayden Island Connector	***Overall Intersection***	8.5	A		
5	Hayden Island Drive North and Hayden Island Connector	***Overall Intersection***	8.7	A		
6	Hayden Island Drive and Jantzen Dr	Northbound Left/Right	5.7	A		
7	Hayden Island Drive and Tomahawk Island Dr	Eastbound Thru/Right	5.3	A		
8	I-5 NB ramp terminal and Tomahawk Island Drive	Northbound Right	1.9	A		
9	Jantzen Ave and Center Ave	Eastbound Left/Right	7.1	A		
10	I-5 SB ramp terminal and Center Ave	***Overall Intersection***	9.5	A		

Midday Peak Hour: 12:00 - 1:00

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	Storage Length	95% Queue (ft)
1	Hayden Island Drive and Jantzen Beach Center	Westbound Left/Thru/Right	10.7	B	250	250 (WBLTR)
2	Hayden Island Drive South and Center Ave	***Overall Intersection***	19.0	B	250	250 (EBLT)
					50	50 (SBLT)
3	Hayden Island Drive North and Center Ave	Westbound Left/Thru	3.6	A		
4	Hayden Island Drive South and Hayden Island Connector	***Overall Intersection***	22.3	C	70	75 (WBLR)
					150	200 (SBL)
5	Hayden Island Drive North and Hayden Island Connector	***Overall Intersection***	15.8	B	115	150 (WBL)
					115	115 (WBT)
6	Hayden Island Drive and Jantzen Dr	Northbound Left/Right	33.5	D		
7	Hayden Island Drive and Tomahawk Island Dr	Southbound Left/Thru/Right	21.2	C		
8	I-5 NB ramp terminal and Tomahawk Island Drive	Northbound Right	2.1	A		
9	Jantzen Ave and Center Ave	Eastbound Left/Right	18.5	C		
10	I-5 SB ramp terminal and Center Ave	***Overall Intersection***	40.1	D	75	150 (WBR)
					130	225 (NBR)

PM Peak Hour: 4:30 - 5:30

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	Storage Length	95% Queue (ft)
1	Hayden Island Drive and Jantzen Beach Center	Eastbound Left/Thru/Right	3.7	A		
2	Hayden Island Drive South and Center Ave	***Overall Intersection***	11.7	B	50	50 (SBLT)
3	Hayden Island Drive North and Center Ave	Westbound Left/Thru	3.5	A		
4	Hayden Island Drive South and Hayden Island Connector	***Overall Intersection***	16.3	B	70	100 (WBLR)
					150	175 (SBL)
5	Hayden Island Drive North and Hayden Island Connector	***Overall Intersection***	32.9	C	115	150 (WBL)
					115	115 (WBT)
6	Hayden Island Drive and Jantzen Dr	Northbound Left/Right	27.1	D		
7	Hayden Island Drive and Tomahawk Island Dr	Eastbound Thru/Right	5.6	A		
8	I-5 NB ramp terminal and Tomahawk Island Drive	Northbound Right	1.9	A		
9	Jantzen Ave and Center Ave	Eastbound Left/Right	7.9	A		
10	I-5 SB ramp terminal and Center Ave	***Overall Intersection***	17.7	B		

Weekend Midday Peak Hour: 1:00 - 2:00

#	Intersection	Approach/Movement	Delay (Seconds)	LOS	Storage Length	95% Queue (ft)
1	Hayden Island Drive and Jantzen Beach Center	Westbound Left/Thru/Right	7.0	A		
2	Hayden Island Drive South and Center Ave	***Overall Intersection***	15.6	B	250	250 (EBLT)
					50	50 (SBLT)
3	Hayden Island Drive North and Center Ave	Westbound Left/Thru	2.6	A		
4	Hayden Island Drive South and Hayden Island Connector	***Overall Intersection***	17.1	B	70	100 (WBLR)
					150	175 (SBL)
5	Hayden Island Drive North and Hayden Island Connector	***Overall Intersection***	21.0	C	115	150 (WBL)
					115	115 (WBT)
6	Hayden Island Drive and Jantzen Dr	Northbound Left/Right	53.5	F		
7	Hayden Island Drive and Tomahawk Island Dr	Northbound Thru/Right	19.5	C		
8	I-5 NB ramp terminal and Tomahawk Island Drive	Northbound Right	2.1	A		
9	Jantzen Ave and Center Ave	Eastbound Left/Right	26.6	D		
10	I-5 SB ramp terminal and Center Ave	***Overall Intersection***	36.1	D	75	125 (WBR)
					130	225 (NBR)

Denotes queues which extend through an upstream intersection.

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: January 31, 2008

TO: John Gillam, Portland Department of Transportation

FROM: David Knowles, David Parisi, PE, TE; Ryan LeProwse, PE; Zachary Horowitz

SUBJECT: **Hayden Island Parking Survey**

PROJECT: Hayden Island Existing Conditions Parking Inventory Study

PROJECT NO: PDXX0000-0139

Purpose

This memorandum addresses the methodology and findings of the parking inventory study completed for Hayden Island.

Methodology

Field reconnaissance and aerial photos were used to physically count the total number of parking spaces on Hayden Island. Hayden Island was divided into study areas to count and identify parking spaces by land use and by business. Maps of the study areas can be viewed, for properties west of I-5 in **Exhibit 1,** and for properties east of I-5 in **Exhibit 2**. Separate areas were created to capture parking lots that may be shared by more than one business. The large parking lots at the Jantzen Beach SuperCenter were generally divided into smaller areas based upon the configuration of the mall's internal road network and the big box stores located on the mall's periphery. On the east side of I-5, parking count areas were demarcated by housing development for residentially zoned areas and by business for other land use types.

Parking for commercial and industrial land uses could generally be determined by physically counting the numbers of spaces in the applicable lots. Parking counts for residential developments, especially those located on private, access-controlled streets, were estimated by counting the number of units, garages, and/or carports located in the development, then adding the number of surface spaces allocated for visitors. For example, the majority of homes in the manufactured home park on the island's north side have a single space carport. Therefore, one parking space per home was estimated. The homes on the island's eastern side generally have two-car garages, and therefore two parking spaces per unit were assumed.

On-street parking was identified via field reconnaissance. One space was enumerated for every 19 linear feet of curb where parking was allowed. Distances were measured using high resolution aerials with a photo viewer software application.

The study areas were placed into one of five possible land use categories: hotel, housing, industrial, office, or retail. Details for each area are given and may include the number of housing units or the name of the businesses

2100 SW River Parkway Portland Oregon 97201 Phone: 503.223.6663 Facsimile: 503.223.2701

located on the property. Lastly, the available parking in a given area is identified if it is shared among multiple businesses or residential areas.

Findings

The results of the parking survey for Hayden Island are presented below. **Exhibit 3** corresponds with the areas identified in **Exhibit 1**, and displays the study results for Hayden Island west of I-5. **Exhibit 3** details the number of parking spaces, land use, any property details and whether or not parking is shared among multiple businesses for properties. **Exhibit 4**, which corresponds with sections identified in **Exhibit 2**, displays the results for Hayden Island east side of I-5. **Exhibit 4** summarizes the number of parking spaces, land use, any property details and whether or not parking is shared among multiple businesses for properties. **Exhibit 5** displays the parking inventory data by land use and provides summary parking totals for Hayden Island.

Exhibit 1: Parking Sections for Hayden Island, West of I-5

Exhibit 1: Parking Sections for Hayden Island, East of I-5

Exhibit 3: Parking Data for Hayden Island, West of Interstate-5

Map Section	Number of Parking Spaces	Land Use Type	Land Use / Business Details	Is Parking Shared?
1	367	Industrial	Auto auction side (parking lot only)	No
2	23	Industrial	Schooner Creek Boat Works	No
3	25	Industrial	Trudeau's SeaRay	No
4	72	Industrial	Huggy Bears Cupboards	No
5	103	Industrial	GMS Logisitics, NW Inflatable Boats and others	Yes
6	93	Industrial	Ocean Pacific Wood Products	No
7	233	Industrial	Tri-State Distributors, DePaul Industries and others	Yes
8	80	Housing	Houseboat area parking	No
9	45	Industrial	Construction Tools Parts, Peerless Pacific and others	Yes
10	74	Hotel	Holiday Inn Express	No
11	46	Retail	NW Rugs	No
12	80	Housing	80 units manufactured housing 36 double carports 8 single carports	Yes
13	371	Housing	345 units manufactured housing 25 double carports 281 single carports 166 RV spaces 40 additional spaces	Yes
14	280	Retail	Sleep Country USA, Video Only, Mattress World	Yes
15	211	Retail	Circuit City	No
16	346	Retail	Toys R Us and Michaels	Yes
17	34	Industrial	Storage facility	No
18	115	Retail	Comp USA	No
19	339	Housing	Houseboat area parking	No
20	1,053	Retail	Home Depot - south Ritz Camera, Hallmark, Boater's World, Pier 1 Imports - center Copeland's, Staples, Old Navy, Linens & Things - north	Yes
21	49	Retail	Barnes & Noble and Starbucks	No
22	140	Retail	North of Supercenter (abandoned restaurant) generally for Target	Yes
23	446	Retail	Supercenter Mall (multiple stores) parking west	Yes
24	30	Retail	Car Toys, Subway, Plaid Pantry	No
25	23	Retail	US Bank	No
26	673	Hotel	Thunderbird Hotel (out of business)	No
27	28	Retail	Vitamin Shoppe, Boomers, Original Joes	Yes
28	127	Retail	Office Depot	No
29	80	Retail	Lot serves SuperCenter, Target and Office Depot	No
30	49	Office	ODOT Facility	No
31	592	Retail	Supercenter Mall (multiple stores) parking east	Yes
32	57	Retail	Dennys, abandoned gas station	Yes
33	76	Retail	BJ's	No
34	44	Retail	McDonalds	No
35	69	Retail	Strip mall (multiple stores)	Yes
36	58	Retail	Newport Bay	No
On-street	400	-	Parking on multiple streets	Yes
Total	**6,931**			

Exhibit 4: Parking Data for Hayden Island, East of Interstate-5

Map Section	Number of Parking Spaces	Land Use Type	Land Use / Business Details	Is Parking Shared?
1	85	Retail	Hooters	No
2	253	Retail	Safeway	No
3	25	Retail	Convenience store	No
4	265	Retail	Old Zupans/Hayden Island Yacht Club	Yes
5	13	Retail	Chevron	No
6	47	Retail	Burger King	No
7	30	Retail	Taco Bell	No
8	0	Retail	Car wash	No
9	25	Retail	Strip mall (multiple stores)	No
10	167	Hotel	Oxford Suites	No
11	15	Retail	Wells Fargo	No
12	617	Hotel	Red Lion	No
13	120	Office	Multiple businesses	Yes
14	222	Housing	Condos/townhomes	No
15	110	Housing	Condos/townhomes	No
16	161	Housing	Condos/townhomes	No
17	22	Housing	11 units (duplexes?)	No
18	36	Housing	18 double garages (18 units?)	No
19	118	Housing	Parking for houseboats (47)	No
20	60	Housing	30 units	No
21	145	Industrial	Marina	No
22	50	Housing	25 units	No
23	142	Housing	Parking for 71 houseboats	No
24	196	Industrial	Marina	No
25	162	Industrial	Marina	No
26	297	Industrial	Marina	No
27	77	Industrial	Marina	No
28	274	Industrial	Marina	No
On-street	165	-	Parking on multiple streets	Yes
Total	**3,899**			

Exhibit 5: Hayden Island Parking Inventory Summary

Land Use	Number of parking spaces			
	West of I-5	East of I-5	Total	% of Total
Retail	3,870	758	4,628	42.7%
Hotel	747	784	1,531	14.1%
Industrial	995	1,151	2,146	19.8%
Office	49	120	169	1.6%
Housing	870	921	1,791	16.5%
On-street	400	165	565	5.2%
Total	**6,931**	**3,899**	**10,830**	**100.0%**

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: February 1, 2008

TO: John Gillam, Portland Department of Transportation

FROM: David Knowles, David Parisi, PE, TE; Ryan LeProwse, PE; Zachary Horowitz

SUBJECT: **Hayden Island Street Inventory Survey**

PROJECT: Hayden Island Existing Conditions Street Inventory Study

PROJECT NO: PDXX0000-0139

Purpose

This memorandum addresses the methodology and findings of a street inventory survey for Hayden Island.

Methodology

Public and private streets on Hayden Island were inventoried and classified using field reconnaissance, aerial photographs and public records. Data collected included: governing jurisdiction, Oregon Department of Transportation (ODOT) roadway classification, City of Portland street classifications by usage (traffic, transit, freight, bicycle and pedestrian classes), posted speed limits, the number and type (narrow or standard) of travel lanes, and the presence or absence of on-street parking, center turn lanes, street trees, sidewalks and bike lanes. A map of Hayden Island showing all public and private streets can be viewed in **Exhibit 1**. A description of ODOT and City of Portland road classifications used in the street inventory survey may be reviewed in **Exhibit 2**.

Inventory data was organized by street name and roadway characteristics. Streets which have characteristics that vary over their length were split into homogenous segments and each segment was individually analyzed. The number of travel lanes for a street refers to the total number of lanes in its cross-section. Travel lanes are described as "narrow" when the width of the traveled way on a two-lane street, which is the pavement width minus on-street parking, is less than 18 feet. For the on-street parking, street trees, sidewalks and bike lanes categories, an answer of "Yes" refers to the presence of these features on both sides of a street, and "No" refers to the absence of features on either side of the street. If the feature is present on only one side of the street, the applicable side is identified using the four cardinal directions.

Findings

The findings of the street inventory survey on Hayden Island may be viewed in **Exhibit 3**. There are three major public roads on the island. The longest is North Hayden Island Drive, which runs from the BNSF Railway tracks at the west end of the developed part of the island, through the I-5 interchange, and ends at North Hayden Bay Drive, though the public street portion of the road ends at North Jantzen Beach Avenue. The second major public road is North Tomahawk Island Drive, which runs east from the I-5 interchange and terminates at the east end of Hayden Island. The section of Northeast Tomahawk Island Drive east of the cul-de-sac is a private road which

2100 SW River Parkway Portland Oregon 97201 Phone: 503.223.6663 Facsimile: 503.223.2701

provides access to the businesses at the end of the island. The third public road is North Center Avenue, which travels north-south and provides access to and from the southbound I-5 ramp terminal on the west side of the highway interchange.

The majority of streets on Hayden Island are privately owned and maintained. Some of the private roads, such as North Lotus Beach Drive and North Lotus Island Drive, are not accessible to the general public. Access to these roads is reserved for the residents who live in the gated communities. Other private roads, such as North Jantzen Avenue and North Jantzen Beach Avenue, function as public roads. Both of these streets are located near the highway interchange, provide access to several businesses, and serve as important parts of Hayden Island's traffic circulation system. The remaining private roads on the island are located in the two manufactured home parks, the recreational vehicle park, the Jantzen Beach SuperCenter on the west side of the interchange, and the condominium complexes to the east of I-5.

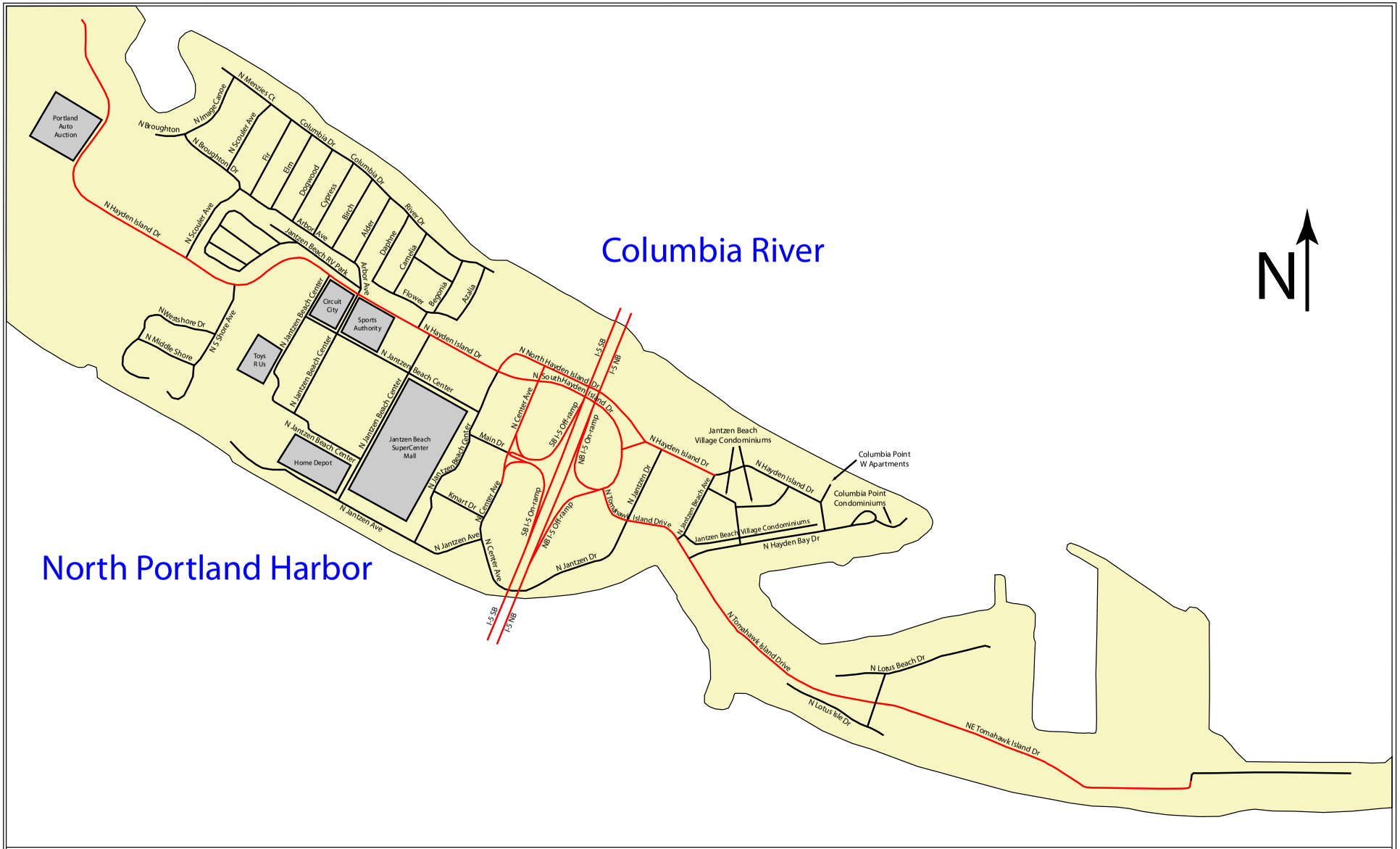
Almost all roads, both public and private, are classified by the City of Portland as local service streets. The following three public streets are exceptions. Center Avenue functions as a District Collector, a Community Transit Street and a City Walkway. North Hayden Island Drive is classified as a District Collector and a Major Truck Street. North Jantzen Drive and North Tomahawk Island Drive function as Neighborhood Collectors and City Walkways. All streets on Hayden Island serve as the lowest classification of bicycle facilities, the Local Service Bikeway.

The Transportation Element of the City of Portland's Comprehensive Plan recommended speed limits for streets on Hayden Island are generally in the 20-25 miles per hour range, though a few locations have higher recommended limits. However, the majority of posted limits on major streets are 25 miles per hour. Travel on private roads in the manufactured home parks and through the Jantzen Beach SuperCenter internal circulation roads are posted at 10 and 15 miles per hour, respectively. There are a few locations where there is no speed limit posted. Most streets have two travel lanes, although Center Avenue has a four-lane cross-section for some of its length. Lane widths on streets primarily used for traffic in and around the interchange generally meet a standard width of 12 feet. Private streets are usually narrower. North Hayden Island Drive has a center turn lane for part of its length, but otherwise this feature is not present on any other street.

Many of the residential and business streets allow on-street parking. Roadways near the interchange generally do not allow on street parking or restrict it to one side of the street. There are street trees along most of North Hayden Island Drive and on North Tomahawk Island Drive. The large manufactured home park has narrow, two-foot wide sidewalks. Sidewalks are also present along North Tomahawk Island Drive, though they are often on either the north or south side of the street. No streets on Hayden Island are equipped with bike lanes.

Data Sources

Field Observations
Aerial photographs. Metro RLIS, http://maps.google.com, and http://maps.live.com
PortlandMaps.com. Data provided by the City of Portland and Multnomah County
Oregon Transportation Map Showing Functional Classification of Roads. Portland Quad. ODOT
Hayden Island Plan. City of Portland
Transportation System Plan. City of Portland
Transportation Element of the Comprehensive Plan. City of Portland



DAVID EVANS AND ASSOCIATES INC.

Hayden Island Existing Conditions Report

Legend
- Public street
- Private street

Exhibit 1

Hayden Island Street Map

Exhibit 2: Roadway Classifications

Oregon Department of Transportation Functional Classifications

Rural Minor Collectors
Collect traffic from local roads and smaller communities.

Local Roads
Focus on land access and relatively short trips and include all other public roads not identified as belonging to a higher roadway classification.

City of Portland Street Classifications

Traffic Street Descriptions
Maintain a system of traffic streets that support the movement of motor vehicles for regional, interregional, interdistrict, and local trips as shown. For each type of traffic classification, the majority of motor vehicle trips on a street should conform to its classification description.

- **Regional Trafficway**
  - Regional Trafficways are intended to serve interregional district movement that has only one trip end in a transportation district or to serve trips that bypass a district completely.
- **District Collectors**
  - District Collectors are intended to serve as distributors of traffic from Major City Traffic Streets to streets of the same or lower classification. District Collectors serve trips that both start and end within a district.
- **Neighborhood Collectors**
  - Neighborhood Collectors are intended to serve as distributors of traffic from Major City Traffic Streets or District Collectors to Local Service Streets and to serve trips that both start and end within areas bounded by Major City Traffic Streets and District Collectors.
- **Local Service Traffic Streets**
  - Local Service Traffic Streets are intended to distribute local traffic and provide access to local residences or commercial uses.

Transit Street Descriptions
Maintain a system of transit streets that supports the movement of transit vehicles for regional, interregional, interdistrict, and local trips.

- **Community Transit Streets**
  - Community Transit Streets are intended to serve neighborhoods and industrial areas and connect to citywide transit service.
- **Local Service Transit Streets**
  - Local Service Transit Streets are intended to provide transit service to nearby residents and adjacent commercial areas.

Freight Classification Descriptions
Designate a system of truck streets, railroad lines, and intermodal freight facilities. That support local, national, and international distribution of goods and services.

- **Major Truck Streets**
  - Major Truck Streets are intended to serve as principal routes for trucks in a Transportation District.
- **Local Service Truck Streets**
  - Local Service Truck Streets are intended to serve local truck circulation and access.

Bicycle Classification Descriptions
Maintain a system of bikeways to serve all bicycle users and all types of bicycle trips.

- **Local Service Bikeways**
  - Local Service Bikeways are intended to serve local circulation needs for bicyclists and provide access to adjacent properties.

Pedestrian Classification Descriptions
Maintain a system of pedestrian ways to serve all types of pedestrian trips, particularly those with a transportation function.

- **City Walkways**
  - City Walkways are intended to provide safe, convenient, and attractive pedestrian access to activities along major streets and to recreation and institutions; provide connections between neighborhoods; and provide access to transit.
- **Local Service Walkways**
  - Local Service Walkways are intended to serve local circulation needs for pedestrians and provide safe and convenient access to local destinations, including safe routes to schools.

Exhibit 3: 2007 Roadway Inventory - Hayden Island - City of Portland, Oregon

Street	Jurisdiction	ODOT Classification	City of Portland Street Classification				
			Traffic	Transit	Freight	Bicycle	Pedestrian
Image Canoe Ave	Private	Local Road	Local Service				
N Scouler Ave	Private	Local Road	Local Service				
Fir	Private	Local Road	Local Service				
Elm	Private	Local Road	Local Service				
Dogwood	Private	Local Road	Local Service				
Cypress	Private	Local Road	Local Service				
Birch	Private	Local Road	Local Service				
Alder	Private	Local Road	Local Service				
Daphne	Private	Local Road	Local Service				
Camelia	Private	Local Road	Local Service				
Begonia	Private	Local Road	Local Service				
Azalia	Private	Local Road	Local Service				
N Broughton Ct	Private	Local Road	Local Service				
N Broughton Dr	Private	Local Road	Local Service				
Arbor Ave	Private	Local Road	Local Service				
N Menzies Dr	Private	Local Road	Local Service				
Columbia Dr	Private	Local Road	Local Service				
River Dr	Private	Local Road	Local Service				
Garden Ave	Private	Local Road	Local Service				
Flower Ave	Private	Local Road	Local Service				
Janzen Beach RV Park	Private	Local Road	Local Service				
N S Shore Ave	Private	Local Road	Local Service				
N Westshore Dr	Private	Local Road	Local Service				
N Middle Shore St	Private	Local Road	Local Service				
N Jantzen Beach Center							
Between Circuit City and Toys R Us	Private	N/A	N/A				
Between Circuit City and Copeland's Sports	Private	N/A	N/A				
Immediately west of SuperCenter Mall	Private	N/A	N/A				
Immediately east of SuperCenter Mall	Private	N/A	N/A				
North of Home Depot	Private	N/A	N/A				
North of SuperCenter Mall	Private	N/A	N/A				
N Jantzen Ave	Private	Local Road	Local Service				
N Center Ave							
Main Dr to N North Hayden Island Dr	ODOT	Local Road	District Collector	Community Transit Street	Major Truck Street	Local Service Bikeway	City Walkway
Main Dr to beginning on southbound I-5 on-ramp	ODOT	Local Road	District Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
K-Mart Dr to N Jantzen Dr	Private	Local Road	District Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Main Dr	Private	Local Road	Local Service Street	Community Transit Street	Major Truck Street	Local Service Bikeway	Local Service Walkway
Kmart Dr	Private	Local Road	Local Service Street	Community Transit Street	Local Service Truck Street	Local Service Bikeway	Local Service Walkway

City of Portland Recommended Speed Limit	Speed Limit (mph)	# of Travel Lanes	Travel Lane Type	Center Turn Lane	On-street Parking	Street Trees	Sidewalks	Bike Lanes	Comments
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	West side	No	No	No	
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	Yes	No	Yes	No	Sidewalks are narrow, approximately 2 feet wide
20-25	10	2	Narrow	No	No	No	No	No	
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	Yes	No	No	No	
20-25	10	2	Narrow	No	Yes	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
N/A	15	2	Standard	No	No	No	No	No	
20-25	Not posted	2	Standard	No	No	No	No	No	
20-40	25	4	Standard	No	No	West side	West side	No	
20-40	25	2	Standard	No	No	West side	West side	No	
20-40	25	2	Standard	No	No	No	No	No	
20-25	15	4	Standard	No	No	North side	North side	No	
20-25	15	2	Standard	No	South side	North side	North side	No	

Street	Jurisdiction	ODOT Classification	City of Portland Street Classification				
			Traffic	Transit	Freight	Bicycle	Pedestrian
N Hayden Island Drive							
Portland Auto Auction property to end	PDOT	Local Road	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
Portland Auto Auction property to N S Shore Ave	PDOT	Local Road	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
N S Shore Ave to end of center median	PDOT	Rural Major Collector	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
Center median end to N Jantzen Beach Center (Between Circuit City and Sports Authority)	PDOT	Rural Major Collector	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
N Jantzen Beach Center (Between Circuit City and Sports Authority) to N Jantzen Beach Center (Immediately east of SuperCenter Mall)	PDOT	Rural Major Collector	District Collector	Local Service Street	Major Truck Street	Local Service Bikeway	City Walkway
N North Hayden Island Dr to N Jantzen Dr	PDOT	Local Road	District Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N South Hayden Island Dr to Jantzen Dr	ODOT	Local Road	Regional Trafficway	Community Transit Street	Major Truck Street	Local Service Bikeway	Local Service Walkway
N Jantzen Dr to N Jantzen Beach Ave	PDOT	Local Road	District Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	Local Service Walkway
N Jantzen Beach Ave to N Hayden Bay Dr	Private	Local Road	District Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	Local Service Walkway
N Jantzen Dr							
N Center Ave to N Tomahawk Dr	Private	Local Road	Neighborhood Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Tomahawk Dr to N Hayden Island Dr	Private	Local Road	Neighborhood Collector	Community Transit Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Jantzen Beach Ave	Private	Local Road	Local Service				
N Tomahawk Island Dr							
N Hayden Island Dr to N Jantzen Dr	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Jantzen Dr to N Jantzen Beach Ave	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
N Jantzen Beach Ave to access road to Lotus Beach Dr and Lotus Isle Dr	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Access road to Lotus Beach Dr and Lotus Isle Dr to NE Tomahawk Island Dr	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
NE Tomahawk Island Dr							
Marine Works to Sundance Marine	PDOT	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Sundance Marine to end	Private	Local Road	Neighborhood Collector	Local Service Street	Local Service Truck Street	Local Service Bikeway	City Walkway
Jantzen Beach Village Condominiums							
N Jantzen Beach Ave to N Hayden Bay Dr	Private	Local Road	Local Service				
N Jantzen Beach Ave to N Hayden Island Dr	Private	Local Road	Local Service				
Jantzen Beach Village Condominiums to N Hayden Island Dr	Private	Local Road	Local Service				
Columbia Point W Condominiums	Private	Local Road	Local Service				
Columbia Point Condominiums	Private	Local Road	Local Service				
N Hayden Bay Dr	Private	Local Road	Local Service				
N Lotus Beach Dr	Private	Local Road	Local Service				
N Lotus Island Dr	Private	Local Road	Local Service				

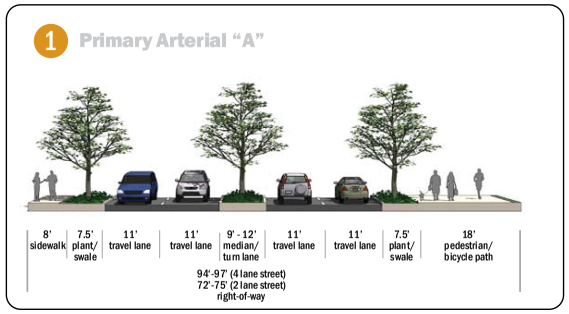
	City of Portland Recommended Speed Limit	Speed Limit (mph)	# of Travel Lanes	Travel Lane Type	Center Turn Lane	On-street Parking	Street Trees	Sidewalks	Bike Lanes	Comments
y	20-40	25	2	Standard	No	Yes[1]	South side	Yes	No	[1] No parking along south side of street for 700' north of Portland auto auction entrance
y	20-40	25	2	Standard	No	Yes	Yes[2]	Yes	No	[2] Street trees are also located in the median
y	20-40	25	2	Standard	No	Yes	Yes[3]	Yes	No	[3] Street trees are also located in the median
y	20-40	25	2	Standard	Yes	Yes	South side	South side	No	
y	20-40	25	2	Standard	Yes	No	South side	Yes	No	
y	20-40	25	2	Standard	Yes	No	North side	No	No	
e	40-55	25	3	Standard	No	No	No	No	No	
e	20-40	25	2	Standard	No	No	Yes	South side	No	
e	20-40	25	2	Narrow	No	North side	South side	South side	No	
y	20-35	25	2	Standard	No	No	Yes	East side	No	
y	20-35	25	2	Standard	No	Yes	No	Yes	No	
	20-25	Not posted	2	Standard	No	No	No	No	No	
y	20-35	25	2	Standard	No	No	South side	Yes	No	
y	20-35	25	2	Standard	Yes	No	South side	Yes	No	
y	20-35	25	2	Standard	No	No	Yes	Yes[4]	No	[4] There is only a sidewalk on the south side of the street until about 500' west of access road to Lotus Beach Dr and Lotus Isle Dr. At that point, there is a sidewalk only on the north side of the street
y	20-35	25	2	Standard	No	Yes	Yes	North side	No	
y	20-35	25	2	Narrow	No	Yes	Yes	North side	No	
y	20-35	25	2	Narrow	No	No	Yes	North side	No	
	20-25	Not posted	2	Narrow	No	No	No	No	No	
	20-25	Not posted	2	Narrow	No	No	No	No	No	
	20-25	Not posted	2	Narrow	No	No	No	No	No	
	20-25	Not posted	2	Narrow	No	No	No	East side	No	
	20-25	Not posted	2	Narrow	No	No	No	No	No	
	20-25	25	2	Narrow	No	Yes	North side	No	No	
	20-25	Not posted	2	Narrow	No	No	No	No	No	
	20-25	Not posted	2	Narrow	No	No	No	No	No	

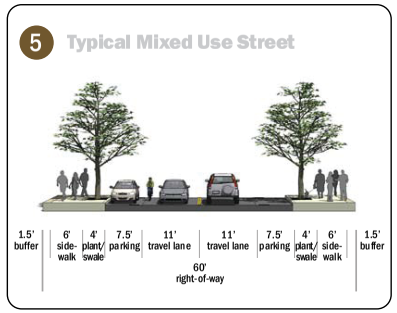
Hayden Island Final Plan

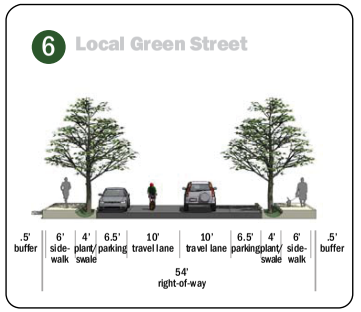
APPENDICES

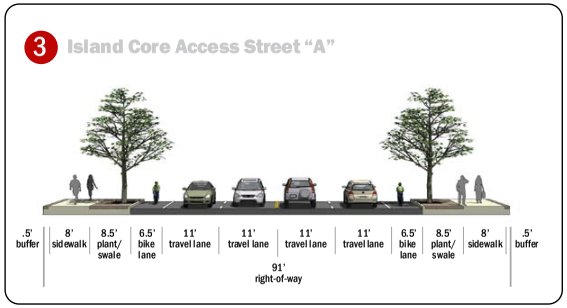
Section C-3

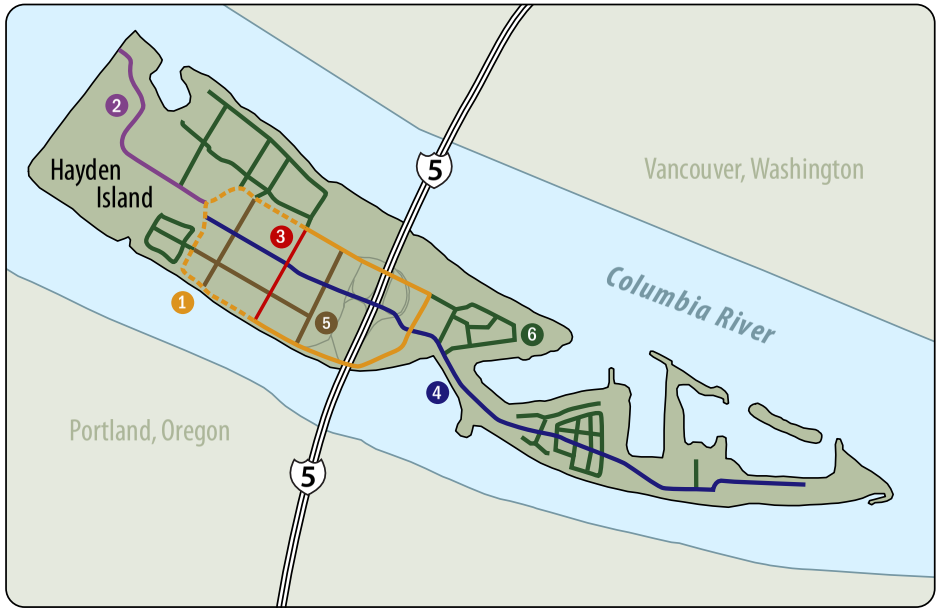
— Street Sections

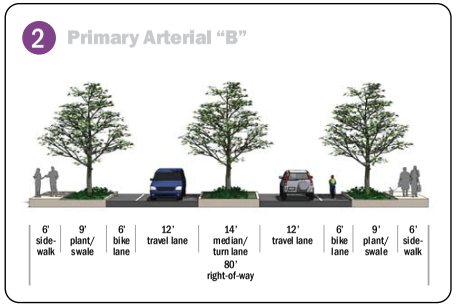

1 Primary Arterial "A"
8' sidewalk
7.5' plant/ swale
11' travel lane
11' travel lane
9' - 12' median/ turn lane
11' travel lane
11' travel lane
7.5' plant/ swale
18' pedestrian/ bicycle path
94'-97' (4 lane street)
72'-75' (2 lane street)
right-of-way

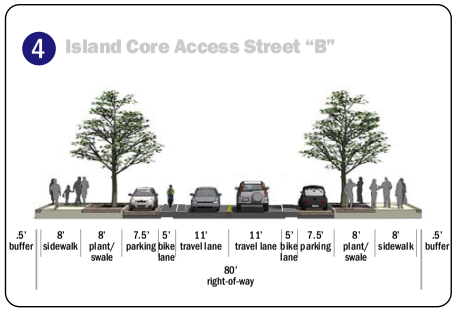

5 Typical Mixed Use Street
1.5' buffer
6' side-walk
4' plant/ swale
7.5' parking
11' travel lane
11' travel lane
7.5' parking
4' plant/ swale
6' side-walk
1.5' buffer
60'
right-of-way


6 Local Green Street
.5' buffer
6' side-walk
4' plant/ swale
6.5' parking
10' travel lane
10' travel lane
6.5' parking
4' plant/ swale
6' side-walk
.5' buffer
54'
right-of-way


3 Island Core Access Street "A"
.5' buffer
8' sidewalk
8.5' plant/ swale
6.5' bike lane
11' travel lane
11' travel lane
11' travel lane
11' travel lane
6.5' bike lane
8.5' plant/ swale
8' sidewalk
.5' buffer
91'
right-of-way


Hayden Island
Vancouver, Washington
Columbia River
Portland, Oregon
1
2
3
4
5
6
5
5


2 Primary Arterial "B"
6' side-walk
9' plant/ swale
6' bike lane
12' travel lane
14' median/ turn lane
12' travel lane
6' bike lane
9' plant/ swale
6' side-walk
80'
right-of-way


4 Island Core Access Street "B"
.5' buffer
8' sidewalk
8' plant/ swale
7.5' parking
5' bike lane
11' travel lane
11' travel lane
5' bike lane
7.5' parking
8' plant/ swale
8' sidewalk
.5' buffer
80'
right-of-way

Hayden Island Final Plan

APPENDICES

Section C-4

— Other Transportation System Plan Amendments

Various amendments to the Transportation System Plan are being enacted as part of the adoption of the Hayden Island Plan. Some chapters of the TSP are adopted as part of the Comprehensive Plan while other chapters provide context for policies, options for future actions or technical support information.

TSP Chapter 2 contains Comprehensive Plan policies and objectives for Goal 6 — Transportation and for Chapter 11B — Public Rights-of-Way. TSP Chapter 3 contains the list of transportation improvements that support the land uses of the Comprehensive Plan. Amendments to Chapters 2 and 3 of the TSP, which as well are amendments to the Comprehensive Plan, are identified and discussed within the Hayden Island Plan document.

TSP amendments that are proposed for future enactment to support the Hayden Island Plan recommendations, but that are not part of the Comprehensive Plan, are identified below. Of particular note are amendments to Chapter 11 — Master Streets Plans. As mentioned above, these amendments provide context for policies and options for future actions.

TSP Table of Contents

Amend the Table of Contents, Chapter 11, Master Street Plans, to add Hayden Island Street Plan.

TSP List of Maps

Amend the List of Maps, under Volume 1, to add Map 11.11.20 Hayden Island Street Plan.
Amend the List of Maps, under Volume 2, to add:
Map 11.11.20A Hayden Island Street Plan *Existing and Proposed Streets and Connections*;
Map 11.11.20B Hayden Island Street Plan *Future Traffic Designations*;
Map 11.11.20C Hayden Island Street Plan *Future Transit Designations*;
Map 11.11.20D Hayden Island Street Plan *Future Bicycle Designations*;
Map 11.11.20E Hayden Island Street Plan *Future Pedestrian Designations*;
Map 11.11.20F Hayden Island Street Plan *Future Freight and Emergency Response Designations*; and
Map 11.11.20G Hayden Island Street Plan *Future Street Design Designations*.

Chapter 11, Master Street Plans

Consistent with City of Portland and regional policies, a master street plan has been prepared to support the Hayden Island Plan. A map and objective statement defining the master street plan for Hayden Island is proposed for adoption as part of the Comprehensive Plan in Goal 11B, Policy 11.11 Street Plans, which is also part of the Transportation System Plan (TSP), Chapter 2 – Transportation Element of the Comprehensive Plan.

Note: This chapter, Chaper 11 of the TSP is not part of the Comprehensive Plan, but it provides background and context for street plans that are adopted as part of the Comprehensive Plan in Goal 11B (TSP Chapter 2). A section for this chapter will be prepared that includes a narrative and supportive maps on the Hayden Island Street Plan.

This section will include discussions on the following:

- Authority of the City Engineer to direct specific improvements and alignments to implement the street plan;
- Street plan support of the land use patterns and development objectives recommended by the Hayden Island Plan;
- Integration of the street plan with the proposed Columbia River Crossing Project;
- Relationship of the street plan, and requirement for consistency, with the interchange area management plan;
- Street plan direction for future street classifications and designations that would be applied upon completion of the Columbia River Crossing Project.

The following maps will accompany the Hayden Island Street Plan section of Chapter 11:

Map 11.11.20A Hayden Island Street Plan *Existing and Proposed Streets and Connections*, as displayed in Exhibit I;

Map 11.11.20B Hayden Island Street Plan *Future Traffic Designations*, as displayed in Exhibit J;

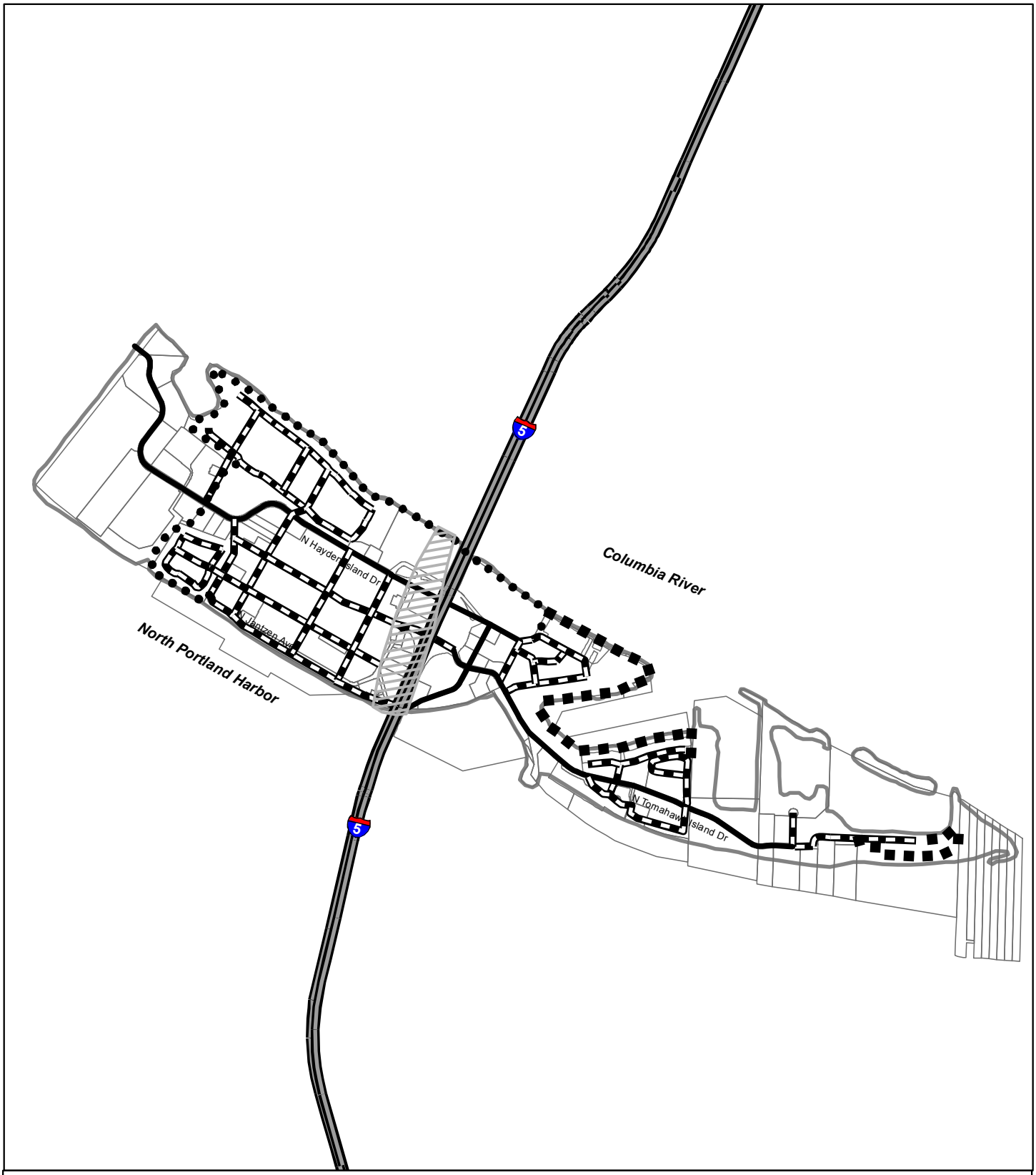
Map 11.11.20C Hayden Island Street Plan *Future Transit Designations*, as displayed in Exhibit K;

Map 11.11.20D Hayden Island Street Plan *Future Bicycle Designations*, as displayed in Exhibit L;

Map 11.11.20E Hayden Island Street Plan *Future Pedestrian Designations*, as displayed in Exhibit M;

Map 11.11.20F Hayden Island Street Plan *Future Freight and Emergency Response Designations*, as displayed in Exhibit N; and

Map 11.11.20G Hayden Island Street Plan *Future Street Design Designations*, as displayed in Exhibit O.



Portland Master Street Plan - Map 11.11.20A

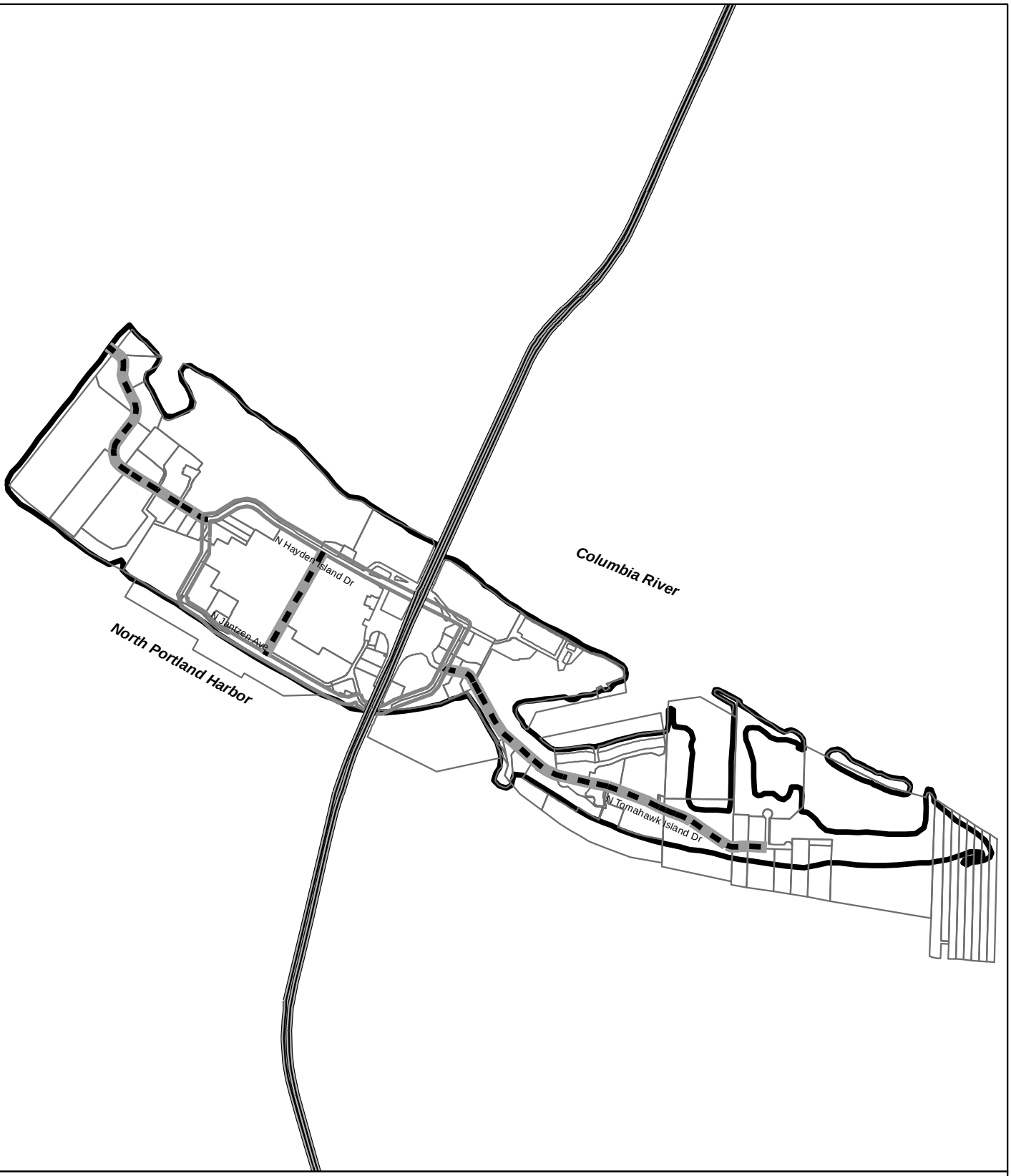
Hayden Island

Existing and Proposed Streets and Connections

Legend

- Existing Streets
- Proposed New Streets
- Pedestrian & Bicycle Connection
- Pedestrian Connection
- Future Highway Area (not incl. LRT)

Exhibit I



Portland Master Street Plan - Map 11.11.20B

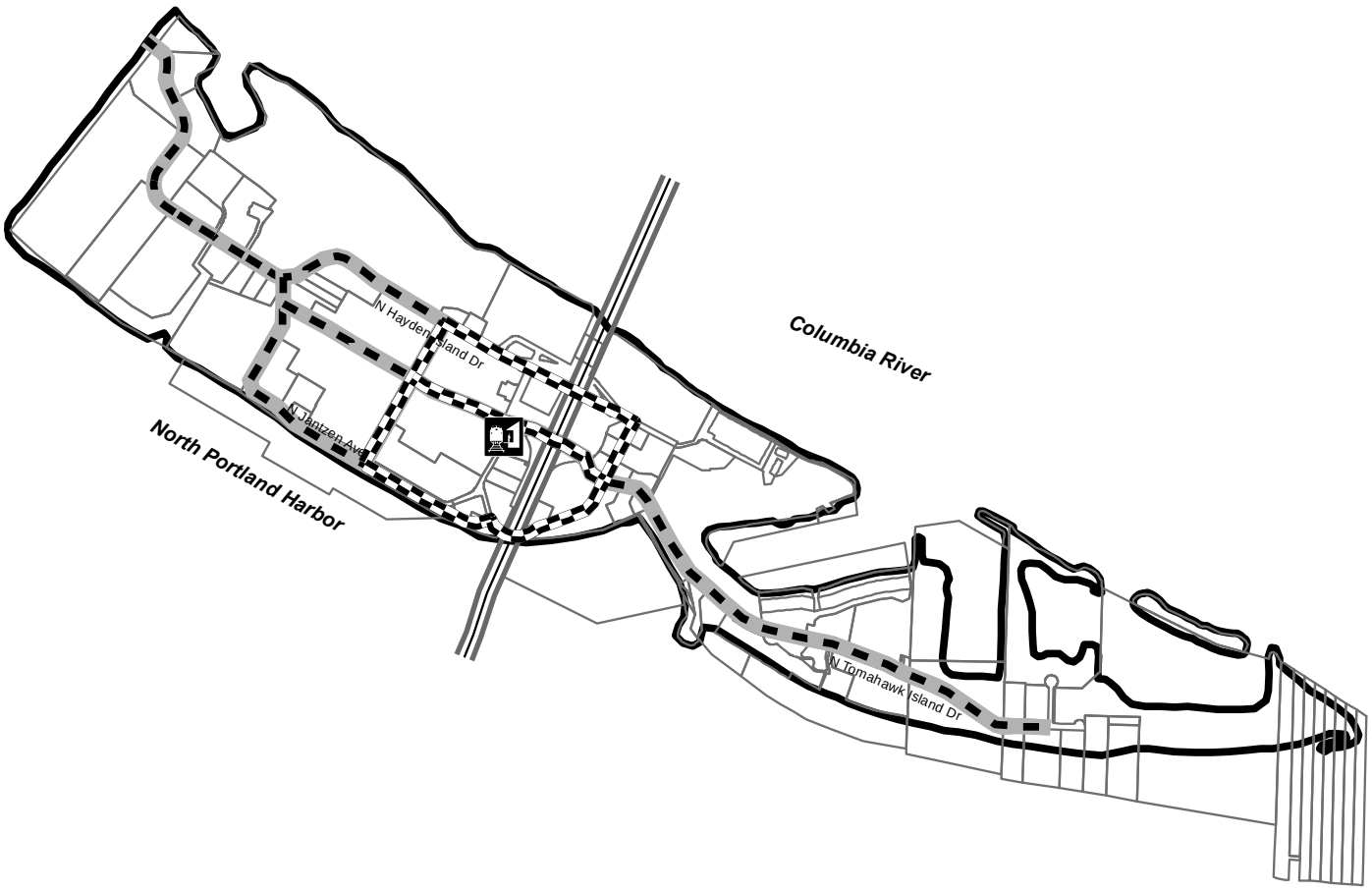
Hayden Island

Future Traffic Designations

Legend

- Regional Trafficway
- District Collector
- Neighborhood Collector

Exhibit J



Portland Master Street Plan - Map 11.11.20C

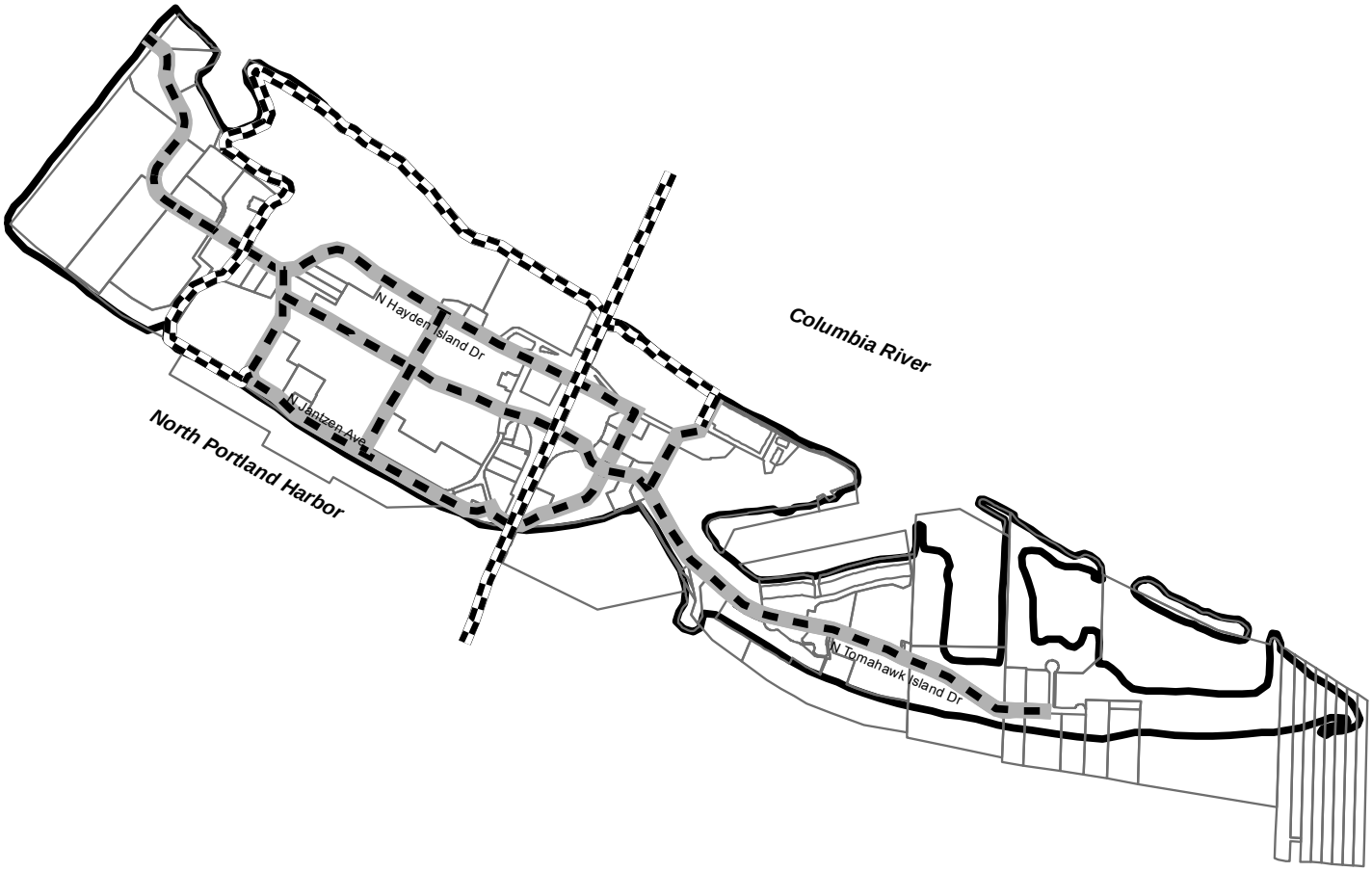
Hayden Island

Future Transit Designations

Legend

- Transit Stop
- Regional Transitway
- Transit Access Street
- Community Transit Street

Exhibit K



Portland Master Street Plan - Map 11.11.20D

Hayden Island

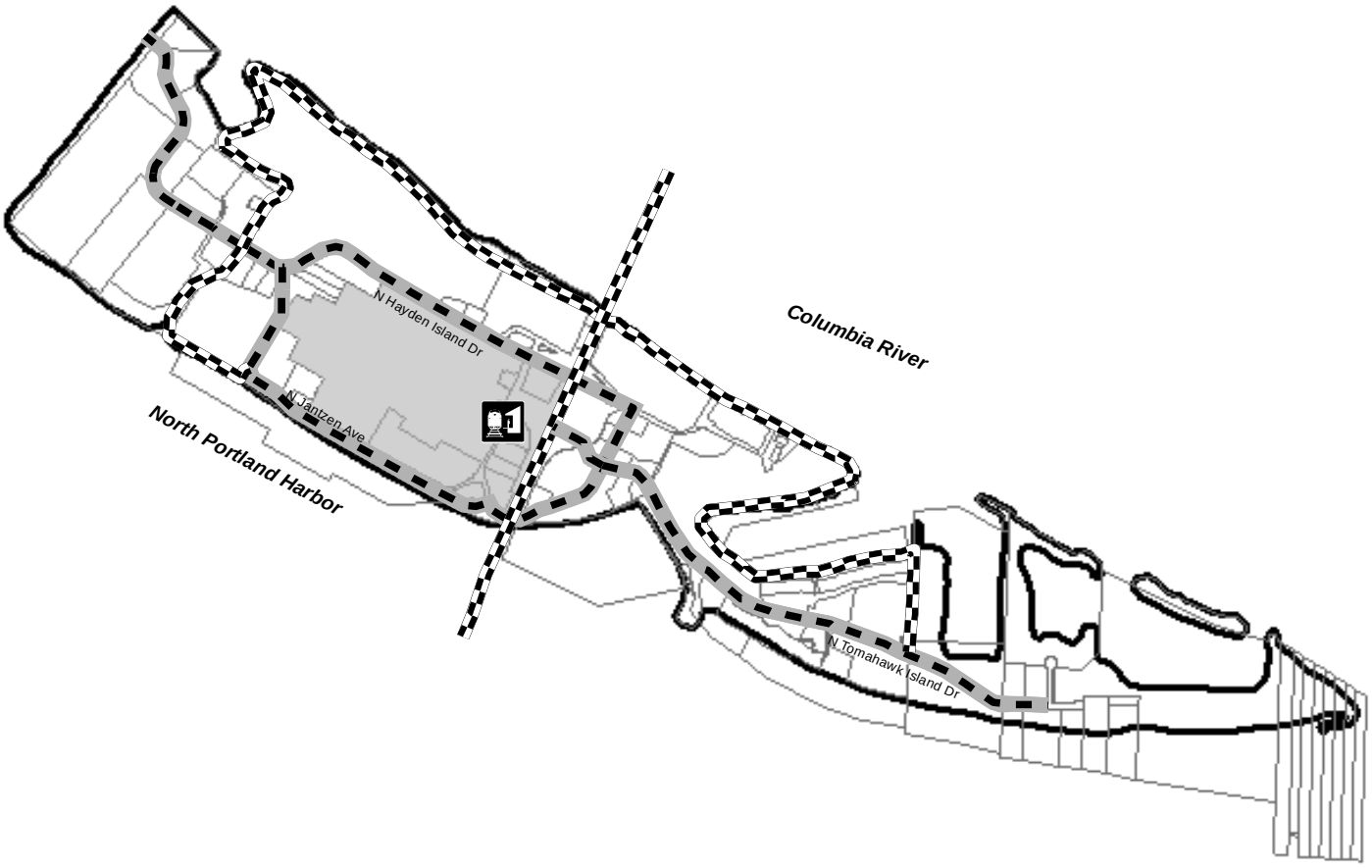
Future Bicycle Designations

Legend

City Bikeway

Off-Street Path

Exhibit L



Portland Master Street Plan - Map 11.11.20E

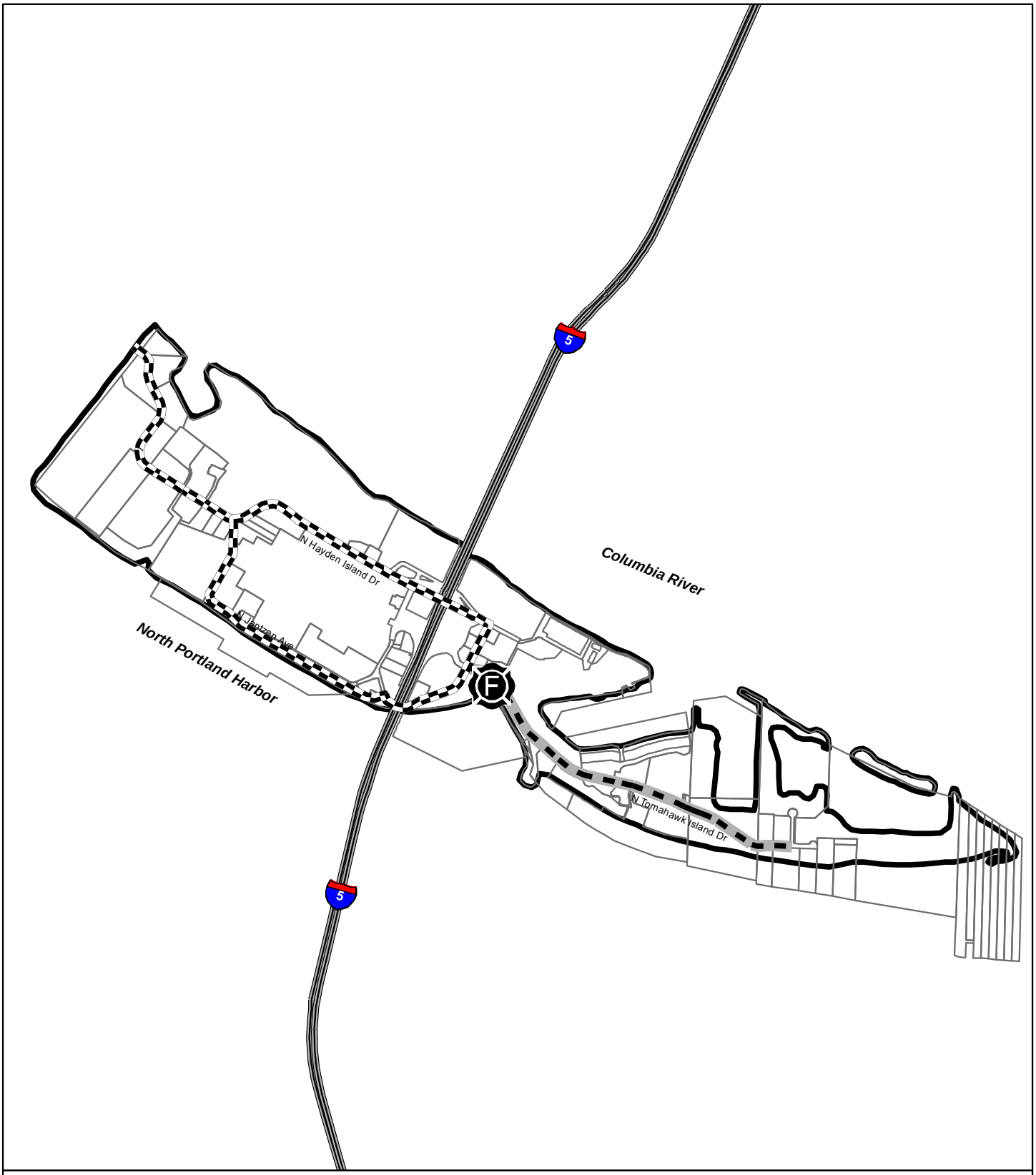
Hayden Island

Future Pedestrian Designations

Legend

- City Walkway
- Off-St Path
- Pedestrian District
- Transit Stop

Exhibit M



Portland Master Street Plan - Map 11.11.20F

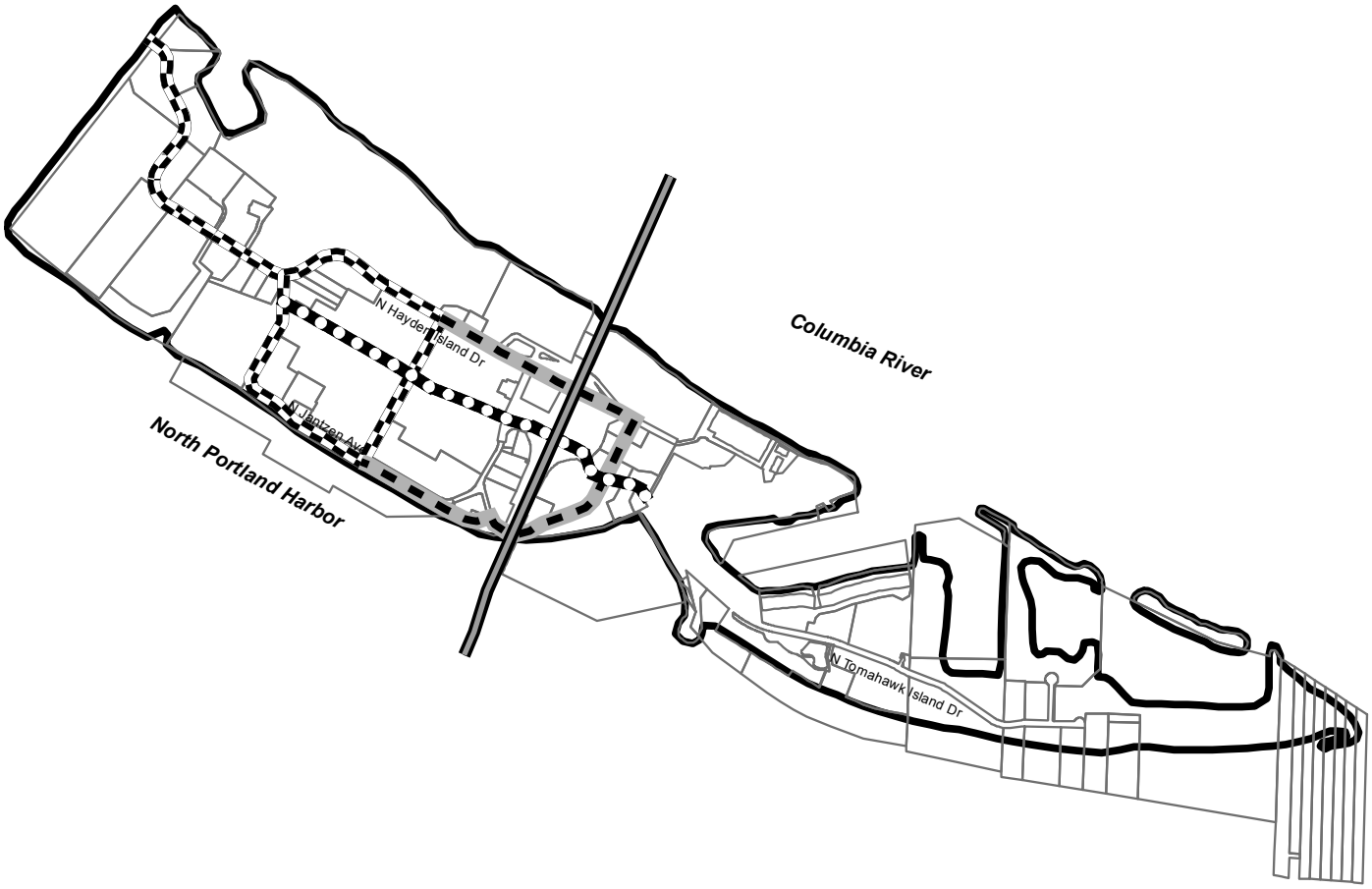
Hayden Island

Future Freight and Emergency Designations

Legend

- Major Emergency Response Street
- Truck Access & Major Emergency Response Street
- Regional Truckway & Major Emergency Response Street
- Fire Station

Exhibit N



Portland Master Street Plan - Map 11.11.20G

Hayden Island

Future Street Design Designations

Legend

- Community Main Street
- Regional Corridor
- Community Corridor
- Urban Throughway

Exhibit O