Portland Union Station
Multimodal Conceptual Engineering Study

Submitted to Portland Bureau of Transportation

by IBI Group
with LTK Engineering

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IBI Group is a multi-disciplinary consulting organization offering services in four areas of practice: Urban Land, Facilities, Transportation and Systems.

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Executive Summary

Introduction and Study Purpose

This study examined the long-term needs of Portland’s historic Union Station to preserve and enhance its role as a multimodal transportation hub. Union Station faces significant challenges and opportunities in light of future transportation services, infrastructure investment needs, and its evolving urban environs.

The City of Portland Bureau of Transportation conducted this study in cooperation with: the Bureau of Planning and Sustainability; the Office of Management and Finance; the Portland Development Commission; Amtrak; Greyhound Bus Lines; the Oregon Department of Transportation (ODOT); Metro; TriMet; the Washington Department of Transportation (WSDOT); and other partners. This study was partially funded by the US Department of Transportation, Federal Transit Administration.

Study Highlights:

- Evaluated long-term needs of Union Station to maintain its viability as a multimodal hub.
- Studied railside capacity needs in light of projected Amtrak Cascades and high speed rail growth.
- Examined the feasibility of incorporating light rail and streetcar modes into Union Station.
- Identified opportunities for Greyhound terminal relocation near Union Station.
- Profiled historic multimodal terminals in the western U.S. and Canada as precedents for future enhancements.
- Proposed strategies to preserve and enhance the multimodal character of historic Union Station.
A Multimodal Gateway

Built in 1896, Union Station is a Portland landmark and is listed on the National Register of Historic Places. It is the oldest major passenger terminal on the West Coast and is the oldest of the grand “union” stations west of St. Louis. The station has five existing tracks and platforms, four of which are in regular use by Amtrak passenger and freight trains.

In 2008 Union Station became the busiest passenger station in Amtrak’s northwestern Cascades corridor between Eugene, Portland, Seattle, and Vancouver, B.C. Two Amtrak long-distance routes, the Coast Starlight (Seattle-Los Angeles) and Empire Builder (Portland-Chicago), also serve Union Station daily. Reinstatement of a daily Pioneer service to Salt Lake City is under study. Portland Terminal Railroad Company freight trains, providing local switching for...
the Union Pacific and Burlington Northern Santa Fe railroads, share trackage through Union Station.

Amtrak Thruway motorcoach services connect with scheduled train services at Union Station, as do intercity bus services to Central Oregon, the Willamette Valley, and coastal communities. Greyhound bus connections throughout the West are available from the adjacent bus terminal.

Union Station has excellent regional transit connections due to its proximity to the Portland Transit Mall (TriMet bus and MAX light rail) as well as existing and future Portland Streetcar lines. A 24-hour parking garage, taxis, pedicabs, bicycle amenities, car rentals, and nearby car sharing round out the modal options converging at Union Station.

The Portland Transportation System Plan includes policy language supporting the preservation of the multimodal character of this regional transportation hub.

**Future Challenges and Opportunities**

Union Station faces significant challenges and opportunities in the coming years:

- The aging terminal requires critical repairs to maintain safety and operability, including roof repairs, seismic/structural upgrades, ADA improvements, mechanical systems, and other repairs.
- Unprecedented levels of federal investment have been proposed for Amtrak intercity rail as well as the development of a new national High Speed Rail network. This could hasten the implementation of enhanced passenger rail services envisioned by ODOT and WSDOT for the Cascades corridor.
- The urban environs of Union Station are evolving as the area redevelops at higher densities. The challenge for Union Station is to maintain its operational functionality while also contributing positively to the surrounding urban fabric.
Future Transportation Conditions and Requirements

Regional and state visions for the Cascades corridor could result in significant increases in intercity rail service in future years, particularly in light of federal initiatives to promote development of High Speed Rail.

The WSDOT Long-Range Plan for the Amtrak Cascades Corridor envisions up to 13 round trips per day between Portland and Seattle by 2023, up from 4 round trips presently. This is in addition to expanded service on the Portland-Eugene segment currently under study by ODOT. The state DOTs envision an “incrementalist” approach to “Higher Speed Rail” through capital project bundles that provide increase service frequency and reduced travel times.

As currently envisioned, Union Station appears to have adequate capacity to accommodate these future service levels, though operations becomes increasingly constrained at higher service levels. Reinstatement of Track 6 as a freight bypass can increase operational flexibility and capacity at higher service levels. However, the reinstatement of Track 6 will require modifications to the existing fueling service road or migration to an in situ fuel storage and distribution solution.

Any significant upgrades to Union Station facilities will trigger the federal requirement for compliance with the Americans with Disabilities (ADA) Act. Most challenging, any upgrade to train platforms would require wheelchair accessibility at significant cost. Uncertainties in federal ADA guidance for train platforms, particularly when rolling stock with varying floor heights is in use, suggests that Union Station will require a specific FRA determination on ADA compliance.

Based on stakeholder consultations and a review of existing plans, there do not appear to be imminent plans to introduce other rail modes (e.g. commuter rail) into Union Station in the foreseeable future. However, this study examined the feasibility of introducing MAX light rail or the Portland Streetcar onto Tracks 1 and or 2 as part of a future extension. Alternatives that provided connections to the Portland Transit Mall, NW 3rd/4th Avenues; and Naito Parkway were examined.

Challenges of incorporating local rail transit modes into the tracks of Union Station include: permanent loss of terminal capacity for future intercity trains; complex alignment and trackwork issues in the vicinity of existing MAX tracks for the Portland Mall; and incursion into the restricted Amtrak platform/boarding area. Also, FRA restrictions on simultaneous use of tracks by compliant and non-compliant equipment may require an FRA waiver even if the streetcar/light rail tracks are physically separated from the “general railroad system of transportation.”

Greyhound Relocation to Union Station

The current Greyhound intercity bus terminal adjacent to Union Station is oversized and functionally obsolete for Greyhound’s current and future needs. The existing Greyhound parcel is also zoned for significantly higher densities than its current use. Because the proximity of bus, rail, and local transit modes enhances the multimodal character of the area, this study examined relocation of Greyhound terminal to alternative sites in or around Union Station.

The alternative preferred by the study committee uses a PDC-owned parcel that is currently a surface parking lot and slated for intensification. The concept envisions a purpose-built pavilion structure accommodating Greyhound’s passenger and operations needs, including 11 bus bays for Greyhound and other regional transit operators terminating at Union Station.

![Figure 5: Conceptual rendering of a new Greyhound terminal on a PDC-owned parcel.](image)
A potential additional benefit is the use of the new or existing Greyhound terminal as a temporary rail passenger facility during major renovations of Union Station, e.g. during structural/seismic retrofits or hazardous materials abatement.

Precedents

Several historic, multimodal stations from around the western U.S. and Canada were examined as precedents for future operations at Union Station. A number of historic rail terminals continue to function as modern, multimodal transportation hubs. The combination of intercity rail transportation with local transit modes is a particularly effective ingredient for the success of these terminals.

There are also precedents for the collocation of Amtrak and Greyhound operations within a single multimodal station, including Vancouver B.C.’s historic Pacific Central Station as well as new stations as in Salt Lake City, St. Louis, and Miami. Typically these facilities are configured to separate actual operations of Greyhound and Amtrak even when housed within the same facility.

Multimodal stations can also be positive contributors to urban environments while effectively maintaining rail operations. Most of the precedents examined have seen, or are poised to see, urban redevelopment and intensification immediately outside of the station footprint. This is in fact a goal of station-area planning in cities like San Diego, Denver, and Sacramento,
which are encouraging transportation-efficient redevelopment in proximity to their respective intercity and local transportation hubs.

Recommendations

With investment to preserve and enhance its historic infrastructure, Union Station is poised to meet the operational needs of intercity rail passengers for the foreseeable future.

- Realizing the full potential of Union Station will require strategic investment in rehabilitation, facilities enhancement, and passenger amenities.
- Rail capacity appears adequate for future operational needs envisioned under the WSDOT Long-Range Plan for the Amtrak Cascades Corridor. Passenger and freight trains coexist successfully under current operations, but re-introduction of Track 6 as a freight bypass will increase operational flexibility as intercity rail service levels increase in the coming years.

- Reinvesting in a new Greyhound terminal at Union Station will preserve the multimodal dimension of the area, and ensure that arriving and departing bus passengers are afforded high quality access to regional transit as well as intercity train and airport (via MAX) connections.
- Improving pedestrian connectivity to the Smart Park parking garage and Portland Streetcar stations will improve access and convenience for passengers.
- Other recommended transportation enhancements include real-time parking guidance, improved driveway management and enforcement practices to manage congestion, improved bicycle accommodations, and more convenient car sharing services for arriving passengers.
- The operational requirements of a working train terminal must be considered as the surrounding neighborhood continues to revitalize and intensify.
Chapter 1: Introduction

Introduction

Union Station, with its iconic Romanesque clock tower and signature terra cotta roof, is a Portland landmark. It is also a gateway to the city for thousands of arriving and departing residents and visitors every year. The famous “Go by Train” slogan beckons night and day and is an embodiment of Portland’s commitment to and reputation for sustainable transportation. Built in 1896, Union Station is preserved as a significant historic asset on the National Register of Historic Places. It is the oldest major passenger terminal on the West Coast and is the oldest of the grand “union” stations west of St. Louis.

With its strategic location on the north end of the urban core and adjacent to the newly-renovated Portland Transit Mall and the Greyhound bus terminal, Union Station is a multimodal hub connecting travelers to the region and to points beyond. The confluence of intercity rail and bus with local bus, light rail and streetcar create a regional transportation nexus whose benefits exceed the sum of its constituent parts.

Union Station faces significant challenges and opportunities in the coming years:

• The aging, historic terminal requires critical repairs to maintain safety and operability, including roof repairs, seismic upgrades, Americans with Disabilities Act (ADA) improvements, drainage repairs, upgraded life safety systems, a replacement power distribution system, and other repairs to the historic interiors and exteriors. The rehabilitation needs of Union Station are estimated to be greater than $40 million.

• At the same time, unprecedented levels of Federal investment have been proposed for both the Amtrak

Figure 7: Front view of Union Station.
intercity rail network as well as the development of a new national High Speed Rail network. These investments could bring improved speed, frequency, and quality of service across the Cascades corridor of which Union Station is a part. As the busiest passenger terminal in the corridor, Union Station is an integral part of the infrastructure that is required to support this service.

- Finally, the urban environs in the vicinity of Union Station are undergoing dramatic transformation as redevelopment and densification take root in the River District Urban Renewal Area. These changes are evidenced in the construction of the Yards at Union Station residences on the former rail yards behind Union Station, pending redevelopment of the Post Office mega block, and construction of the Resource Access Center and affordable housing on the opposite side of Irving Street. Union Station must continue to function as an effective rail hub, provisioning for future capacity needs, while integrating seamlessly into the surrounding urban fabric.

**Study Purpose**

The opportunity facing the City of Portland is to position Union Station to flourish as a full-service multimodal center in light of future transportation services and demand, infrastructure investment needs, and an evolving urban landscape. This report was commissioned by the City of Portland and the Portland Development Commission to explore how Union Station can respond to these challenges, strengthening its position as the region’s premier multi-modal transportation facility serving local, regional, and intercity transportation needs.

This study focuses on long-range transportation planning and feasibility issues as typified by the following questions:

- How well does Union Station function today as an intermodal transportation center?
- What are the future capacity and operational requirements in light of projected future service levels, both for intercity services as well as local high capacity transit that may serve Union Station?
- How can Union Station respond to future needs to effectively and efficiently serve passengers with an increasing level of convenience and accessibility?

**Previous Planning Efforts**

After purchasing Union Station in 1987, the Portland City Council established the Union Station Transportation Committee to prepare a long range vision and track plan, which reflected five goals:

**Goal 1.** Maintain and improve passenger comfort, aesthetics and historical integrity of Union Station.

**Goal 2.** Provide an adequate number of tracks for current and future passenger and freight railroad uses.

**Goal 3.** Improve and simplify the existing track layout.

**Goal 4.** Accommodate current and future passenger access and egress needs at Union Station platforms.

**Goal 5.** Balance transportation needs and redevelopment opportunities.

It has been over a decade since the question of rail capacity at Union Station has been comprehensively examined. The City of Portland commissioned a Union Station Transportation Study in 1991 (updated 1998) that analyzed the numbers of tracks and platforms that should be preserved to support existing Amtrak rail passenger services and future intercity and metro area operations. As a result the City decided to retain five tracks (Goal 2) and the High Shed pedestrian path from the head house to boarding platforms (Goal 4). Subsequent investments by the Oregon Department of Transportation (ODOT) and the Portland Terminal Railroad have simplified and improved the track layout and signaling (Goal 3).

**Study Participants**

Reflecting the diversity and complexity of Union Station itself, a number of agencies participated in providing direction, technical information, and policy input for this study:

**City of Portland**

As the primary municipal government agency for the largest city in the region, the City of Portland
has been a leader in walkable, bicycle-friendly development. As part of its responsibilities for planning the multimodal transportation system for the urban core, to the City of Portland commissioned this study to strengthen Union Station’s role as a premier multimodal hub and multimodal gateway for the region.

The Portland Transportation System Plan includes a policy (6.33) to “participate in coordinated planning, development, and interconnection of Portland, regional, and intercity transportation services for passenger travel.” A specific objective of this policy is to “support continuation of Union Station as the Multimodal Transportation Hub, serving as the primary passenger rail and intercity bus terminal in the Portland metropolitan area and providing direct connections among passenger rail, light rail, streetcar, intercity buses, taxis, and airport shuttles.”

Portland Development Commission
The Portland Development Commission (PDC) was created by Portland voters in 1958 to serve as the city’s urban renewal agency as laid out in Chapter 15 of the City’s Charter. PDC provides comprehensive housing, development and economic development programs within the Portland region. PDC owns Union Station and also oversees the River District Urban Renewal Area, of which Union Station is a part. (Note that there is a pending appeal of the River District boundaries). PDC is working to foster the redevelopment of the surrounding neighborhoods including rehabilitation of Union Station.

Amtrak
As the United States’ national passenger railroad, Amtrak operates intercity passenger rail services out of Union Station. This includes the Cascades service between Eugene, Portland, Seattle, and Vancouver B.C. several times a day. Amtrak also operates the transcontinental Empire Builder between Portland and Chicago, and Union Station is a stop on the Coast Starlight route between Seattle and Los Angeles. Additionally, several Amtrak Thruway intercity bus lines provide connecting services between trains at Union Station and communities across Oregon, including supplemental service to Eugene.

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Oregon Department of Transportation (ODOT)
ODOT oversees the planning, funding, regulation, and operations of many aspects of the multimodal transportation network. The ODOT Rail Division is responsible for planning and operations of passenger and freight rail systems, and is currently undertaking a statewide rail study. ODOT provides funding for the Oregon portion of the Amtrak Cascades line between Portland and Eugene. ODOT also operates...
a successful intercity bus program, including several lines that connect with Amtrak services and/or terminate at Union Station.

**Washington State Department of Transportation (WSDOT)**

WSDOT provides similar functions to ODOT in Washington State. WSDOT is a major contributor to the operation of the Amtrak Cascades service, having invested over $300 million in capital and operating expenses since 1994. WSDOT has developed Mid-Range and Long-Range Plans for the future development of passenger rail in the Cascades corridor detailing infrastructure and operating investments to sustain certain levels of train frequency and speed.

**Greyhound**

Greyhound operates the largest intercity bus network in the country. Greyhound operates out of a shared intercity bus terminal located immediately south of Union Station. Greyhound also operates Thruway bus services in Oregon under contract to Amtrak.

**Portland Terminal Railroad Company**

Operating from the Guilds Lake Yard north of Union Station, the Portland Terminal Railroad Company (PTRC) is a short line railroad that conducts freight operation on tracks through Union Station. The PTRC is jointly owned by the Union Pacific and Burlington Northern Santa Fe railroads.

**Metro**

Metro is the Metropolitan Planning Organization for the Portland area. As part of its transportation mandate, Metro is undertaking a regional High Capacity Transit (HCT) System Plan to define investment priorities in the Portland region over a 30-year period.

**TriMet**

Tri-County Metropolitan Transportation District of Oregon (TriMet) is the primary transit agency in the Portland region. TriMet operates an extensive network of bus, light rail (MAX), streetcar, and commuter rail services. Several of these lines serve, or will serve, Union Station, including the refurbished Portland Mall that will service buses and MAX trains in the urban core.

**Zipcar**

Zipcar is a car sharing service operating in Portland and cities across the U.S. Zipcar allows members to reserve and use automobiles in the Zipcar fleet (including fuel and insurance costs) on an hourly or daily basis. Zipcar has a number of vehicles located within the neighborhoods surrounding Union Station. At other locations in the U.S. Zipcar has vehicles stationed within or adjacent to rail stations, providing an amenity for arriving passengers.

**Study Methodology**

This project was conducted between November 2008 and June 2009. The following are the key activities conducted in the course of reviewing existing conditions, analyzing future needs, and developing recommendations:

**Kickoff Meeting**

A kickoff meeting was conducted on November 8, 2009 at Union Station involving participants from the project steering committee. In addition to reviewing the project work plan and tasks, stakeholder agencies discussed study objectives and ideas for the future vision of Union Station as a multimodal hub.

**Information Collection and Review**

The study team conducted a background scan of existing documentation and studies pertaining to Union Station and associated rail system and neighborhood planning. The City assisted the team in identifying and obtaining background studies, documentation, reports, base maps, photos, GIS layers, plans, data, etc. from project stakeholders based upon a written information request submitted by the study team. Using City data, the study team identified and documented classification of streets within the study area.

**Stakeholder Agency Outreach**

The study team met with stakeholder agencies in one-on-one meetings to review previous and existing plans and policies, including existing operational
needs and planned changes in future services. The objective of these meetings was to identify and interpret relevant plans, policies, and regulations as a basis for analyzing future transportation services and facility requirements.

**Federal and State Railroad Regulation**
The study team reviewed and evaluated the regulations of the Federal Railroad Administration (FRA) which govern the design and operation of Amtrak and freight railroad rolling stock and signal systems (including grade crossing warning devices). Rules regarding the shared use of tracks by railroad and “non-compliant” vehicles (e.g. streetcars and/or light rail vehicles) were considered. Applicable Oregon state rail policies were also reviewed. A written summary of applicable federal and state regulations and their likely effects on joint use of tracks at Union Station is incorporated into this report.

**Multi-Modal Transportation Center Precedents**
Following identification of key issues of concern, the study team prepared a shortlist of multimodal transportation facilities in the US and abroad that share similar operational characteristics to Portland Union Station and which may provide insight into potential solutions. Several multimodal facilities with similar operational and urban characteristics were profiled, including modes served, functional facility layouts, and other facility data and characteristics. Similarities or lessons learned in light of Union Station’s needs were discussed.

**Existing and Future Track Utilization**
The study team worked with Amtrak, Oregon DOT, Washington DOT, and Portland Terminal Railroad representatives to review and document existing track utilization as well as any anticipated changes in the future.

**Inter- and Intra-City Passenger Rail Activity – Current and Future**
The study team consulted Oregon DOT, Amtrak, Washington DOT, and the Portland Terminal Railroad to confirm and update the information on current operations, and to understand their future plans in order to better predict likely potential future facility requirements at Union Station.

The potential implementation timetables for commuter rail services were also reviewed with TriMet, Metro, and regional planning staff. With this information in hand, the study team assessed the needs for track space and utilization of tracks likely to emerge at representative future levels of train traffic through the facility.

The primary objective of this analysis was to ascertain the ability of Union Station to accommodate future service increases, with or without the use of Tracks 1 and 2 for light rail, streetcar, or mixed traffic operation. The study team assessed the feasibility of accommodating future intercity passenger and freight rail operations under existing five-track scenarios using various assumptions for future service levels.

**Intercity Bus Activity and Greyhound Relocation Study**
The study team met with Greyhound Terminal management to assess current and proposed intercity bus operations at the terminal, including but not limited to services operated as Amtrak Thruway connections to intercity rail services. Based on analysis of current and future space and operating requirements, the team evaluated opportunities to relocate Greyhound and other motor coach services into a new, more appropriately-scaled facility in the vicinity of Union Station. Schematic design alternatives were developed for the consideration of stakeholder agencies.

**Light Rail and Streetcar Transit Service Integration**
The study team met with TriMet, Metro, and City personnel to discuss potential alternatives for introducing MAX and streetcar into Union Station. The study team examined scenarios where Track 1 or Tracks 1 and 2 were removed from intercity services and dedicated to local rail transit service by MAX or streetcar.

**Review of Recommendations**
Findings and proposed recommendations were reviewed with stakeholder agencies. Comments and revisions were incorporated into this final report.
Chapter 2: Existing Conditions

History and Character

Portland Union Station, designed by Van Brunt and Howe Architects, was completed and opened for service on February 14, 1896. It is the oldest major passenger train terminal still in operation on the West Coast. The building has been in continuous use for 113 years, and has had one major remodeling in 1930 and numerous repairs and modifications since.

The building is a long horizontal structure punctuated by a 170-foot clock tower, its primary feature. The main volume of the building is a three-story structure that contains the lobby and waiting areas, with two- and one-story wings extending to the east and west stepping down in mass from the main volume. The building was constructed with brick bearing walls and heavy timber framing. The expansive red tiled roof was originally clad with metal tiles. A separate two-story boiler room annex is located to the south. The boiler room annex houses railroad crew facilities on part of the ground floor and has vacant tenant space on the second floor. As with the main station building itself, the boiler room is not compliant with current building codes.

Chapter Highlights:

- In 2009, Union Station became the busiest passenger terminal in the Amtrak Cascades Corridor.
- Significant increases in intercity rail train services and investment have been proposed in the coming years.
- Union Station is faces challenges in sustaining operations in the future without investment in pressing rehabilitation needs.
- The neighborhood surrounding Union Station is poised for significant redevelopment and intensification over the next few decades.
Uses and Layout

Amtrak and rail passenger facilities occupy most of the ground floor with a ticketing counter, large passenger waiting room, smaller first class waiting room (Metropolitan Lounge), secondary lobbies, baggage claim, queuing space at track side, a large baggage room, secure commissary storage space, and package express facilities. An adjoining wing to the northwest of the Amtrak baggage room is used by the City of Portland for building maintenance.

The remaining ground floor spaces to the southeast of the main waiting room include a small retail/newsstand, restrooms, and Wilf’s Restaurant, which is open for lunch and dinner.

Amtrak also has regional offices on the second story, occupying space once used for Southern Pacific engineering offices. Many of the office spaces on the second and third floors have private offices or are vacant; the physical condition of the building is a deterrent to attracting additional lease tenants to the upper floors of the building.

The main entrance to the station is located at the Entrance Plaza, a landscaped driveway accessed by NW Station Way (NW 6th Avenue Extension). This new street extension connects the north end of NW 6th avenue to NW 9th Avenue in the Pearl District. The street continues diagonally past the southwestern side of the building then heads north under the Broadway Bridge ramp and continues diagonally adjacent to the train tracks until it reaches 9th Avenue. The street is the main vehicle access to Union Station.

Passengers arrive in the driveway by bus, taxi, auto, bicycle, and as pedestrians on the southwest face of the building. The driveway can be a congested

Figure 9: Layout of Union Station.
space during peak train arrival periods, which occur 4 to 6 times per day. The driveway is used for passenger pickups and drop-offs, taxi queuing, and active loading and layover for Thruway and other intercity motorcoach providers serving Union Station. Congestion is exacerbated during periods of multiple train arrivals or delays when pick-up/drop-off traffic (including taxi queues) lingers in the driveway longer than normal.

The train tracks (1–5) and passenger boarding platforms are located on the northeast side of the building. Passengers access the platform through the main lobby and are not allowed onto the platform without a valid ticket.

Maintenance trucks and delivery vehicles arrive off the driveway to a small parking area at the northwest end of the building. Another driveway is located under the Broadway Bridge ramp and has access to a small outdoor storage space that is covered with a tall steel shed and has access to the tracks and platforms. Fuel trucks service the diesel trains from this area and spare parts, flammable liquids and baggage carts are stored here. Passengers are restricted from this area.

A small employee parking area is located at the southeastern end of the building adjacent to the boiler room structure at the north end of NW 5th Avenue. The parking area continues between the two buildings and is restricted as a fire lane. A pedestrian bridge with stairs and elevator is located between

![Figure 10: Square footage of various uses in Union Station.](image)
the two buildings and provides access over the train tracks to the Yards at Union Station and Naito Parkway beyond.

Wilf’s Restaurant has a separate entrance through the station garden off of NW Station Way. Wilf’s customers and employees utilize the PDC parking lot opposite the station at the intersection of NW Station Way and NW Irving Street.

Physical Conditions

The physical rehabilitation needs of Union Station are well documented and are therefore treated briefly in this document. A number of exterior and interior features have deteriorated due to deferred maintenance and building components and systems that are well beyond their intended operational lives. Examples include roof tiles, trusses, and areas on the exterior walls where bricks have spalled and mortar has deteriorated, requiring repointing. The north end of the building has significant damage where the structural terra cotta is exposed. Lead paint, asbestos, and aging plumbing, mechanical, and electrical systems are other significant concerns. As an historic structure many facets of the structure are not compliant with modern building codes (e.g. sprinkler systems, secondary emergency egresses). These are issues that will need to be addressed as part of the building’s renovation.

Structural Issues

Union Station is situated on an in-filled lake. The soil is therefore unstable and the building has settled unevenly over its 100-plus year life, causing significant portions of the facility to list in the direction of the river. This deterioration is evidenced by sloping walls, floors, and doorways throughout the building.

The existing building, sheds, canopies and platforms are deteriorating due to numerous water problems from rain and damaged underground storm drainage system for the platforms.

Platform Area

Union Station has five tracks, numbered eastward from the head house, and designated as follows:

- Track 1 – Storage track for Amtrak and privately owned rolling stock (little used)
- Tracks 2 and 3 – Amtrak station tracks for terminating and originating trains
- Tracks 4 and 5 – Mainline tracks for through passenger and freight trains

Tracks 4 and 5 are shared by passenger and freight trains. Tracks 2 and 3 are passenger only. Freight trains primarily run on Track 5 but occasionally use Track 4. Tracks 1 through 4 are owned by the Portland Development Commission; Track 5 is owned by the Portland Terminal Railroad Company.
Beyond Track 5 is a service road, formerly Track 6, currently used for fueling and maintenance. The right of way has been considered for possible reinstatement of Track 6, though this would require alternative provisions for fueling and other train servicing operations currently using the service road. The passenger loading platforms are asphalt and in a deteriorating condition. They are low level platforms that do not facilitate level boarding onto rail cars. Onboard or portable lifts are used to provide handicapped access to rail cars. Platform canopies, while historic in character, are rusted and in need of repair or replacement. The canopies and platforms do not meet current requirements regarding geometry and ADA compliance and would need significant modifications. In the 1990s, the canopy adjacent to Tracks 4 and 5 was modified to accommodate Amtrak Superliner equipment and provide better clearance for maintenance and operations employees.

**Seismic Issues**

Related to structural issues and the age of Union Station is the fact that the structure is susceptible to damage from a major seismic event. The need to retrofit the structure for improved safety and resilience in the event of an earthquake has been documented and is a priority for investment to preserve Union Station.

**Neighborhood**

Union Station is located north of the Portland Central Business District near the convergence of the Old Town/Chinatown and Pearl District neighborhoods. Portland Union Station is located within the Portland Development Commission’s pending River District Urban Renewal Area (URA), which encompasses the Pearl District, several riverfront properties, and

![Figure 13: Neighborhoods surrounding Union Station.](image-url)
significant portions of Old Town/Chinatown. Tax increment financing allows some of the taxes earned on redevelopment projects to be directly invested back into the URA for infrastructure and property acquisition, creating a positive feedback loop for the area.

The Old Town/Chinatown neighborhood is part of the original core of Portland. The neighborhood features numerous attractions, such as Skidmore Fountain, the Portland Classical Chinese Garden, and numerous nightclubs. However, the neighborhood has seen decline since its heyday, and it is now home to a large number of surface parking lots and under-utilized buildings. Redevelopment efforts, such as a new Uwajimaya Asian food store and housing development, are envisioned to revitalize the neighborhood.

The Pearl District is a former warehousing and rail yard district in Northwest Portland that has undergone revitalization as a high-density residential neighborhood since the early 1990s. The Portland Streetcar helped to boost development in the neighborhood, which features several well-designed parks and Powell’s City of Books, which claims to be the largest independent new and used bookstore in the world. However, Union Station is isolated from the Pearl by the Broadway Bridge to the north and a large US Postal Service distribution center to the west, which covers a roughly 13-acre site and lacks any cross streets (see redevelopment discussion below).

In addition, the area along the Willamette River near Union Station has seen several new housing developments, such as The Yards at Union Station, which is connected to Union Station by the pedestrian bridge.

Development around Union Station

Development projects proposed and in progress illustrate the dramatic transformation underway in the vicinity of Union Station, from a formerly industrialized and low-density fringe district to a higher density, mixed-use neighborhood. In 2002 PDC sponsored a design study for the northern Chinatown/Old Town neighborhood, the NW Broadway Urban Design Master Plan.
Significant developments in the neighborhood include the following (see Figure 11 for geographical location):

1 - Centennial Mills

PDC is planning to convert this former grain mill facility into a major public facility for the River District (Figure 12). Plans include a public market, gathering spaces, restaurants, and retail. The project may preserve the current Mounted Police Unit facility or utilize that land for a number of other uses.

2 - One Waterfront Place

This 12-story, LEED™ Platinum pre-certified office building would include a pedestrian bridge over the train tracks, connecting residents of the Pearl District with the waterfront and a new job center for the River District.

3 - Hoyt Street Property Master Plan

The Hoyt Street Property master plan, which covers several blocks to the northwest of Union Station, includes a large neighborhood park (Figure 13) across the street from Centennial Mills, in addition to a number of mixed-use projects, one of which is the Encore building recently completed at NW 9th Avenue and NW Overton Street.

4 - Post Office

This 13-acre site opposite Broadway from Union Station is currently used as a central distribution facility for the US Postal Service, a site that has become increasingly incompatible with surrounding urbanization and redevelopment trends. The Postal Service is considering relocating its operations to another site. The Portland Development Commission is currently working toward purchasing and redeveloping the Post Office site, and potential uses include reinstituting the street grid for high density mixed use development, or retaining the superblock characteristic for a large footprint use.

Figure 17: Map of various projects in the River District Urban Renewal Area. Union Station is location 6.

Figure 18: Centennial Mills redevelopment project.
5 - Resource Access Center Affordable Housing Project

The Resource Access Center is an eight-story, 106,000 square-foot building that will provide a 90-bed men’s shelter, five floors of permanent housing with 130 studio apartments, as well as transitional aids such as computer stations, lockers and showers, laundry facilities, a barbershop, telephones, and mail facilities.

6 - Blanchet House Redevelopment

Blanchet House of Hospitality, currently located at 340 NW Glisan Street, has been serving meals and providing temporary lodging to Portland’s homeless community since 1952. A new, larger facility is envisioned at the foot of the Steel Bridge in Old Town/Chinatown.

7 - Yards at Union Station

The Yards at Union Station is a large apartment complex across the tracks from Union Station, located on former Southern Pacific rail yards. A number of the units are income-restricted, and the development is connected to Union Station by a pedestrian bridge. The rear property line of this development abuts the service road next to Track 5, effectively constraining any future expansion of the footprint of the rail right of way.

8 - Streetcar

The Eastside Loop extension of the Portland Streetcar, which has received funding for implementation, passes adjacent to Union Station at elevated grade on the Broadway Bridge. See Chapter 3: Future Transportation Conditions for further discussion.

Figure 19: Current site plan for The Fields Neighborhood Park in the Pearl District.

Figure 20: The proposed Resource Access Center at NW Broadway and NW Irving. Part of Union Station is visible behind the building.
Transportation Conditions

Union Station is well-connected to the local, regional, and intercity transportation network, including mass transit, intercity buses, freeways, parking, bicycle paths and pedestrian walkways. The following discussion summarizes existing transportation conditions.

Intercity Passenger Rail

Union Station primarily serves as an Amtrak intercity passenger rail station. Portland presently is served by eight arriving and eight departing Amtrak trains each day.

Amtrak Cascades

The majority of train and passenger movements at Union Station are part of the popular Amtrak Cascades service, now offering four daily round trips between Portland and Seattle. Of these, two round trips continue to/from Eugene and two begin at Union Station and travel north to Seattle. From Seattle continuing northbound service is available to/from Bellingham, WA and Vancouver, BC. The Bellingham train will continue north to Vancouver beginning in August 2009.

Total ridership in the Cascades corridor in 2008 was 774,421 passengers, the highest ridership level ever and a 14.4 percent increase from 2007 according to WSDOT statistics. In 2008, Union Station accounted for the most passenger boardings and alightings in the Cascades corridor (451,026), exceeding Seattle (438,787) for the first time since Cascades service began in 1994.

Cascades service utilizes Spanish-designed Talgo pendular trainsets, which tilt to allow higher speeds relative to track curvature and superelevation, a feature that is an asset along the corridor’s winding tracks. However, due to track conditions, FRA regulations limit train operations to 79 mph.

The line is funded in large part by WSDOT and ODOT, each of which fund operations and certain infrastructure improvements within their respective segments. Union Station is the demarcation between the Oregon- and Washington-funded segments of the line; WSDOT has historically funded operations north of Union Station (to Seattle and points north), while Oregon funds operations south of Union Station (to Eugene).

Amtrak Coast Starlight

Trains 11 and 14 are the Seattle-to-Los Angeles Coast Starlight. This long distance route features sleeping cabins and is known for its scenic route, making it popular among vacationers, rail enthusiasts, and long-distance travelers between California and the Pacific Northwest. Trains are typically 10 to 12 cars and 2 diesel locomotives totaling 1,000 to 1,200 feet in length. These trains nearly always stop on Track 5, due to their length, so that they do not block the High Shed crosswalk.

Changes over time in traffic levels at Portland Union Station

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[a] In practical terms, Portland-Eugene trains are continuations of Seattle-Portland runs.

Figure 21: Table of past and current passenger rail operations at Union Station.
Amtrak Empire Builder

Trains 7 and 8 are the Portland-Chicago Empire Builder, typically with 4 or 5 cars and 1 diesel locomotive totaling about 400 to 500 feet long. This train splits and recombines at Spokane, Washington, with segments of the cross-country consist terminating at Seattle and Portland, respectively. The arriving train usually stops on Track 4 or 3 south of the High Shed, is moved across the Steel Bridge for turning during the day and then re-spotted on Track 4 or 3 south of the High Shed until its late afternoon departure. Because Union Station is a terminating station for the Empire Builder, additional commissary supplies and servicing equipment are housed in the non-public portion of the Amtrak facilities at Union Station. Additionally, dwell times of Empire Builder trains tend to be longer that other services because of the layover time for maintenance, servicing, and schedule recovery.

Other Passenger Rail

Union Station infrequently serves other passenger rail trains. Examples include private railcars and special or historic excursion equipment, such as former Southern Pacific equipment displayed as part of National Train Day in May 2009. These cars are typically stored on Track 1 when stopped at Union Station.

Terminal Passenger Operations

The main waiting room and ticketing is occupied intermittently throughout the day in concert with train arrivals and departures. Departing rail passengers began arriving in significant numbers up to one full one hour before departure. According to Amtrak station operations personnel, the passenger departure lobby and boarding gates are suited to up to two simultaneous departures or arrivals. During delays, or when 3 or more trains are actively boarding, the space becomes congested and chaotic.

The passenger platforms are restricted spaces, limited to ticketed passengers during boarding periods only. The prohibition on unticketed passengers from entering the platform area helps to manage operations, security, and safety in vicinity of active rail lines.

Amtrak baggage and ancillary spaces are suited for normal operations, though space shortages in the baggage room can result during delays, winter storms, and busy holiday travel periods.

The main waiting room is the focal point for passenger activities at Union Station. It houses three activities: ticket sales, space assignments (coach and business class seats, and sleeping car rooms), and a large area where passengers may sit or stand while waiting for the call to board their trains. In addition, the Metropolitan lounge, Amtrak's only first-class passenger lounge on the West Coast, provides additional seating for passengers.

**Ticketing**

Arriving through the main entry, passengers are in view of the queuing area for the ticket counter. Cordons establish waiting lines for coach and first/business class patrons. The ticket clerks sell coach, first and business class passage and sleeping car rooms on the long distance services, for the current day’s and future days’ trains. Tickets also can be reserved online at Amtrak’s website, but in some cases must be picked up at the station ticket office.

One of the ticket clerks also assigns Cascades business class seats for that day’s trains.

Once ticketed, passengers may either:

- If not checking baggage, turn east to the waiting area and train gates, or
- If checking luggage, continue north through the Great Hall to the Baggage Check area, then return to one of the waiting areas

**Coach Seat Assignments**

At present, all trains serving Union Station assign seats to coach passengers. This task is accomplished by each train’s crew, using the semi-circular counter between the train concourse entryways at the east end of the Main Waiting Hall. Once seats are assigned, passengers may seat themselves in the waiting areas, or join the boarding queue for their train.

**Queuing**

From the foregoing, it may be seen that a coach passenger may spend time in up to four queues, of which three use space in the Main Waiting Hall: at the
The area immediately south of Union Station is within TriMet’s “Fareless Square,” where passengers are able to board without paying, significantly speeding boarding times in the downtown core. Those trips beginning and ending in the Fareless Square are free. Note that, as of the time of writing, the boundaries and policies regarding Fareless Square were being re-evaluated by TriMet.

MAX Light Rail
TriMet’s 44-mile Metropolitan Area Express (MAX) light rail system with 64 stations connects the cities of Portland, Gresham, Beaverton and Hillsboro, and the Portland International Airport. MAX accounts for 34% of weekday transit trips in the region. All three lines cross the Steel Bridge to the south of Union Station. The following lines are currently in operation and stop at NW 1st Avenue and NW Everett Street - a 7-block walk to Union Station:

• The 5.5-mile Airport MAX Red Line opened in September 2001 and connects with the MAX Blue and Yellow lines. It runs every 15 minutes between Beaverton and Portland International Airport.

Local and Regional Transit
TriMet’s transit service, including MAX light rail, buses and, Westside Express Service commuter rail, carries over 300,000 passengers per weekday in the Portland Metropolitan Area.

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Arriving passengers claim baggage & disperse
Departing passengers assemble, buy tickets, check baggage, obtain seats
Departing passengers board train

Figure 22: Graphic distribution of afternoon station activities.
The 15-mile Eastside MAX Blue Line runs between downtown Portland and Gresham.

The Interstate MAX Yellow Line connects the Expo Center through North Portland to the Rose Quarter, and through downtown Portland.

The 18-mile Westside MAX Blue Line runs between downtown Portland and the cities of Beaverton and Hillsboro.

With the rehabilitation of the Portland Transit Mall, the existing Yellow Line and the future MAX Green Line to Clackamas Town Center will service new stations two blocks from Union Station. This is discussed further in the Future Transportation Conditions section of this document.

Portland Streetcar

The first segment of the popular Portland Streetcar system, owned by the City of Portland and operated by TriMet, opened in 2001 and has been a major factor in the redevelopment of the Pearl District to the west of Union Station. The streetcars run on an 8.0-mile continuous loop (4.0-mile in each direction) from Legacy Good Samaritan Hospital at NW 23rd Avenue, on Lovejoy and Northrup, through the Pearl District and on 10th and 11th Avenues, to Portland State University, SW River Parkway and Moody (RiverPlace), and SW Moody and Gibbs in the South Waterfront District. Here the Streetcar connects with the Portland Aerial Tram to a terminus at SW Lowell and Bond.

Of the 46 stops on the loop, several are within a short walk of Union Station. Of those within TriMet’s Fareless Square, the closest stops are the northbound stop at NW 10th and NW Glisan and the southbound stop at NW 11th and NW Glisan, which are approximately 6 and 7 blocks from the station, respectively. Future extension of the streetcar to the Eastside is planned; this is discussed in the Future Transportation Conditions section of this document.

TriMet Bus

A number of TriMet bus lines serve the area immediately surrounding Union Station. Many of the routes that traditionally served the Portland Transit Mall along 5th and 6th Avenues were moved to 3rd and 4th Avenues during construction. With the completion of the project, many of these routes resumed service on the Mall starting May 24, 2009. The following routes now serve the 5-block radius around Union Station:

- 4 – Division/Fessenden
- 8 – Jackson Park/NE 15th
- 9 – Powell/Broadway
- 16 – Front Ave/St Johns
- 17 – Holgate/NW 21st
- 33 – McLoughlin/Fremont
- 35 – Macadam/Greeley

Figure 23: The Portland Streetcar.

Figure 24: Streetcar (orange), the Portland Transit Mall (yellow) and existing Max lines (red) in relation to Union Station (center). The dashed blue line shows the future East Portland Streetcar. Dots show light rail or streetcar stops. The Greyhound facility is between the two MAX stops on the Portland Transit Mall.
Figure 25: Map of transit operations in Downtown Portland.
wayfinding signage between Union Station and this garage is not currently present.

A number of privately owned parking lots are also located within a short walk of Union Station to the south (Old Town area), but rates tend to be significantly higher than the SmartPark garage.

**Automobile**

Union Station is highly accessible by automobile given its proximity to major arterials and freeways. In addition to the compact street grid downtown, the Broadway Bridge provides convenient access to East Portland and Interstate 5, while the Pacific Highway West (99W) crosses the Steel Bridge to the south. In addition, Interstate 405 is located roughly 8 blocks west of Union Station and completes a freeway loop effectively tying Union Station and the Central Business District (CBD) to regional centers in the metropolitan area.

**Parking**

Sixty-five public parking spaces are available on a triangular parcel opposite NW Station Way from Union Station. On-street parking is also available on NW Station Way underneath and beyond the Broadway Bridge ramp. On-street spaces in the vicinity of Union Station are metered through the City of Portland’s pay-and-display multi-space meter system, which accepts coins, credit cards, and smart cards. Allowable parking durations are between 90 minutes and 5 hours, limiting the utility of these parking spaces for departing rail passengers looking for longer-term or overnight parking.

Of greatest interest to passengers arriving by automobile to depart by rail is the City of Portland’s 400-space SmartPark public parking garage is located off NW Station Way, adjacent to the Lovejoy Ramp of the Broadway Bridge. This garage is open 24 hours and charges a maximum of $6 a day. Overnight parking is allowed at this facility, and currently garage occupancy ranges in the 50-60% range at peak periods, meaning that paid public parking is usually available for rail passengers. The garage is approximately a five minute walk from Union Station via the NW Station Way underpass under the Broadway Bridge. Sidewalks are present but this area can be isolated and dark at night. Pedestrian taxi queue during afternoon train arrival. Figure 26: Taxi queue during afternoon train arrival.

**Taxi**

Taxis currently queue in the driveway in front of the station prior to train arrivals. The combination of the taxi queue and other vehicular activity (e.g. pick-up and drop-off) leads to congestion in the passenger drop-off zone, particularly when several trains arrive or depart simultaneously or during delays.

Figure 27: Taxi queues and pick-up traffic can spill over onto NW Station Way, causing congestion.
Car Rental

Several rental car agencies are located within a short walk of Union Station; however most are not explicitly geared towards arriving rail passengers. Hertz has a rental office telephone (call for pickup) at Union Station, and Dollar (Broadway and Davis), Thrifty (Broadway and Pine), and Crown Auto Rental (5th and Couch) all operate offices within a 10-block radius of the station. In addition, Enterprise, Budget and Avis will pick up or drop off customers at Union Station, and Budget and Avis both operate offices within a few blocks of the Portland Transit Mall.

Carsharing

In addition to conventional automobile rentals, commercial car sharing has increased in popularity in recent years. Customers are able to reserve cars scattered throughout a city and use their individual or business account card to unlock cars to use on an hourly or daily basis. This service is convenient for those who travel by intercity rail but need access to an automobile for the “first and last mile,” especially if transit is unavailable to their final destination. Zipcar, the largest car sharing company in the US, currently has 25 cars parked in as many locations within a 10-block radius of Union Station, including one adjacent to the station at NW Irving Street and NW 6th Avenue.

Amtrak Thruway

To supplement its rail lines, Amtrak operates several “Thruway” intercity buses, including a Portland to Eugene bus as part of the Cascades service. Thruway buses board and alight passengers at the curb along the west side of the building, adjacent to the Amtrak baggage counter. Coaches also lay over at this location or on the opposite curb adjacent to NW Station Way.

Greyhound

Portland’s Greyhound depot is located immediately south of Union Station and provides regional and nationwide bus service, including: daily trips to Spokane; twice-daily trips to Salt-Lake City; and several trips to Sacramento, Seattle, and Vancouver, BC. Many buses overnight at the depot which features facilities for drivers and light vehicle maintenance. Other secondary coach and transit operators (e.g., Tillamook Transit) also operate through this facility.

Greyhound considers its two-block facility to be oversized and functionally obsolete, and has been exploring relocation alternatives. In addition, the parcel that Greyhound occupies is zoned for much higher densities, suggesting that an alternative highest and best use may be possible for this site.

Other Bus Operators

In addition to Amtrak- and Greyhound-branded buses, a number of public and private bus operators provide regional services from Union Station (some of which are operated under the Amtrak Thruway banner):

- The Central Oregon Breeze – twice-daily service between Portland and Bend
- Oregon Coachways – daily service to Astoria via Cannon Beach
- The Valley Retriever – daily service to Newport via Salem and Corvallis
- Tillamook County Transportation District – twice daily service to Tillamook

The Oregon Department of Transportation provides operating and capital support for a number of intercity bus connections in the state, including lines servicing Union Station and the Greyhound terminal.
This includes the Amtrak Thruway service between Portland and Eugene that supplements Cascades rail service in this corridor. ODOT considers the intercity bus program to be highly successful based upon ridership and fare recovery metrics.

**Bicycle**

Recognized as one of the most bicycle friendly communities in the United States, Portland hosts a wide network of bike trails, bicycle boulevards, and bike corrals (parking) that affirm the place of cycling in the City’s transportation system. This, combined with relatively flat neighborhoods and an environmentally-minded population, makes bicycling a prominent mode of transportation in Portland, with a bicycle mode share up to three times higher than comparable cities.

Accordingly, Union Station is reasonably accessible by bicycle, with bike trails crossing both the Steel Bridge and the Broadway Bridge and several safe approaches to the station available. In addition, the pedestrian bridge connects cyclists to the waterfront trail, and bicycles are allowed on MAX, TriMet bus, and the Portland Streetcar.

Union Station provides 10 covered bicycle parking spaces while 14 are available at the Station Place parking garage just north of the station.

![Map showing bicycle facilities in the vicinity of Union Station. Off-street paths (purple) are also used by pedestrians.](image-url)

**Figure 29:** Map showing bicycle facilities in the vicinity of Union Station. Off-street paths (purple) are also used by pedestrians.
Commercial pedicabs are periodically observed in the vicinity of Union Station. Pedicabs provide an environmentally low-impact option for rail travelers to destinations within central Portland.

Currently Amtrak policy requires bicycles carried onboard trains serving Union Station to be checked as baggage, either using an onboard bike rack (Cascades services), an Amtrak cardboard “bike box” (available for purchase at Union Station) or other approved shipping container.

**Pedestrian**

Portland is widely known as a pedestrian-friendly city, and the vicinity of Union Station features safe and convenient walking routes (including crosswalks) on most streets. A pedestrian bridge over the active rail lines also offers easy access to riverfront developments along Front Avenue. The Broadway Bridge provides the most direct pedestrian route across the river to the Eastside. The downtown business district, Pearl District, and Old Town/Chinatown neighborhoods are all within a ¼ mile radius of Union Station.

Certain shortcomings in the existing pedestrian connectivity around Union Station are noteworthy. Pedestrian wayfinding signage to nearby destinations and transit stops in and around the station is not common. Pedestrians may have trouble determining where to enter and exit the station for various activities. As mentioned previously, the pedestrian route from Union Station to the Station Place parking garage passes under a dark overpass and may benefit from new design features such as lighting and landscaping. Wayfinding between Union Station and MAX/bus stations on the Transit Mall would improve the connectivity to local transit connections here.

One of the most tenuous pedestrian connections at Union Station is to and from the Portland Streetcar. The nearest stations on the existing alignment are at NW 10th and 11th Avenues at NW Glisan St., on the opposite side of the Post Office parcel. The nearest station on the eastside streetcar loop will be at NW 9th and Lovejoy.

**Freight Rail**

The Portland Terminal Railroad Company (PTRC) owns Track 5, and is responsible for freight operations through Union Station. PTRC and Amtrak have an informal working relationship, to coordinate operations so that freight train movements do not conflict with Amtrak arrivals and departures, as well as terminal movements during train layovers (notably, the daily midday turning of the Empire Builder consist on the wye at the east end of the Steel Bridge). Movements through Union Station are controlled by Union Pacific Railroad (UPRR) dispatchers, now that UPRR owns the controlling financial interest in
PTRC (UPRR 60%; BNSF 40%). PTRC management indicates that this working relationship has been satisfactory.

At present, freight traffic is down significantly from previous years, both locally and nationally, as a result of the global economic slowdown. Currently, as few as 3 to 4 freight trains a day pass by, owing to the decline in rail freight resulting from the general recession in the US economy. When the economy rebounds, the number of freight trains through Union Station may grow back toward the 8 trains that were operating when the 1991 Union Station report was prepared (Figure 25); however, it seems unlikely that greater numbers of freight trains than that would ever materialize, as those running now and in the foreseeable future use the Union Station trackage to reach specific yards serving the northwest Portland industrial area (Guilds Lake – UP and Willbridge – BNSF) or as the most direct route between operating segments of its own railroad (P&W). The main UPRR yards, Albina and Brooklyn, are east of the Willamette; BNSF’s main yard in Vancouver. Through freights received at and dispatched from these facilities access main lines to the north, east and south directly, and would not travel out-of-direction to traverse the slow trackage through Union Station and across the Steel Bridge.

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* Occasional marine shipments of rail for track maintenance throughout the Union Pacific network are imported at Port of Portland and loaded onto railcars at Guilds Lake Yard; California manifest trains presently annulled (not operated)

Figure 33: Summary table of freight train traffic at Union Station.

Figure 32: Tracks 5 and 6, the latter of which is a dirt road used for train fueling and maintenance.
Street Classification

The Transportation System Plan (TSP) is the 20-year plan for transportation improvements in Portland. The TSP describes how the transportation system should look and what purpose it fulfills. The street classifications and policies in the TSP are adopted as part of the City's Comprehensive Plan and describe the types of motor vehicle, transit, bicycle, pedestrian, freight and emergency response movement that should be emphasized on each street. The Broadway Bridge is notable as an important corridor for all of these modes and acts as a “major city traffic street” as well as a “city bikeway” in the TSP, the highest classification among surface streets in those categories. Other important streets near Union Station include Naito Parkway and NW Broadway Ave. as well as the Steel Bridge-NW Glisan St. corridor. The Street Classification maps can be found in Appendix A.
Chapter 3: Future Transportation Conditions

Introduction

The Northwest corridor is poised for significant changes in the coming years if the emerging state, regional, and national vision for improved and higher speed intercity rail service comes to fruition. As a principal gateway to this corridor, the terminal capacity requirements of Union Station will be driven by the vision for passenger rail service levels in the future.

This chapter examines future rail capacity needs taking into account proposed future Amtrak service levels, freight rail requirements, and potentially the introduction of other regional high capacity rail transit modes such as commuter rail, streetcar, or light rail.

Future rail service assumptions are highly fluid at present, given the recent initiatives announced by the federal government to support intercity rail development. Federal regulations govern ADA requirements, which may impact future platform upgrades and/or station capacity given the varying floor heights of rolling stock in use.

Chapter Highlights:

- The WSDOT Mid- and Long-Range Plans for the Amtrak Cascades Corridor envision up to 13 round trips between Seattle and Portland, up from 4 round trips presently.
- Future intercity rail service levels may evolve in the face of planning for High Speed Rail using federal transportation funds and the potential reintroduction of the Pioneer route.
- Introduction of future Portland Streetcar or MAX has been considered on Track 1 or Tracks 1 and 2.
- Federal regulations govern ADA requirements, which may impact future platform upgrades and/or station capacity given the varying floor heights of rolling stock in use.
- Track sharing by general rail (intercity, freight, commuter rail) and lighter transit modes (streetcar and light rail) modes is subject to Federal Railroad Administration regulation and waivers.
- Track capacity appears adequate under future service level scenarios analyzed.
- Reintroduction of Track 6 for a freight bypass will increase operational flexibility and capacity.

Figure 34: The Talgo XXI trainset is the fastest diesel train available and has been cleared by the Federal Railroad Administration for intercity passenger travel.
Intercity Rail Requirements

Amtrak Cascades

Toward “Higher Speed Rail”

The emerging regional consensus suggests that the most cost effective investment program for intercity rail in the Northwest is an “incrementalist” approach to achieving high speed rail – in other words, gradual implementation of projects to reduce travel times and increase speeds, achieving “Higher Speed Rail.” This is consistent with the WSDOT Long-Range Plan for the corridor.

The Talgo pendular trainsets used on the Cascades line are capable of traveling up to 125 mph; however, Federal Railroad Administration (FRA) regulations currently limit speeds on the line to 79 miles per hour due to track conditions and a lack of Positive Train Control (PTC) which provides for automatic control of locomotives from a central location and safer operation at high speeds. WSDOT has requested funding from the American Recovery and Reinvestment Act for PTC implementation, which would allow higher speed operation on areas with suitable tracks.

In addition, WSDOT has proposed a number of projects to incrementally increase the on-time performance and speed of Cascades trains through realignment and elimination of capacity bottlenecks. These include the Point Defiance Bypass project in Tacoma and rail realignments in the Vancouver (WA) Rail Yard, both of which will reduce delay-inducing interactions with freight trains.

Ultimately, implementation of a European-style true high speed rail system in the Northwest would require an exclusive passenger rail right-of-way involving extensive grade separation and right-of-way acquisition. The required investment is well beyond the magnitude of the proposed federal high speed rail program at this time.

Developments in the national and regional high speed rail program will continue to evolve in the coming months and years and should be monitored closely to ensure that the outcomes of this study remain

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### SYNOPSIS OF FEDERAL REGULATIONS GOVERNING TRACK, SIGNALS & ROLLING STOCK SAFETY FOR RAIL PASSENGER SERVICES

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Maximum Speed (mph)</th>
<th>FRA Track Class (a)</th>
<th>Signals (b) (d) (h)</th>
<th>Rolling Stock (c)</th>
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<td>Level 2</td>
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<td>Tier 1</td>
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<td>Above + Sealed Grade Crossings</td>
<td>Tier I</td>
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<td>Level 2</td>
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<td>9 (f)</td>
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<td>Tier III (g)</td>
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(a) 49 CFR 213.9 & 213.307; (b) 49 CFR 236.0; (c) 49 CFR 238.5.
(d) By 2015, all lines used by passenger trains must be equipped with Positive Train Control (PTC).
(e) For train speeds up to 160 mph; (f) For train speeds up to 200 mph.
(g) FRA has not yet written regulations to govern safety requirements for Tier III trains.
(h) ABS - Automatic Block Signals; TCS - Traffic Control System (aka Centralized Traffic Control, CTC); ATC - Automatic Train Control (Cab Signaling with Automatic Speed Control)

Figure 36: Synopsis of Federal Regulations Governing Track, Signals & Rolling Stock Safety for Rail Passenger Services.
consistent with the evolving vision.

For purposes of design standards and safety regulation, passenger rail services are considered in several levels, which may be defined succinctly by maximum authorized operating speed:

- Conventional, generally up to less than 80 mph
- Higher Speed, 80 to 110 mph
- High Speed Tier I, up to 125 mph
- High Speed Tier II, greater than 125 mph up to 150 mph
- High Speed Tier III, greater than 150 mph

By 2015, all lines used by passenger trains must be equipped with an approved form of Positive Train Control, standards and requirements for which are being prepared by the FRA.

For various maximum authorized operating speeds, current FRA regulations specify FRA track class (level to which track must be maintained), train control and signal requirements, and requirements for passenger rolling stock by design classification (Tier I, II or III). A synopsis of these requirements is in Figure 28.

Very high speed service above 125 mph is likely to require development of dedicated new rail lines not shared with conventional passenger or freight trains. The investment in such facilities would be high, even if built “only” through rural areas outside the major metropolitan centers to be served. Recognizing this financial barrier, and the fact that rail service need not be as fast as technically possible, but merely fast enough to achieve running times competitive with driving and flying door-to-door, responsible authorities in the Pacific Northwest have crafted a program for “higher speed” trains that eventually may reach speeds as high as 110 mph, and incremental improvements to the existing railroad line that will reduce Seattle-Portland travel times from the present 3 hours and 30 minutes to 2 hours and 30 minutes.

Portland-to-Seattle Segment

The best approximation of future passenger rail service levels in the Cascades Seattle-to-Portland Corridor is the WSDOT Mid-Range and Long-Range Plans prepared in 2008 and 2006, respectively. These plans articulate a vision to gradually increase the number of Seattle-Portland round trips in concert with packages of capital improvements and rolling stock acquisitions to support target levels of service and travel times.

<table>
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<tr>
<th>PROJECTS EXPECTED TO IMPROVE SERVICE BETWEEN PORTLAND AND SEATTLE</th>
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<td>Project Group*</td>
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<td>Project Group A and B</td>
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<td>Project Group A, B, and C</td>
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*A project group is a set of projects or project stages to be implemented collectively to achieve additional service and reduce running times.

Group A includes projects “Tacoma - Bypass of Pt. Defiance - 66th St. to Nisqually”, “Vancouver - Yard Bypass and W 39th St”, “King Street Station - Track Improvements”, and “Cascades Train Sets - Overhaul”


Figure 35: Service increase scenarios for Amtrak Cascades.
MID-RANGE GOALS

The four cumulative capital project and service level options presented in the Washington State Amtrak Cascades Mid-Range Plan are as follows:

- Option 1 – Maintain current operation (4 Seattle-Portland round trips)
- Option 2 – Complete four capital projects under way by 2012 (5 Seattle-Portland round trips)
- Option 3 – Complete five additional capital projects by 2017 (6 Seattle-Portland round trips)
- Option 4 – Complete five additional capital projects by 2014, assuming “unconstrained” financing availability (8 Seattle-Portland round trips)

As suggested by the above, available levels of funding will affect WSDOT’s timing in adding more Cascades round trips. Options 2 and 3 assume funding following the pattern of funding up to the present and more years to achieve a six round trip train schedule, while Option 4 assumes a more aggressive work effort and funding commitment to intercity passenger service to achieve the highest projected level of service in fewer years.

Option 4 would reduce trip time from the current three hours and thirty minutes to a more competitive three hours (twenty minutes faster than Option 3), and improve on-time performance to an estimated ninety-two percent. For comparison, Google Maps estimates the driving time between downtown Seattle and Portland to be roughly two hours and fifty minutes, and this is highly dependent upon traffic conditions.

LONG-RANGE GOALS

Even higher utilization of Union Station for intercity trains is envisioned in WSDOT’s Long Range Plan for Amtrak Cascades, which includes an ultimate timetable with 13 round trips between Portland and Seattle, and four to/from Vancouver, BC. This level of service is the assumed “full build” scenario for the capacity analysis conducted under this study.

PORTLAND-EUGENE SEGMENT

The WSDOT Plan does not address Portland-Eugene service, which is under the purview of the Oregon Department of Transportation. ODOT is completing a statewide rail study that is due in the fall of 2009.

ODOT envisions adding between one and three additional daily round trip train between Portland and Eugene, possibly with “across the platform” transfers to northbound continuing services to Seattle. Implementation of this service will require the purchase of additional trainsets, possibly of lower capacity than the Talgo trainsets used in the northern portion of the line owing to the reduced passenger volumes south of Portland. Even without additional service, the planned addition of a Seattle-Portland round trip will remove one Talgo trainset that is currently used on the Portland-Eugene run, which will require ODOT to seek replacement equipment.

The trade-off that must be accommodated is the inconvenience to through riders who must change trains in Portland, compared to the “extra” expense of operating the existing rolling stock on a service for which it has more passenger carrying capacity than is needed.

AMTRAK LONG DISTANCE SERVICES

As part of the 2008 Passenger Rail Improvement Act, Congress has instructed Amtrak to commission a study of the feasibility of restoring the Pioneer route, the long-haul train route connecting Seattle, Portland, Boise, and Salt Lake City via the Columbia and Snake River valleys. The Pioneer was discontinued in 1997 after posting significant financial losses in its final year.

Amtrak has announced that it will complete this study by October 16, 2009, after which point a decision will be made regarding restoring the route. The route would likely leave Portland and head east through the Columbia Gorge. Assuming that the Pioneer is reinstituted, this would likely result in one daily departure in each direction, either terminating at Union Station or continuing to a terminus at Seattle’s King Street Station.

The Empire Builder and Coast Starlight lines are not expected to see any significant changes (additional or reduced service) in the foreseeable future.

FREIGHT RAILROAD REQUIREMENTS

The Portland Terminal Railroad Company (PTRC) operates switching services for Oregon’s two Class 1 railroads, the Union Pacific and Burlington Northern.
Santa Fe railroads, from its base at the Guilds Lake Yard north of Union Station. The PTRC is majority owned and managed by the Union Pacific.

The PTRC owns Track 5 at Union Station, and also uses Track 4 for freight traffic. Freight dispatch is coordinated with Amtrak train arrivals, departures, and layovers. Amtrak agrees not to simultaneously block Tracks 4 and 5 in order to ensure a freight path through the terminal.

Traffic includes 3 or 4 daily manifest (mixed freight) trains and 1 or 2 interchange trains with the BNSF. The Portland and Western Railroad (PNWR, an Oregon short line) also operates 1 train daily in each direction to/from the Guilds Lake Yard.

The PTRC also handles a significant volume of rail cargo, which is unloaded at Port of Portland Terminal 2 and is used to support track maintenance and reconstruction throughout the Union Pacific system.

Freight rail traffic through Union Station is not expected to change significantly in the near future, but significant passenger service increases may result in the need to address track capacity issues, up to and including re-instituting Track 6. At current passenger and freight service levels, PTRC management does not see re-institution of Track 6 as a critical need.

### Future Track Utilization at Portland Union Station

Union Station has five tracks, numbered eastward from the head house, and designated as follows:

- **Track 1** – Storage track for Amtrak and privately owned rolling stock (little used)
- **Tracks 2 and 3** – Amtrak station tracks for terminating and originating trains
- **Tracks 4 and 5** – Mainline tracks for through passenger and freight trains

Figure 37: Graphic distribution of morning station activities under “Ultimate” scenario.
The island platform between Tracks 4 and 5 is 1,900 feet long, while the island platform between Tracks 2 and 3 is 1,700 feet long. The platform adjacent to the head house and serving Track 1 is approximately 570 feet in length, limited to the area between the north end of the steam plant building and the north end of the head house.

Tracks 1 through 4 are crossed by a pedestrian access walk, about 60 ft wide, under the High Shed. Rolling stock stored on Tracks 1 through 4 must be positioned clear of this walkway; but its effect is to provide storage space on each track for two shorter trains, one parked north and one south of the High Shed. The effective lengths of platform segments north and south of the High Shed are:

- Track 1 – 320 ft south; 190 ft north
- Tracks 2 and 3 – 540 ft south; 1,100 ft north
- Track 4 – 560 ft south; 1,280 ft north
- Track 5 – 1,900 ft (track is not crossed by High Shed walkway)

The Empire Builder consist generally does not exceed a length of 495 ft, five 85-ft long cars plus one 70-ft long diesel locomotive, and fits within the south platform lengths of Track 2, 3 and 4. The Coast Starlight typically runs with 12 85-ft cars and two 70-ft diesel locomotives, for a total train length of 1,160 ft, which can be accommodated on Track 4 north of the High Shed and on Track 5.

Existing Cascades trainsets, with 12 cars, one diesel and one cab-baggage car, are about 640 ft long, so must be stopped north of the High Shed on Tracks 2, 3 or 4 to stay clear of the High Shed walkway. WSDOT’s Long Range Plan for Amtrak Cascades envisions lengthening the consists by two more middle cars, for a total train length of nearly 727 ft, still within the limits of the north-end sections of the island platforms at Union Station. The relatively short

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**Graphic Distribution of Evening Station Activities; WSDOT Long Range Timetable + Amtrak 11/14-Coast Starlight, 7/8-Empire Builder, 25/26-Pioneer**

Figure 38: Graphic distribution of evening station activities under “Ultimate” scenario.
lengths of the south segments of these platforms vis-à-vis train lengths limits their utility for storing out-of-service consists. This, along with lower passenger demand, is a reason that ODOT is considering alternate trainsets for future Portland-Eugene needs.

Terminal Capacity Requirements

Capacity Analysis Scenarios

A detailed terminal capacity analysis is presented in Appendix B, based on the foregoing assumptions about future intercity rail service levels and freight requirements.

The following scenarios were analyzed:

- “Low” Existing Service Level (Operations as of 2009 - Portland-Seattle: 4 Daily Corridor Trains; 3.5-Hr Seattle-Portland Run Time)
- “Medium” Future Service Level - Portland-Seattle: 6 Daily Corridor Trains; 3-Hr Seattle-Portland Run Time Assumed
- “High” Future Service Level - Portland-Seattle: 8 Daily Corridor Trains; 3-Hr Seattle-Portland Run Time Assumed
- “Ultimate” Future Service Level - Portland-Seattle: 13 Daily Corridor Trains; 2.5-Hr Seattle-Portland Run Time Assumed

Adequacy of Terminal Capacity for Future Needs

Under each of the three scenarios, Union Station appears to have adequate capacity to handle boardings and layovers of both Cascades and long-distance intercity passenger trains. Operations become, however, more constrained as train frequencies increase. For example, train placement on specific tracks becomes more important, and there is less excess capacity in the system to absorb service disruptions. These issues are not unlike certain constraints facing the Cascades corridor as a whole.

However even in the “High” scenario, under normal circumstances, Track 1 still would be available for use by unscheduled Amtrak or private cars or locomotives, and as a reliever track to handle abnormal events. Freight capacity for through movements is maintained on Track 4 or 5.

The Main Waiting Hall may be expected to become much busier as service is gradually increased under WSDOT’s mid- and long-range plans from 4 to 6, then 8 and eventually 13 Cascades round trips per day (see Appendix B for details), and the Pioneer perhaps is returned as a third long distance train with consist similar to the Empire Builder. Pedestrian congestion will be both more intense and occur over longer periods of each operating day. When operations reach the “Ultimate” envisioned, at least two trains will be worked at Union Station during the hours from 8:00 am until 8:30 pm, except 10:00-10:30 am and 12:30-1:00 pm, when only one passenger train at a time will be in the station. However, it seems likely the facility will be handling passengers for three trains simultaneously in the time periods 11:30 am-noon, 1:00-1:30 pm, 2:30-3:30 pm, 4:00-5:30 pm, and 7:00-7:30 pm (Figure 29 and 30).

At the present level of train service, Union Station accommodated 451,026 annual passengers in 2007 (average of 1,235 each day or slightly over 100 on each of 12 daily trains serving Portland) and 598,633 in 2008 (average of 1,640 per day or 135 per train). Conservatively assuming no growth in the average passengers per train, future passenger volumes through Union Station on the order of the following may be anticipated at the various numbers of round trips using the facility:

- “Medium”: 6 Cascades + 2 long distance (LD), 16 trains/day, 1,600-2,160 passengers/day
- “High”: 8 12-car Cascades + 2 LD, 20 trains/day, 2,000-2,700 passengers/day
- “Ultimate”: 13 14-car Cascades + 3 LD, 32 trains/day, 3,200-4,320 passengers/day

It is not unrealistic to envision as many as 5,000 or more passengers moving through Union Station on a future heavy travel day at the “Ultimate” level of train service analyzed.

Additional details on the analysis are presented in Appendix B.
Reinstatement of Track 6

The idea of reinstating Track 6 as a freight bypass track has been proposed. Due to right-of-way restrictions, it is not likely that this track would be serviced by a passenger platform. It would however allow for separation of freight movements and could alleviate lateral clearance issues associated with future ADA high-level platform implementation (if high level platforms turn out in fact to be warranted based on clarification of Federal guidelines).

The impacts of higher passenger service levels on freight traffic is highly dependent upon future freight demand, which as discussed previously has declined from recent high volumes. Degradation of freight service is likely to emerge as periodic circumstances where Tracks 4 and 5 are simultaneously blocked by passenger trains, precluding freight movements for an hour or two, or under abnormal operating circumstances (e.g. late trains).

Routing freight onto a Track 6 bypass also has implications for passenger rail capacity in the terminal. Under higher proposed service levels, restoration of Track 6 as a freight bypass track provides increased flexibility for turning and storing Amtrak consists, and potentially for through routing of future commuter trains at Union Station.

Another important consideration that must be addressed is fueling operations that currently utilize the service road in the former Track 6 roadbed. Alternative fueling options, up to and including piped fueling systems, will require further investigation if the Track 6 option is pursued.

Locomotive Fueling

Diesel locomotives hauling all or most Amtrak trains are refueled during their Portland station stops. This activity is accomplished by parking a local dealer’s tank truck adjacent to the location where the locomotive(s) of the train to be fueled will stop, and delivering the diesel fuel by hose directly from the truck into each locomotive’s fuel tank.

For through trains, this is done while passengers and baggage are being loaded and unloaded from the train. Most through trains make their station stops on Track 5, which allows the fuel truck to park on the dirt road where Track 6 used to be, and the train to be refueled without laying the fuel truck’s hose across any tracks. Were Track 6 restored, with its jog to the east side of the Broadway Bridge abutment, new access points to the dirt road would be needed to/from Naito Parkway on either side of the affected area. These could be provided via easements negotiated with owners to all the fuel trucks to move through properties between Naito Parkway and the PTRC right-of-way.

Figure 39: The former Track 6 is currently used for locomotive fueling.

Figure 40: A reinstated Track 6 would flare eastward to clear the Broadway Bridge pier.
Terminating trains are refueled during their layovers at Union Station, during which time they are spotted on Track 2 or 3. For some of these events, the fuel truck parks in the shed west of Track 1 at the north end of the Union Station headhouse.

As traffic grows in the future, it may become necessary to augment the refueling capabilities and facilities at one or more locations along the length of Union Station. These improvements might take the form of pipes and hoses to feed fuel from a fuel truck to a train without the truck having to be immediately adjacent to the locomotive fuel tank. Eventually, an economic alternative to direct truck delivery to trains might be an on-site diesel fuel storage tank. Siting such a tank is likely to be a physical and, perhaps, an environmental issue. The tank would be linked via pipes to fueling hoses place strategically along the platform tracks, most likely at the south and north ends where locomotives for the Coast Starlight stop now, and also north of the High Shed to handle locomotives on Cascades trains (Amtrak’s practice is to place the diesel locomotive on the south end, and the cab-baggage car on the north end of these consists).

Other Anticipated Trackside Improvements

In addition to Track 6 restoration and alternative fueling accommodations, Amtrak has expressed interest in a number of additional improvements to improve railside operations. The following list is based upon current operating conditions; additional investments may be required to support the build-out vision for future enhanced intercity rail in the corridor.

- Replacing all remaining jointed rail with continuously welded rail.
- Raising platforms to 8 inches above top of rail.
- Increasing the number of locations idling equipment can access ground power to reduce noise & emissions.
- Installing additional potable water stanchions.
- Powering all switches within the station complex.
- Crosstie renewal & ballasting.

Removal of the High Shed At-Grade Pedestrian Walkway

Additionally, an “Ultra” Future Service option was considered, assuming 13 Daily Portland-Seattle Corridor Trains, 2.5-Hr Seattle-Portland Run Times, and removal of the “High Shed” at-grade pedestrian walkway. This alternative is designed to address issues discussed above with respect to train lengths and blockage of the High Shed walkway in certain configurations. The new St. Louis Intermodal Station profiled in Chapter 4 shows a visual example of this type of mezzanine structure.

This type of grade separation, with the construction of a new mezzanine structure or tunnel and the elevators that this implies, is likely to be very expensive but allows longer trains (e.g. the Empire Builder) to park and lay over on the inner tracks without blocking pedestrian access to the outer tracks.

Introducing Other Rail Transit Modes

Future incorporation of local rail transit modes at Union Station has been proposed. There are three additional modes that could potentially provide service into Union Station in the future:

- A new Commuter Rail Service, similar to the Westside Express Service (WES)
- MAX Light Rail
- Portland Streetcar

Ultimately, the motivation for developing these services and providing connectivity to Union Station is contingent upon factors beyond the scope of this study. However for purposes of evaluating future capacity and facility needs, regional stakeholders involved in the planning and development of rail transit were consulted and existing plans were reviewed to identify any existing or emerging plans for such services.

Incorporation of local rail transit could involve one of three approaches:

- Addition of services to the Portland Transit Mall
- Introduction of services on other streets adjacent to Union Station; and/or
• Introduction of local transit onto the existing Tracks 1-5 at Union Station

In the latter option, introducing light rail, streetcar, and/or non-compliant commuter rail vehicles effectively requires removal of Track 1 and/or Track 2 from intercity rail and freight service to meet FRA regulations (see detailed regulatory discussion below). However, FRA-compliant (conventional or DMU) commuter rail trains could operate in mixed traffic with intercity rail and freight trains.

High Capacity Transit Plan

As part of its regional transportation planning mandate, Metro is undertaking a regional High Capacity Transit (HCT) System Plan to define major transit investment priorities in the Portland region over a 30-year period. The HCT Plan will prioritize a handful of corridors as part of the Regional Transportation Plan in December 2009.

While the HCT is not mode specific, and defers questions of Central City access and alignment until a future update of the Portland Central City Plan, it does provide insight into long-term regional thinking about future transit corridors. Several of the corridors recommended for advancement in the HCT study (as of the time of writing) are potential rail corridors that could one day service or terminate at Union Station.

Corridors recommended for further study that could impact to Union Station include: The Barbur Blvd./99W corridor in Portland, Tigard, and Sherwood (Corridor 11); A MAX or commuter rail extension from Hillsboro to Forest Grove (Corridor 12); a corridor serving the NW Industrial Area, St. Johns, and North Portland, following the existing North Portland Mainline (Corridor 43); and a Powell Boulevard corridor between Portland and Gresham (Corridor 10). Two other corridors in the southern part of the metropolitan area, including Tigard-Lake Oswego-Clackamas (Corridor 29) and Oregon City/Milwaukie (Corridor 9) appear to be possible rail corridors, thought the HCT plan does not speak to how if at all these services would penetrate the downtown core.

While inconclusive, the HCT plan suggests that a number of corridors could potentially impact future operations in and around Union Station; however further project definition and analysis of central Portland transit alignment and capacity issues will be required before any such determination can be made with certainty.

Commuter Rail

Commuter rail service is the most obvious form of regional transit that could require a terminal-type accommodation like Union Station, either through a heavy rail system or one of the emerging lightweight Diesel Multiple Unit (DMU) technologies as has been deployed for the Westside Express Service (WES) between Beaverton and Wilsonville.

Based on review of planning documents and discussions with project stakeholders, there does not appear to be an official, cohesive plan to introduce a new commuter rail corridor into central Portland in the near future. Furthermore, it is uncertain if future extensions of WES that have been discussed at the conceptual level, including extensions to Forest Grove, Salem, and Sherwood, would terminate at the existing WES terminus in Beaverton, where connecting high frequency MAX service to downtown is available.

A 1999 study commissioned by the Southwest Washington Regional Transportation Council (RTC) determined that a commuter rail line between Portland and Vancouver, WA, was cost prohibitive due to improvements that would be required to address capacity constraints and other right-of-way conditions between Union Station and the Columbia River rail bridge in North Portland.

While a motive for introducing commuter rail into Union Station was not clearly identified, the study briefly examined the operational and capacity impacts of a new commuter rail service into Union Station. Based on the experience of the new Westside Express as well as typical operating patterns for other commuter rail systems, each line might run half-hourly during peak commuting hours, putting a train through Union Station every 15 minutes in both directions (four trains per hour, two in each direction), with midday service on an hourly frequency.

Track 1 could be upgraded to handle the off-peak service entirely, and peak operations in one direction, but would be hard pressed to accommodate both north- and southbound trains at peak frequencies.
A second commuter track would be needed to assure that train operations through Union Station remained fluid and reliable. One possibility would be to use Track 3, which should be available between after 6:30 am until 10:00 am, and then again from about 5:00 pm until very late evening. However, another track would need to be used during the afternoon service build-up before 5:00 pm. Track 4 would be the likely candidate. Depending on the intensity of freight operations past Union Station, this may necessitate reinstating Track 6 as a freight bypass line. See Appendix B for a discussion on this topic.

MAX Light Rail
With the completion of the Mall renovation in 2009, which runs north along NW 5th Avenue and south along NW 6th Avenue through downtown to Portland State University, two MAX lines will stop near Union Station: the existing Yellow Line to the Expo Center and the future Green Line, currently under construction to Clackamas County. The lines will stop at stations between NW Glisan and NW Hoyt on both NW 5th and NW 6th and connect with East Portland via the Steel Bridge. TriMet has also begun testing new low-floor (Type IV) light rail vehicles with slightly larger capacity for use throughout the system.

I-205/Portland Mall MAX Light Rail
The 8.3-mile extension into Clackamas County and along a new alignment in downtown Portland will open Sept. 2009. TriMet’s fifth MAX line will add tracks between Gateway Transit Center and Clackamas Town Center; and in downtown along the Mall on 5th and 6th Avenues between Union Station and Portland State University.

Milwaukie MAX Light Rail
A second light rail extension to Clackamas County is in the design phase. The 7.3-mile Portland-Milwaukie Light Rail Project would connect Portland State University and South Waterfront to SE Portland and Milwaukie. The project is projected to open in 2015 and will use the Portland Transit Mall downtown, stopping near Union Station.

Portland Streetcar
The City of Portland Bureau of Transportation and Bureau of Planning, in coordination with Metro, TriMet, and other bureaus, is currently developing a Streetcar System Plan (SSP) as a 20- to 50-year planning study to identify potential streetcar corridors. The City will use this study to look at how transit infrastructure investments can work with pedestrian-oriented, mixed-use development projects to create more walkable and sustainable neighborhoods.

However, two specific Streetcar initiatives are under development that could potentially impact Union Station:

Portland Streetcar Loop
A major extension of the Portland Streetcar to the Eastside was recently awarded $75 million in federal funding. This project will take the line from NW Lovejoy in the Pearl District across the Broadway Bridge, serving the Central Eastside (see Figure 33). Eventually the city intends to complete a loop across a new bridge to the South Waterfront portion of the existing streetcar line.

Station locations are not finalized, but the Broadway Bridge alignment is adjacent to Union Station, albeit at elevated grade. Ensuring pedestrian connectivity to the nearest station on this alignment from Union Station is an urban design challenge to be taken into consideration as this project concept moves forward. However, because the streetcar alignment will use the center lanes of the bridge, the likelihood of an elevated streetcar stop on the bridge near Union Station is very low.

Lake Oswego Streetcar
Various jurisdictions have been studying the possibility of creating a streetcar line along the Willamette River between Portland and Lake Oswego. The project entered the Draft Environmental Impact Statement (DEIS) phase in June 2009, and the line may join the existing Streetcar line in the South
Figure 41: Map of future Portland Streetcar Loop and Milwaukie MAX line.
Waterfront; alternatively it could follow an alignment to enter the eastern portion of the Central Business District or follow a course along Naito Parkway. The latter two options could possibly introduce a new Streetcar alignment into the vicinity of Union Station.

Penetration of Local Transit into Union Station

While the development of commuter rail, light rail and/or streetcar projects (and especially their routing through the downtown core) are at very conceptual levels of development, this study examined potential routing opportunities of local transit modes into Union Station using Track 1 or Tracks 1 and 2. This configuration would provide for a local rapid transit stop immediately adjacent to the station terminal, somewhat akin to the Santa Fe Depot intermodal center in San Diego that is profiled in Chapter 5.

Alignment Alternatives

Three proposed alignment alternatives were examined for a track alignment into and out of Union Station on the south end:

- Track 1 or Tracks 1 and 2 onto the Transit Mall (NW 5th and 6th Avenues)
- Track 1 or Tracks 1 and 2 to NW 3rd and 4th Avenues
- Track 1 or Tracks 1 and 2 to NW Naito Parkway

On the north end, the path of egress from the station is less constrained but also more contingent upon the ultimate destination of the transit service. Options include re-penetrating the street grid into the Pearl District, proceeding into the NW Industrial Area, Waterfront, or Montgomery Park, or terminating services at a turn-around loop north of Union Station on one of several brownfield sites.

Figure 42: Planned and potential Portland Streetcar and MAX alignments.
Transit Mall Alignment - Introduction of a transit spur onto the Transit Mall from Union Station is complicated by both geometric constraints (curvature) as well as the presence of complex switching. Connections onto the existing Transit Mall tracks, if possible at all, are likely to be constrained to select movements in one or both direction onto the Mall and/or the ramp to the Steel Bridge. An alignment from the Steel Bridge directly into Union Station would be unable to serve the Transit Mall and the Portland CBD, and faces its own set of track geometric challenges given the crossover in this area (NW Irving Street).

NW 3rd and 4th Avenues - It is assumed that transit modes operating on 3rd and 4th avenues would do so as a one-way couplet, sharing the streets with mixed traffic, particularly given the existing intensity of transit service on 1st, 5th, and 6th avenues today. However, access to these alignments from Union Station is also complicated by the presence of MAX crossovers on NW Irving Street.

Naito Parkway - Of the alignments analyzed, an alignment between Union Station and Naito Parkway is likely the most feasible alternative, though clearance constraints of the Steel Bridge approach ramps and piers are an engineering concern. Additionally, introduction of in-street transit into Naito Parkway, which is effectively a bypass/distributor for the downtown core, will impact the traffic operating characteristics of this route. A final concern, from a transit perspective, is that this route is rather peripheral to the key origins and destinations in the Portland Center City and is arguably redundant with the existing MAX service on nearby NW/NE 1st Avenue.

Figure 43: Various transit alignment alternatives at Union Station.
Challenges of Introducing Local Transit into Union Station

Note that this configuration of local transit on Track 1 and/or Track 2 effectively removes these two tracks from the “general railroad system of transportation” for FRA purposes, requiring physical or temporal separation of local rail transit systems from the intercity passenger and freight systems which fall under FRA jurisdiction. (Conventional commuter rail with FRA-compliant rolling stock could operate on shared intercity/freight tracks, but noncompliant DMU rolling stock would have to be physically or time-separated from intercity or freight modes.)

There are other terminal operational challenges that would have to be addressed to manage the joint use of the terminal platform area by transit, intercity passenger rail, and freight. Under current conditions, access to the platform area is restricted by Amtrak for safety and security reasons, such that only ticketed passengers are allowed onto the platforms, and only during the active train boarding process. Introducing local transit modes would likely result in passengers waiting for arriving vehicles on the platform, and the frequent arrivals of transit vehicles would result in a greater presence of public transit patrons on the platforms throughout the day.

Another consideration is the potential development impact of a Streetcar or MAX stop at Union Station. From an urbanistic perspective, the proposed Union Station stop location on Tracks 1 and 2 is isolated from developable land parcels (e.g. the Post Office parcel), on-street activity and other transit connections. Pedestrian impediments include the Union Station building itself, the active railroad tracks, the Broadway Bridge, and TriMet Transit Mall layover facilities. Aside from serving Union Station itself, the proposed station will not substantially increase transit access to the area, and therefore its ability to leverage new transit-oriented development is limited. This consideration needs to be weighted against the dollar-for-dollar development benefit of a similar Streetcar or MAX investment in an area of the city with lower overall transit accessibility.
Regulatory Issues

Shared Use of Tracks

The rail-side tracks and platforms at Portland Union Station are connected to the “general railroad system of transportation” and clearly fall within FRA jurisdiction. Simultaneous mixed operation of compliant and non-compliant rail vehicles through Portland Union Station is not likely to be approved by FRA, based on precedents to date. Temporal separation might be allowed under the waiver process for some conditions, particularly considering the low speeds of all trains operating through Union Station.

Possibilities for MAX light rail and/or Portland Streetcar operation on Track 1 or Tracks 1 and 2, and the consultant’s assessments thereof are:

- Simultaneous joint use of Track 1 or Tracks 1 and 2: FRA likely will not sanction, based on previous cases synopsized above. Waiver approval prospects – not feasible.
- Temporal separation on Track 1 only: FRA may or may not sanction due to close proximity of Tracks 1 and 2. FRA generally requires 25-ft distance between centerlines. May be waived on a case-by-case basis – situation would be mitigated by low operating speeds of trains through Union Station. Waiver approval prospects – low.
- Temporal separation on Tracks 1 and 2: FRA might approve if “adequate” safety measures (e.g., positive derails in place at each end of both tracks when non-compliant vehicles are being operated on affected tracks) can be demonstrated to be in place. Waiver approval prospects – medium.
- Exclusive use of Track 1 and removal of its connections to the general system: FRA likely will not sanction due to close proximity of Tracks 1 and 2. Waiver approval prospects – low.
- Exclusive use of Tracks 1 and 2 and removal of their connections to the general system: FRA might approve, because tracks will not be connected to the “general system” and a platform separates Tracks 2 and 3. Waiver approval prospects – medium or better.

Transit on Union Station Tracks – Summary

There are no clear benefits, but many operating and physical challenges for running either MAX light rail trains or Portland Streetcars through Union Station. On the “pro” side is the notion that proximity on adjacent tracks would automatically offer good connectivity between local rail transit and intercity passenger train services.

On the “con” side are the following factors:

- Processing Amtrak’s boarding intercity passengers: Amtrak passengers are processed (ticketing, seat assignments, ticket checking) in the headhouse before being allowed to board their trains; so cross-platform transfers are not useful in this situation. If anything, gradually heightening security measures in future are likely to make direct transit/train transfers even less feasible.
- Rail Passenger Operations: Reduction of track capacity for intercity passenger trains operations:
  - Removal of Track 1 would hamper Amtrak’s ability to accommodate the higher levels of service envisioned in the WSDOT Long Range Plan. Reinstalling Track 6 could relieve this limitation.
  - Removal of Tracks 1 and 2 would make it difficult to impossible to handle even today’s terminal activities, even with Track 6 added back.
- Rail Transit Operations: Track 1 alone would be an operational impediment if it had to accommodate MAX trains or streetcars operating in both directions. Adding Track 2 would require joint use of the platform serving Tracks 2 and 3. Some protection and coordination would be needed to control Amtrak passengers crossing the MAX/streetcar track(s).
- South end connections: MAX or streetcar tracks would need to be connected to their respective networks:
  - 5th/6th(MAX on mall): major reconstruction of newly installed trackage and conflicts with
Green/Yellow MAX line train movements, addition of more special trackwork; Union Station to 5th – difficult; 6th into Union Station – impossible in practical terms due to curve radii, building and park constraints to alignment.

» 3rd/4th (putative new streetcar route): major reconstruction of newly installed trackage and conflicts with Green/Yellow MAX line train movements; 3rd/4th north of Burnside not in draft Portland Streetcar System Concept Plan.

» Naito Parkway (putative new streetcar route): Insufficient room to place two streetcar tracks between PTRC tracks and Steel Bridge Glisan Ramp; impacts redevelopment site; Steel Bridge vertical clearances difficult to impossible; Naito Parkway Roadway grades and discontinuities in north and south lane elevations; Naito Parkway not in draft Portland Streetcar System Concept Plan.

• North end connections: MAX or streetcar tracks would need to be connected to their respective networks:
  » No MAX lines are planned that would connect with the north end of Union Station.
  » Streetcar connections to Northwest Portland (Lovejoy and Northrup) could be made using NW Northrup between Union Station and the existing streetcar track at NW 10th/Northrup. If a direct connection to NW 11th were desired, without going to NW 23rd and back, connecting turnouts and a streetcar track and also would need to be installed on NW 11th between Northrup and Lovejoy.
  » Streetcar connection to Northeast Portland could use the same connection at NW 10th/Northrup and the added NW 11th track, but would require additional special trackwork (turnouts and crossings) to turn from southbound 11th to eastbound Lovejoy, and from westbound Lovejoy to northbound 10th to access the Northrup connecting tracks into Union Station. Alternatively, the NW Northrup connecting tracks could turn south on NW 9th to make connections with the Eastside streetcar tracks via a wye junction that would have to be installed at NW 9th/Lovejoy.

• Regulatory Issues: Any use of tracks in the station for transit may be expected to require the involvement and approval of the Federal Railroad Administration in regard to issues such as center-to-center separation of transit and railroad tracks, and waivers to enable temporal separation of transit and railroad trains sharing the same track(s). Approval of such waivers cannot be assumed.

With nearby stations on NW 5th and 6th Avenues, MAX light rail patrons will have reasonably convenient access to Union Station starting in fall 2009. If, in the future, it becomes desirable to provide streetcar service directly to Union Station, consideration may be given to the NW Northrup connecting tracks as described above, a double track streetcar line in NW 6th Avenue/Station Way, and connecting turnouts to the new MAX track at NW 6th/Irving. These approaches would avoid all of the “con” issues that would accompany rail transit on Tracks 1 or 1 and 2.

**ADA Compliance**

Any significant upgrade to Union Station facilities will trigger the federal requirement that the facility be compliant with the Americans with Disabilities Act (ADA). Most challenging, any upgrade to the train platforms would mean that the platforms must be wheelchair accessible, significantly adding to the costs of construction and design.

There is also currently an absence of specific Federal guidance on ADA requirements for train platforms. In addition, the variety of rolling stock types and floor heights makes uniform platform heights unlikely in the near term, which suggests that other accommodations must be made to maximize the operational flexibility of the station (i.e., the ability to board various types of rolling stock at a given platform. Potential strategies to address this may be to include partial high platforms with wheelchair ramps or platforms dedicated to specific car heights.
Due to the shared use of certain Union Station tracks with freight trains, raised platforms may need to be modified to allow for required clearance for freight cars, and solutions may include platforms that fold out of the way to allow freight trains to pass. This issue is discussed further in Appendix C.

It is likely, given the diverse rolling stock used at Union Station, that a specific FRA determination on ADA compliance at Union Station will be required. The use of multiple platform heights for specific rolling stock would have implications for capacity and operational flexibility at Union Station.
Chapter 4: Greyhound Relocation Study

Introduction

The proximity of Greyhound and other intercity motorcoach services strengthens intermodal character of Union Station and facilitates connections between intercity rail and bus services, as well as connections with mid-distance transit and feeder bus lines from communities in Oregon. The proximity of local transit connections to TriMet bus, MAX, and the Portland Streetcar is also an asset for motorcoach passengers.

Recognizing that the existing Greyhound terminal is not well suited for the company’s long-term needs in the Portland area, this study examined the feasibility of relocating Greyhound passenger operations to a site at or near Union Station in order to preserve this intermodal character.

A new intercity motorcoach terminal facility could also provide a consolidated facility for other regional bus lines serving the Greyhound terminal and/or Union Station today, and possibly also service Amtrak Thruway buses.

A potential additional benefit is the use of the new or existing Greyhound terminals as a temporary rail passenger facility during major renovations of Union Station, should the rail passenger facility need to be removed from service during structural/seismic retrofit or hazardous materials abatement.

Current Conditions

The existing Greyhound facility was built in 1985 as a part of the north end of the Bus Mall (now Portland Transit Mall). Designed by SOM (Skidmore Owens & Merrill), the building is mostly one story with a basement dormitory at one end which is sometimes used by bus drivers during layovers. The total square foot area of the ground floor is approximately 37,000 SF and the basement adds an additional 11,100 SF. The building is roughly divided into

Chapter Highlights:

- The current Greyhound terminal in Portland is oversized and functionally obsolete for existing and future intercity bus service.
- The collocation of the Greyhound terminal enhances the intermodal character of Union Station, passenger convenience, and regional accessibility to the terminal by transit.
- The existing terminal is used by Greyhound as well as other regional transit and intercity service providers connecting Portland to other communities in Oregon.
- The PDC parking lot opposite NW Station Way from Union Station is a promising potential site for a new Greyhound terminal that preserves the existing intermodal bus-rail connection.
3 parts: the main lobby and waiting area, the ticket/baggage/storage and employee area with basement dormitory and the partially covered bus loading bays.

The lobby waiting area and bus loading bays are located under a high roof structure supported by a series of twin steel masts spaced at 20 foot intervals down the center of the building, with the lobby waiting area on one side and the bus bays on the other side separated by a wall. The structure entirely supports the roof and the exterior walls are non load bearing allowing the roof to float above the spaces. The west wall of the waiting area has public lockers and doors providing access to the bus bays on the other side.

A brick and concrete arcade runs along the west side of the building and provides the main entrance to the public spaces. A fast-food restaurant is located on the west side of the main waiting area; passenger restrooms are the south end of the waiting area. There is an employee parking lot with 20 spaces at the north end of the building.

Counting layover spaces, the maximum motorcoach parking capacity at the existing facility is 16 spaces. There are 14 existing bus bays, of which 7 are for active loading, 5 are layover spaces, and 2 are for other intercity and transit carriers. Currently 12 Greyhound buses arrive and depart Portland each day. Two additional non-Greyhound buses arrive and leave daily, Tillamook Transit (to Tillamook) and Valley Retriever (to Salem, Albany, Corvallis, Newport, and intermediate points). Tillamook Transit also stops at Union Station but coaches lay over at the Greyhound facility.

Bus bays 6, 7, and 8 are refueling stations. Diesel fuel is pumped into an underground tank 3 times a week by a semi trailer fueling tanker. The fuel is then pumped over to the 3 bays. There is an underground oil separator that is cleaned out occasionally.

Facility Requirements

Greyhound managers have discussed the spatial needs and program requirements to operate in Portland. Many of the existing spaces on the ground floor in the building are too large and are underutilized given current service levels. Some spaces are not needed for Greyhound operations under current corporate service standards, such as the restaurant in the waiting area. The dormitory located in the basement at the north end of the building may be functionally obsolete as Greyhound drivers typically live in Portland and do not sleep over at the facility. Outsourcing is possible for drivers that need to stay overnight during storms using hotel accommodations rather than maintaining an in-house dormitory.

The next step in the analysis was to determine if Union Station can accommodate the function and spatial needs of projected Greyhound operations. Since the Union Station building has some of the same functions and spaces as the Greyhound
facility (such as ticketing, waiting, baggage handling, storage, and restrooms), several collocation or space-sharing alternatives were considered. However, it is also important to recognize the need to maintain an operational separation between Amtrak and Greyhound facilities to support peak capacity needs, security, and day-to-day operations, particularly in light of potential future rail growth.

Greyhound prepared a Terminal Program Requirements chart for the Portland facility to be used in the analysis. The following reduction in floor space at the Greyhound facility were proposed based on projected operational needs:

- Baggage Handling and Storage 10,000 SF current reduced to 4,032 SF
- Ticket Lobby and Waiting Area 15,000 SF current reduced to 4,608 SF
- Eliminate the restaurant - 4,000 SF reduction
- 7 Offices (each 10 ft x 12 ft) - 840 SF
- Office supplies/copy rooms - 360 SF
- Break Room - 384 SF
- Locker Room - 240 SF
- Training/Conference Room - 336 SF

Ticket Counter - 228 SF
Drivers’ Lounge - 384 SF

Total SF needs for the Greyhound terminal - approximately 14,000 SF

Greyhound Terminal Program Requirements for a proposed new facility stipulate 8 bus bays for its operations (active passenger loading and ready buses). Accounting for other operators serving Union Station, a target of 10-12 bus bays was used in developing conceptual designs.

Options Evaluated

Four Greyhound Relocation Options were evaluated, combining different interior and exterior space configurations. The alternatives are summarized in the Figure 40 and are further described in the subsequent discussion.

Two options use the existing Block Y parking lot as the site of a new terminal facility. While this lot currently serves short term parking and tenant needs of Union Station, it is owned by PDC and is slated for eventual redevelopment in any case.

<table>
<thead>
<tr>
<th>Option</th>
<th>Exterior Configuration</th>
<th>Interior Configuration</th>
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<tbody>
<tr>
<td>1A</td>
<td>13 Bus Bays on Block Y (opposite Union Station on NW Station Way)</td>
<td>Separate Greyhound passenger waiting room in Union Station; Shared Amtrak/Greyhound baggage and ticketing spaces</td>
</tr>
<tr>
<td>1B</td>
<td>12 Bus Bays along NW Station Way north of Union Station</td>
<td>Separate Greyhound passenger waiting room in Union Station; Shared Amtrak/Greyhound baggage and ticketing spaces</td>
</tr>
<tr>
<td>2</td>
<td>11 Bus Bays in a purpose-built pavilion structure on Block Y (opposite Union Station on NW Station Way)</td>
<td>Retains existing Amtrak uses inside Union Station; Greyhound facilities inside new pavilion</td>
</tr>
<tr>
<td>3</td>
<td>12 Bus Bays along NW Station Way north of Union Station</td>
<td>New addition for Greyhound offices; Separate Greyhound passenger waiting room in Union Station; Shared Amtrak/Greyhound baggage and ticketing spaces</td>
</tr>
</tbody>
</table>

Figure 49: Design options for Greyhound relocation.
Option 1A

Option 1A would combine Amtrak and Greyhound operations into Union Station while providing a new bus parking and loading facility on the small parking lot across the street. Most of the southern portion of Union Station would be dedicated to Greyhound while baggage and ticketing facilities would be shared between Amtrak and Greyhound. While the bus bay option removes buses from public rights of way, this option may be less convenient for customers due to the separation of buses from customer facilities in Union Station.

**Main Features:**
- Greyhound and Amtrak use combined lobby and lounge
- Shared Amtrak/Greyhound baggage room
- Buses located opposite Union Station (Block Y)

Figure 50: Option 1A.
Benefits

- Combined facilities less expensive than new construction
- Ticketing for all intercity bus/rail operations in one facility
- Consolidated intercity bus bays

Drawbacks

- Constraints on future Amtrak growth in terminal
- Operational comingling of Greyhound/Amtrak functions
- Passengers must cross NW Station Way (a public street) from waiting room to board buses, unprotected from the elements
- Historic preservation limitations on configuration

Figure 51: Floorplan for option 1A.
Option 1B

Option 1B combines Greyhound and Amtrak in a single facility without requiring any significant structural modifications to Union Station. Greyhound and Amtrak would share baggage and ticketing facilities and Greyhound would have dedicated space in a large portion of the southern wing of the building. Buses would line up on the street, reducing the capital cost for Greyhound but also taking up valuable public right of way.

Main Features:
- Greyhound and Amtrak use combined lobby and lounge
- Shared Amtrak/Greyhound baggage room
- Linear queue for bus boarding and layover along NW Station Way

Figure 52: Option 1B.
Benefits

- Does not require any new construction aside from interior changes
- Ticketing for all intercity bus/rail operations in one facility
- Short-term parking lot remains intact

Drawbacks

- Operational comingling of Greyhound/Amtrak functions
- Loss of on-street parking
- Linear bus boarding and staging occurs on a public street and is inconvenient for passengers
- Constraints on future Amtrak growth in terminal
- Historic preservation limitations on configuration

Figure 53: Floorplan for option 1B.
Option 2A

Option 2A includes a new, dedicated facility for Greyhound on what is now a small triangular parking lot. The new facility would allow simplified operations for Greyhound while maintaining capacity for future Amtrak service increases. In addition, the use of bus bays allows for concentrated operations and avoids using street capacity for parked buses while creating a convenient facility for customers.

Main Features

- Greyhound in a new, separate facility across street from Union Station
- Buses park in adjacent off-street bus bays
- Operational separation between Greyhound and Amtrak

Figure 54: Option 2A.
Benefits

- Dedicated building for Greyhound limits space and operational conflicts between rail and bus
- Adjacent bus passenger waiting room is convenient for passengers
- Buses park, pull in, and back up off of public streets

Drawbacks

- Potential visual impact on Union Station depends on facility design

Figure 55: Floorplan for option 2A.
Option 3

Option 3 would add a facility for Greyhound at the north end of Union Station and combine Greyhound and Amtrak baggage handling and ticketing into shared facilities. Buses would line up on the street outside Union Station. Greyhound would use the southern portion of the second floor for its offices.

Main Features:

- Greyhound facility on North end of building, including a new addition
- Shared Amtrak/Greyhound baggage room
- Linear queue for bus boarding and layover along NW Station Way
Benefits

- Purpose-built facility for Greyhound
- Short-term parking lot remains intact

Drawbacks

- Operational comingling of Greyhound/Amtrak functions
- Loss of on-street parking
- Linear bus boarding and staging occurs on a public street and is inconvenient for passengers
- Requires a significant reorganization of space inside Union Station.
- Requires expansion of Union Station
- Historic preservation compatibility and limitations on configuration

Figure 57: Floorplan for Option 3.
Preferred Alternative: 2A

Based on discussions with Greyhound and other project stakeholders, Option 2A with its new dedicated Greyhound bus pavilion emerged as the preferred alternative. This option provides a motorcoach facility scaled to Greyhound operational requirements and maintains the intermodal linkage with Union Station and local transit without intermingling intercity rail and bus operations. The Greyhound customer experience is enhanced with a dedicated waiting area that is immediately adjacent to the bus boarding bays. This alternative also has favorable on-street circulation and freeway access via the Broadway Bridge.

Relocating to this new facility would allow for the existing facility to be redeveloped with more intensive uses in accordance with zoning of those parcels and the overall redevelopment vision for the neighborhood.

Consideration should be given to the design of the Greyhound pavilion so as to complement and not compromise views of Union Station. The raised grade of the Broadway ramp adjacent to the site will help to reduce the visual impact of the new Greyhound facility.

Note that Union Station could be used to accommodate certain Greyhound support functions if needed, including office space.
Chapter 5: Precedents

Introduction

In order to learn from comparable multimodal facilities in other cities, several multimodal stations have been chosen as case studies. Narrowing from among a large number of candidate facilities throughout the world, six were chosen which are most applicable to Portland’s Union Station due to a combination of city and station characteristics, such as city population and density, station location within the urban area, intensity of use, historical character, and relationships to various other modes of transportation.

The most similar precedents chosen were of course the historic downtown rail terminals located in sister cities in the Cascades corridor, Seattle King Street Station and Vancouver B.C.’s Pacific Central Station.

Additionally, three examples are mentioned that demonstrate the ongoing investment of cities in joint-use Amtrak rail and Greyhound intercity bus terminals: St. Louis, Salt Lake City, and Miami.

Finally, San Diego Santa Fe Depot, Denver Union Station, Albuquerque’s Alvarado Transportation Center, and Sacramento Valley Station were chosen as examples due their close fit as downtown rail terminals in large Western U.S. cities.

<table>
<thead>
<tr>
<th>Station</th>
<th>New or Historic</th>
<th>Tracks</th>
<th>Modes Serving</th>
<th>Max number of regularly scheduled passenger train departures per day (excluding light rail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancouver Pacific Central Station</td>
<td>Historic</td>
<td>4 heavy rail (passenger)</td>
<td>nearby N Y</td>
<td>2 on Tues, Thurs, Sat</td>
</tr>
<tr>
<td>Seattle King Street Station</td>
<td>Historic</td>
<td>6 heavy rail</td>
<td>Y Y Y</td>
<td>37 on weekdays</td>
</tr>
<tr>
<td>Salt Lake Central Station</td>
<td>New</td>
<td>4 heavy rail</td>
<td>nearby Y N Y</td>
<td>22 on weekdays</td>
</tr>
<tr>
<td>Miami Intermodal Center</td>
<td>New</td>
<td>To be determined</td>
<td>Y Y Y</td>
<td>Not yet built</td>
</tr>
<tr>
<td>St. Louis Gateway</td>
<td>New</td>
<td>4 heavy rail, 2 light rail</td>
<td>Y N Y</td>
<td>9 every day</td>
</tr>
<tr>
<td>Sacramento Valley Station</td>
<td>Historic</td>
<td>4 heavy rail, 1 light rail</td>
<td>Y Y* N</td>
<td>23 on weekdays</td>
</tr>
<tr>
<td>Denver Union Station</td>
<td>Historic</td>
<td>4 heavy rail, 2 light rail</td>
<td>Y N N</td>
<td>2 every day</td>
</tr>
<tr>
<td>San Diego Santa Fe Depot</td>
<td>Historic</td>
<td>4 heavy rail, 2 light rail/ freight (shared)**</td>
<td>Y Y N</td>
<td>25 on Fridays</td>
</tr>
<tr>
<td>Albuquerque Alvarado Transportation Center</td>
<td>New</td>
<td>8 heavy rail</td>
<td>Y N Y*</td>
<td>16 on weekdays</td>
</tr>
<tr>
<td>Portland Union Station</td>
<td>Historic</td>
<td>5 heavy rail (1 shared w/ freight)</td>
<td>nearby N nearby</td>
<td>9 every day</td>
</tr>
</tbody>
</table>

*Amtrak Capitol Corridor is a frequent service between Sacramento and the San Francisco Bay Area and acts as commuter rail for many

**Freight and light rail trains are temporally separated, with freight running overnight

Figure 61: Facility comparison table
Stations in the Amtrak Cascades Corridor

Vancouver Pacific Central Station

As the northern terminus of the Amtrak Cascades service, Pacific Central Station is the primary intercity rail station in Vancouver, British Columbia. The station was built in 1919 by the Canadian Northern Railway.

Pacific Central Station is a terminus for Canada's national intercity rail network (VIA Rail) connecting to central and eastern Canada as well as tourist excursion trains into the Canadian Rockies. The station is a short walk to a nearby Skytrain elevated rapid transit station and includes an attached Greyhound/Pacific Coach Line intercity bus terminal. In addition to the Amtrak Cascades service, the station features a Hertz rental car counter, food court, customs facilities, and a newsstand.

Seattle King Street Station

Built in 1906 and listed in the National Register of Historic Places, Seattle's primary passenger train station is served by regional commuter rail (Sounder) and shares Amtrak Cascades service with Portland to the south and Vancouver, B.C. to the North. The Seattle consist of the cross country Empire Builder, and the north-south Coast Starlight, both terminate at King Street Station. The station is owned by the City of Seattle which purchased it from the BNSF railroad in 2008. In addition, King Street Station is a short walk to the Downtown Seattle Transit Tunnel, which will host Sound Transit’s Link Light Rail beginning in Mid-2009.

New platforms were recently built to accommodate the Sounder commuter rail service operated by Central Puget Sound Regional Transit Authority (Sound Transit), following a debate over preserving the historic but dilapidated original canopies. Facing many of the same critical investment needs as Union Station, King Street Station is currently undergoing a $30.5 million series of renovations in order to improve the appearance, customer experience, and safety of the station. Terminal track improvements at the station will benefit the operation of Cascades trains. Rehabilitation of the station is being funded by a combination of Federal, State, and regional sources. Work is anticipated to continue through 2011 and will involve temporary closure of the station to passengers during the most intensive periods of the rehabilitation.
New Multimodal Stations Incorporating Amtrak and Greyhound

Several new stations have recently been built in the United States that successfully combine Amtrak and Greyhound into a single multimodal facility, creating a hub for regional ground transportation networks. These stations are often more convenient for passengers and can encourage ridership increases, since they create a single transfer point between several modes of transportation.

The LEED™-certified Salt Lake Central Station hosts Amtrak, light rail, commuter rail, greyhound, and local buses in a brand new facility near the edge of downtown and a number of redevelopment projects, such as the renowned Salt Lake City Gateway urban village project.

The future Miami Intermodal Center will be a major transportation hub for seventh-largest metropolitan area in the United States, combining heavy rail metro, commuter rail, Amtrak, elevated people mover, local buses, and Greyhound into a brand new facility.

The St Louis Gateway Intermodal Station opened in 2008, is located below a number of freeway overpasses and flyovers and features enclosed walkways between train platforms and the main terminal. The building includes new platforms for Amtrak and Metrorail (the regional light rail system), several bus bays for Greyhound, and a food court.
Santa Fe Depot
San Diego, California

Description
Opened in 1915 and listed in the National Register of Historic Places, the Santa Fe Depot is located in the heart of San Diego and just two blocks from the harbor. Featuring mission revival architecture, the Depot is across the street from the America Plaza Trolley Station, a modern light rail station, and within walking distance of a major ferry terminal.

Transportation Modes

Intercity and Commuter Rail
Similar to long-range plans for the Cascades route, the Santa Fe Depot is a terminus for a popular regional rail service in Southern California. The Amtrak Pacific Surfliner serves the Santa Fe Depot with 11 daily trains to downtown Los Angeles. Three of those terminate in Santa Barbara and 3 continue to San Luis Obispo. The station is also served by North County Transit District’s Coaster commuter rail, with 11 daily round trips and daily ridership of approximately 6,000 passengers in 2006, connecting in Oceanside to the Los Angeles-area Metrolink commuter rail network.

Local Transit
San Diego Trolley’s Blue Line (light rail) serves the station, while the Blue and Orange Lines both stop at the America Plaza Trolley Station across the street from the Santa Fe Depot. The Trolley provides frequent service throughout San Diego as well as a convenient trip to the Mexican border. In addition, nine bus lines stop at the America Plaza Trolley Station.

Intercity Bus
San Diego’s Greyhound depot is several blocks away from the Santa Fe Depot but located along a Trolley line, making connections between modes fairly easy despite physical separation.

Urban Context
The Santa Fe Depot is located on the western edge of Downtown San Diego and only two blocks from the waterfront, where passenger ferries connect to Coronado Island, a popular residential neighborhood and home to the famous Hotel Del Coronado. Downtown San Diego enjoyed a renaissance during the late 1990s and early 2000s, during which a building boom saw numerous high-density housing projects come into being. In particular, the Marina District, immediately south of the Santa Fe Depot, has been home to a large number of high-end condo and apartment projects. Slightly further south is the Gaslamp Quarter, a historic district popular for its nightlife and special events.
Key Similarities and Differences

Similarities to Union Station:
- Situated in constrained urban areas with little room for expansion or parking
- Large amounts of high density housing and mixed use development have built in the vicinity of the station in recent years.
- Features one of the most successful light rail systems in the country with almost identical ridership to MAX. In the fourth quarter of 2008, MAX and the Portland Streetcar combined hosted 107,600 daily riders while the San Diego Trolley carried 103,900 daily riders on a slightly larger system (53.5 miles versus Portland’s 48 miles).

Differences from Union Station:
- San Diego has a commuter rail system, which means a large number of short-distance trains and more intensive use of the station.
- San Diego’s station is more central to downtown than Portland’s, making it a convenient hub for commuter rail.

Lessons Learned
Santa Fe Depot’s success is due in part to its prime location in the downtown, making it convenient for commuter rail service, as well as the popularity of the highly scenic Pacific Surfliner rail service serving the congested I-5 corridor. The inclusion of light rail platforms in and around the station has enhanced the intermodal character of the station and provides seamless connections between modes, and the America Plaza Trolley Station lends a modern edge to the neighborhood while solidifying Santa Fe Depot’s role as a major transportation center for the region.

Figure 69: The Santa Fe Depot is located near the waterfront in Downtown San Diego.
Denver Union Station
Denver, Colorado

Description
 Owned by the Denver Regional Transportation District (RTD), Denver Union Station opened in its current form in 1914, after several rebuilds and renovations. The station is located in a revitalized neighborhood on the edge of Downtown Denver and hosted more travelers than Stapleton Airport until 1958. Various improvements were built in 1980 to improve operations for transit and intercity trains, and a new effort is underway to significantly upgrade the station for commuter rail use.

Transportation Modes

InterCity Rail
 Union Station is served by Amtrak’s California Zephyr, which runs once daily in each direction between Chicago and California, as well as a seasonal ski train.

Regional Transit
 Between 1997 and 2000 a public-private partnership built the Central Platte Valley Light Rail Spur to Union Station, creating the first major link between regional light rail and intercity rail in Denver. In addition, the planned FasTrack regional rail network, consisting of several new light rail and commuter rail lines, will use Union Station as its central hub.

Urban Context
 Union Station is located at the geographic center of the Denver metropolitan area and acts as the northwest edge of the developed downtown. The station is four blocks from two of Denver’s major sporting venues: Coors Field, to the Northeast, and Pepsi Center, to the Southwest. While there are eight empty blocks of land to the north of the station, the area to the South has seen significant redevelopment in recent years. Like Union Station in Portland, redevelopment of lands around Denver Union Station could significantly alter the character of the station area in future years.

Key Similarities and Differences

Similarities to Portland Union Station:
• Revitalized area on edge of downtown
• Proximity to a downtown transit mall and regional rail systems
• Similarly sized urban areas and even similar density levels:
  » Portland’s city population is 575,930 with 2,159,720 in the metropolitan area.
  » Denver’s city population is 598,707 with 2,506,626 in the metropolitan area.
  » Density: 4,288/sq mi in Portland vs. 3,905/sq mi in Denver
• Both are historic stations
• Proximity to substantial redevelopment/brownfield lands.
• Studied relocation of Greyhound terminal to the rail station

Differences from Portland Union Station:
• Denver Union Station serves primarily as the hub for a growing commuter rail system and only hosts limited intercity service, whereas Portland Union Station is served primarily by Amtrak as an intercity train station.
• Portland’s MAX and Streetcar systems combined carry about 55% more daily riders and 25% more riders per mile than Denver’s RTD system.
• Denver is also somewhat more isolated than Portland, which is within a three hour drive of Seattle and is part of a major economic corridor. Colorado Springs is the nearest metropolitan area to Denver and is only home to roughly 610,000 people. Therefore, the role of intercity rail in Denver is diminished relative to regional transit services.

Lessons Learned

RTD’s choice to make Union Station the hub for its regional rail network, starting with the construction of a light rail station, will help make regional and intercity ground transportation more seamless for Denver. In addition, due to space constraints and plans for considerable service increases, one of the major changes as part of the Union Station Redevelopment Plan will be the creation of two levels of transportation infrastructure at the station, with commuter and Amtrak trains below ground and light rail and bus traffic at grade. With increased density and ridership in the future, some variation on this idea may prove useful for Portland.

In 2008, Greyhound Lines cancelled a proposed relocation to Denver Union Station on financial grounds. The proposal would have cost $22 million to move to Union Station from its existing terminal facility in downtown Denver. The proposal would have involved construction of an elevated facility over existing rail tracks as part of a multimodal parking garage and RTD over-the-road bus terminal.
Alvarado Transportation Center
Albuquerque, New Mexico

Description
Albuquerque’s Alvarado Transportation Center (ATC) was built in 2002 after the city’s original train station burned to the ground. The first phase of the facility contained offices for the City of Albuquerque’s Transit Department and operated as a major local transit center. In 2006 a second phase opened to serve Amtrak and Greyhound. Albuquerque’s Greyhound Depot was previously located 2 blocks from the Amtrak station, and the new expansion incorporates Greyhound and Amtrak into a combined facility.

Transportation Modes
Passenger Rail
Amtrak’s Southwest Chief (Chicago to Los Angeles) stops once daily in each direction, and two Amtrak Thruway bus lines connect to El Paso and Denver, respectively. In addition, the New Mexico RailRunner Express commuter rail service, similar to Seattle’s Sounder service, began in 2006 and connects Albuquerque with Santa Fe as well as surrounding suburbs with 9 daily northbound and 5 southbound departures.

Local Transit
The station serves Albuquerque’s ABQRide bus system and a Bus Rapid Transit line. In addition, Albuquerque is pursuing implementation of a new streetcar line which would run past Alvarado Transportation Center and connect Downtown to the University of New Mexico.

Intercity Bus Service
The Alvarado Transportation Center acts as Albuquerque’s Greyhound depot and is also used by the New Mexico Park and Ride service, which connects to Santa Fe and Los Alamos, and Autobuses Americanos, which is a partner with Greyhound and provides service to Mexico.

Urban Context
ATC is located in Downtown Albuquerque and near several important civic and commercial buildings. Compared to Portland, Downtown Albuquerque is considerably underdeveloped, with many empty blocks used as parking lots. However, the area immediately surrounding ATC includes a recently built movie theater, high density housing, and a large parking garage that serves the station.

Key Similarities and Differences
Similarities to Union Station:
- The bulk of rail service for each city is in a single corridor.
- Both Portland and Albuquerque have limited rail service and can benefit from combining other uses, such as Greyhound, into a single facility.

Differences from Union Station:
- As is readily visible from aerial photography, Portland’s downtown is considerably denser than Albuquerque’s, and Portland as a whole is somewhat denser than Albuquerque, with 4,288 people per square mile versus 2,796.
- Although the cities have similar population sizes (Albuquerque is home to 518,271 compared to
Portland’s 575,930), Albuquerque is part of a considerably smaller metropolitan area, with only 845,913 compared to Portland Metro’s 2,159,720.

- Albuquerque, unlike Portland, does not have a light rail system and instead relies on buses for local transit.
- While Alvarado Transportation Center is a new facility designed with its current uses in mind, Portland Union Station is an historic station designed for rail, making the incorporation of other uses more challenging.

Lessons Learned

Although Albuquerque does not yet have a streetcar or light rail system, the inclusion of Greyhound has transformed Alvarado into a significant intermodal facility, improved operating efficiencies, and opened up a major parcel for station-area development.

Figure 73: Urban context, with several empty lots immediately surrounding ATC and downtown Albuquerque to the northwest of the station.
Sacramento Valley Station
Sacramento, CA

Description
Sacramento Valley Station is the central rail terminal for the Sacramento Region. Completed in 1925 near what are now the Union Pacific railyards, the station is listed in the National Register of Historic places and is one of the busiest stations on the Capitol Corridor connecting Sacramento with the San Francisco Bay Area.

Transportation Modes

Amtrak
The Capitol Corridor Joint Powers Authority operates 16 weekday round trip trains between Sacramento and the Bay Area and 11 on weekends and holidays. Amtrak also operates one Coast Starlight (Los Angeles to Seattle), one California Zephyr (San Francisco to Chicago), and two San Joaquins (to Bakersfield) daily in each direction. In addition, the station has several dedicated Thruway Motorcoach bus bays with a covered passenger loading area.

Regional Transit
Sacramento Regional Transit District (RT) operates light rail with the Gold Line (Folsom to Downtown) terminating at a new station adjacent to the train platforms. Various local and regional buses also stop at the station.

Greyhound
Sacramento’s Greyhound station is located several blocks away on the K Street Mall. An interim station is planned and funded for Richards Blvd industrial area several blocks north of Sacramento Valley Station.

Urban Context
Future Plans for the station include physically moving the historic depot several blocks north and incorporating it into a much larger modern multimodal terminal, which would include Greyhound. This is part of the Sacramento Railyards redevelopment project, which is expected to include 10,000 housing units and millions of square feet of office and retail space on a 240-acre brownfield site (with a potential net density of more than 50,000 people per sq. mi., roughly equal to that of Paris).

Key Similarities and Differences

Similarities to Union Station:
- Each city has an extensive light rail system serving the suburbs and central city, and neither system centers on the intercity rail terminal. In Portland’s case, two of the four MAX lines will serve Union Station with the completion of the Portland Mall, while Sacramento’s Gold Line to
Folsom is the only line serving Sacramento Valley Station.

- Portland Union Station and Sacramento Valley Station are both historic stations with renewed passenger rail service.
- Traffic at both stations largely consists of intercity rail between cities in the 2 to 3-hour driving range.
- Portland and Sacramento have similar city and metropolitan population sizes.
- Significant redevelopment/brownfield lands in proximity to the station.

**Differences from Union Station:**

- Portland has much more urban momentum and population density in the central city, but Sacramento will see a major increase if the Sacramento Railyards project is completed.
- Sacramento has a large amount of space for expansion, while Portland Union Station is spatially constrained.
- Portland has significantly higher transit ridership with 309,900 average weekday boardings in 2007 compared to Sacramento’s 109,000 average weekday boardings.
- Sacramento has a somewhat higher train frequency than Portland and carries a significant number of commuters between Sacramento and San Francisco.
- Partly because Amtrak Capitols is a quasi-commuter rail system, the platforms are open to all users, unlike the tightly controlled platform area at Portland Union Station.

**Lessons Learned**

By building a light rail platform adjacent to Sacramento Valley Station, RT set the stage for the station’s role as an intermodal terminal for Sacramento, creating a seamless connection between the eastern suburbs, many of which are not otherwise served by rail, and the Bay Area. In addition, the rehabilitation of older buildings around the station to include retail has helped to create a more pleasant experience for waiting passengers.
Summary
This examination of station precedents in the western United States shows that there are a number of viable, historic, and multimodal intercity passenger rail facilities that continue to service the needs of the traveling public. Like Union Station, most are located on the fringe of the central business district rather than in its heart. Therefore the proximity of local transit (bus and/or rail) strengthens connection of these facilities with nearby activity centers as well as the region at large from which intercity passenger are drawn.

In most but not all examples, there is a separation of Amtrak intercity rail operations from local transit stations and boarding platforms for operational, safety, and/or security reasons. San Diego is an exception in that light rail and commuter operations separate Amtrak station facilities from boarding platforms; whereas light rail in Salt Lake City operates in the street outside the front door of the terminal.

There are several precedents for collocation of intercity rail (Amtrak) and intercity bus (Greyhound) within a common terminal, which enhances the options and accessibility for passengers making intermodal connections. Vancouver’s Pacific Central station is an excellent example within the Cascades corridor, but new facility investments in other parts of the country illustrate the concept has continuing merit and support of both operating companies. Day to day rail/bus operational and passenger spaces, however, tend to be separated to provide each mode with the space, control, and flexibility they need to manage operations in accordance with their company policies.

In several cases concessions have been made to the needs of modern rail operations (e.g., replacement of historic but dilapidated platform canopies at Seattle King Street Station), but the historic integrity of the station buildings themselves is preserved and enhances the rail experience. On the other extreme, Saint Louis recently built a brand new Amtrak/Greyhound station, its historic Union Station having been converted to a hotel and retail complex years prior.

In both Sacramento and Denver, large-scale brownfield redevelopment are anticipated to change intensify the urban character of the station area in coming years, requiring consideration of how to make rail stations and denser development become “good neighbors” to one another. This is a recognized challenge for Portland Union Station in the coming years as well.
Chapter 6: Recommendations

In addition to being a Portland icon and being listed on the National Register of Historic Places, Union Station is a vital regional transportation hub and a gateway to the City of Portland. Passenger rail service in the Northwest, including the Amtrak Cascades Corridor, continues to grow, and Union Station has recently become the corridor’s busiest station stop. Federal initiatives to promote investment in quality inter-city rail, coupled with a regional vision for expansion of rail services, suggest that the role of Union Station as an intermodal center will continue to grow.

Reinvesting in a new Greyhound terminal at Union Station will further enhance the intermodal characteristic of this area for years to come, and ensures that arriving and departing passengers are also afforded high quality local transit connections through bus, light rail, streetcar, and other transit connections from the Portland Transit Mall.

Realizing the full potential of Union Station will require strategic investment in rehabilitation, facilities enhancement, and passenger amenities, as well as consideration of the operational needs of the facility as the neighborhood continues its revitalization and intensification.

Furthermore, it is essential that Union Station is recognized as an integral part of the infrastructure supporting passenger rail service in the Northwest. The significant needs to revitalize and enhance Union Station are as critical to the attractiveness and success of intercity passenger rail in the Northwest as investments that directly impact rail capacity and speed.
Physical Rehabilitation

As has been highlighted in previous studies, critical repairs are required to stabilize and rehabilitate Union Station, including roof repairs (ongoing), seismic upgrades, stabilization of the building foundation, ADA enhancements, new electrical distribution systems, fire protection, and façade restoration. These needs are estimated to be in excess of $40 million and are a once-in-a-generation investment that directly impacts the ability of Union Station to continue to function as an operable rail terminal in the decades to come.

Intercity Rail Track Capacity

Over the years, terminal rail capacity at Union Station has been steadily reduced. In fact, “The Yards at Union Station” housing development is so named given its location on former Southern Pacific rail yards immediately behind the existing boarding platforms. In the early 1990s, the former 7-track terminal arrangement (including two PTRC freight running tracks) was reduced to the current 5-track arrangement.

It is important to ensure that the operational needs of Union Station, as a working passenger terminal of increasing intensity, are considered in light of the overall urbanization and development of the North Broadway corridor, Waterfront, and Old Town-Chinatown neighborhood. While passenger rail terminals are certainly not incompatible, and are arguably enhanced, by urban densification, preservation of existing rail rights of way should be a goal. Improvements such as grade crossing enhancements to permit “quiet zone” operations and electrification of idling diesel locomotives can be instituted to ensure that rail operations and other urban uses remain good neighbors.

The WSDOT Long-Range Plan for the Amtrak Cascades corridor (2006) is widely regarded as a likely vision of rail service expansion in the Northwest corridor, and is forming the basis for ongoing discussions about “Higher Speed Rail” opportunities in the region, as well as the reintroduction of the Pioneer line. Full implementation of this plan would result in up to 13 round trip trains between Portland and Seattle by 2023, from 4 today. Based on an analysis of track capacity, this study concludes that Union Station will likely have sufficient capacity to meet this level of demand with the five existing terminal tracks at Union Station.

Freight Operations

The Portland Terminal Railroad Company (PTRC) provides vital switching services for the Burlington-Northern Santa Fe and Union Pacific Railroads. This includes routing of rail cars from Guilds Lake Yard in NW Portland through Union Station and across the lower deck of the Steel Bridge. While freight volumes have dropped from recent highs both locally and nationally given economic conditions, the combination of expanded passenger traffic and recovering freight levels will eventually create increased conflicts that could be alleviated with a freight bypass.

Higher levels of passenger rail service may justify consideration of a reinstatement of Track 6 as a freight bypass to alleviate conflicts between passenger and freight operations in Union Station. It is recommended that the operational benefits of a Track 6 freight bypass be re-examined in conjunction with future proposed increases in Amtrak Cascades service levels.

Other Rail Transit Modes

In consultation with study stakeholders and review of existing plans, including the Regional High Capacity Transit (HCT) System Plan under development by Metro, a compelling argument for the introduction of new rail transit services to the vicinity of Union Station was not identified. The HCT plan in fact defers future transit alignment questions in the Portland Central City to future planning efforts for the City Center. A previous study of commuter rail to Vancouver, WA rendered the concept infeasible due to track capacity limitations in North Portland, and no other current transit project envisions Union Station as a proposed terminus.

In anticipation, however, that future transit planning in the urban core may identify a MAX or streetcar right of way in the vicinity of Union Station, this study examined the feasibility of using Track 1 or Tracks 2-5.
1 and 2 for streetcar or light rail. This proposal is complicated by a number of factors, including: tight geometric design constraints; potential interference with Transit Mall operations; and operational complications in the access-restricted Amtrak boarding area. Also, because of FRA regulations prohibit intermingling of non-compliant streetcar and light rail vehicles with heavy rail equipment, removal of these tracks from intercity service could have long-term implications for expansion of passenger and freight rail in the corridor.

The Eastside Portland Streetcar Loop will pass into close proximity to Union Station in a grade-separated fashion over the Broadway Bridge. Because of the grade separation and the fact that the Streetcar will be on structure in the vicinity of Union Station, careful attention should be paid in the future to ensuring connectivity between Union Station and the nearest new streetcar stations in the NW Lovejoy Street corridor.

Another consideration is the potential development impact of a Streetcar or MAX stop at Union Station. From an urbanistic perspective, the proposed Union Station stop location on Tracks 1 and 2 is isolated from developable land parcels (e.g. the Post Office parcel), on-street activity and other transit connections. Pedestrian impediments include the Union Station building itself, the active railroad tracks, the Broadway Bridge, and TriMet Transit Mall layover facilities. Aside from serving Union Station itself, the proposed station will not substantially increase transit access to the area, and therefore its ability to leverage new transit-oriented development is limited. This consideration needs to be weighted against the dollar-for-dollar development benefit of a similar Streetcar or MAX investment in an area of the city with lower overall transit accessibility.

Greyhound/Intercity Bus Facility

While technically not part of Union Station proper, the symbiotic relationship between the Amtrak facilities there and the Greyhound terminal across NW Irving Street is well recognized. Examples of precedent stations show ongoing investment by cities and both companies in joint use intermodal terminals that combine intercity bus and rail service. The fact that Amtrak operates numerous Thruway bus connections from Union Station further demonstrates the connection between these two modes. In Portland, rail and bus passengers also benefit from the excellent regional transit connections available at the adjacent Portland Transit Mall.

This study presents a concept for a new Greyhound facility adjacent to Union Station that preserves these benefits while addressing the overhead costs and functional obsolescence of the existing Greyhound facility. Investment in this location can also provide a new home for other intercity and regional motorcoach lines that currently split operations between Union Station and the Greyhound terminal.

Inclusion of other transit providers may help to leverage additional federal funding sources for intermodal center investment. Finally, either the new or existing Greyhound facilities could play a key role as temporary rail passenger facilities in the event that Union Station’s passenger facilities must close temporarily during major critical renovations.

Redevelopment of the existing two-block Greyhound site at a higher density is another advantage of relocating the terminal to a smaller parcel while maintaining the proximity to other modes at Union Station. Note that other Greyhound relocation opportunities may exist that were not addressed in this analysis, such as relocation to a portion of the Post Office site or re-use of a smaller portion of the existing Greyhound parcel.

Pedestrian Connectivity

Union Station benefits from its location in a pedestrian-friendly location near the urban core. Generally, sidewalks and crosswalks are in good condition and provide for clear and logical pedestrian connections. However, this study recommends the following enhancements to improve pedestrian connectivity:

- Improved wayfinding signage between Union Station and the Portland Transit Mall, possibly including an orientation map for arriving passengers located inside the waiting area;
- Improved signage, lighting, and security presence in the NW Station Way underpass between Union Station and the Portland Transit Mall.
Station and the Smart Park garage, a principal passenger parking facility, at the corner of NW Lovejoy and NW Station Way;

- As noted above, connectivity to the Portland Streetcar Eastside Loop alignment on the Broadway Bridge and NW Lovejoy merits special consideration to ensure a legible pedestrian path and wayfinding between Union Station and the nearest new (and existing) Streetcar stations.

An interim pedestrian connection from Union Station to the new Portland Streetcar Eastside Loop can be developed with minor improvements, including pedestrian lighting wayfinding and a Stop located at the base of the NW Lovejoy ramp of the Broadway Bridge. Street improvements have been recently made for NW Station Way which extends under the Broadway Bridge to Union Station. A new accessible sidewalk adjacent to Station Place apartment building at 1020 NW Ninth was built along the south side of the building between the building and the edge of the Lovejoy ramp with landscaping and some lighting and connects to NW Lovejoy Court intersecting with NW Station Way. Improvements should be made to the underside of the Broadway Bridge, including pedestrian scaled lighting, signage and a thorough cleaning of the bridge piers, sidewalks and installation of anti-pigeon landing devices in the ledges of the Bridge structure.

Efficiency of Passenger Facilities

From the discussion in Chapter 3, it may be seen that if substantially greater volumes of passengers are to be handled, greater efficiencies will be needed in ticketing, seat assignments, and queuing by boarding passengers. Changes in Amtrak business practices which could help the situation include:

- Greater computerization of future space inventories, so that seats can be assigned when tickets are purchased, reducing or eliminating today’s coach seat assignment queues;

- Increased reliance on passenger self-service ticketing, including space reservations, using the internet and in-station ticket machines, to
reduce the load on and space needed for manual ticketing (or more likely, to enable the present ticket counter to remain adequate by reducing the percentages of all tickets sold and seats assigned there);

- Accommodate both waiting First Class (sleeping car) and Business Class (Cascades) patrons in the Metropolitan Lounge, to relieve pressure on other waiting room seating.

- An interim pedestrian connection from Union Station to the new Portland Streetcar Eastside Loop can be developed with minor improvements, including pedestrian lighting wayfinding and a Stop located at the base of the NW Lovejoy ramp of the Broadway Bridge. Street improvements have been recently made for NW Station Way which extends under the Broadway Bridge to Union Station. A new accessible sidewalk adjacent to Station Place apartment building at 1020 NW Ninth was built along the south side of the building between the building and the edge of the Lovejoy ramp with landscaping and some lighting and connects to NW Lovejoy Court intersecting with NW Station Way. Improvements should be made to the underside of the Broadway Bridge, including pedestrian scaled lighting, signage and a thorough cleaning of the bridge piers, sidewalks and installation of anti-pigeon landing devices in the ledges of the Bridge structure.

Other Transportation Enhancements

- Parking: At the present time, overnight passenger parking is usually adequate at the City-owned the Smart Park garage at the corner of NW Lovejoy and NW Station Way. As the neighborhood continues to intensify, parking availability at this facility should be monitored to ensure that rail passengers arriving by automobile have access to a reliable, overnight parking supply. On-street parking can continue to service the needs of shorter-term parkers, including passenger drop off areas.

Real-time parking guidance signage, as has been installed in downtown Portland and at Portland International Airport, can both raise awareness of nearby parking availability and reduce congestion due to parking search and standing automobiles in the terminal driveway and on adjacent streets. Supporting parking policies (e.g. free first half hour with rail ticket stub) could also improve short-term parking and driveway congestion management.

- Driveway Management: During peak periods, a swelling taxi queue combined with private automobile pickups and drop-offs causes substantial congestion in the driveway at the entrance to Union Station. This congestion is exacerbated during late train arrivals and at peak holiday travel periods. Development of designated “kiss and ride” spaces and increased enforcement of vehicle regulations in the driveway (e.g., parking/waiting limits, which are not enforced by the City) can assist with management of vehicular congestion at the station entrance.

- Bicycle: Bicycle access via on-street facilities and low-traffic streets is generally good, and bicycle parking was not identified as a major concern at Union Station. However given the increasing mode share of bicycling, consideration should be given to bicycle parking needs in the future, possibly including attended bicycle parking or short-term locker rentals for travelers, employees, and others who choose the cycling option. Designated waiting areas or other accommodations for pedicabs is another opportunity to increase the visibility of this environmentally friendly travel option for trips within the Portland urban core.

Attended bicycle facilities are common in European and Asian train stations, and are growing in popularity in the United States. Typical amenities include secure storage, end-of-trip facilities (e.g. lockers, showers), an offer other services such as cycling repairs, bicycle rentals, or a café. An attended bicycle parking facility at Union Station could serve both arriving and departing rail passengers as well visitors to the region, particularly if bicycle rentals are provided. It could also serve a broader local commuter market, given the close proximity to the Transit Mall and key bicycle routes into northwest Portland.
and northeast Portland. The first facility of its kind opened at a transit center in Long Beach, California in the late 1990s, and examples are found in other western cities including Seattle and several Bay Area Rapid Transit (BART) stations.

- **Carsharing:** As in most cities, carsharing services in Portland are not explicitly marketed towards arriving rail passengers. However, the two largest cites on the Cascades Corridor, Seattle and Vancouver B.C., both host Zipcar carsharing services and members who can access Zipcar vehicles in Portland. The City may consider providing reserved spaces at Union Station or otherwise encourage the use of Zipcars by arriving rail passengers to provide rail passengers with another alternative for local transportation, particularly for regional destinations not served by transit.

![Bikestation in Long Beach, CA](image)
APPENDIX A:
STREET CLASSIFICATION
MAPS
Figure 81: Traffic Classification Map.
Appendix A: Street Classification Maps

Figure 82: Transit Classification Map.
Figure 83: Bicycle Classification Map.
Figure 84: Pedestrian Classification Map.
Figure 85: Freight Classification Map.
Figure 86: Emergency Response Classification Map.
Figure 87: Street Design Classification Map.
APPENDIX B: TRACK UTILIZATION AT UNION STATION
Intra- and Intercity Passenger Rail Activity

Union Station has five tracks, numbered eastward from the head house, and designated as follows:

- Track 1 – Storage track for Amtrak and privately owned rolling stock (little used)
- Tracks 2 and 3 – Amtrak station tracks for terminating and originating trains
- Tracks 4 and 5 – Mainline tracks for through passenger and freight trains

The island platform between Tracks 4 and 5 is 1,900 feet long, while the island platform between Tracks 2 and 3 is 1,700 feet long. The platform adjacent to the head house and serving Track 1 is approximately 570 feet in length, limited to the area between the north end of the steam plant building and the north end of the head house.

Tracks 1 through 4 are crossed by a pedestrian access walk, about 60 ft wide, under the High Shed. Rolling stock stored on Tracks 1 through 4 must be positioned clear of this walkway; but its effect is to provide storage space on each track for two shorter trains, one parked north and one south of the High Shed. The effective lengths of platform segments north and south of the High Shed are:

- Track 1 – 320 ft south; 190 ft north
- Tracks 2 and 3 – 540 ft south; 1,100 ft north
- Track 4 – 560 ft south; 1,280 ft north
- Track 5 – 1,900 ft (track is not crossed by High Shed walkway)

The Empire Builder consist generally does not exceed a length of 495 ft, five 85-ft long cars plus one 70-ft long diesel locomotive, and fits within the south platform lengths of Track 2, 3 and 4. The Coast Starlight typically runs with 12 85-ft cars and two 70-ft diesel locomotives, for a total train length of 1,160 ft, which can be accommodated on Track 4 north of the High Shed and on Track 5. Existing Cascades trainsets, with 12 cars, one diesel and one cab-baggage car, are about 640 ft long, so must be stopped north of the High Shed on Tracks 2, 3 or 4 to stay clear of the High Shed walkway. WSDOT’s Long Range Plan for Amtrak Cascades envisions lengthening the consists by two more middle cars, for a total train length of nearly 727 ft, still within the limits of the north-end sections of the island platforms at Union Station. The relatively short lengths of the south segments of these platforms vis-à-vis train lengths limits their utility for storing out-of-service consists.

Intercity Passenger Rail Activity – Current and Future

Portland presently is served by 8 Amtrak arrivals and 8 Amtrak departures per day: two Coast Starlight, one Empire Builder, and five Cascades:

- #11 and #14, Seattle-Los Angeles Coast Starlight, typically 10 to 12 cars and 2 diesel locomotives totaling 1,000 and 1,200 feet in length. These trains nearly always stop on Track 5, due to their length in relation to the High Shed crosswalk.
- #7 and #8, Portland-Chicago Empire Builder, typically with 4 or 5 cars and 1 diesel locomotive totaling about 400 to 500 feet long. The arriving train usually stops on Track 4 or 3 south of the High Shed, is moved across the Steel Bridge for turning during the day and then re-spotted on Track 4 or 3 south of the High Shed until its late afternoon departure.
- All other regularly scheduled passenger train serving Union Station are part of the Amtrak Cascades service, now offering four daily round trips between Portland and Seattle, of which two round trips continue to/from Eugene, and two continue north from Seattle, one round trip to/from Bellingham and the other to/from Vancouver, BC. The Bellingham train will continue to Vancouver, BC starting in August 2009 and run on a trial basis through the Paralympic Games in March, 2010.
Existing Amtrak Schedules and Track Occupancy

The schedule of passenger train arrivals and departures at Union Station is shown in the table below, except for the Empire Builder, which arrives from the east (via the north end or “throat” of station) at 10:10 am and departs (also via the north throat) at 4:45 pm. Trains 11 and 14 are the south-and northbound Coast Starlight.

“Rotations” indicated for the Cascades trains show how four of the five assigned “Talgo” trainsets, A through D, move through a four-day cycle beginning and ending at their Seattle maintenance base: A runs on day one, B on day two, etc. Set E is assigned to the daily Seattle-Vancouver, BC round trip, and returns nightly to Seattle.

<table>
<thead>
<tr>
<th>Pacific Northwest Corridor; Condensed Pro Forma Timetable</th>
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<tbody>
<tr>
<td><strong>Existing (2009), Portland-Seattle: 4 Daily Corridor Trains, 3.5-Hr Run Time</strong></td>
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<td><strong>Southbound</strong></td>
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<td>Station</td>
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<td>Vancouver, BC</td>
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<td>Bellingham</td>
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<td>Portland</td>
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<td>Eugene</td>
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<tr>
<td><strong>Rotations: A1 -- D1 B2 A3 E2</strong></td>
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<tr>
<td><strong>Northbound</strong></td>
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<td>Station</td>
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<td>Bellingham</td>
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<tr>
<td>Vancouver, BC</td>
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<tr>
<td><strong>Rotations: A-B-C-D; E-E</strong></td>
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</tbody>
</table>

Figure 88: Current Amtrak Cascades timetable.

A passenger train track occupancy chart, by hour, reveals that each track, except Track 1, is regularly occupied by stopping trains or standing consists that have terminated at Portland and are awaiting their next runs.
### Station Track Occupancy at Portland Union Station

**“Low” Service Level (Operations as of Winter 2009)**

<table>
<thead>
<tr>
<th>Track</th>
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<th>0900</th>
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<th>1200</th>
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<th>1800</th>
<th>1900</th>
<th>2000</th>
<th>2100</th>
<th>2200</th>
<th>2300</th>
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</table>
| Platform 1
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Platform 2
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|     #504-#516
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Platform 3
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|     #501-#506
|     #513-#508
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Platform 4
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|     #7-#8
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| Platform 5
|      |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|     #500
|     #11
|     #14
|     #507
|     #509

**Notes:**
- Track 1 used for occasional storage of Amtrak cars and/or locomotives, and privately owned passenger cars.
- Keep in mind that Track 5 also accommodates most freight train movements through Union Station, although a freight train occasionally will be routed along Track 4. During times when freight traffic is heavier than in early 2009, it is necessary to keep both Tracks 4 and 5 available for through passenger trains and freight trains.
- Then, the Empire Builder consist is stored on Track 3 south of the High Shed, while the Cascades consists from Seattle turning back at Portland, #s 501-506 and 513-508 will use Track 3 north of the High Shed, and the consist arriving from Eugene as #504 and departing for Seattle as #516 will use Track 2 north of the High Shed. At present, no regularly scheduled equipment is stored at Union Station overnight. When unscheduled Amtrak or private cars or locomotives are parked at Union Station, they are spotted on Track 1, which may be considered as a kind of “reliever” track.

### Potential Future Amtrak Schedules and Track Occupancy

What levels of passenger train activity might Union Station see in future years? Led by Washington DOT, the plan is to gradually increase the number of Seattle-Portland round trips. The most recent documentation is the Washington State Amtrak Cascades Mid-Range Plan of December 2008. Its four options, and the number of daily Seattle-Portland round trips each would enable, are:

- **Option 1** – Maintain current operation (4 SEA-PDX round trips)
- **Option 2** – Complete four capital projects under way by 2012 (5 SEA-PDX round trips)
- **Option 3** – Complete five additional capital projects by 2017 (6 SEA-PDX round trips)
- **Option 4** – Complete five additional capital projects by 2014, assuming “unconstrained” financing availability (8 SEA-PDX round trips)

As suggested by the above, available levels of funding will affect WSDOT’s timing in adding more Cascades.
round trips. Options 2 and 3 assume funding following the pattern of funding up to the present and more years to achieve a six round trip train schedule, while Option 4 assumes a more aggressive work effort and funding commitment to intercity passenger service to achieve the highest projected level of service in fewer years.

Oregon DOT, meanwhile, continues to consider the possibility of acquiring its own rolling stock to operate Eugene-Portland trains that would connect across the platform at Portland with the Cascades, instead of offering through service. However, the bleak funding picture in Oregon makes achieving even this modest program a questionable proposition.

Considering the above, two notional scenarios have been prepared, with putative pro forma passenger train timetables to support track occupancy charts giving an idea of how increasing service levels might affect utilization of tracks at Portland Union Station. The medium option includes six, while the high scenario has eight Cascades Portland-Seattle round trips. In both cases, three round trips are assumed to continue to and from Eugene. Amtrak’s long distance Empire Builder and Coast Starlight trains would retain a daily round trip, as at present, except that the southbound Coast Starlight, #11, has arbitrarily been advanced 30 minutes to make a better fit between Cascades trains. The condensed pro forma timetable for the medium alternative, with Seattle-Portland service every 2.5 hours, is shown below.

<table>
<thead>
<tr>
<th>Pacific Northwest Corridor; Condensed Pro Forma Timetable</th>
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<tbody>
<tr>
<td><strong>Future Service, Portland-Seattle: 6 Daily Corridor Trains, 3-Hr Run Time</strong></td>
</tr>
<tr>
<td><strong>Southbound</strong></td>
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<td>Station</td>
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<td>Vancouver, BC</td>
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<td>Bellingham</td>
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<td><strong>Northbound</strong></td>
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<td>Vancouver, BC</td>
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**7-Day Rotation: A-B-C-D-E-F-G**

It may be seen that, with through operation of trains assumed, seven trainsets would suffice to operate the entire Cascades service (as opposed to the five presently used), and that each trainset could rotate through the entire schedule every seven days, an important concept in getting each set of equipment back to the Seattle maintenance base with some frequency. Trains would lie overnight at Seattle (two), Vancouver, BC (one), Eugene...
(two) and Portland (two). In addition, this kind of schedule would offer good choices to passengers traveling to/from station south of Portland and north of Seattle, as well as those riding in the mid-section of the corridor.

The track occupancy chart below is drawn to keep Tracks 4 and 5 open for stopping passenger trains and freight trains. Daytime storage of the Empire Builder consist (#7 and #8) is moved to Track 3, while Track 2 handles most of the Cascades trains turning back at Portland, except for one consist held overnight on Track 3 (#511-#502). This last consist could be held on the north end of Track 2 if the consist turning from #509 to #506 could be held on the same track south of the High Shed. At this level of operation, Track 1 still would be open for use by unscheduled Amtrak or private cars or locomotives, and as a reliever track to handle abnormal events.

The pro forma timetable for the high scenario, with eight Portland-Seattle Cascades round trips offering service every two hours, is below. Note that southbound Cascades #505 passes southbound #11 during the latter’s 35-minute Portland stop, providing a means for passengers to leave Washington stations later and catch the Coast Starlight to continue south from Eugene.
### Pacific Northwest Corridor; Condensed Pro Forma Timetable

**Future Service, Portland-Seattle: 8 Daily Corridor Trains, 3.0-Hr Run Time**

<table>
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<tr>
<th>Station</th>
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<td>6:20</td>
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<td>14:20</td>
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<td>8:20</td>
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<td>10:20</td>
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<td>16:20</td>
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<td>8:20</td>
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<td>18:20</td>
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<td>A1 H1 D1 G1 F2 B2 H3 E2</td>
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<td>B1 F1 E1 I1 C1 H2</td>
<td>G2</td>
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**7-Day Rotation: A-B-C-D-E-F-G-H-I**

As with the medium alternative, this enhanced level of service is arranged so that the nine trainsets required to run it could cycle through the entire timetable every nine days, starting from Seattle as set “A” and spending nights there between days “A” and “B,” days “F” and “G” and days “I” and “A” (i.e., numerically, the nights of days 1, 6 and 9). Trains would lie overnight at Seattle (three), Vancouver, BC (one), Eugene (two), Bellingham (one) and Portland (two). As compared to the medium option, service to passengers is further enhanced by offering two more round trips for a daily schedule providing:

- Eight Portland-Seattle round trips (nine if Coast Starlight included)
- Two through Eugene-Portland-Seattle-Vancouver round trips
- Three Portland-Eugene round trips, of which the third continues to/from Seattle
- Three Seattle-Vancouver round trips, of which one originates and terminates at Seattle
- One Portland-Seattle-Bellingham round trip, timed for a full business day in Seattle

The corollary track occupancy chart for Portland Union Station is presented below. It may be seen that Track 2 would be fully committed for use by Cascades trainsets turning back north at Portland. As before, assignments are made to keep Tracks 4 and 5 open for stopping passenger trains and freight trains. Track 3 accommodates daytime storage of the Empire Builder consist (#7 and #8) and, in addition, overnight storage of one Cascades trainset, unless two such consists can be stored on Track 2, one north and one south of the High Shed.
normal circumstances, Track 1 still would be available for use by unscheduled Amtrak or private cars or locomotives, and as a reliever track to handle abnormal events.

<table>
<thead>
<tr>
<th>Track</th>
<th>0600</th>
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<th>0800</th>
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<th>1000</th>
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Station Track Occupancy at Portland Union Station

Future Service, Portland-Seattle: 8 Daily Corridor Trains; 3-Hr Seattle-Portland Run Time Assumed

Notwithstanding the foregoing, the possibility should be examined of having to handle even more trains through Union Station than envisioned in the high scenario. What if, for example, there emerged through interstate cooperation and joint funding a commuter rail system of, say, two lines routed through Portland Union Station, perhaps Woodland to Wilsonville (or beyond) and Camas, WA to Newburg (or beyond)? Based on the new Westside Express as well as typical operating patterns for other commuter rail systems, each line might run half-hourly during peak commuting hours, putting a train through Union Station every 15 minutes in both directions, with midday service on an hourly frequency (four trains per hour, two in each direction). Track 1 could be upgraded to handle the off-peak service entirely, and peak operations in one direction, but would be hard pressed to accommodate both north- and southbound trains at peak frequencies. A second commuter track would be needed to assure that train operations through Union Station remained fluid and reliable. One possibility would be to use Track 3, which should be available between after 6:30 am until 10:00 am, and then again from about 5:00 pm until very late evening. However, another track would need to be used during the afternoon service build-up before 5:00 pm. Track 4 would be the likely candidate. Depending on the intensity of freight operations past Union Station, it might be that at about this point it would be necessary to re-install Track 6 as a freight bypass line. This, however, would impinge on the area used by delivery trucks fueling Amtrak locomotives; so any Track 6 design would need to accommodate that activity.
Even higher utilization of Union Station for intercity trains is envisioned in WSDOT’s Long Range Plan for Amtrak Cascades, which includes an ultimate timetable with 13 round trips between Portland and Seattle, and four to/from Vancouver, BC. This document does not address Portland-Eugene service. The pro forma timetable below incorporates the WSDOT schedule, adds three Portland-Eugene Cascades round trips, and retains the Coast Starlight with its longer running time. Note that between Portland and Seattle, this causes southbound #11 to be passed by #107, and northbound #14 to be passed by #122 and #124 – feasible moves on the double- and in some areas triple-tracked reverse signaled railway line that now exists and will be further improved before such an ambitious schedule is placed into operation. This pro forma timetable requires two more Cascades trainsets than the “high” level service discussed earlier.

### Pacific Northwest Corridor; Condensed Pro Forma Timetable

#### Future Service, Portland-Seattle: 13 Daily Corridor Trains, 2.5-Hr Run Time

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<th>105</th>
<th>11</th>
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<th>109</th>
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<th>111</th>
<th>115</th>
<th>117</th>
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<th>121</th>
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</tbody>
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| J1 | E1 | I1 | D1 | G1 | A2 | K1 | C2 | E3 | F2 | I3 | A4 | B2 | G3 |


Figure 94: Timetable under 13-train scenario.

The accompanying track occupancy diagram for Portland Union Station is shown below. For this level of operations, the display has been expanded to separate the north and south ends of Tracks 1 through 4, not necessary for Track 5 since no trains terminate there and the stopping trains pausing on Track 5 tend to stand with their consists more or less centered on the High Shed. As noted previously, the relatively short Empire Builder consist can be held south of the High Shed, allowing a short-turning Cascades trainset (#109-#120) to stand on the north end of the same track for a portion of the midday time period. Unfortunately, the #113-#124 turn cannot be accommodated on Track 3-N because it would prevent the departure of #8 to the north at 4:45 pm. Other than this instance, Cascades trainsets are parked on Track 1-N only when two other consists are already occupying Tracks 2-N and 3-N. It should be possible to revise turns.
### Station Track Occupancy at Portland Union Station

**Future Service, Portland-Seattle: 13 Daily Corridor Trains; 2.5-Hr Seattle-Portland Run Time Assumed; No High Shed (Ped Platform Access Grade-Separated)**

| Track | 0500 | 0600 | 0700 | 0800 | 0900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 0000 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2-N   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #108  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #101-112 | #107-116 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #115  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #126  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #123  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 2-S   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #106  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #105-118 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 3-N   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #103  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #114  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #109-120 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #113-124 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #117-128 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #121  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #125  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 3-S   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #106  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #105-118 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 4-N   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #25   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #111-122 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 4-S   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #11   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #25   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| #14   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 5     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 6     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

**Notes:**
- **N** - Track north of High Shed; **S** - Track south of High Shed.
- #7-#8, Empire Builder, Long distance train to/from Chicago terminating at Portland; lays over in station, 10:10 am - 4:45 pm (locomotives fueled)
- #11, Coast Starlight, long distance train Seattle-Los Angeles, stops Portland, 1:20 pm - 1:55 pm (locomotives fueled)
- #14, Coast Starlight, long distance train Los Angeles-Seattle, stops Portland, 3:40 pm - 4:20 pm (locomotives fueled)
- #103, #108, #114, #115, #121, #126, Cascades operating through to/from Eugene and points north of Portland; 15-minute stop at Portland for each train within hour highlighted.
- Pioneer (1996 Schedule): #25 to Seattle, 2:30-3:05 pm; #26 to Chicago, 11:25-11:40 am
- All other 100-series trains, Cascades turning at Portland from southbound (odd #s) to northbound (even #s) as indicated.

**Figure 95:** Track occupancy chart under 13-train scenario.

Unfortunately, the lengths of the Cascades trainsets appear to preclude holding those trains south of the High Shed; and as a result, there are times of the day when a through track – other than Tracks 4 and 5 – would not be available for through-routed commuter trains. It appears that times when station tracks could be available for through routed commuter trains are:

- **Track 1**, 6:00 am until noon
- **Track 2**, 7:00-8:00 am and 5:00-7:00 pm
- **Track 3**, 8:00-10:00 pm

At other times, through-routed commuter trains would need to use Tracks 4 and 5.

However, commuter trains operating only to the south from Union Station could use Tracks 1-S and 2-S if their consist were no longer than could be accommodated by the platforms serving those locations. Assuming standard 85-ft long passenger cars, Track 1 could accommodate two-car trains (or perhaps three-car trains if the southernmost car loaded and unloaded passengers only from its north end), while Track 2 could accommodate trains as long as six cars.

Restoration of Track 6 as a freight bypass track could open up some increased flexibility for turning and storing Amtrak consists and through routing OR-WA commuter trains at Union Station.
APPENDIX C: FEDERAL AND STATE RAILROAD REGULATIONS
Railroad operations through Portland Union Station are subject to safety regulation by the US Federal Railroad Administration (FRA) and Oregon Department of Transportation’s Rail Division. In addition, changes to passenger facilities at Union Station must incorporate provisions to comply with the Americans with Disabilities Act (ADA).

Federal Regulations Affecting Track and Platform Use at Portland Union Station

Two elements of federal regulation must be considered and their requirements accommodated when implementing any changes on the “rail side” of Portland Union Station:

• Laws and regulations governing safety, administered by the Federal Railroad Administration
• The Americans with Disabilities Act of 1990 and its implementing regulations, administered by the USDOT and coordinated by the United States Access Board, including Guidelines promulgated by the Architectural and Transportation Barriers Compliance Board

The Federal Railroad Administration and Its Authority

The Federal Railroad Administration, or FRA, is a regulatory agency of the Federal Government, administratively part of the U.S. Department of Transportation. The FRA has some historical antecedents traceable to the early regulation of the railroad industry in the 19th century, but the FRA in its present form was created with the establishment of the US Department of Transportation in 1966. While it does have other functions, the primary purpose of the FRA (the one which makes it important to this study) is the promulgation and enforcement of railroad safety regulations. Many of these directly affect, or even specify in some detail, the physical design and method of operation of passenger equipment used on railroad lines.

In the FRA’s own words, the “… Office of Safety promotes and regulates safety throughout the Nation’s railroad industry. It employs more than 415 Federal safety inspectors, who operate out of eight regional offices nationally. FRA inspectors specialize in five safety disciplines and numerous grade crossing and trespass-prevention initiatives: Track, Signal and Train Control, Motive Power and Equipment, Operating Practices, Hazardous Materials, and Highway-Rail Grade Crossing Safety. The Office trains and certifies State safety inspectors to enforce Federal rail safety regulations. Central to the success of the rail safety effort is the ability to understand the nature of rail-related accidents and to analyze trends in railroad safety. To do this, the Office of Safety collects rail accident/incident data from the railroads and converts this information into meaningful statistical tables, charts, and reports” (FRA website).

Adopted FRA regulations can be found in a larger body of Federal rules known as the “Code of Federal Regulations.” The Code of Federal Regulations, also known as “the Code” or “CFR,” is “…a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government. The Code is divided into 50 titles which represent broad areas subject to Federal regulation. Each title is divided into chapters which usually bear the name of the issuing agency. Each chapter is further subdivided into parts covering specific regulatory areas.” Title 49 of the Code of Federal Regulations addresses Transportation. Parts 200 through 299, published in a 900-page volume, are made up of the regulations of the Federal Railroad Administration. References in this study, formatted as “49CFR209” for example, refer to these regulations and their subparts specifically.

Scope of FRA Jurisdiction

A continuous source of discussion and comment is the relationship of FRA jurisdiction to the jurisdiction of state agencies over rail transit safety. In very general terms, one can say that passenger services operated over “railroad” tracks, whether publicly- or privately-owned fall under FRA jurisdiction. In contrast, safety regulation
of “rail transit” systems, such as light rail or rapid transit (e.g., the MAX light rail and Portland Streetcar lines in this region) is left to the states. In Oregon, the agency responsible for rail transit safety is the Oregon Department of Transportation (ODOT) Rail Division.

This would seem relatively straightforward, but there are occasions upon which the distinction seems blurred. In these cases, one key criterion is whether or not the tracks are part of the “general railroad system of transportation.” Absence of a track connection to the general railroad system does not in and of itself mean that FRA lacks jurisdiction, but the presence of a connection, and the operation of the line as part of that system as shown by the presence of through passenger and freight trains, assures the presence of FRA jurisdiction. An extensive discussion of jurisdiction over passenger operations can be found in 49CFR Part 209.

These matters have become an issue in cases where there has been a desire to introduce light rail transit and, subsequently, light DMU transit, onto tracks that are used at some point by freight trains. The FRA has made it clear that it retains jurisdiction in those cases, but that waivers from some requirements may be granted under proper conditions, of which the key provision is an absence of simultaneous co-mingled operation rail rolling stock whose design is FRA-compliant with rail vehicles whose design is non-FRA-compliant. The granting of waivers from certain requirements, and the application of state-level (such as the ODOT in Oregon) rail transit safety regulation to the operation under waiver, does not mean that FRA jurisdiction itself is being waived – a point that has sometimes been overlooked amidst the complexity of operations, equipment and regulation. In the case of Portland Union Station, FRA jurisdiction is a certainty. The central issue is whether or not conditions exist for the granting of waivers for non-compliant equipment – MAX light rail vehicles and/or Portland Streetcar vehicles – to use one or more tracks through the station, i.e., Track 1 alone or Tracks 1 and 2.

Evolution of Waiver/Temporal Separation System – for Light Rapid Transit

In the early decades of the twentieth century, in what might now be called the “first rail transit age,” numerous examples emerged throughout the US of mainline railroads and interurban trolley lines sharing tracks. One of the largest such system was the Los Angeles region’s own Pacific Electric Interurban, on which freight trains drawn by steam engines ran interspersed with electric passenger trains. In Texas, trolley wire was strung for lightweight interurban cars to share a steam railroad line between Dallas and Denton. A similar operation existed into the 1950s along what is now the Springwater Corridor through Southeast Portland to Gresham. Farther east, intercity electric interurbans, local trolleys and railroad passenger and freight trains all shared the Big Four bridge over the Ohio River between Louisville, KY and Jeffersonville, IN. All of these and similar arrangements elsewhere ended during the abandonment of trolley systems during the last century’s middle decades.

A track sharing revival, of sorts, began with the opening of the San Diego Trolley line to San Ysidro in 1981, which signaled the start of a “new age” for rail transit in the US. Electric light rail trains and diesel-powered local freight trains share over 13 miles of the former San Diego & Arizona Eastern railroad line, purchased by the Metropolitan Transit Development Board for the LRT project. A second LRT line to El Cajon was completed in stages between 1986 and 1989, and also is shared by electric transit trains and diesel-powered local freights. On both lines, freight trains operate during the overnight hours when LRV’s are not running; but there is some overlap during the late evening and early morning transition periods. At first, there were no FRA rules governing shared use of tracks, but once the Federal rules were finally adopted in 2000, it was necessary for San Diego agencies to apply for a waiver to continue the operating plan that had proven successful and safe for nearly 20 years. The initial waiver of 2001 required rigid day LRT/night freight “temporal separation,” such that the late evening/early morning overlap had to be abandoned, with freights limited to the late night hours when no LRT trains were on the line. Finally, in 2006, FRA modified its waiver so that the overlap could be restored, preserving the ability to run late evening LRT service, while easing the restriction on freight operating hours. Under the current plan, “trolleys” may run in one direction on one main track while freights are operating in the opposite

1 Schumann, John W., History of Railroad and Transit Joint Track Use, ASCE Workshop on Operational Issues in Designing Rail Transit and Commuter Railroad Services, Detroit, Michigan, May 1977.
direction on the second main track, with all trains under the control of the LRT dispatcher.

Similar LRT/local freight track sharing arrangements are also in effect on portions of new LRT lines using old railroad alignments in Baltimore (since 1992) and Salt Lake City (since 1999). These properties also followed the FRA waiver process, as did New Jersey Transit in 2002 and 2006 for a very limited section – about 1,500 feet – of shared track on the Newark City Subway LRT line. A synopsis of LRT/freight track sharing operations follow in Figure 75, below.

**Synopsis of “Non-FRA-Compliant” Shared Track Operations in the U.S.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Property</th>
<th>State</th>
<th>Transit</th>
<th>Dispatch Control</th>
<th>Synopsis of Waiver’s Effect</th>
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</thead>
<tbody>
<tr>
<td>1981</td>
<td>San Diego Trolley</td>
<td>CA</td>
<td>LRT</td>
<td>Transit</td>
<td>Day/evening LRT; late night freight (contract freight operator)</td>
</tr>
<tr>
<td>2006</td>
<td>San Diego Trolley</td>
<td>CA</td>
<td>LRT</td>
<td>Transit</td>
<td>Simultaneous late evening freight south &amp; LRT north on separate tracks; early AM vice versa</td>
</tr>
<tr>
<td>1992</td>
<td>Maryland Transit</td>
<td>MD</td>
<td>LRT</td>
<td>Transit</td>
<td>Day/evening LRT; late night freight (two separate segments, freight operators)</td>
</tr>
<tr>
<td>1999</td>
<td>Utah Transit Authority</td>
<td>UT</td>
<td>LRT</td>
<td>Transit</td>
<td>Day/evening LRT; late night freight (contract freight operator)</td>
</tr>
<tr>
<td>2002</td>
<td>NJ Transit City Subway</td>
<td>NJ</td>
<td>LRT</td>
<td>Transit</td>
<td>Day/evening LRT; late night freight (Norfolk Southern) via “extended crossing” (1,100 ft)</td>
</tr>
<tr>
<td>2005</td>
<td>NJ Transit City Subway</td>
<td>NJ</td>
<td>LRT</td>
<td>Transit</td>
<td>Midday freight crossings allowed between LRVs; signal system maintains separation</td>
</tr>
</tbody>
</table>

Application of Waiver/Temporal Separation System to DMU (NJT, NCTD, Cap Metro)

Since its initial application to electric LRT systems using shared track, the FRA waiver process has been extended to newer projects contemplating common trackage for non-compliant “light” diesel multiple unit (DMU) transit trains and “heavy” freight trains.

The first of these projects, New Jersey Transit’s 34-mile RiverLine linking Camden and Trenton, opened in 2004. Vehicles built to European railway structural requirements, enhanced by front end designs applying crash energy management (CEM) principles initially had access to the shared portion of the route, about 32 miles, from 6:00 AM until 10:00 PM, when the shared section had to be vacated to make way for overnight freight operations (temporal separation). In the years since, NJT, Conrail (the freight operator) and FRA have agreed to a series of modifications that maintain the freight time window, while allowing limited expansion of the DMU passenger service. These are highlighted in Table 2 below.

Also listed in Table 2 are two additional “new start” light DMU lines: the 22-mile Sprinter between Oceanside and Escondido in northern San Diego County, and Capital Metro’s 32-mile Metrorail line to begin serving Austin, TX in March 2009.
Synopsis of “Non-FRA-Compliant” DMU Shared Track Operations in the U.S.

<table>
<thead>
<tr>
<th>Year</th>
<th>Property</th>
<th>State</th>
<th>Transit</th>
<th>Dispatch Control</th>
<th>Synopsis of Waiver’s Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>NJ Transit RiverLine</td>
<td>NJ</td>
<td>DMU</td>
<td>Transit</td>
<td>Day/evening DMU; late night freight (contract freight operator)</td>
</tr>
<tr>
<td>2004</td>
<td>NJ Transit RiverLine</td>
<td>NJ</td>
<td>DMU</td>
<td>Transit</td>
<td>Above modified to allow early AM DMU north of Florence to make NEC connections at Trenton, w/freight continuing to run south of Florence</td>
</tr>
<tr>
<td>2005</td>
<td>NJ Transit RiverLine</td>
<td>NJ</td>
<td>DMU</td>
<td>Transit</td>
<td>Add early AM south-end service Cinnaminson-Camden</td>
</tr>
<tr>
<td>2006</td>
<td>NJ Transit RiverLine</td>
<td>NJ</td>
<td>DMU</td>
<td>Transit</td>
<td>Extend last northbound trip from 26th St to Pennsauken/Rte 73 Park-Ride</td>
</tr>
<tr>
<td>2006</td>
<td>NJ Transit RiverLine</td>
<td>NJ</td>
<td>DMU</td>
<td>Transit</td>
<td>Early AM &amp; late PM service, Burlington to Camden &amp; Trenton</td>
</tr>
<tr>
<td>2007</td>
<td>NJ Transit RiverLine</td>
<td>NJ</td>
<td>DMU</td>
<td>Transit</td>
<td>Modified track/signals to support expanded late evening DMUs north to Pennsauken/ Rte 73</td>
</tr>
<tr>
<td>2008</td>
<td>NCTD Sprinter</td>
<td>CA</td>
<td>DMU</td>
<td>Transit</td>
<td>Day/evening DMU; late night freight (contract freight operator)</td>
</tr>
<tr>
<td>2009</td>
<td>Capital Metro Rail</td>
<td>TX</td>
<td>DMU</td>
<td>Transit</td>
<td>Day/evening DMU; late night freight (contract freight operator)</td>
</tr>
</tbody>
</table>

Implications for Portland Union Station

The rail-side tracks and platforms at Portland Union Station are connected to the “general railroad system of transportation” and clearly fall within FRA jurisdiction. Simultaneous mixed operation of compliant and non-compliant rail vehicles through Portland Union Station is not likely to be approved by FRA, based on precedents to date. Temporal separation might be allowed under the waiver process for some conditions, particularly considering the low speeds of all trains operating through Union Station. Possibilities for MAX light rail and/or Portland Streetcar operation on Track 1 or Tracks 1 and 2, and the consultant’s assessments thereof are:

- Simultaneous joint use of Track 1 or Tracks 1 and 2: FRA likely will not sanction, based on previous cases synopsized above. Waiver approval prospects – nil.
- Temporal separation on Track 1 only: FRA likely will not sanction due to close proximity of Tracks 1 and 2. Waiver approval prospects – low.
- Temporal separation on Tracks 1 and 2: FRA might approve if “adequate” safety measures (e.g., positive derails in place at each end of both tracks when non-compliant vehicles are being operated on affected tracks) can be demonstrated to be in place. Waiver approval prospects – medium.
- Exclusive use of Track 1 and removal of its connections to the general system: FRA likely will not sanction due to close proximity of Tracks 1 and 2. Waiver approval prospects – low.
- Exclusive use of Tracks 1 and 2 and removal of their connections to the general system: FRA might approve, because tracks will not be connected to the “general system” and a platform separates Tracks 2 and 3. Waiver approval prospects – medium or better.

Americans with Disabilities Act and Enabling Regulations

In 1990, a bipartisan majority of the US Congress passed the Americans with Disabilities Act, and it was signed enthusiastically by then-president, George H. W. Bush, recognizing it as a significant step forward in opening society to mobility-impaired people, and helping to fulfill one aspect of the promise of equal rights for all people. As such, ADA has taken its place among the country’s underlying civil rights statutes, and as a result, there is very limited scope for deviating from standards established in its implementing regulations.
Design and operating requirements for new and renovated facilities and public transportation vehicles are contained in several parts of the Code of Federal Regulations (CFR), including:

- 36 CFR Ch. XI, Part 1192 – ADA Accessibility Guidelines for Transportation Vehicles
- 49 CFR Subtitle A, Part 38 – ADA Accessibility Specifications for Transportation Vehicles

In regard to the correlation of railroad passenger car entries and station platforms, often referred to as the “car/platform gap,” Section 38.113 in the latter is specific:

**TITLE 49—TRANSPORTATION, Subtitle A--Office of the Secretary of Transportation, PART 38_AMERICANS WITH DISABILITIES ACT (ADA) ACCESSIBILITY SPECIFICATIONS FOR TRANSPORTATION VEHICLES, Subpart F_Intercity Rail Cars and Systems**

Sec. 38.113 Doorways.

(d) Coordination with boarding platforms--(1) Requirements. Cars which provide level-boarding in stations with high platforms shall be coordinated with the boarding platform or mini-high platform design such that the horizontal gap between a car at rest and the platform shall be no greater than 3 inches and the height of the car floor shall be within plus or minus 5/8 inch of the platform height. Vertical alignment may be accomplished by car air suspension, platform lifts or other devices, or any combination.

(2) Exception. New cars operating in existing stations may have a floor height within plus or minus 1-1/2 (1.5) inches of the platform height.

(3) Exception. Where platform set-backs do not allow the horizontal gap or vertical alignment specified in paragraph (d) (1) or (2), platform or portable lifts complying with Sec. 38.125(b) of this part, or car or platform bridge plates, complying with Sec. 38.125(c) of this part, may be provided.

(4) Exception. Retrofitted vehicles shall be coordinated with the platform in existing stations such that the horizontal gap shall be no greater than 4 inches and the height of the vehicle floor, under 50% passenger load, shall be within plus or minus 2 inches of the platform height.

Source: http://www.fta.dot.gov/civilrights/ada/civil_rights_3905.html

Existing facilities, such as Portland Union Station, normally are required to meet these and other ADA mandates when facilities are replaced or renovated. For such projects on the “rail side” of Union Station, paragraph (3) Exception is important, because either or both of two issues may impede full compliance with the car/platform gap dimensions specified in paragraphs (1) and (2):

- Cars with significantly varying floor heights use Union Station’s platforms
- Regulations governing freight train clearances are at odds with ADA mandates

**Cars With Differing Floor Heights Use Union Station’s Platforms**

Passenger car entry heights vary significantly over the types used on trains regularly stopping at Union Station:

- Superliner – entries 15-in above rail: Coast Starlight, Empire Builder and, if restored, Pioneer (likely)
- Talgo – entries 26-in above rail: Cascades
Amfleet, Horizon, Heritage – entries 51-in above rail: Special trains, e.g., sports specials to/from Seattle; private cars and freight railroad business trains

Superliner entries are about 15-in above rail; “standard” cars (Amfleet, Horizon, pre-Amtrak “heritage” cars) have entries 51-in above the rail; Talgo entries are about 26-in above the rail. Passenger cars with other entry heights may come into use for these and other services in future years as existing fleets are eventually replaced and/or new services are begun. For example, the multi-level coaches typically purchased for the newer commuter rail systems have entries that are 25-in above the rail. Entry floor heights for other off-shore rolling stock tends to fall within the 15-in to 26-in range, but there is no uniformity; a platform height designed to match one set of equipment may not match another type.

This suggests that if level boarding as defined by ADA is in fact to be offered, platforms of different heights may need to be dedicated to different car types, e.g., Superliners on Tracks 4 & 5 with a 15-in platform, Talgos on Tracks 2 & 3 with a 26-in high platform, “standard” cars (only occasionally used on Portland trains) at either Tracks 4 or 5, or on Track 1 with the existing rail-level platform, step loading and a lift for wheelchairs. Coordination and clarification on ADA requirements from USDOT is required as part of the process for concluding the design of any platform improvements at Union Station.

State Regulations Governing Freight Train Clearances Are At Odds With ADA Mandates

Railroad safety is governed by the State of Oregon through Railroad Rules and Regulations of the Oregon Department of Transportation, Chapter 741 Administrative Rules, Division 310, with 741-310-0030 governing side clearances at station platforms. The key provisions establishing minimum distances from the track centerline for platforms of various heights are as follows.

741-310-0030, Platforms

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum Clearance</th>
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</thead>
<tbody>
<tr>
<td>(a) Platforms constructed 8 inches or less above top of rail at greatest height</td>
<td>4 feet 8 inches</td>
</tr>
<tr>
<td>(b) Platforms constructed in excess of 8 inches but 4 feet or less above top of rail at greatest height</td>
<td>7 feet 3 inches</td>
</tr>
<tr>
<td>(c) Platforms constructed prior to January 1, 1982, in excess of 4 feet but 4 feet 6 inches or less above top of rail at greatest height</td>
<td>8 feet</td>
</tr>
</tbody>
</table>

Note that these clearances apply to “tracks transporting freight cars” per the ODOT sketch, Exhibit A, at the end of this section.

Car/Platform Gap Closing Alternatives

To provide ADA-compliant horizontal and vertical gaps for a typical 10-ft wide passenger car with floor between 8-in and 51-in above the rail, the platform edge would need to be no more than 5-ft 3-in from the platform track centerline, and at the same height above the rail as the car floor. This is 2-ft within the 7-ft 3-in distance from centerline required for platforms between 8-in and 48-in above the rail, an 2-ft 9-in less than the 8-ft requirement for platforms higher than 4-ft up to 4-ft 6-in. Tracks serving such platforms must be (a) equipped with devices to adequately separate freight trains from the platform edge, or (b) restricted from use by freight cars. There are two ways this might be achieved practically on Track 5 at Union Station:

- Build a gauntlet for freight use offset to the east from Track 5, restrict Track 4 to passenger train use, as is already the case for Tracks 1 through 3.
Figure 99: Exhibit "A": Typical clearance of structures from railroad tracks for use in the State of Oregon.
• Restore Track 6 for freight use so that Tracks 4 and 5 can be dedicated to use by passenger trains.

Restoring Track 6 would be the least technically “innovative” way to separate freight trains from the other tracks through Union Station. Such freight “bypass” tracks have long been used at other major passenger stations through which freight trains pass, such as King Street in Seattle, WA, as well as North Philadelphia, PA, Trenton, NJ and others along the Northeast Corridor. At Union Station, the “cost” would be addition of a little more than 1,000 ft of track and interlocked turnout at each end. The width of the right-of-way east from the edge of the Track 5 platform is 42-ft. Assuming Track 5 to 6 centerline separation of 15-ft and an additional 6-ft to east edge of Track 6 ballast line, a width of about 16-ft would remain for use by Amtrak fuel trucks and railroad maintenance of way vehicles.

A “gauntlet” uses a set of controlled switch points at each end of the station area to divert stopping passenger trains to the high-level platform, while allowing freight and non-stopping passenger trains to pass the area on the main tracks, with safe side clearances provided as mandated by the applicable state laws. Similar to restoring Track 6, a gauntlet adds track and signal (switch interlocking) components, but taking less r-o-w width.

A third alternative would be to install gangplanks along the Track 4 and 5 platform edges, These would be lowered to serve passenger trains, but raised at other times to allow freight trains to pass. This solution is working acceptably on the Sprinter DMU line in northern San Diego County, CA. While a reasonable approach for short two-car trains drawn from a uniform fleet having all cars the same length, same floor height and with doors in the same locations along the length of the car, gangplanks would be cumbersome for the 1,900-ft long Track 4 & 5 platform at Union Station, and incompatible for a facility handling different kinds of passenger cars with different door locations, and even different floor heights, as noted above. It would be more practical and in all likelihood less costly to restore Track 6 as a freight bypass.
Conclusions

Changes to platforms are likely to trigger requirements to raise these facilities to promote level boarding. Raising platforms uniformly to 15-in could provide level boarding for Superliner cars, but would require step and lift boarding for other car types using Union Station. Raising different platforms to different heights for different equipment would increase the number of passengers offered level or near-level boarding, but would reduce the operating flexibility to berth trains on different tracks (e.g., Superliners restricted to Tracks 4 and 5 with 15-in platform; Talgos restricted to Tracks 2 and 3 with 26-in platform, etc.). Ramps to raised platforms would have to be constructed north and south of the High Shed crosswalk, which must remain at rail height.

All of these kinds of changes should be deferred until train volumes through facility require more capacity (e.g., restoration of Track 6 as a freight bypass), and there is a better understanding of future passenger train designs and their car/platform coordination requirements.
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<td>Refurbished Transit Mall streetscape in the Old Town/Chinatown neighborhood.</td>
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<td>Centennial Mills redevelopment project.</td>
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<td>The proposed Resource Access Center at NW Broadway and NW Irving. Part of Union Station is visible behind the building.</td>
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<td>Streetcar (orange), the Portland Transit Mall (yellow) and existing MAX lines (red) in relation to Union Station (center). The dashed blue line shows the future East Portland Streetcar. Dots show light rail or streetcar stops. The Greyhound facility is between the two MAX stops on the Portland Transit Mall.</td>
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<td>Map of transit operations in Downtown Portland.</td>
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<td>Taxi queue during afternoon train arrival.</td>
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<td>Taxi queues and pick-up traffic can spill over onto NW Station Way, causing congestion.</td>
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<td>Amtrak Thruway and other regional operators board and alight passengers in the front driveway of Union Station.</td>
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<td>A pedestrian bridge crosses over the Union Station platforms and connects to the waterfront.</td>
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<td>The pedestrian connection between the Pearl District and Union Station. Crosses under Broadway Bridge and lacks adequate signage.</td>
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