

Opportunities and Challenges

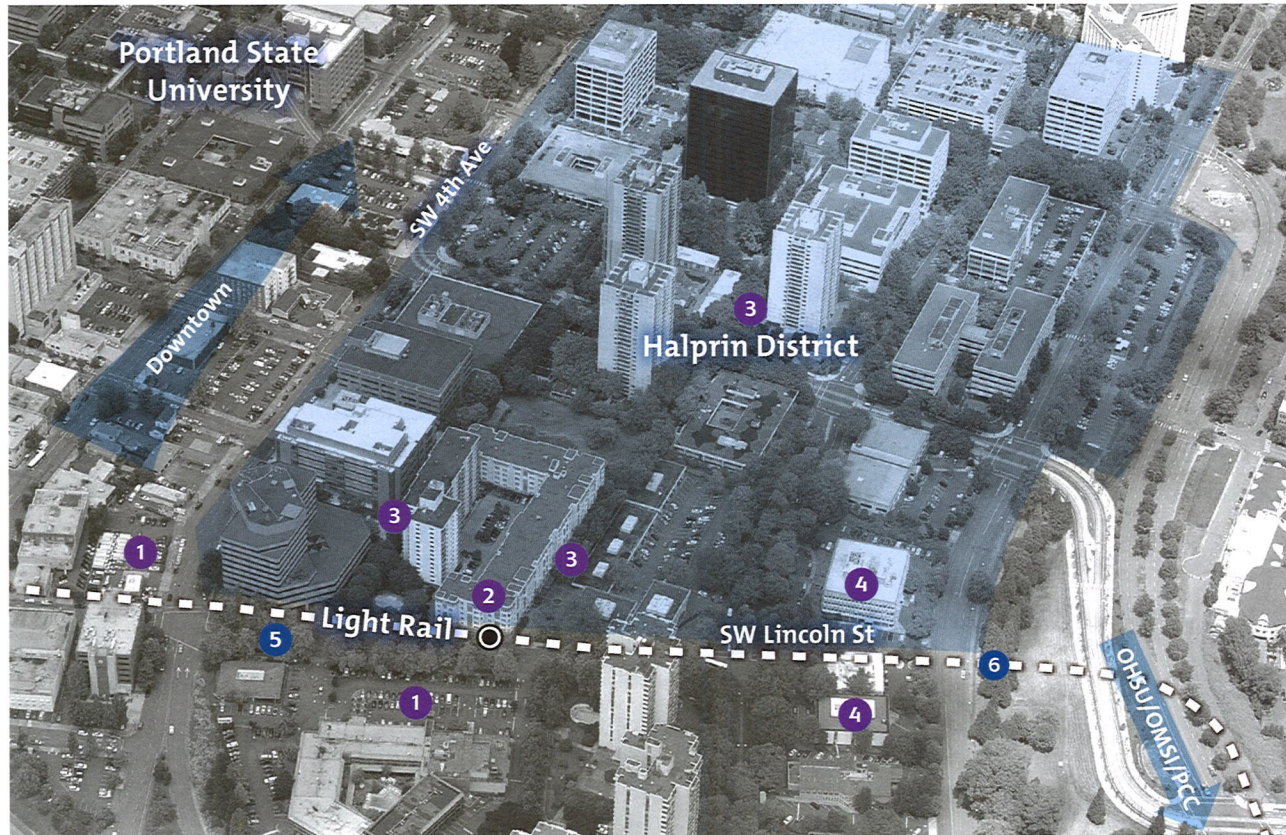


FIGURE 11: PSU/Lincoln Street station area—Opportunities and Challenges

PSU/LINCOLN STREET STATION AREA

Neighborhood Context:

Largely built during the urban renewal movement of the 1960s, the district surrounding the Lincoln Street station is characterized by high-rise residential and commercial buildings surrounded by green space, and the series of fountains, plazas and connecting pedestrian spines that were designed by renowned landscape architect Lawrence Halprin.

Opportunities

- 1 Activate area by creating transit-oriented development on underutilized sites (PSU University Place and neighboring properties)
- 2 Highlight entry to downtown and employment
- 3 Integrate station with Halprin pedestrian ways, fountains and plazas
- 4 Highlight the mid-century modern architectural character of the district

Challenges

- 5 Maintain the green character of Lincoln Street
- 6 Lack of a bike and pedestrian connections on Harbor structure

Current Design Direction

The PSU/Lincoln Street station will add another access point to the regional light rail system in an area with significant existing and envisioned transit-supportive uses. This will help increase transit use in accordance with Central City goals.

This part of the alignment will connect with the southern terminus of existing light rail on SW 5th and 6th avenues and then head east down SW Lincoln Street (Fig. 12). The SW 5th and Jackson station, to open in 2012, will be the final station on the Portland Mall before light rail turns onto the PMLR alignment.

The PSU/Lincoln Street station's center platform will be located on SW Lincoln Street between the Halprin pedestrian walkways (located where SW 2nd and 3rd avenues would be). Enhanced crossings aligned with these walkways will create a portal to these major

pedestrian features that organize the Halprin District. Placing artwork and perhaps some transit elements, such as bike parking, or systems or signal buildings, in the portal areas could further strengthen the connection between the station and the surrounding neighborhood. The final placement of these elements and the station design are still under consideration given the importance of a thoughtful response to the Halprin District.

The alignment requires a widening of the right-of-way, which will impact all trees between SW 1st and 4th avenues. These trees will be replaced as space on the rebuilt street allows to maintain the green character of these blocks. In order to mitigate for removed trees that cannot be replaced on SW Lincoln Street, the project will plant trees at locations to be determined. Vegetated storm water elements will be added to SW Lincoln Street and serve to complement the well-landscaped character of this district (Fig. 13). U-turns will be permitted on SW Lincoln Street.

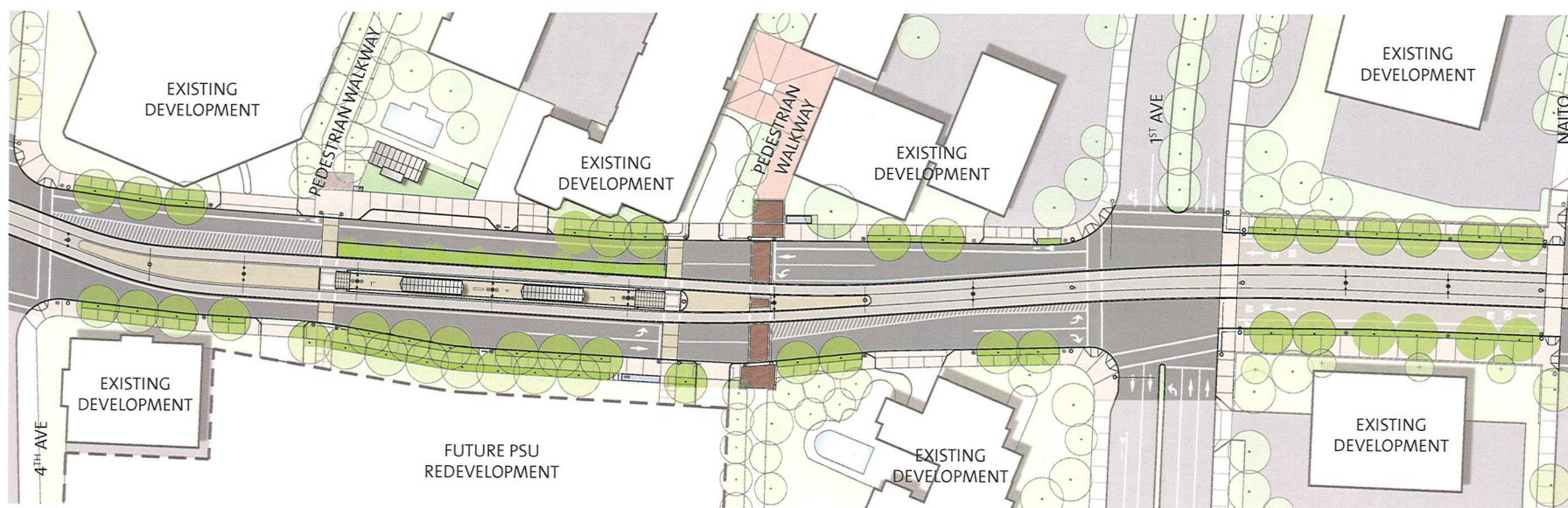


FIGURE 12: PSU/Lincoln Street station area plan

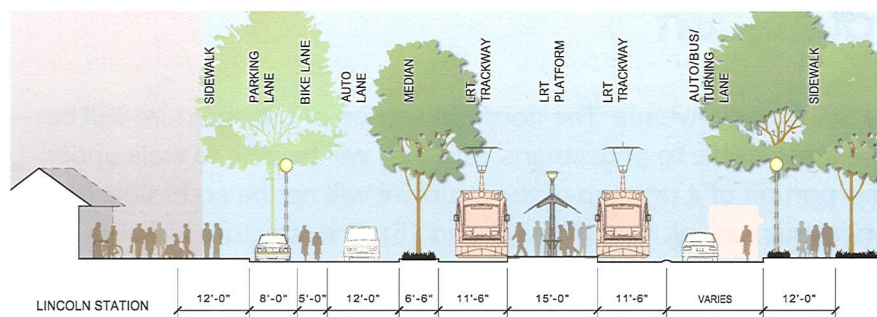


FIGURE 13: PSU/Lincoln Street station cross section

Bicycle lanes will be provided on SW Lincoln Street in both directions between SW Naito Parkway and 1st Avenue and in the westbound direction (uphill) from SW 1st to 4th Avenue. The project will also add bike facilities to the reconstructed portion of SW Naito Parkway, approximately 100 feet north and south of the SW Lincoln Street intersection. Bicycles from SW Harrison Street will be able to connect to the Lincoln Street bike facilities at SW Naito Parkway, and bicycles from downtown will be able to connect to SW Lincoln Street at SW 5th Avenue.

As contemplated during the South Corridor's project planning phase, the PMLR project is reviewing the financial feasibility of installing a second light rail shelter at each of the platforms on SW 5th Avenue. The additional ridership brought by the PMLR extension supports the exploration of adding these amenities.

This station area is in the South Auditorium Urban Renewal Area and the project design is guided by the University District Framework Plan and the South Auditorium District Design Guidelines.

Other Design Options

Station location: TriMet consulted with area property owners and stakeholders in both individual and large public meetings in the spring and summer of 2009 to explore various station options.

Through these discussions, consensus was reached for the proposed station location and configuration. Early in the planning process the station was proposed between the SW 3rd Avenue walkway and SW 1st Avenue, but it was moved west to allow for a left turn lane at SW 1st Avenue without increasing adjacent property impacts. The current location is advantageous in that it places the station between the two pedestrian walkways that are a legacy of the Halprin plan.

Pedestrian and bicycle improvements: Alternative pedestrian and bicycle improvement options were considered during the planning process. The North Macadam Transportation Strategy developed a proposal for a pedestrian and bicycle path connecting PSU/Downtown and the South Waterfront District adjacent to the I-405 Freeway. This path was suggested as a possible alternative to accommodating cyclists on SW Lincoln Street and on the transitway on the Harbor Drive structure between SW Naito Parkway and SW Moody. During Preliminary Engineering it was determined that it was viable to accommodate pedestrians and cyclists on SW Lincoln Street and that improvements to SW Naito Parkway connecting to SW Harrison Street provided an acceptable alternative to adding pedestrian and bicycle facilities on the Harbor Drive structure. The I-405 path continues to be of interest to the City of Portland but will be pursued outside the project.

Outstanding Issues

- Locations for systems building and bicycle parking
- Installation of additional shelters on SW 5th Avenue of the Portland Mall
- Bicycle and pedestrian connections from SW Lincoln Street to SW Naito Parkway to SW Harrison Street and across Harbor Drive to RiverPlace

STATION AREA DESIGN CONCEPTS: INNOVATION QUADRANT

HARBOR DRIVE STRUCTURE

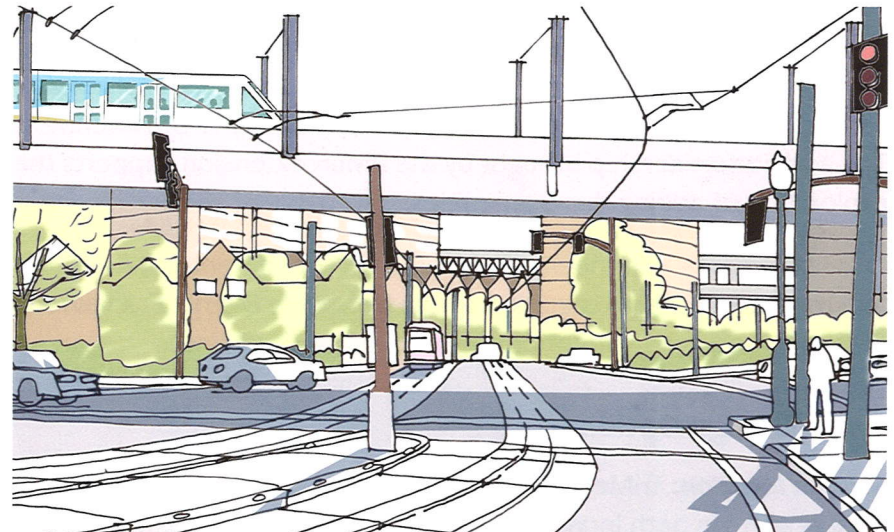
Neighborhood Context, Opportunities and Challenges

The Harbor Drive structure is located between the edges of the Halprin District (South Auditorium Plan District), RiverPlace, and the South Waterfront District. It is adjacent to significant infrastructure, including the I-405 and I-5 ramps and the Marquam Bridge. However, the neighboring mixed-use districts, which will have some views of the structure, offer pedestrian-friendly environments.

This elevated structure will allow the light rail to cross over SW Harbor Drive and proceed on a structure under the I-5/I-405 ramps and into the South Waterfront District travelling along the west side

of SW Moody Avenue. The northern section of the structure will be the most visible to pedestrians, and they will be able to walk under this portion of it (the top of the structure will not be accessible to pedestrians or cyclists) (Figs. 14 and 15). The structure will also be highly visible to drivers coming from the I-5 freeway and South Waterfront, and can therefore contribute to a sense of arrival in downtown. This location requires careful consideration of this context and the aesthetics of the structure and offers opportunities to incorporate public art (Fig. 16).

Development opportunities: There are also significant development opportunities adjacent to the structure that must be preserved and could contribute to the sense of arrival into downtown. The spine of development opportunities between SW Harbor Drive and SW Naito Parkway from SW Market Street to I-405 is on property jointly



FIGURES 14 AND 15: The Harbor Drive structure will pass over motorists, streetcars, pedestrians and cyclists. On the left, a view from Harbor Drive looking north. On the right, a view from Harrison Street looking west.

Opportunities and Challenges

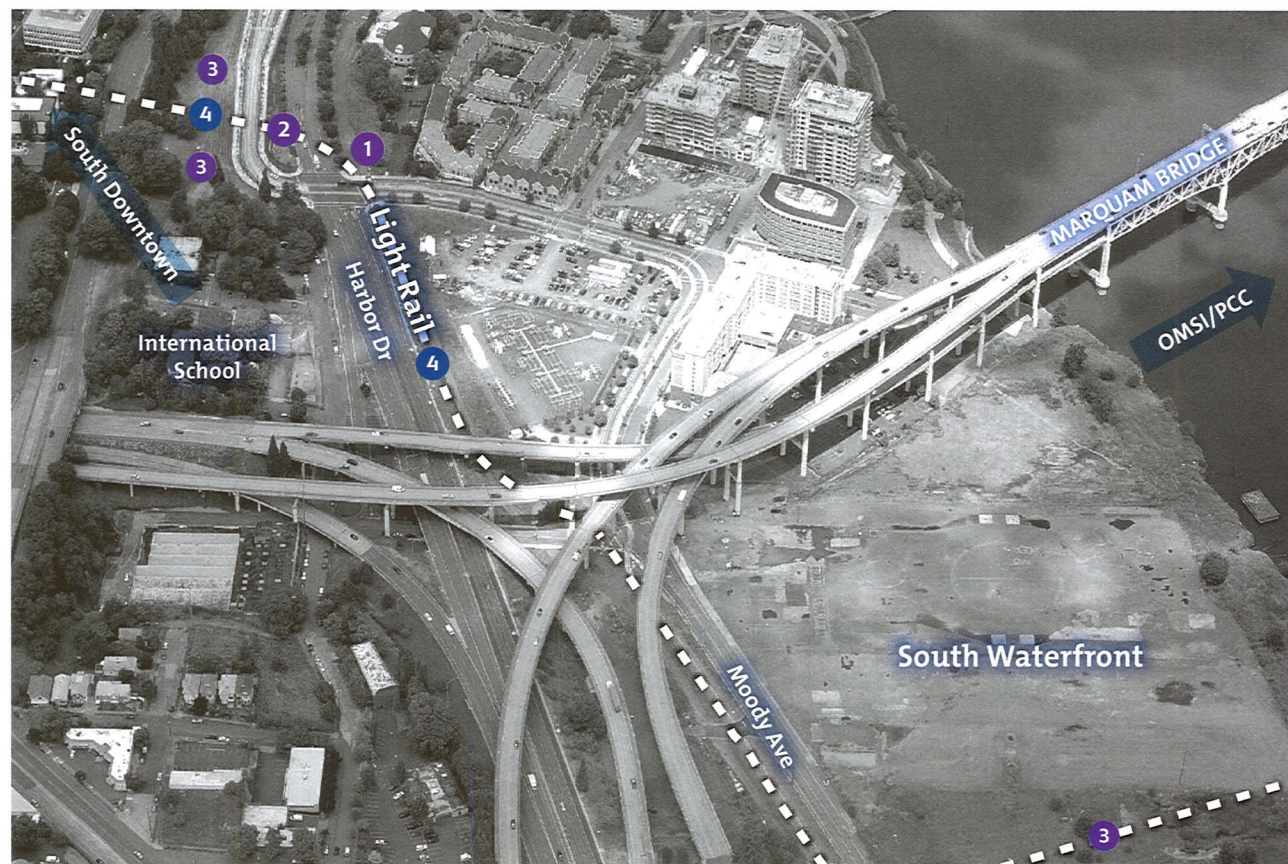


FIGURE 16: Harbor Drive structure—Opportunities and Challenges

HARBOR DRIVE STRUCTURE

Neighborhood Context:

This area serves as a passageway between neighborhoods and districts, with pedestrians passing through at grade and drivers passing through both at grade and on elevated structures.

Opportunities

- 1 Create a highly visible structure
- 2 Highlight transit over transit crossing (LRT curving over Streetcar alignment)
- 3 Light rail crossing at grade with Naito Parkway supports future development on adjacent parcels

Challenge

- 4 Lack of bike and pedestrian connections on structure. Possible future bike and pedestrian connections underneath structure

owned by the Oregon Department of Transportation and Portland Bureau of Transportation. The *Harbor/Naito Concept Plan*, which studied various development options, was completed in June 2004. Although this land is being planned for redevelopment it faces significant challenges due in part to the existing slope of the land, access to utilities and the need for street connections to Naito Parkway or the Harrison connector.

Current Design Direction

Vehicles and pedestrians will be prohibited from utilizing the structure; however, the northern section will be designed to optimize the experience for pedestrians walking underneath it. The three columns under this section (near SW Harrison, SW Harbor and SW River Parkway) have been identified as public art opportunities. The northern part of the structure will have a sweeping curve of concrete with a consistent shadow line from the deck above. Poles placed on the structure will be made of metal to accentuate the clean sweeping form of the curving girders (Figs. 14 and 15).

The proposed alignment for the Harbor Drive structure maximizes the opportunity for redevelopment of the Harbor/Naito properties. The PMLR alignment is not currently designed to allow for an off-street, north-south connection under the Harbor Drive structure between Naito Parkway and the Harrison connector, but the Portland Development Commission has requested that this be added to the design to improve the redevelopment potential of these properties. The project is also being coordinated with the Oregon Department of Transportation to resolve right-of-way, structural and maintenance issues.

URBAN DESIGN VISION

The Harbor Drive structure is a well-rendered element that preserves future development opportunities, improves connectivity between neighboring districts and supports the pedestrian activities in this part of downtown. It projects out of the Halprin District and provides great views of the river, bridges, city, Mount Hood and the West Hills. The structure is both functional and aesthetically appealing with public art that enhances the visual appearance of the structure from key locations, responds to the character of the area, and enhances connections between neighboring districts. The sweeping curves of the structure connect South Waterfront district to the Halprin District and are part of a sequence of arrival experiences including the Willamette River Bridge.

Other Design Options

Alignment: Alternative alignments for the Harbor Drive structure were evaluated including providing an elevated crossing over SW Naito Parkway (to improve traffic operations) and shortening the structure by crossing the parcels to the east of SW Naito at a more acute angle (to reduce cost). Both alternatives were rejected as they would have impacted the aesthetics of this location and the potential for future development on adjacent parcels. The current design of the alignment through this area was also modified from earlier plans by shifting it eastward along the east side of SW Harbor Drive to allow space for a potential future I-5 northbound ramp.

Bicycles and pedestrians on the Harbor Drive structure:

Early in Preliminary Engineering, project staff studied pedestrian and bicycle connections as part of the evaluation of alignment options for the Harbor Drive structure. There was consideration of including pedestrian and bicycle paths on the structure, but that option was rejected due to the existing and future connections that will create a robust pedestrian and bike network, cost, and complexity/potential infeasibility due to the horizontal and vertical constraints under the I-5/I-405 interchange. The selected alignment for the Harbor Drive structure supports the city's desire to preserve opportunities for the future construction of a pedestrian/bicycle connection from SW Naito to SW Harrison and under the Harbor Drive structure from SW Sheridan to SW River Parkway.

Harbor Drive station: Including a station at Harbor Drive was considered during the SDEIS phase, but it was eliminated due to engineering and cost challenges with an elevated station platform in relationship to projected ridership. This decision, made by the Project Management Group, was confirmed with additional technical work and public discussion during Preliminary Engineering.

Outstanding Issues

- TriMet and the City of Portland will hold design workshops to articulate aspects of the structure, including lighting, column design and shape, and other design elements
- Advancing the art concepts for the columns
- Allowing for an off-street, north-south connection under the structure west of the Harrison connector to support redevelopment of sites between SW Harbor Drive and Naito Parkway



The development of residential towers, institutional spaces and parks continues at South Waterfront.

BRUCE FORSTER

STATION AREA DESIGN CONCEPTS: INNOVATION QUADRANT

SOUTH WATERFRONT STATION AREA

Neighborhood Context, Opportunities and Challenges

This station is located on the northern end of the South Waterfront District, an emerging high-density, mixed-use neighborhood located adjacent to the Willamette River. This north end is currently largely undeveloped but will be anchored by future development on the Oregon Health & Science University's (OHSU) Schnitzer Campus and the Zidell Company's property, as well as the City of Portland's South Waterfront Greenway, which will stretch along the banks of the Willamette River from the Marquam Bridge south to the River Forum Building.

This station will serve both buses and light rail and is one of two stations to do so on the "shared transitway" which extends from SW Naito and Lincoln, over the Harbor Drive structure and Willamette River Bridge, to SE 7th and Caruthers. The project must address the complexities of the multi-modal (bus, light rail and future streetcar) use of the alignment and the station platform; the movement of pedestrians and bicycles from the Willamette River Bridge to SW Moody and, in the future, to and from the greenway; construction of significant grade changes to support adjacent redevelopment; and coordination with future street improvements (Fig. 17).

OHSU's Schnitzer Campus is a cornerstone of the Innovation Quadrant. This light rail project presents opportunities to strengthen connections into and within the Quadrant with a transit hub that

provides bus, streetcar, light rail and tram service. This station will also be very close to the Willamette River Bridge. The bridge can influence the aesthetics and urban design of this station, as well as the OMSI station, so that both sides of the river are visually connected to each other and to the rest of the Innovation Quadrant.

Development opportunities: Integrating the project design with adjacent development plans will be pivotal to the success of both in this station area. The light rail project will set the stage for the development of surrounding properties, parks and the Willamette River Greenway. OHSU's 19-acre Schnitzer Campus is expected to house 4,500 employees by 2030, and the Zidell Company's property offers 33 acres of developable land. A new public plaza on the north side of the platform planned as part of the OHSU development can help connect the station to the campus.

Current Design Direction

The light rail station will be configured with separate platforms for east- and westbound trains; light rail trains will run on the outside and buses and future streetcar will run in the middle (Figs. 18 and 19). The platforms will be built approximately 14 feet above the current grade and future streets will be constructed to slope up and meet the grade of the station. Future adjacent buildings will be designed with parking below the level of the platform and main pedestrian entrances that open onto the sidewalks adjacent to the shared light rail and bus stations.

Buses, future streetcar and the light rail will pass through this station and the platform will serve both light rail and buses (streetcar will not stop at the platform but will have stations nearby). Bicycles will

Opportunities and Challenges

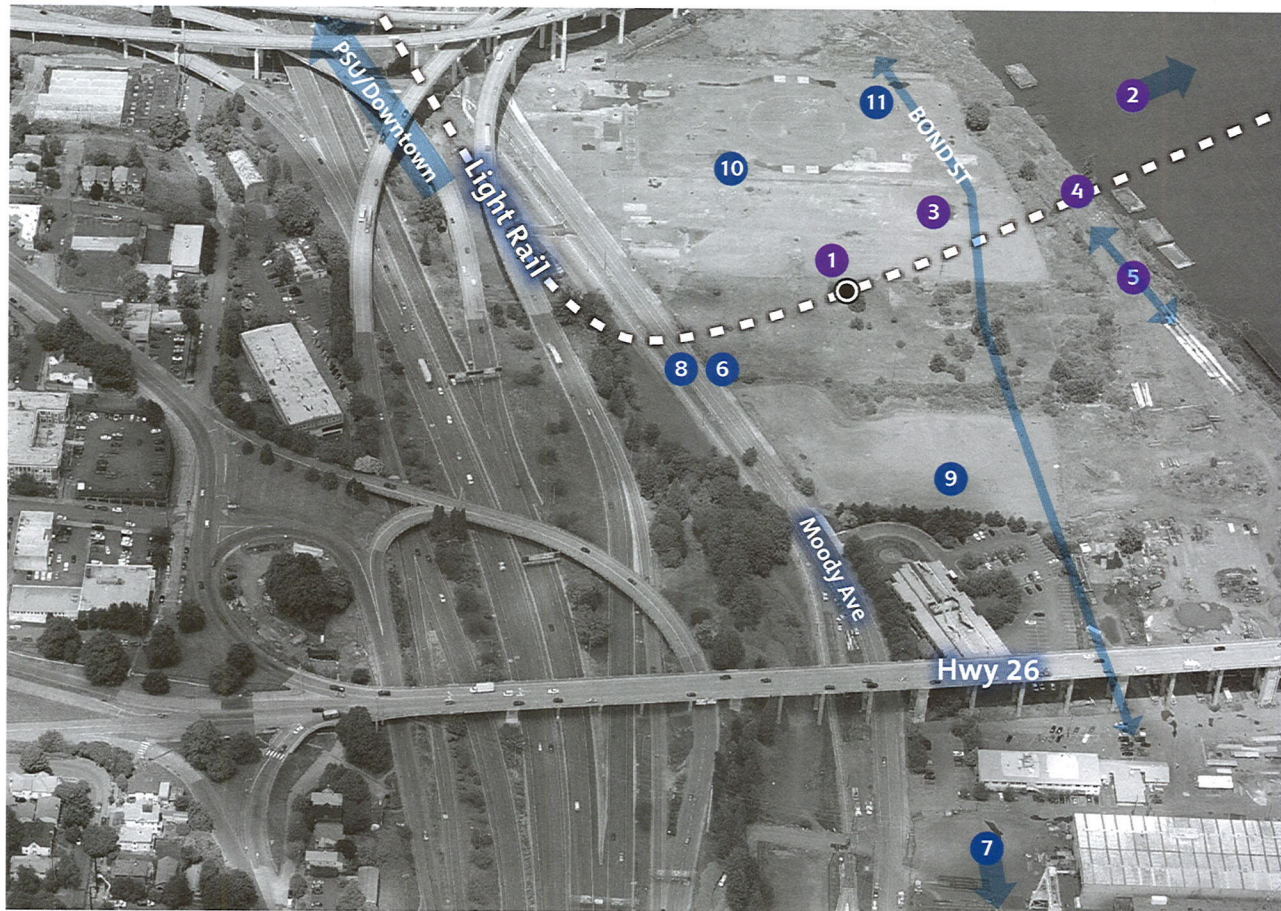


FIGURE 17: South Waterfront station area—Opportunities and Challenges

SOUTH WATERFRONT STATION AREA

Neighborhood Context:

The South Waterfront District is an emerging high-density, mixed-use neighborhood. The new station will be in the undeveloped north end, which will be anchored by OHSU's future 19-acre Schnitzer Campus and the Zidell Company's 33-acre property, as well as the City's South Waterfront Greenway along the banks of the Willamette River.

Opportunities

- 1 Create a westside transit hub with regional connections
- 2 Connect to complementary institution on the east side of the river
- 3 Anchor the station with the planned public plaza in the OHSU campus
- 4 Celebrate bridgehead/riverfront location
- 5 Connect the station to the future Greenway Trail

Challenges

- 6 Address the complexities of the multi-modal (bus, streetcar and light rail) use of the alignment and the station platform
- 7 Accommodate distance between station and tram landing
- 8 Provide good pedestrian and bicycle circulation across multiple track sections
- 9 Activate station in absence of near-term development
- 10 Resolve significant grade changes to support adjacent redevelopment
- 11 Coordinate with future street improvements

URBAN DESIGN VISION

The South Waterfront station and related improvements are integrated with the developments of the OHSU Schnitzer Campus, the Zidell Company property, the greenway and street infrastructure. The station showcases Portland's emphasis on quality design and multi-modal transportation by providing bus, light rail and future streetcar service to the neighborhood and strengthening connections to the Portland Aerial Tram. Residents, workers and tourists use the station to then transfer to the tram which provides great views of Portland and its surroundings. In addition, this area has enhanced bicycle and pedestrian access. The station helps activate the district, stimulates development activity in the area and creates an exceptional urban experience that offers transit, mixed-use development, recreation opportunities, quality green spaces and a connection to the river.

The station, combined with the new public plaza to the north, is a major focal point of the area. The connection to the future Willamette River Greenway and addition of creative storm water elements that celebrate the rain and river themes of our city are valuable enhancements to this prime location. The South Waterfront station serves as the western end of a seamless river "embrace" across the new bridge to the OMSI station area. The two stations share design elements to strengthen the cross-river relationship and reinforce the identity of the Innovation Quadrant.

also move through this station in one-way cycle tracks, between the light rail trackway and sidewalks, to access existing and future street networks. Pedestrians will be provided 15-foot wide sidewalks on both the north and south sides of the station area. As part of

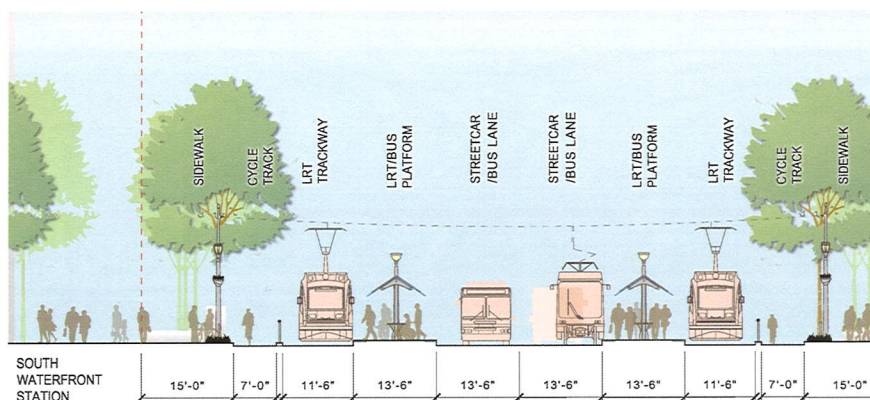


FIGURE 18: South Waterfront station cross section

a separate project, the City of Portland will improve SW Moody Avenue, which will enhance pedestrian and bicycle connections from the PMLR project to the Portland Aerial Tram. Bicycle and pedestrian connections from the bridge and through the South Waterfront station area are being planned with significant input from the City of Portland's bicycle and pedestrian advisory committees and community advocates.

Development plans for the Zidell Company and OHSU properties were integral to the design of the South Waterfront Street plan. It is expected that SW Moody Avenue will be reconstructed by the time the project opens to include double-track streetcar with two-way traffic and a cycle track. Farther in the future, the City of Portland plans to create a Moody/Bond couplet with SW Bond Street serving northbound traffic and SW Moody Avenue serving southbound traffic and both directions of streetcar. To control traffic crossing, the City of Portland will install a traffic signal at the intersection of SW Porter and Bond streets as part of the future project. Careful coordination has been, and will continue to be, necessary to fit a multi-modal transit platform between these future streets and allow pedestrian and bicycle movements through the platform block. For

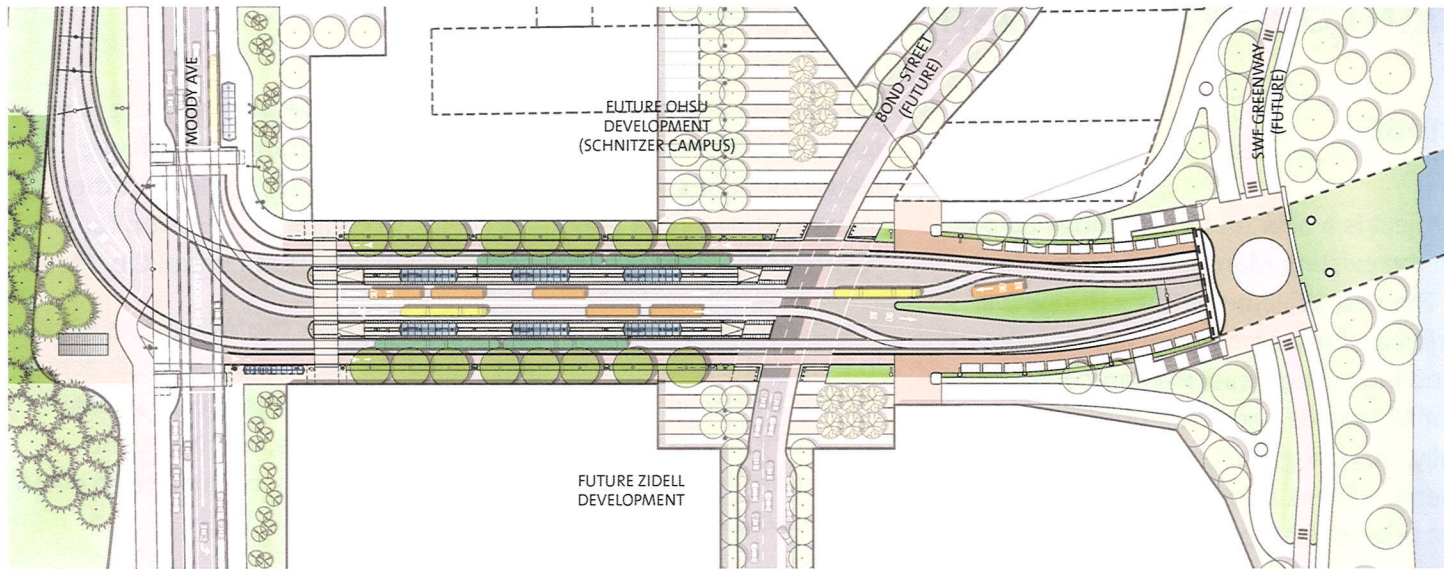


FIGURE 19: South Waterfront station area plan

these reasons Porter Street (the location of the PMLR alignment in South Waterfront) has been designated a transit only street by the City of Portland. As a result, the remaining future east-west streets (Woods, Arthur and Baker) will become critical to auto circulation as redevelopment occurs in the station area. The alignment is designed to function well with both existing and proposed infrastructure improvements.

Various design ideas are currently being explored to creatively manage storm water runoff from the bridge and to create strong connections with the future greenway. One idea being considered is to build a vegetated bioswale (or other water quality facility) near the station on the bridge approach to capture and treat runoff and then allow the treated water to flow under the structure to create a dynamic water feature where the bridge meets the greenway. Other ideas for future stairs, ramps, planters and plaza spaces to help integrate Porter Street with the greenway and other parts of the district are being explored but would not be constructed as part of

the PMLR project. The design team and project partners are focused on anticipating future opportunities and designing the project to be able to accommodate future needs and developments in the district.

The project team will work to reconcile the PMLR design with the strategies that emerge from the OHSU Schnitzer Campus Master Plan, as well as the South Waterfront District Standards and the South Waterfront Greenway Development Plan.

Outstanding Issues

- Refinement of the planning for bicycle and pedestrian connections to the future greenway
- Phasing of, and coordination with, numerous construction projects
- Obligations of others for future public improvements
- Optimization of signal timing and intersection design at the SW Moody/SW Porter intersection

STATION AREA DESIGN CONCEPTS: INNOVATION QUADRANT

WILLAMETTE RIVER BRIDGE

A critical component of the project is a new multi-use bridge across the Willamette River between the existing Marquam (I-5) and Ross Island (Highway 26) bridges. The new Willamette River Bridge will link vital employment, education and research centers in downtown Portland, South Waterfront and inner Southeast Portland with each other and with the city of Milwaukie and other portions of Clackamas County. Additionally, this bridge will carry light rail, buses (up to three frequent service lines), pedestrians, bicycles and potentially streetcars—but not private vehicles—and interface with

two riverbank greenways (one existing and one planned), the river users and riparian wildlife habitat. Given that transit and bicycle usage continues to rise, the bridge is a significant addition to the infrastructure of the region and helps to complete the vision for a “Central City Circulator” first identified in the 1988 Central City Plan.

The opportunity to design a new crossing over the Willamette River in Portland is a rare occurrence—it will be the first bridge built across the Willamette in 35 years. The bridge will be a significant addition to the city and its riverscape; many stakeholders, architects and community leaders have participated in advisory committees formed to choose the bridge location and type.

Bridge Location

In May 2008, the Willamette River Crossing Partnership, which ultimately evolved into the Willamette River Bridge Advisory Committee, recommended a specific alignment for the bridge to cross the Willamette River. On the river's west bank, this alignment begins north of the property line between OHSU's future Schnitzer Campus and the Zidell Company property in the South Waterfront, crossing the river to land on the east bank at the former SE Sherman Street right-of-way just north of the Portland Opera. This recommended alignment was adopted in the project's Locally Preferred Alternative in July 2008 (Fig. 20).

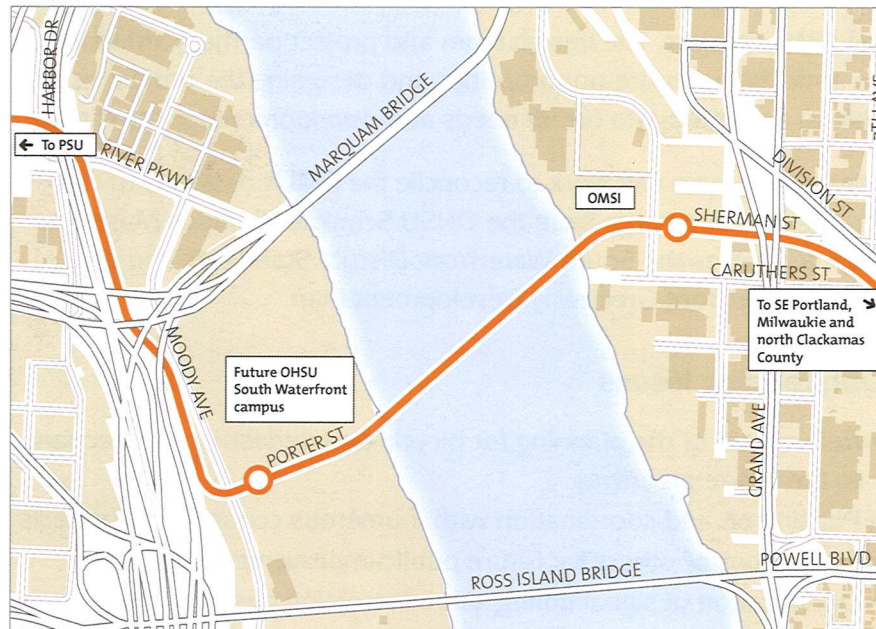


FIGURE 20: The Willamette River Bridge alignment

A multi-use bridge will carry Portland-Milwaukie light rail, TriMet bus lines, cyclists and pedestrians across the Willamette River.



FIGURE 21: A conceptual illustration of the Willamette River Bridge as viewed from the south.



FIGURE 22: A conceptual illustration of the Willamette River Bridge as viewed from the bridge bicycle and pedestrian path. The delineation of the path treatment will be resolved during Final Design.

Bridge Type

Given the multi-modal purpose of the bridge, its location and its vital importance to Portland-Milwaukie light rail, a committee of design, transportation, business and community leaders was asked to study bridge types and recommend to the community only those types appropriate for the context and the budget. From July 2008 through May 2009, a volunteer citizen committee, called the Willamette River Bridge Advisory Committee, under the leadership of former Portland Mayor Vera Katz, met to advise project partners on bridge type selection.

During this eleven-month period, the committee studied a wide variety of bridge types and ultimately made its recommendation based on several selection criteria: cost, risk, navigation, fundamental performance, architecture, urban context, greenway impact, environmental-sustainability, operations and miscellaneous technical considerations and opportunities. By considering these criteria, the

committee systematically narrowed the list of appropriate bridge types through a series of steps to arrive at its recommendation (See *Portland-Milwaukie Light Rail Project: Willamette River Bridge Type Selection Process*, TriMet: February 2009).

The committee ultimately recommended a cable-stayed bridge type that consists of two towers from which cables are strung to support the bridge deck. This bridge type is efficient at spanning long distances, which allows for a reduction of the number of piers in the water. Fewer in-water piers reduce the long-term environmental impact of the structure. In addition, the cantilevered construction reduces environmental impacts during construction.

Bridge Design

In May 2009, the project hired MacDonald Architects to lead the design effort for the cable-stayed bridge as recommended by the Willamette River Bridge Advisory Committee. Working with project

URBAN DESIGN VISION

The new bridge is a simple and elegant addition to Portland's riverscape and a prized amenity for pedestrians and cyclists. It fits into the context of the river while expressing a modern aesthetic. It provides the navigational clearances to meet the needs of river users and minimizes environmental impacts by limiting the number and placement of in-water piers. With good connections to the east and west greenways, the bridge is now an integral part of the network of recreation trails that celebrate the Willamette River.

engineers, such as HNTB, MacDonald Architects was charged with producing a bridge design that is simple and elegant, and makes a significant contribution to "Bridgetown". An artist team is collaborating with the architect on elements of distinction, such as potential aesthetic lighting of the structure (Figs. 21 and 22).

The bridge design, which is still in development, includes:

- Four bridge piers, with two on land and two in the river
- Two 180-foot high bridge towers
- A 14-foot wide shared pedestrian and bike path on each side of the bridge
- Publicly accessible belvederes at each tower and at mid-span along the pedestrian/bike paths
- Integration of the bridge with a planned greenway and the site of OHSU's future Schnitzer campus on the west bank, and with an existing greenway and OMSI and Portland Opera on the east bank
- Lighting for the transitway and paths
- Integrated artwork

The bridge's pedestrian/bicycle paths are important elements that have been modified in response to community feedback. Initially, 12-foot paths were proposed, but given the high use projections additional width was desired. The engineers found a design solution that could expand the paths to 14 feet. It was determined that the benefits of the wider paths outweighed the added cost of \$3.25 million. Still to be resolved is how 14 feet will be allocated between bicycle and pedestrian use, and how the two uses are divided. Additional planning work is also underway to determine how these paths will be integrated with future greenway connections.

Consistent with input from various natural resource agencies and environmental groups, bridge lighting will need to avoid being directed toward the water in order to protect endangered salmon species.

As design of the bridge moves toward 100 percent completion, refinement of all of the above elements will continue. Bridge construction is scheduled to begin July 2011 through a design-build contract.

Outstanding Issues

- Bicycle and pedestrian connections to east/west greenways
- How space on the bike and pedestrian path will be allocated and what treatments will be used to delineate the modes
- Whether to include aesthetic lighting and how it could be incorporated
- How the railings will be configured
- The final design of the bridge's leading edge pending wind tunnel testing

To review detailed conceptual bridge renderings and the work of the Willamette River Bridge Advisory Committee, visit trimet.org/pm.

STATION AREA DESIGN CONCEPTS: INNOVATION QUADRANT

OMSI STATION AREA

Neighborhood Context, Opportunities and Challenges

The Oregon Museum of Science and Industry (OMSI) station is located in the Central Eastside Industrial District and Urban Renewal Area. It is in a mixed-use/industrial district anchored by OMIS, which attracts more than 900,000 visitors annually, and Portland Community College's Workforce Training Center, which serves more than 10,000 students per year. The district has a rich industrial history and is largely characterized by warehouse, distribution and manufacturing uses, with some commercial and institutional uses. The Union Pacific Railroad (UPRR) runs through this area along its northeast edge. The Martin Luther King Viaduct (currently under construction) bounds this area on the east.

OMSI, the Portland Opera and the Oregon Rail Heritage Foundation's future Restoration Facility and Interpretive Center are clustered around the light rail station. The Portland Streetcar Loop Project will bring streetcar service to the area in 2011. A 3.3-mile extension of the existing system will provide service from NW Portland, across the existing Broadway Bridge, into the Lloyd District and down to OMIS. The Willamette River Bridge constructed as part of this light rail project sets the stage for a future project that would allow the streetcar to "close the loop" by connecting this extension to the streetcar stations on SW Moody Avenue (Fig. 23).

The Eastbank Esplanade and Greenway Trail, which extend from the Steel Bridge to Caruthers Street, offer riverfront recreational

opportunities for cyclists and pedestrians. Connections from the bridge and the station to the recreation trail are of significant importance—planning for bicycle/pedestrian connectivity on both sides of the river is ongoing and will include both project-related and future enhancements.

Pending funding availability, the City of Portland plans to construct a "new" Water Avenue to accommodate vehicular and freight traffic as well as pedestrians and cyclists. The light rail project provides opportunities to enhance bicycle and pedestrian access to the Esplanade/Greenway and strengthen connections to other parts of the district. It must also continue to support industrial uses in the area and accommodate truck circulation, which is expected to be provided by the "new" Water Avenue.

This station will also be very near the Willamette River Bridge. The bridge can influence the aesthetics and urban design of this station, as well as the South Waterfront Station, so that both sides of the river are visually connected to each other and to the rest of the Innovation Quadrant.

The project requires right-of-way acquisition of light industrial properties along this segment of the alignment, and active relocation support is essential to keep jobs in the region. There may also be the opportunity to utilize remnant acquisition parcels for transit-oriented development or community use.

Development opportunities: The Portland Opera is planning to develop its property between the proposed "new" and existing "old" Water avenues with mixed-use and office space, and to redevelop the site of its existing facility with a new performance hall.

Opportunities and Challenges

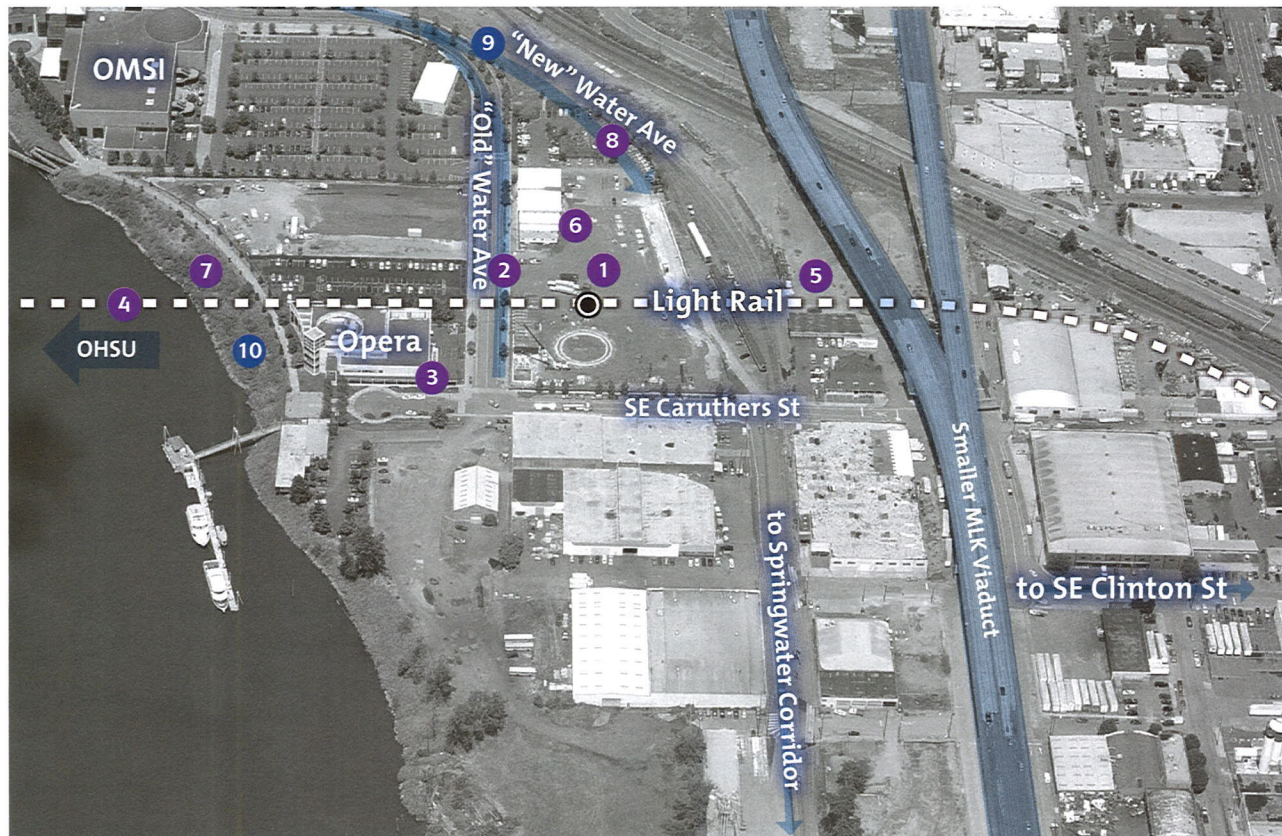


FIGURE 23: OMSI station area—Opportunities and Challenges

OMSI STATION AREA

Neighborhood Context:

This station area has a rich industrial history and is largely characterized by warehouse, distribution and manufacturing uses, with some commercial and institutional uses, including the Oregon Museum of Science and Industry (OMSI), Portland Community College's Workforce Training Center, Portland Opera and the future Oregon Rail Heritage Foundation (ORHF) museum.

Opportunities

- 1 Create eastside transit hub with regional connections
- 2 Connect to future OMSI streetcar station
- 3 Coordinate with future development of Portland Opera site
- 4 Connect to complementary institution on west side of the river
- 5 Coordinate with the future development of ORHF's Rail Museum
- 6 Coordinate with OMSI's master planning of its 21.4-acre property
- 7 Connect to the river and the Eastbank Esplanade
- 8 Construct a "new" Water Avenue for vehicular traffic

Challenges

- 9 Provide safe and clear multi-modal (motor vehicle, bike and truck) connections through the area
- 10 Provide good pedestrian and bicycle connections to the Eastbank Esplanade while minimizing impacts to the structure

URBAN DESIGN VISION

The station and related enhancements recognize the area's industrial history while also embracing aspirations to transition to a vibrant civic, education and employment district. The stage is set for future developments by OMSI, the Portland Opera, the Oregon Rail Heritage Foundation and other neighboring property owners. With improved bicycle and pedestrian circulation and good connections to the greenway, buses and streetcar, this station area is integrated with the rest of the City. It now uses the SE Division crossing to connect to southeast neighborhoods and the Willamette River Bridge to reach across the river to OHSU and other institutions in the Innovation Quadrant.

OMSI has completed the first phase of a Master Plan for its approximately 22-acre property. The plan envisions expanding the museum's science and educational programs and adding up to one million square feet of complementary development that could include educational uses, laboratory space, research and development, and other uses. The campus occupies a prominent yet underdeveloped waterfront location and will be at the transportation nexus of light rail, streetcar and bus systems. The transit projects combined with OMSI and its future campus developments will advance the Innovation Quadrant's vision for a vibrant science and technology corridor that spans the Willamette River.

The Oregon Rail Heritage Foundation plans to develop a Restoration Facility and Interpretive Center on a triangular site bounded by the



BRUCE FORSTER

The project bridge will cross the river south of the Marquam Bridge, stopping at a station surrounded by a growing OMSI and the Portland Opera.

UPRR, the Oregon Pacific Railroad (OPRR) and the future PMLR trackway. The foundation is currently developing schematic designs for the project and hopes to be under construction in 2011.

Current Design Direction

The station is located and designed in coordination with plans for development of the OMSI, Portland Opera and Oregon Rail Heritage Foundation properties. The station platform will be located approximately one block north of SE Caruthers Street between the "new" and the "old" Water Avenue, where it is surrounded by these development opportunities (Figs. 24 and 25). There will be separate platforms for east- and westbound trains; light rail trains will run on the outside and buses will run in the middle and share platforms

with light rail. The streetcars will come on and off the alignment near the west end of the station and will have separate stations on “old” Water Avenue.

The station platform will be built at approximately the existing grade, although a slight grade change is required for the bridge to provide the necessary vertical clearance for river navigation. The surrounding street and sidewalk connections will be reconstructed to provide accessible routes to and through the station area. Bicycles will be able to move through this station in one-way cycle tracks between the light rail trackway and sidewalks and will access the Willamette River Bridge at either the intersection of “old” or “new” Water Avenue. Pedestrians will be provided 12-foot wide sidewalks on both the north and south sides of the station area (Fig. 26).

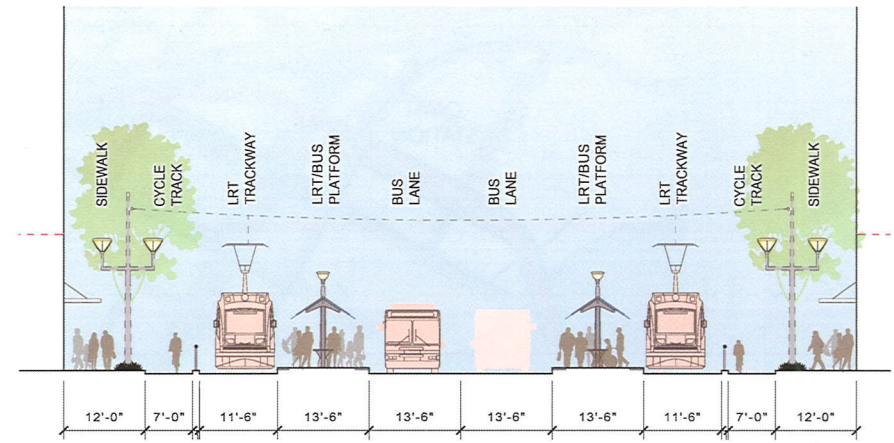


FIGURE 24: OMSI station cross section

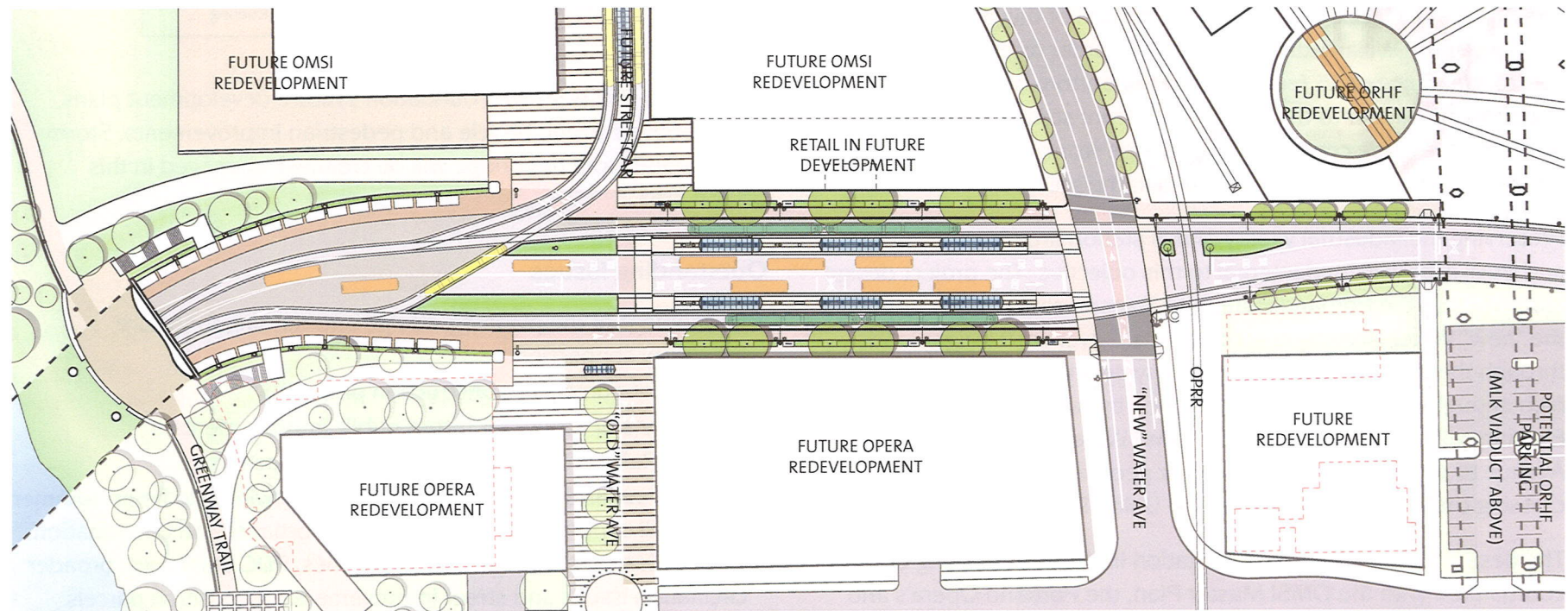
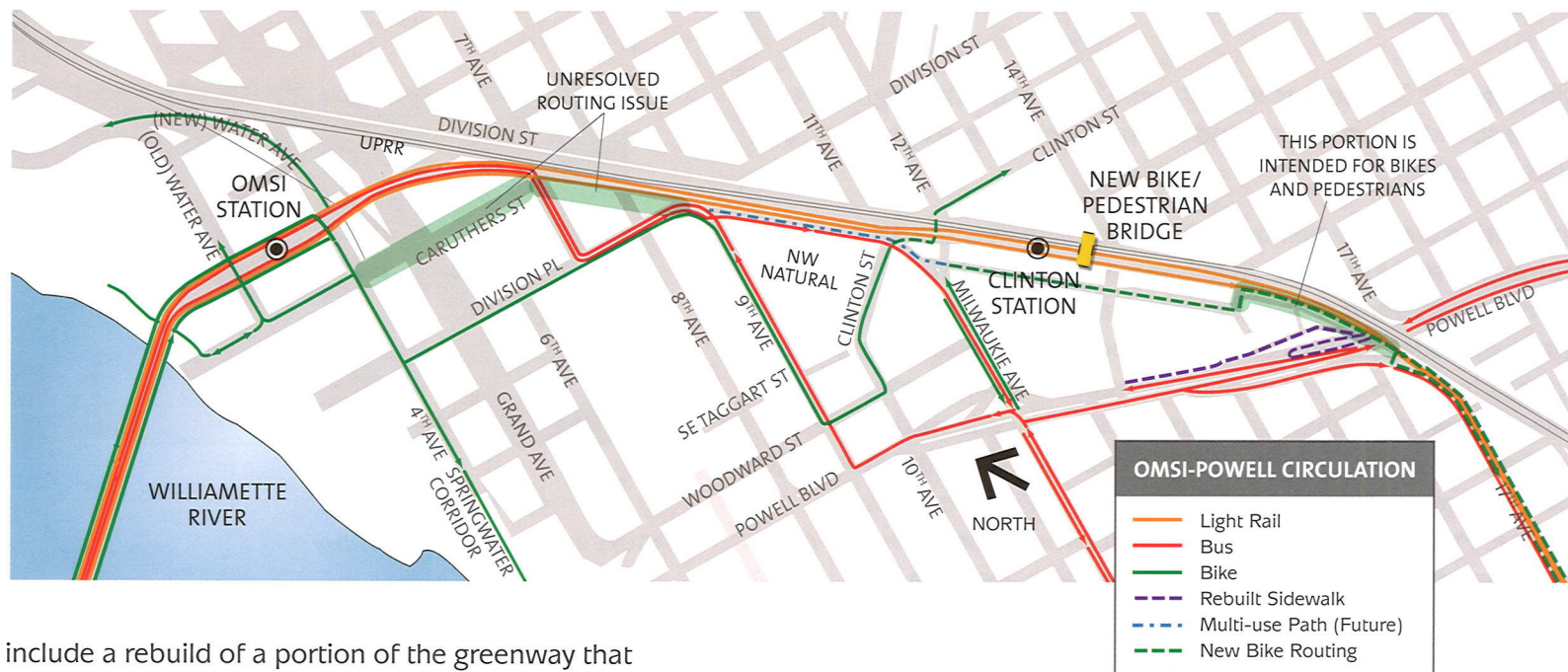


FIGURE 25: OMSI station area plan

FIGURE 26:
OMSI to SE Powell
Boulevard bus,
bicycle and
pedestrian
circulation map



The project will include a rebuild of a portion of the greenway that runs under the Willamette River Bridge in order to provide adequate vertical clearance of 15 feet between the bottom of the bridge and the trail. Similar to the South Waterfront station, storm water elements are being considered to manage storm water runoff and create a dynamic water feature down at the greenway level.

Preserving the industrial vitality of this station area is important, and truck access is fundamental to this objective. The project design assumes that the Portland Bureau of Transportation will construct the “new” Water Avenue to accommodate oversized freight loads through the area. Overhead catenary system wires will be installed high enough so that they can be cleared by oversized freight trucks. Fencing will be installed from the “new” Water Avenue to SE 17th Avenue to provide safety and prevent people from accessing or crossing the light rail trackway or the Union Pacific tracks beyond.

The design of the alignment and station in this area is being carefully coordinated with the OMSI Master Plan, the Portland Opera’s and

the Oregon Rail Heritage Foundation’s future development plans, and proposed street, bicycle and pedestrian improvements. Storm water runoff from the bridge will be creatively managed in this station area.

Outstanding Issues

- Refinement of the planning, design and funding for future greenway connections
- Phasing of numerous construction projects
- Obligations of others for future public improvements
- Oregon Rail Heritage Foundation site transaction
- The next series of Station Area Planning activities (to begin summer 2010) will continue to address Central Portland Plan coordination, Central Eastside Industrial Council issues, PDC objectives, broader circulation issues and street improvements/acquisition parcels

CORRIDOR CONCEPTS: NEIGHBORHOODS/EMPLOYMENT SEGMENT

The Neighborhoods/Employment Segment of the alignment in inner Southeast Portland extends from SE Division to SE Steele streets and includes the Clinton Street, Rhine Street and Holgate Boulevard station areas (Fig. 27). It has a community scale with a mix of lower density residential, commercial and industrial uses. Many of the well-established neighborhoods are highly desirable and offer historic homes on tree-lined streets, coffeehouses, eclectic restaurants, locally owned shops and good public schools. The strong employment base is anchored by the PGE, Fred Meyer and TriMet corporate headquarters, PECO Manufacturing and the various businesses in the industrial sanctuary.

The Union Pacific Railroad (UPRR) runs through the area and creates a significant barrier between neighborhoods. Three new pedestrian/bicycle overcrossings and other bicycle and pedestrian improvements, combined with development opportunities in close proximity to the stations, can help reconnect divided neighborhoods in this segment.

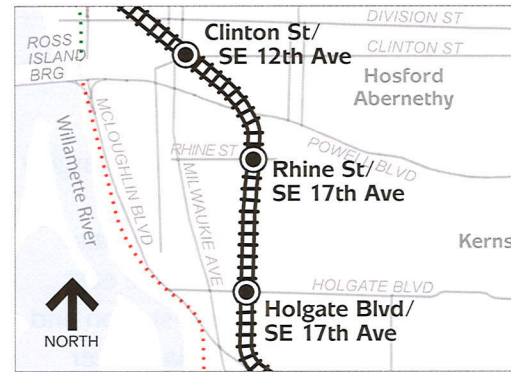


FIGURE 27: Neighborhoods/Employment Segment map

STATION AREA DESIGN CONCEPTS: NEIGHBORHOODS/EMPLOYMENT SEGMENT

CLINTON STREET STATION AREA

Neighborhood Context, Opportunities and Challenges

The area immediately surrounding the Clinton Street station is largely comprised of industrial/commercial uses and is bisected by the Union Pacific Railroad (UPRR). The Hosford-Abernethy residential neighborhoods extend to the north (Ladd's Addition) and the east (Clinton), and the Brooklyn neighborhood is south of the station and Powell Boulevard. The Clinton neighborhood's commercial center begins approximately eight blocks to the east of the station on SE Clinton Street. The new station and related improvements present opportunities to help connect these neighborhoods.

The light rail project necessitates extensive coordination with UPRR as the alignment will run adjacent to the existing rail lines and require several shared crossings (Fig. 28). There is a strong neighborhood desire for a quiet zone in this area; this requires careful design to secure the intersections so that neither light rail nor freight horns need to be sounded (see Quiet Zones section).

There are opportunities to improve the pedestrian and bicycle connections through this area toward the waterfront. SE Clinton Street is a popular bicycle boulevard from SE 51st to SE 12th Avenue, where cyclists face a difficult crossing over the railroad tracks and Milwaukie Boulevard to reach the bike boulevard on SE 9th Avenue.

The station is near the crossroads of three major Southeast Portland arterials (SE Division, Milwaukie and Powell) but will have little

visibility from these streets. There is the opportunity to include an art installation to draw visual attention to the platform.

The project requires right-of-way acquisition of commercial and light industrial properties along this segment of the alignment, and active relocation support is essential to keep jobs in the corridor.

Development opportunities: There is strong redevelopment potential for the NW Natural Gas Company property adjacent to the station platform—master planning efforts are currently underway for this triangular site. Additional redevelopment opportunities are strong immediately south and east of the station. A number of private property owners are interested in assembling a larger redevelopment site bounded by Milwaukie Avenue/Powell Boulevard/Gideon Street. This station is also likely to have a positive effect on development along the SE Division Street corridor. There may also be the opportunity to utilize remnant acquisition parcels for transit-oriented development or community use.

Current Design Direction

The Clinton Street station platform will be located east of SE 12th Avenue, parallel with SE Gideon Street (Fig. 29). There will be a buffer between SE Gideon Street and the station platform that will likely include a landscaped storm water quality zone and a large number of bicycle parking amenities. Vertical art elements have been identified as opportunities to provide a strong visual connection to the station from SE Division and SE Powell.

Powell Boulevard over/underpass: The project will include significant bicycle and pedestrian improvements in this area (Fig. 26). A new Powell Boulevard overpass will provide a safe and direct

Opportunities and Challenges

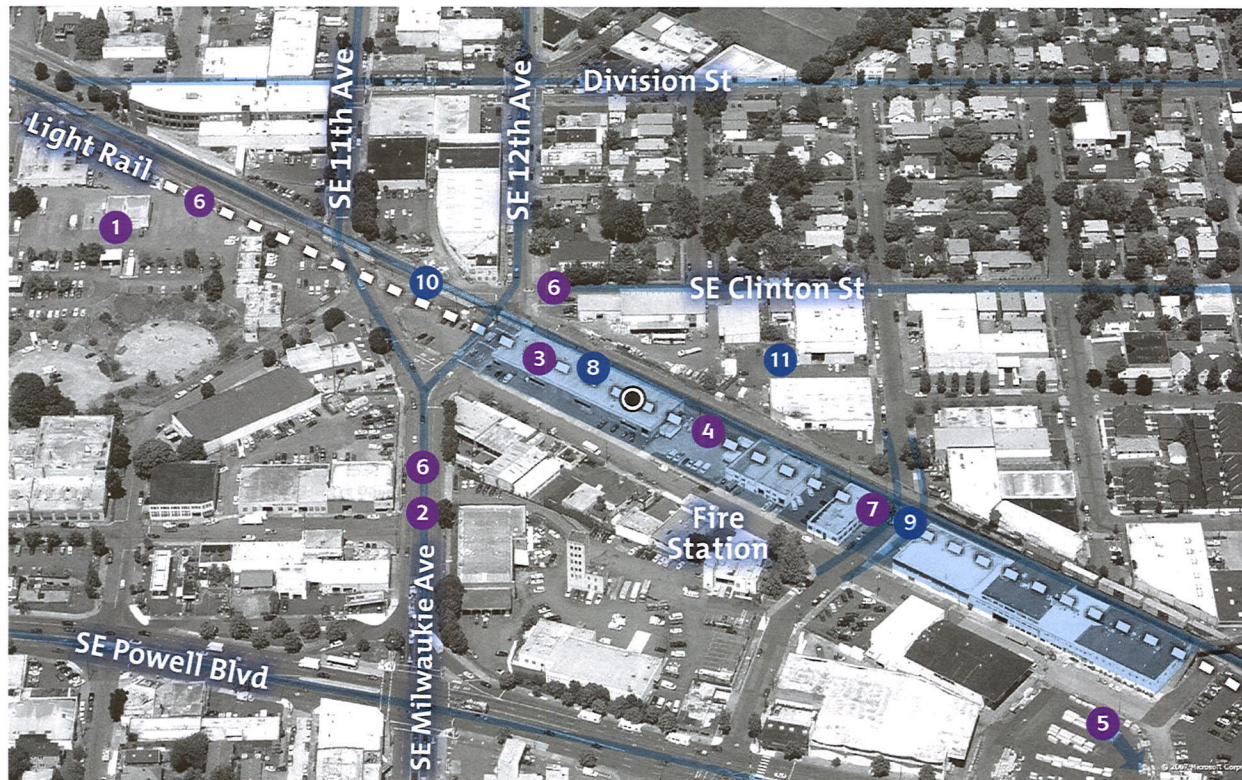


FIGURE 28: Clinton Street station area—Opportunities and Challenges

CLINTON STREET STATION AREA

Neighborhood Context:

While the area immediately surrounding the Clinton Street station area is largely comprised of industrial/commercial uses and is bisected by the Union Pacific Railroad (UPRR), the Hosford-Abernethy residential neighborhoods extends to the north (Ladd's Addition) and the east (Clinton), and the Brooklyn neighborhood is south of the station and Powell Boulevard.

Opportunities

- 1 Create transit-oriented developments on underutilized sites to help bridge Hosford-Abernethy and Brooklyn neighborhoods
- 2 Locate the station at the crossroads of major southeast corridors of Division, Milwaukie and Powell
- 3 Incorporate an art installation to draw visual attention to platform
- 4 Redevelop large parcels in station area
- 5 Improve pedestrian and bicycle crossings over and under SE Powell Blvd and over the Union Pacific tracks
- 6 Provide good bicycle connections between the station and Clinton Street bike route, add bike lanes to Milwaukie Avenue, create bicycle/pedestrian multi-use path along busway between SE 11th and SE 8th/9th avenues, and create future improved connections to the bridge
- 7 Utilize remnant acquisition and right-of-way parcels for transit-oriented development/community uses

Challenges

- 8 Draw attention to the station, which has little visibility from major corridors
- 9 Design an attractive pedestrian bridge over Union Pacific tracks
- 10 Enhance north/south connections; street improvements may be necessary
- 11 Provide good pedestrian access to the station

URBAN DESIGN VISION

The Clinton Street station is a central gathering place framed by a series of new transit-oriented developments. The area is now active with a vibrant mix of industrial, employment, retail, services and housing that successfully integrates with the character of the surrounding neighborhoods. Easy wayfinding is provided and enhanced by public art. The station is easily accessible by bicyclists, pedestrians and bus riders, and improved connections provide a link to the riverfront. The Powell Boulevard overpass is a highly visible structure used by many bicyclists and pedestrians who now enjoy a safe connection between the Brooklyn and Hosford-Abernethy neighborhoods. Students who live in the surrounding area use the station and improved bicycle routes to access OHSU and PSU.

bicycle/pedestrian route over Powell Boulevard. Cyclists heading south from the Clinton Street station will have direct access from the overpass to new bike lanes on SE 17th Avenue. Those heading northbound will have direct access to SE 16th Avenue and into the station. Originally the project was not going to modify the Powell Boulevard underpass, which is currently perceived to be unsafe due to poor lighting and blind switchbacks. However, with the reconstruction of the structure, the underpass along the west side of Powell Boulevard will be modified to improve safety for cyclists and pedestrians by providing a straighter route, better lighting and a more open feel. There will be no changes to the east side of the underpass.

The existing pedestrian bridge that crosses the railroad tracks at SE Brooklyn/SE 16th Avenue will be relocated to SE 14th Avenue to link directly to the light rail station and the SE 13th Avenue pedestrian

crossing of Powell Boulevard, thereby better connecting the Brooklyn and Hosford-Abernethy neighborhoods. In response to the Inner Powell Boulevard Streetscape Plan, SE Milwaukie Avenue will be widened to include bike lanes from SE Powell to the 11th/12th Avenue split adjacent to the station, connecting the existing bike network south of Powell Boulevard to the inner southeast network including the Clinton Street bike boulevard. The three rail crossings at SE 8th Avenue, SE 9th Avenue and Division Place will be consolidated into a single, realigned, signalized crossing at SE 8th Avenue that includes light rail. SE Clinton Street will be closed between SE 11th and 12th avenues, and the crossings at SE 11th and SE 12th avenues will be modified to accommodate light rail. These crossing improvements are intended to meet the standards required for a quiet zone.

Between SE 9th and Milwaukie avenues, the project will purchase right-of-way adjacent to the existing railroad for light rail tracks, an exclusive bus lane and a future shared bicycle/pedestrian path (however, the shared path will not be constructed as part of the PMLR project). The project's closure of SE Clinton Street between SE 11th and 12th avenues will require cyclists heading east or west to reroute using the SE 12th Avenue crossing.

TriMet must place a third light rail track in the central eastside, as close as possible to the Willamette River Bridge, to allow for temporary train storage to keep the entire regional system on schedule. The third track will be located just south of the Clinton Street station and will be used for schedule recovery, to clear track of inoperable light rail vehicles, or to store extra vehicles for a planned event. Fencing will be installed from the new Water Avenue to SE 17th Avenue to provide safety and prevent people from accessing or crossing the light rail trackway or the UPRR tracks beyond.

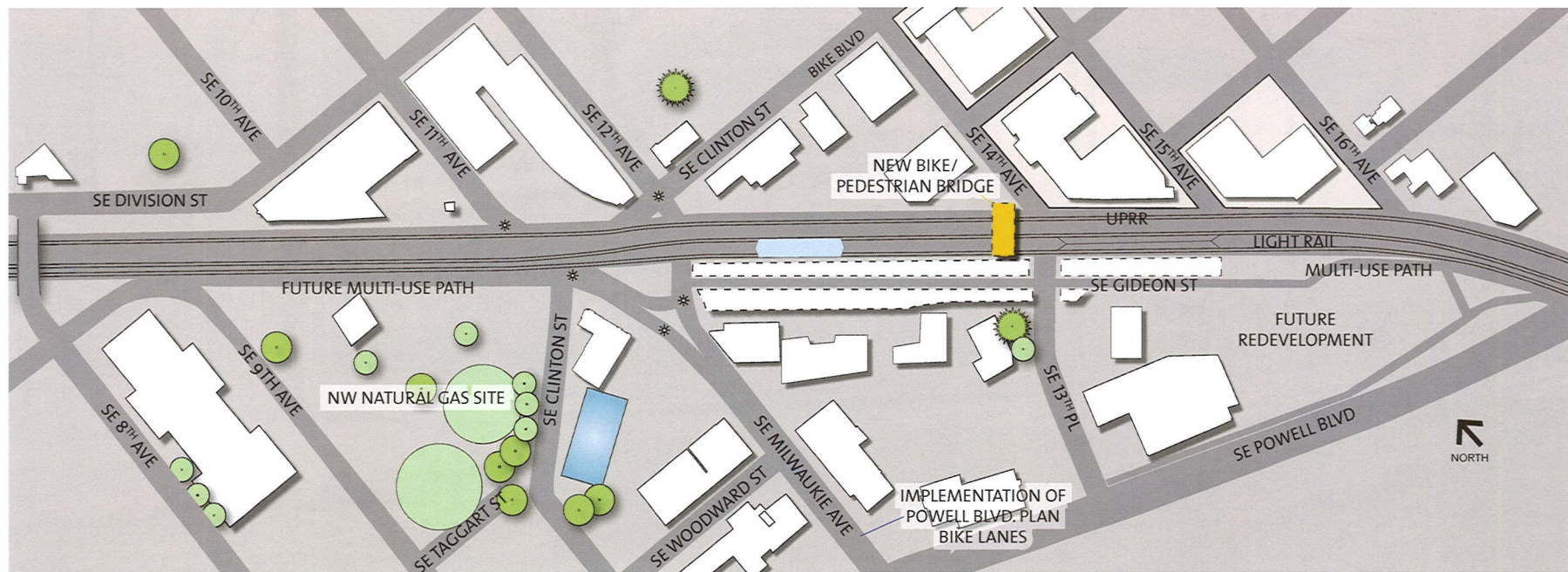


FIGURE 29: Clinton Street station area plan

The City of Portland and TriMet project staff are working to ensure that the Portland Fire Bureau's station house located at SE Gideon/13th Place can maintain response times utilizing 12th Avenue. Traffic signal and train communication tools may be utilized within the station house to provide confirmation of any traffic blockage or train crossing delay that would allow the Fire Bureau to select alternative routes as quickly as possible. This issue will be resolved in Final Design.

The light rail project improvements in this area will be consistent with the Inner Powell Boulevard Streetscape Plan.

Other Design Options

Signalized crossing at SE 8th and Powell: Earlier in the planning process there was consideration of adding a traffic signal at SE 8th and Powell to provide a direct bus connection from the Willamette River Bridge to Powell Boulevard. However, the Oregon Department of Transportation raised significant concern over this proposal, citing safety concerns with potential unacceptable accident rates and potential queuing onto the Ross Island Bridge. For this reason, alternative routes for east side bus access to/from the transit bridge were studied. The alternatives were evaluated based on travel time, cost impacts, additional right-of-way requirements and operational attributes. The selected eastbound route utilizes additional right-of-way on the NW Natural Gas Company site to develop a separate bus



TIM JEWETT

The rail crossing as currently configured at the intersection of SE Division Place and 9th Avenue will be reconfigured by the project.

roadway facility adjacent to the light rail alignment. This connects eastbound buses from the realigned SE 8th/9th intersection at Division Place and drops them onto southbound Milwaukie Avenue just south of Clinton Street (Fig. 26). This route saves several minutes of bus travel time. Westbound buses will access the shared transitway via SE 8th Avenue. The shared transitway is expected to save 3.3 minutes for bus patrons during the peak period compared to buses that would remain on the Ross Island Bridge.

At-grade crossing vs. pedestrian bridge: While the City of Portland reviewed the location of the grade separated pedestrian and bike

crossing near Clinton Street station and requested the structure move to align with SE 13th and 14th avenues, city staff suggested that the preferred approach would be to build the crossing at grade with existing roadways and across the UPRR and light rail tracks. The project team developed this alternative and proposed it to the UPRR, TriMet Operations and the Oregon Department of Transportation. All three entities had significant concerns with an at-grade crossing, particularly due to the number of train movements on the main line, switching movements related to the Brooklyn Yard, and the number of train movements on the light rail line and pocket track—all

of which would affect the pedestrians attempting to cross at this location. Additionally, given that the proposal also would have been a secondary response route for the Portland Fire Bureau, there was concern over how to protect the crossing from other vehicle traffic. Given the significant safety concerns, a pedestrian bridge is planned for this crossing.

Alternative station location: A thorough, multi-agency approach was used to review the various options for station locations throughout the alignment. Most of the alternative locations considered for this station were either further east to tie more directly to SE Powell Boulevard, or further west to anchor future redevelopment on the NW Natural site. It was determined that existing land use, transportation connections, and site constraints support placing the station at the proposed location.

Bicycle “HAWK” signal: The City of Portland had plans to install a bicycle HAWK (High-intensity Activated crossWalk) signal at SE Clinton/11th/12th to improve crossing safety at this intersection. The HAWK signal project was cancelled due to the intersection redesign with light rail and a potential revised bike circulation scheme from SE Clinton Street across SE 11th/12th and at the periphery of the NW Natural Gas site.

Outstanding Issues

- The next series of Station Area Planning efforts, to begin spring 2010, will address zoning and development issues and opportunities in this station area
- Treatment of the 50-foot setback zone between the freight rail and PMLR trackway
- Opportunities for remnant parcels from right-of-way acquisitions
- Design of pedestrian/bike bridge and detail of the Powell Boulevard overpass to be the subject of design workshops during Final Design
- Clinton Street bike crossing at SE 11th/12th Avenue
- Strategies to ensure that the Portland Fire Bureau’s station house located at SE Gideon/13th Place can maintain response times utilizing 12th Avenue
- Planning, design and funding of multi-purpose path along NW Natural Gas property between SE 9th and Milwaukie Avenue
- Multi-use path adjacent to the light rail alignment between SE 7th and 9th avenues and on Caruthers between SE 4th and SE 7th

STATION AREA DESIGN CONCEPTS: NEIGHBORHOODS/EMPLOYMENT SEGMENT

RHINE STREET STATION AREA (SE 17TH AVENUE)

Neighborhood Context, Opportunities and Challenges

This station area is characterized by the Brooklyn neighborhood's residential and commercial properties to the west of the alignment and the industrial area to the east. Most of the properties immediately adjacent to the light rail trackway are commercial and industrial properties, but a single-family residential neighborhood begins half a block west of the alignment.

The project must be designed to accommodate heavy truck traffic in the area, and also fit light rail into the neighborhood character and retain an effective buffer for the single-family residential properties to the west. The project presents opportunities to reinforce connections between the Brooklyn neighborhood, Powell Park and Fred Meyer corporate headquarters (Fig. 30).

The city's bicycle network is currently fragmented in this area. There are difficult connections across SE Powell Boulevard and down SE 17th Avenue until a bike route starts on SE 16th Avenue south of SE Lafayette Street. There is a lack of east-west connections over the railroad tracks and through the industrial sanctuary. This project presents opportunities to add bike lanes and make other improvements to strengthen the bicycle connections through this area.

URBAN DESIGN VISION

The Rhine Street station is a neighborhood focal point that serves as a transition between the industrial and employment district to the east and the Brooklyn neighborhood to the west with public art and design features that reflect the history and character of the area. It is a gateway to the Brooklyn neighborhood and provides connections to major employment sites and open spaces, including the Powell and Brooklyn parks. The light rail improvements fit into the neighborhood while maintaining industrial activity access, and new landscaping provides sustainable storm water solutions that enhance the character of the streetscape. SE 17th is now an enhanced transportation corridor that complements Milwaukie Avenue as the commercial "Main Street".

The project requires right-of-way acquisition of commercial and light industrial properties along this segment of the alignment, and active relocation support is essential to keep jobs in the corridor (Fig. 30).

Development opportunities: There are some redevelopment opportunities in this station area, particularly along SE Powell Boulevard. Light rail project improvements in this area will support the Inner Powell Boulevard Streetscape Plan.