Point Defiance Bypass Project
Environmental Assessment

Prepared for:
U.S. Department of Transportation
Federal Railroad Administration

Prepared by:

Washington State Department of Transportation

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Point Defiance Bypass Project Environmental Assessment

Submitted pursuant to the National Environmental Policy Act

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Prepared for:
U.S. Department of Transportation
Federal Railroad Administration

Prepared by:
Washington State Department of Transportation

February 22, 2013

Date of Approval

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Washington State Department of Transportation

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EXECUTIVE SUMMARY

The Washington State Department of Transportation (WSDOT) is implementing a program of infrastructure improvement projects along the Pacific Northwest Rail Corridor (PNWRC) also known as the PNWRC Improvement Program. To fund these projects, WSDOT applied and was selected for grant funding through the Federal Railroad Administration's (FRA) High Speed Intercity Passenger Rail (HSIPR) Program. As part of the PNWRC Improvement Program, when combined with the other component projects, the Point Defiance Bypass route (the Project) would allow for two additional Amtrak Cascades service round trips between Seattle, Washington, and Portland, Oregon with improved reliability and reduced travel time. This Project would also support Amtrak's longer-distance Pacific Northwest passenger rail service, the Coast Starlight. The PNWRC Improvement Program is made up of approximately 17 component projects. One such component project included in the PNWRC Improvement Program is the Point Defiance Bypass route, which would address deficiencies in the existing rail operations around Point Defiance between Tacoma and Nisqually in Washington State. This Project is the subject of this Environmental Assessment (EA).

To support the obligation of grant funds for the PNWRC improvement program, FRA and WSDOT issued a Tier-1 Programmatic EA analyzing the potential impacts of the projects comprising the PNWRC Program. Based on the analysis of potential impacts and proposed measures to avoid, minimize and mitigate potential impacts in the Programmatic EA, FRA issued a Finding of No Significant Impact (FONSI) in November 2010. Both the Programmatic EA and the November FONSI anticipated a series of Tier-2 or project-level environmental documents to study the potential impacts of the component projects at a higher level of detail prior to making a decision on implementing a specific component project.

This project-level EA has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations (CFR) 1500-1508), the FRA's *Procedures for Considering Environmental Impacts* (64 FR 28550, May 26, 1999), and the Washington State Environmental Policy Act (SEPA) (WAC 197-11). FRA is the lead agency under NEPA and WSDOT is the lead agency under SEPA. FHWA and Sound Transit are cooperating agencies under NEPA.

The purpose of the Project is to provide more frequent and reliable high-speed intercity passenger rail service along the PNWRC between Tacoma and Nisqually. In conformity with the decisions under the Tier 1 Programmatic EA, the PNWRC Improvement Program has reduced the overall environmental impacts of providing improved passenger rail service with the use of an existing transportation corridor and associated infrastructure, rather than creating a new corridor.

The Project is needed to address the deficiencies in the existing rail alignment around Point Defiance. The existing alignment (Puget Sound route), shared by freight and passenger rail traffic, is near capacity and is therefore unable to accommodate additional high-speed intercity passenger rail service without substantial improvements. In addition, the existing alignment has physical and operational constraints that adversely affect both passenger and freight train scheduling and reliability.

As part of an alternatives analysis, FRA and WSDOT identified and evaluated several alternatives, including improvements to the Point Defiance Bypass route and No Build Alternative. During the course of the alternatives analysis, only the Point Defiance Bypass route and existing Puget Sound route were determined to be reasonable alternatives. Therefore, the subsequent analysis of alternatives was focused on the remaining reasonable alternatives: the Point Defiance Bypass route (Build Alternative) and the Puget Sound route (No Build Alternative).

The No Build Alternative would only include the routine maintenance and repair activities necessary to keep the Burlington Northern-Santa Fe (BNSF)-owned line Puget Sound route operational. Under the No Build Alternative there are no other planned capital projects along the Point Defiance Bypass route, so the existing track conditions would remain. The Sound Transit Project, establishing commuter service to the City of Lakewood on the Point Defiance Bypass route, is considered as part of the existing condition for purposes of this analysis.

The Build Alternative would provide for the rerouting of intercity passenger trains from the Puget Sound route that runs along the southern Puget Sound shoreline to an existing rail corridor (the Point Defiance Bypass route) that runs along the west side of Interstate 5 (I-5) between Tacoma and Nisqually. The Project would include railroad track and support facility improvements, and relocation of the Tacoma Amtrak Station to Freighthouse Square in Tacoma. A total of 12 Amtrak Cascade and two Coast Starlight service train trips would use the Point Defiance Bypass route. Components of the Project include:

- Construction of a new second track adjacent to Sound Transit's existing main line between South Tacoma and Lakewood.
- Installation of new rails, ties, and ballast on Sound Transit's existing track between Lakewood and Nisqually.
- Improvements at the connection to BNSF's main line near Nisqually.
- Safety improvements at some existing at-grade crossings within the project corridor.[1]
- Relocation of the existing Tacoma Amtrak Station from Puyallup Avenue to the Tacoma Dome Station at Freighthouse Square (the Tacoma Dome Station) in Tacoma. Property acquisition for additional parking west or north of Freighthouse Square is anticipated.

FRA and WSDOT evaluated the anticipated environmental effects of the Build and No Build alternatives, which are summarized in Table Executive Summary-1. Proposed avoidance, minimization measures, and best management practices (BMPs) (Table Executive Summary-2) will be integrated into the Project and will reduce or eliminate anticipated environmental effects.

[1] *The Point Defiance Bypass route is also referred to as the corridor or project corridor.*

Table Executive Summary-1. Summary of Effects

Resource Area	Anticipated Environmental Effects	
	No Build Alternative	**Build Alternative**
Air Quality	No Change.	▪ In conformity with the Clean Air Act requirements. ▪ Temporary air quality effects during construction.
Noise and Vibration	▪ Continued noise from train-mounted horns on freight trains. ▪ Continued noise and vibration from gaps in track ends.	▪ Moderate noise effects (increase) predicted at two receptors. ▪ Vibration effects (increase) predicted at two sites. ▪ Temporary noise and vibration effects during construction.
Transportation	▪ Passenger rail service on the Puget Sound route would continue to be affected by freight operations and have a limited ability to expand service. ▪ Traffic volumes, intersection delay and queues at some intersections would be projected to increase by 2030.	▪ No effect to Sounder or freight trains during construction (freight trains will be rerouted onto other available Tacoma Rail (TR) track and FRA and WSDOT will coordinate with TR and BNSF). ▪ Improved passenger connections and convenience between Amtrak and Sounder, Tacoma Link light rail, and bus transit. ▪ Increase in daily train trips on the Point Defiance Bypass route. ▪ Decrease in passenger train schedule delays. ▪ Vehicle queue length would increase at some crossing locations due to increased frequency/duration of road blockages from train crossings. ▪ Vehicle queue length would decrease at some crossing locations due to signal improvements. ▪ Level of Service would improve at four intersections and decrease at four intersections. ▪ Sidewalk improvement at North Thorne Lane Southwest, Berkeley Street Southwest, and Barksdale Avenue. ▪ No effect to bus transit. ▪ Minor vehicle, pedestrian and bicycle transportation disruptions during construction. ▪ Dwell time of the Coast Starlight train at Freighthouse Square during an event at the Tacoma Dome would result in a decline of LOS to below LOS D at most affected intersections.
Geology and Soils	No Change.	▪ No long-term effects to geologic hazard areas. ▪ Temporary disturbance of soils and sediments by construction activities.
Water Resources	No Change.	▪ No effects to surface waters through changes in volume or water quality. ▪ No effect to floodplains or shoreline areas. ▪ No effects to critical aquifer recharge or well protection areas. ▪ No effects during construction.
Wetlands	No Change.	▪ No fill or removal activities would take place in wetland or wetland buffer areas. ▪ No effects during construction.

Table Executive Summary-1. Summary of Effects

	Anticipated Environmental Effects	
Resource Area	**No Build Alternative**	**Build Alternative**
Fish, Vegetation, and Wildlife	No Change.	▪ Removal of 24 acres of maintained vegetation, 2.5 acres of disturbed mixed forest, and 1 acre of scattered trees. ▪ Vegetation removal would not affect terrestrial wildlife. ▪ Effects from construction activities to terrestrial wildlife would be discountable due to urban setting. ▪ No effects to aquatic species during construction due to no in-water work.
Hazardous Materials	No Change.	▪ No increase in transport of hazardous materials. ▪ Construction activities may encounter contaminated media.
Visual Quality	No Change.	▪ Project elements would be similar to existing views and inconspicuous in most locations. ▪ Decreased privacy for occupants of buildings adjacent to the rail line due to additional trains. ▪ Visual quality experienced by individuals using the passenger railroad system will change from a view of the Puget Sound to a more urban environment.
Cultural Resources	No Change.	▪ No adverse effect.
Socioeconomics and Environmental Justice	No Change.	▪ No displacements or relocations would occur. ▪ Temporary noise and vibration effects during construction to properties near railroad. ▪ Vibration effects during operation to properties near railroad. ▪ Minor effects to public access and safety from increased number of trains. ▪ Upgrades to intersections would improve connectivity and safety at those locations. ▪ Minority or low-income (environmental justice) populations would be temporarily affected by noise and vibration during construction. ▪ Minority or low-income (environmental justice) populations would not be adversely affected by Project operation.
Land Use	No Change.	▪ Consistent with adopted land use policies. ▪ Occupied areas in railroad right-of-way under lease agreement would not be displaced. ▪ No displacement of other existing land use or change to existing planned development.

Table Executive Summary-1. Summary of Effects

	Anticipated Environmental Effects	
Resource Area	**No Build Alternative**	**Build Alternative**
Public Services, Utilities, and Safety	No Change.	▪ Short-term effect to public safety during intersection construction due to traffic delays. ▪ Increased train trips result in more frequent grade closings during pass-bys, and may delay emergency service vehicles and extend travel time to medical centers, government offices and schools. ▪ No effect to utilities. ▪ Long-term improvement to safety at several existing at-grade crossings. ▪ No displacement of public services.
Energy	No Change.	▪ Reduction in rail traffic delays, resulting in a decrease in energy consumption and greenhouse gas emissions. ▪ Shorter rail route would allow for more energy efficient travel.
Indirect Effects	No Change.	▪ No indirect effects to air quality, noise and vibration, fish, wildlife and vegetation, geology and soils, wetlands, water resources, pubic services and utilities, or energy would occur. ▪ Possible beneficial indirect effect from limited redevelopment at Freighthouse Square to hazardous materials, visual quality, land use, socioeconomic and environmental justice populations. ▪ Redevelopment could result in an indirect effect to transportation from additional vehicle traffic.
Cumulative Effect	No Change.	▪ No cumulative effects to air quality; geology and soils; water resources; wetlands; fish and wildlife, or cultural resources would occur because the Project would not affect these resources. ▪ No significant cumulative effects to noise and vibration; transportation; vegetation; hazardous materials; visual quality; socioeconomics and environmental justice; land use; public services and utilities, and safety; and energy would occur.

Table Executive Summary-2. Summary of Avoidance, Minimization Measures, and BMPs

Resource Area	Proposed Measures
Air Quality	▪ Spray water and operate water trucks on haul roads. ▪ Cover and/or wet materials onsite and during transport, or provide adequate freeboard. ▪ Provide wheel washers to remove PM that vehicles would otherwise carry offsite. ▪ Remove mud and windblown dust deposited on paved roadways. ▪ Maintain construction equipment with required pollution-control devices.
Noise and Vibration	▪ Ensure all construction activities comply with local noise regulations, including no nighttime work unless a variance is obtained. ▪ Use natural and artificial barriers to shield against construction noise (e.g. baffles or stockpiles of construction materials). ▪ Strategically place stationary equipment to reduce effects to noise-sensitive receivers. ▪ Equip each internal combustion engine with a manufacturer-recommended muffler. ▪ Use vibratory or hydraulic insertions for pile driving at locations determined during final design. ▪ Use wayside horns at at-grade crossings to limit the sounding of train horns and reduce the area exposed to train warning sounds. ▪ Use of track treatments (such as resiliently supported ties, or ballast mats) to reduce the vibration transmitted to the ground to levels below the FTA vibration impact criterion.
Transportation	▪ Implement coordination framework during design and construction to ensure freight delivery meets customer needs during construction. ▪ Develop a traffic control plan during construction. ▪ Coordinate with Tacoma Rail during construction to maintain freight movement. ▪ WSDOT will coordinate with local jurisdictions regarding the construction schedule, construction areas, and detour routes during Project development to minimize community disruption including for events such as the US Open. ▪ Implementation of a detour plan that may include static signs identifying detour routes and/or dynamic message signs that identify the detour routes during a train blockage at Freighthouse Square.. FRA and WSDOT would provide additional modeling detail and design at the C and D Street intersections as part of the Final Design process.
Geology and Soils	▪ Prepare and follow a Temporary Erosion and Sediment Control (TESC) Plan to implement proper erosion control and surface water runoff BMPs. ▪ Pave or permanently restore disturbed areas as soon as possible. ▪ Design temporary excavation slopes to prevent surface sloughing and shallow landsliding. ▪ Design all fill and pavement areas to drain away from construction areas and prevent ponding of water and softening of subgrade soils. ▪ Limit cut slopes or use retaining walls, and include drainage facilities designed for anticipated water flows.
Water Resources	▪ Implement minimization BMP measures during construction. ▪ Implement a Construction Stormwater Pollution Prevention Plan (CSWPPP).

Table Executive Summary-2. Summary of Avoidance, Minimization Measures, and BMPs

Resource Area	Proposed Measures
Wetlands	▪ Clearly mark clearing limits and protect with construction fencing. ▪ Use various sediment control BMPs to remove sediment prior to any stormwater runoff leaving the site. ▪ Stabilize exposed soils to prevent erosion (i.e hydroseeding, straw wattles, etc.). ▪ Place a temporary erosion control blanket immediately after seeding, fertilizing, and mulching. ▪ Handle and dispose of all on-site pollutants, including waste materials and demolition debris, in a manner that does not cause contamination of stormwater. ▪ Establish on-track vehicle/machinery maintenance and fueling locations away from aquatic resources. ▪ Ensure any on-site fuel storage would have secondary containment equal to 150 percent of storage capacity. ▪ Remove all waste oils and machinery fluids by a maintenance vehicle when they are generated. No waste oils or fluids would be stored on site. ▪ Conduct application of chemicals such as fertilizers and pesticides in a manner and at application rates that would not result in loss of chemicals to stormwater runoff. ▪ Handle highly turbid or contaminated dewatering water separately from stormwater; do not allow it to enter local drainage systems.
Fish, Vegetation, and Wildlife	▪ Confine construction activities to the minimum area necessary. ▪ Develop and implement a TESC Plan and CSWPPP for clearing, vegetation removal, grading, ditching, filling, embankment compaction, or excavation. The BMPs in the plans would be used to control sediments from ground-disturbing activities. ▪ For construction activities that occur within 200 feet of surface water or wetland habitat as identified by the Project biologist, use BMPs to ensure that no foreign material, such as railroad ballast or other material, is sidecast, and to control and prevent sediments from entering aquatic systems. ▪ Minimize removal of native vegetation to the greatest extent possible. ▪ Reseed areas using a native seed mix.
Hazardous Materials	▪ Perform site-specific hazardous material investigations when and where necessary. ▪ Prepare a project-specific hazardous material management plans. ▪ Prepare a CSWPPP. ▪ Prepare a TESC Plan, including dust control measures. ▪ Prepare a Spill Prevention, Control and Countermeasure Plan (SPCCP). ▪ Coordinate with Washington Department of Ecology (Ecology) during acquisition and construction for work completed within the environmental restrictive covenant at Freighthouse Square.
Visual Quality	▪ Maintain existing vegetation at the edge of the railroad right-of-way to screen the rail line at locations determined during final design. ▪ Enhance vegetative buffers and screening where the rail line is adjacent to residential and institutional properties at locations determined during final design.
Cultural Resources	▪ Develop an inadvertent discovery plan using standard WSDOT template.
Socioeconomics and Environmental Justice	▪ See project measures for air quality, noise and vibration, transportation, hazardous materials, and public services, utilities, and safety.
Land Use	▪ No measures are proposed.
Public Services, Utilities, and Safety	▪ Coordinate and communicate with public service providers to identify ways to minimize delays. ▪ Coordinate with utility owners to determine conflicts and determine a suitable resolution to avoid or minimize disruption. ▪ Post construction schedules near affected crossings and provide the information to residents and businesses in the area. ▪ Initiate the *Operation Lifesaver* training on track safety for community members. ▪ Continue to develop and implement security procedures to reduce the likelihood of rail trespass.

Table Executive Summary-2. Summary of Avoidance, Minimization Measures, and BMPs

Resource Area	Proposed Measures
Energy	▪ Limit equipment idling. ▪ Locate staging areas near work sites. ▪ Schedule the delivery of materials during off-peak hours to allow trucks to travel to the site with less congestion and at fuel-efficient speeds.
Indirect Effects	▪ No measures are proposed.
Cumulative Effects	▪ No measures are proposed.

1.0 INTRODUCTION AND PROJECT DESCRIPTION

1.1 Introduction

The Washington State Department of Transportation (WSDOT) is implementing a program of infrastructure improvement projects along the Pacific Northwest Rail Corridor (PNWRC) also known as the PNWRC Improvement Program. To fund these projects, WSDOT applied for and was selected for grant funding through the Federal Railroad Administration's (FRA) High Speed Intercity Passenger Rail (HSIPR) Program. As part of the PNWRC Improvement Program, when combined with the other component projects, the Point Defiance Bypass route (the Project) would allow for two additional Amtrak Cascades service round trips between Seattle, Washington, and Portland, Oregon with improved reliability and reduced travel time. This Project would also support Amtrak's longer-distance Pacific Northwest passenger rail service, the Coast Starlight. The PNWRC Improvement Program is made up of approximately 17 component projects. One such component project included in the PNWRC Improvement Program is the proposed Point Defiance Bypass route, which is proposed to respond to deficiencies in the existing rail operations around Point Defiance between Tacoma and Nisqually in Washington State. This Project is the subject of this Environmental Assessment (EA).

To support the obligation of grant funds for the PNWRC improvement program, FRA and WSDOT issued a Tier-1 Programmatic EA analyzing the potential impacts of the projects comprising the PNWRC Program. Based on the analysis of potential impacts and proposed measures to avoid, minimize and mitigate potential impacts in the Programmatic EA, FRA issued a Finding of No Significant Impact (FONSI) in November 2010. Both the Programmatic EA and the November FONSI anticipated a series of Tier-2 or project-level environmental documents to study the potential impacts of the component projects at a higher level of detail prior to making a decision on implementing a specific component project.

This project-level EA has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality NEPA implementing regulation (40 Code of Federal Regulations (CFR) 1500-1508), the FRA's *Procedures for Considering Environmental Impacts* (64 FR 28550, May 26, 1999). WSDOT will use FRA's decision documentation and other supporting documentation to satisfy the Washington State Environmental Policy Act (SEPA) (WAC 197-11).

1.2 Project Area Description

The Project is located in Pierce County (Figure 1) along an existing approximately 20-mile rail corridor between Tacoma and Nisqually. The northern limit of the Project is TR Junction near the I-5 overcrossing of the Puyallup River and East Bay Street in Tacoma. The southern limit of the Project is at Nisqually Junction where Nisqually Road crosses the Nisqually River.

The Point Defiance Bypass route is an existing railroad corridor that generally parallels and is west of the I-5 transportation corridor and is located within both incorporated and unincorporated areas of Pierce County. Approximately two-thirds of the Project length is located within or adjacent to the incorporated cities of Tacoma, Lakewood, and DuPont. The remainder lies within unincorporated area of Pierce County, the majority of which is occupied by US Joint Base Lewis McChord (JBLM) and Camp Murray National Guard military complexes.

The Point Defiance Bypass route topography is of low relief at the northern end and rises 200 to 400 feet at the southern end. The route is located in a highly developed region surrounded by commercial and residential properties, military bases, and roadways. The Point Defiance Bypass route includes rail tracks supported by ties and a gravel base with managed (sprayed, mowed) vegetation generally occurring at or near the edge of the railroad right-of-way.

The Point Defiance Bypass route is owned primarily by Sound Transit, and Tacoma Rail with BNSF owning the southernmost mile of the route. Both freight and commuter trains operate along the Point Defiance Bypass route, including freight operators Tacoma Rail, BNSF, and Sound Transit's *Sounder* commuter rail service.

Within this corridor,[2] Tacoma Rail provides service to its customers on its rail line in Frederickson and other points south of Tacoma. The average freight train traffic between TR Junction and East "D" Street is two trains per day to as few as two trains per week on other portions of the Point Defiance Bypass route. BNSF freight operations are limited to service operating between 100th Street in Lakewood and Nisqually, serving JBLM and the town of Roy via a branch line that extends south from 108th Street in Lakewood. Sound Transit's *Sounder* commuter rail service currently leaves the BNSF main line at TR Junction and continues to Freighthouse Square on the Tacoma Rail line. Sound Transit currently operates 18 trains between Freighthouse Square and Seattle each weekday, and also offers occasional special event trains, usually on weekends, to serve sporting and other events in Seattle and Tacoma. *Sounder* service to Lakewood Station began in October 2012.

[2] *The Point Defiance Bypass route is also referred to as the corridor or project corridor.*

Figure 1. Project Location and Alternatives

2.0 PURPOSE AND NEED

2.1 Purpose of the Project

As described above, the Point Defiance Bypass route is part of the larger PNWRC. Within Washington State, the vision for the PNWRC is to "…improve intercity passenger rail service by reducing travel times and achieving greater schedule reliability in order to accommodate growing intercity travel demand…" (WSDOT 2009).

The purpose of the Project is to provide more frequent and reliable high-speed intercity passenger rail service along the PNWRC between Tacoma and Nisqually. In conformity with the decisions under the Tier 1 Programmatic EA, the PNWRC Improvement Program has reduced the overall environmental effects of providing improved passenger rail service with the use of an existing transportation corridor and associated infrastructure, rather than creating a new corridor.

2.2 Need for the Project

The Project is needed to address the deficiencies in the existing rail alignment around Point Defiance. The existing alignment (Puget Sound route), shared by freight and passenger rail traffic, is near capacity and is therefore unable to accommodate additional high-speed intercity passenger rail service without substantial improvements. In addition, the existing alignment has physical and operational constraints that adversely affect both passenger train scheduling and reliability.

Improving intercity passenger rail service in the study area and meeting the Project needs would be accomplished by:

- Enhanced Frequency: Increasing Amtrak Cascades round-trips from four to six by 2017 to meet projected service demands.
- Improved Reliability: Reducing scheduling conflicts with freight trains that often result in delays, and by minimizing or avoiding operational delays (e.g., drawbridge openings) and weather-related delays (e.g., mudslides), and improving on-time performance from 68 percent to 88 percent.
- Enhanced Efficiency: Enhancing the efficient movement of people by decreasing trip times by 10 minutes, and reducing the amount of time passenger trains spend yielding to freight movements.
- Improved Safety: Constructing at-grade crossings with upgraded safety features, including wayside horns, median barriers, advance warning signals, and traffic signal improvements.

3.0 DESCRIPTION OF ALTERNATIVES

As part of an alternatives analysis process, FRA and WSDOT evaluated three build alternatives: the Point Defiance Bypass route, the Shoreline Alternative, and the Greenfield Alternative to identify the range of reasonable alternatives to carry forward for detailed analysis. A brief description of each build alternative follows:

- Point Defiance Bypass route includes railroad track and support facility improvements, and the relocation of Amtrak's Tacoma Station. Additional detail is provided below in Section 3.2.
- The Shoreline Alternative would make improvements along the 26 mile-long Puget Sound route between Nisqually and Tacoma. This alternative consists of adding eight miles of new track and re-aligning 15 miles of existing track.
- The Greenfield Alternative includes six routes (Lakewood South Route, Spanaway Route, Lakewood to Tacoma Tunnel Route, Fredrickson Route, Rainer Route, and I-5 Median Route). Although each route has minor differences each would construct a new alignment and reconstruct an existing route.

WSDOT eliminated two of the alternatives (the Shoreline Alternative, and the Greenfield Alternative) from further study. Although either alternative could meet the Project's purpose and need, each was determined to be impracticable and unfeasible due to technical constraints, high construction costs, and significant environmental effects. Because of these adverse factors, neither alternative was carried forward into this EA for further analysis. Refer to Appendix A for the technical evaluation of the Shoreline and Greenfield Alternatives.

Modifications to the proposed project suggested during the public involvement process for this EA included adding a Cascades station within the Lakewood or DuPont city limits, and constructing one or several grade-separated crossings. However, consistent with the trip time element of the Project's purposes and need and in order to meet performance standards set by WSDOT, no additional stops are proposed for this Project. However, construction of the Point Defiance Bypass route would not preclude the future construction of a station or stations within the study area if a feasibility study or demand warranted an additional station.

Grade separations were also evaluated for further consideration. The evaluation of grade separations included in Appendix B revealed that current and projected future traffic volumes do not warrant the construction of new grade-separated crossings. The analysis determined that the construction and operation of grade-separated crossings would result in significant environmental impacts to the surrounding community (e.g., noise, property acquisitions, visual impacts from retaining walls, and the increased perception of community isolation, particularly in Tillicum). While not included in this Project for the reasons described in Appendix B, construction of the Build Alternative would not preclude the future construction of grade-separated crossings within the Project Area.

This EA evaluates the Point Defiance Bypass route (the Build Alternative), and the No Build Alternative. Figure 1 shows the northern and southern project limits and the existing station locations in the study area.

3.1 No Build Alternative

If the Project is not built (the No Build Alternative), Amtrak's Cascades and Coast Starlight passenger train service would continue to use the existing BNSF rail line (Puget Sound route) that runs along the southern Puget Sound shoreline and Point Defiance (Figure 1). The No Build Alternative includes only the minor maintenance and repair activities necessary to keep the existing BNSF line operational and no increase in Amtrak service. Similarly, beyond the improvements already made by Sound Transit to

establish service between Lakewood and Tacoma, there are no other planned capital projects along the Point Defiance Bypass route, so the existing track conditions would remain.

The existing congestion on the Puget Sound route would continue to constrain passenger operation. Future passenger trains would experience an increase in congestion as the number of trains on the Puget Sound route increases. Amtrak would not use the Point Defiance Bypass route.

With the No Build Alternative, it would be expected that as freight traffic increases, congestion would adversely affect Amtrak service reliability, and the travel time for Amtrak trains between Seattle and Portland would increase. Weather-related cancellations and delays due to mudslides would continue to affect passenger service.

Along the Point Defiance Bypass route, Tacoma Rail and BNSF freight services would continue. Tacoma Rail operates as many as two trains per day on some portions of the Point Defiance Bypass route to as few as two trains per week on other portions of the Point Defiance Bypass route. BNSF operates intermittent freight trains on the Point Defiance Bypass route to serve military transportation needs at JBLM. Freight trains do not travel through the entire length of the Point Defiance Bypass route and would need the permission of both the Surface Transportation Board and Sound Transit to travel on the new grade constructed between East "D" Street and the Tacoma Avenue Overpass. There is currently no plan to open this section of the Point Defiance Bypass route to freight trains. The at-grade crossings at Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue Southwest would not be upgraded to include modern safety controls.

Sound Transit's *Sounder* commuter passenger trains became operational in October 2012 between the Tacoma Dome Station at Freighthouse Square in Tacoma and Sound Transit's Lakewood Station (on the Point Defiance Bypass route). Once fully functional, Sound Transit would operate as many as 18 *Sounder* trains per day between Freighthouse Square and the Lakewood Station. For this EA, *Sounder* service is considered as the existing corridor condition.

3.2 Build Alternative

The Project consists of railroad track and support facility improvements to facilitate the rerouting of Amtrak's intercity passenger rail to the Point Defiance Bypass route, and the relocation of Amtrak's Tacoma Station. The following sections detail specific components of the Build Alternative.

3.2.1 Construct New Track Adjacent to the Existing Main Line

A new 3.5-mile track adjacent to the existing main line would be constructed from South 66th Street (rail MP 6.9) in Tacoma to between Bridgeport Way Southwest (rail MP 10.4) and Clover Creek Drive Southwest (rail MP 10.9) in Lakewood (Figure 2). This new section of track would be constructed parallel to and generally 15-20 feet west of the existing track center. The new track would consist of continuous welded rail and ballast mats where appropriate to reduce noise and vibration from passing trains.

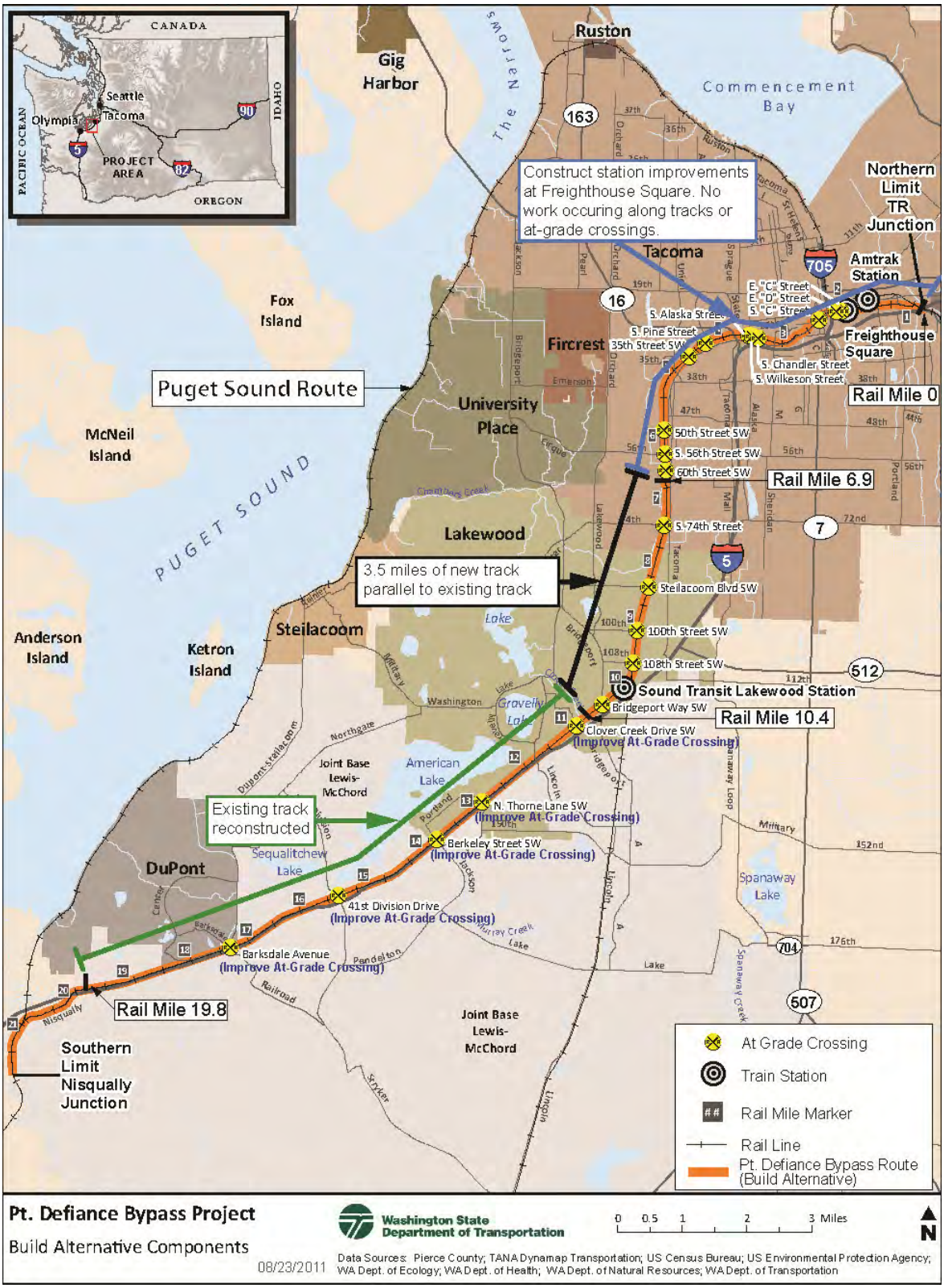


Figure 2. Build Alternative Components

3.2.2 Reconstruct and Rehabilitate the Existing Main Line

Starting just southwest of Bridgeport Way Southwest (rail MP 10.4) in Lakewood, the existing track would be reconstructed to a location southeast of the I-5/Mounts Road Southwest interchange (rail MP 19.8) at Nisqually Junction (Figure 2). This would include:

- Removal of the existing track and minor regrading of the existing subgrade to provide a slightly wider, regraded, and compacted stable surface on which to construct a new track.
- Installation of new crushed rock ballast, concrete ties (except under the at-grade crossings), and continuous welded rail.
- Extension of the wing walls at the rail bridge south of the Mounts Road interchange with northbound I-5.
- Relocation/protection of utilities.
- Installation of additional railroad train control signal system components.

3.2.3 Improvements at Grade Crossings

Several grade crossings (Figure 2) would be improved with wayside horns, gates, traffic signals and signage, sidewalks, median separators, and warning devices. These crossings include Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive and Barksdale Avenue. Figure 3 illustrates a before and after of the grade crossing improvements at Berkeley Street Southwest. These improvements are typical of those planned for the other grade crossings in the area.

3.2.4 Tacoma Amtrak Station Relocation

The existing Tacoma Amtrak Station would be relocated from its Puyallup Avenue location to the Tacoma Dome Station at Freighthouse Square, at 430 East 25th Street in Tacoma. The Freighthouse Square location is positioned to act as a regional transportation center serving the surrounding communities including DuPont, Lakewood, and Tacoma, allowing shorter connections between Amtrak passenger rail and other transit services provided at the Tacoma Dome Station. In addition, Freighthouse Square is already configured to accommodate Sound Transit commuter rail passenger volumes, and has convenient freeway access, making it a suitable station location for the Project.

Relocation to the Tacoma Dome Station would require:

- Reconstruction of a portion of the existing Freighthouse Square building to create a passenger ticketing and waiting area, and baggage handling space (approximately 4,800 square feet). Improvements would be ADA compliant.
- Reconstruction and extension of the existing commuter rail platform to meet intercity passenger rail needs. The Coast Starlight is 1,235 feet long and would require construction of an additional platform at the parking lot between East “C” and East “D” Street as well as the existing platform at Freighthouse Square.
- Additional off-street parking, to be located near Freighthouse Square station on identified properties that are available either for purchase or lease by WSDOT, and made available for exclusive use by Amtrak passengers.
- Improving traffic signals to accommodate pedestrian crossings and traffic flow to and from Freighthouse Square.

Figure 3. Photo of Existing Berkeley Street Southwest Grade Crossing
and Illustration of Proposed Grade Crossing Improvement at Berkeley Street Southwest

3.2.5 Operational Changes

Operational changes refer to the type, frequency, and speed of rail traffic that can be expected on a daily basis once the Project is completed.

Amtrak's existing Cascades and Coast Starlight passenger train service would be rerouted from the Puget Sound route to the Point Defiance Bypass route. The Project would also provide for the addition of Amtrak's Cascades service by increasing the number of round trips provided from four to six, or a total of 12 Cascades service train trips. Amtrak Coast Starlight would also travel on the Point Defiance Bypass route for a total of two service train trips. Train speeds along the route would vary from 30 mph for *Sounder* trains to an operating speed up to 79 mph for Amtrak trains on this section of the PNWRC.

There would be no change to the operation of freight trains on the Point Defiance Bypass route under the Build Alternative. Tacoma Rail and BNSF would continue to operate as many as two trains per day on some portions of the Point Defiance Bypass route to as few as two trains per week on other portions of the Point Defiance Bypass route. BNSF would continue to operate intermittent freight trains on the Point Defiance Bypass route to serve military transportation needs at JBLM. The Project would not enable freight traffic to move beyond the East "D" Street and Tacoma Avenue Overpass.

3.3 Laws, Regulations, and Permits

Federal, state, and local laws and regulations authorize agencies to issue permits, review plans, or provide consultation regarding potential project impacts. Table 1 identifies the pertinent federal, state, and local permits and consultation required for the Build Alternative. Regulations presented in Table 1 are organized by the primary issuing agency.

Table 1. Laws and Related Permits for the Build Alternative

Applicable Law or Order	Primary Responsible Agency(ies); Citation	Description and Requirements
Federal Permits/Approvals		
NEPA of 1969	FRA; 42 United States Code (USC) § 4321	NEPA requires preparation of environmental documentation evaluating potential effects to resources to ensure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.
Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act	Council on Environmental Quality; 40 Code of Federal Regulations (CFR) §§ 1500–1508	Provides regulations for Implementing NEPA procedures.
FRA's Procedures for Considering Environmental Impacts	FRA; 64 FR 28550, May 26, 1999	Provides FRA's procedures for the assessment of environmental impacts of agency actions and for the preparation and processing of documents based on assessments.
Clean Water Act (CWA) Section 402	Ecology; 33 USC § 1344	Projects disturbing one acre or more of land during construction require a National Pollutant Discharge Elimination System (NPDES) permit that requires Best Management Practices (BMPs) be in place during construction.
National Historic Preservation Act (NHPA) Section 106; Executive Order 11593 Protection and Enhancement of the Cultural Environment; Archeological Resource Protection	FRAFRA, Washington Department of Archeology and Historic Preservation (DAHP), City of Tacoma, City of Lakewood, and City of DuPont; 16 USC § 470 et seq.; Tacoma Municipal Code (TMC) Chapter 13.07; Lakewood Municipal Code (LMC) Chapter 14.62; DuPont Municipal Code (DMC) Chapter 25.80	Requires federal agencies to take into account the effects to properties on or eligible/may be eligible for the National Register of Historic Places (NRHP).
Executive Order 13175 Consultation/ Coordination with Tribes	FRA	Requires responsible agency(ies) to follow specific processes, including policymaking criteria, consultation, and coordination before taking certain actions that affect "Indian tribes" as defined by the Order.
Executive Order 12898 Environmental Justice	FRA; 59 FR 7629, Feb. 11, 1994	Requires that federal agencies ensure there are no disproportionately high and adverse effects on minority and low-income populations for their agency actions.
Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency	FRA; 65 FR 50121	Requires federal agencies to examine existing services, identify any need for services, and develop and implement a system to ensure that access to Limited English Proficiency (LEP) applicants and beneficiaries.

Table 1. Laws and Related Permits for the Build Alternative

Applicable Law or Order	Primary Responsible Agency(ies); Citation	Description and Requirements
Americans with Disabilities Act (ADA)	U.S. Department of Justice Public Law 101-336; FRA	Prohibits discrimination and ensures equal opportunity for persons with disabilities.
State Permits/Approvals		
Resource Conservation and Recovery Act Hazardous Waste Management Act of 1976	Ecology; 40 CFR Parts 239-282 WAC Chapter 173-303	Governs the disposal of solid waste and hazardous waste. Approvals from Ecology are required for disturbances to sites with a restrictive covenant.
Asbestos demolition/renovation notification	Ecology; 40 CFR Part 61.145	An asbestos demolition/renovation notification form must be submitted any time a structure is demolished, or renovation of an existing structure containing asbestos.
State Environmental Policy Act (SEPA)	WSDOT WAC Chapter 197-11	Similar to NEPA, it is state policy that requires state and local agencies to consider the likely environmental consequences of a proposal before approving or denying the proposal.
Local Permits/Approvals		
Noise Variance	City of Lakewood; LMC Chapter 8.36.010	A noise variance is required for construction activities occurring outside the allowed daytime working hours of 7:00 a.m. to 10:00 p.m. on weekdays and 9:00 a.m. to 10:00 p.m. on weekends.
Right-of-Way/Street Opening Permit	City of Lakewood; LMC Chapter 12A.07	A permit is required to use the City of Lakewood right-of-way during construction and/or to tie new roads or improvements into existing City of Lakewood right-of-way.
Shoreline Substantial Development Permit – Exemption	Pierce County; Pierce County Code Sections 20.76.030.B.2 and 18.40	Clover Creek is a managed shoreline within Pierce County. Construction work adjacent to Clover Creek is likely exempt per WAC 173-27-040, subject to the review and approval by Pierce County.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section provides a concise description of the potential impacts to the resources within the study area that could result from the No Build and Build Alternatives. For each resource area, this EA provides a brief description of the study area and methodologies used to identify potential effects, a brief description of the affected environment that currently exists in the study area, a brief analysis of the potential environmental impacts (both adverse and beneficial) that result from the No Build and Build Alternatives, and where appropriate identifies measures to avoid or minimize potential impacts. Because the project includes minimization measures, the Project would not result in significant impacts.

Detailed technical analyses for most resource areas are provided in discipline reports, which are appended to this EA and are incorporated herein by reference. For resource areas that were not present or adjacent to the study area, no effects would occur and no additional analysis was completed in the discipline reports or this EA. These include:

- coastal zone management;
- use of other natural resources, such as water, minerals, or timber; and,
- recreational opportunities.

4.1 Air Quality

4.1.1 Study Area and Methodology – Air Quality

The study areas for air quality are based on the EPA National Ambient Air Quality Standard (NAAQS) pollutants of concern for transportation-related projects, and each is described below.

For carbon monoxide (CO), the areas of concern are highly localized and typically occur close to congested roadway intersections. Therefore, the study area for CO is determined by identifying those intersections which have traffic flows that would be most affected by the Project. Modeling is then performed to determine future CO concentrations at those area roadway intersections resulting from project vehicle assignments (often referred to as a hot-spot analysis). For other pollutants, such as nitrogen oxides (NO_x), volatile organic compounds (VOC), particulate matter – 10 microns or less (PM_{10}), and particulate matter – 2.5 microns or less ($PM_{2.5}$) are a concern on a wider geographic scale, and the study area for these pollutants, therefore, consists of the entire Seattle/Tacoma metropolitan area. The Project is not subject to federal Transportation Conformity regulations, but is covered under General Conformity rules and Project NAAQS air pollutant emissions were evaluated for compliance with the General Conformity requirements.

For the General Conformity analysis, emissions of nonattainment and maintenance area pollutants (CO, PM_{10} and $PM_{2.5}$ [including $PM_{2.5}$ precursors sulfur dioxide (SO_2), NO_x, and VOCs]) from construction and locomotive operations on the Project rail alignment were considered on a wider geographic scale. Therefore, the study area for these pollutants consists of the entire Seattle/Tacoma metropolitan area.

In addition to the NAAQS air pollutants, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., trains, airplanes, etc.), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. The MSATs are compounds emitted from highway vehicles and other mobile transportation sources, including locomotives. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete

combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. Conformity requirements for MSAT emissions have not been set by the EPA but a qualitative MSAT analysis was conducted within the Project limits using the 2009 FHWA interim guidance.

4.1.2 Affected Environment – Air Quality

Maintenance areas are those areas that meet NAAQS and implement a maintenance plan to prevent the area from being reclassified to non-attainment.

The project corridor traverses areas that are designated as maintenance areas for PM_{10}, CO, and O_3; and as nonattainment for $PM_{2.5}$. Nonattainment areas are areas that currently exceed NAAQS standards for specific pollutants. Most of Pierce County was designated a nonattainment area for fine particle pollution ($PM_{2.5}$) in 2009 because fine particle pollution levels too frequently exceeded the national limit. The study area is in attainment with the other NAAQS criteria pollutants - nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). Additional information regarding affected environment is in Appendix C (page 17).

4.1.3 Environmental Consequences – Air Quality

4.1.3.1 No Build Alternative – Air Quality

Under the No Build Alternative, passenger locomotive emissions per mile traveled would remain the same as they are today, and would be expected to decrease over time with gradual improvements in emissions controls in the Amtrak fleet. Amtrak and freight locomotive operations and emissions would continue to occur on the Puget Sound route.

The level of congestion at roadway intersections in the vicinity of the Project would not change under the No Build Alternative. Continued implementation of vehicle emission reduction programs and trends under the No Build Alternative, including stricter vehicle emission standards for new cars, and gradual replacement of older, more polluting vehicles with newer, cleaner cars, are expected to continue to reduce vehicle emissions.

No Project-related construction emissions would occur under the No Build Alternative.

The No Build Alternative would not be expected to cause or contribute to any new violations of the NAAQS, would not increase the frequency or severity of any existing violation of the NAAQS, and would not delay the attainment of the NAAQS for $PM_{2.5}$.

4.1.3.2 Build Alternative – Air Quality

Construction Effects

Construction activities temporarily generate PM_{10} and $PM_{2.5}$ (mostly dust) and small amounts of other pollutants associated with earthwork and demolition activities. PM from construction activities would be visible if uncontrolled. Mud and particulates from trucks may also be visible if construction trucks are routed through residential neighborhoods. Minimization measures would be in place to control dust and prevent deposition of mud on paved streets and are described in Section 4.1.4 below. To further minimize the potential for PM impacts, burning would not be allowed during construction.

Heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO and NO_x in exhaust emissions. These emissions would be temporary and limited to the immediate area surrounding the construction site. The temporary use of heavy trucks and construction equipment is not

expected to cause exceedance of the NAAQS. The use of diesel construction equipment would result in a temporary increase in MSAT emissions in the study area.

In addition, temporary odors may be detected by people near asphalt paving operations but would decrease with increased distance from the source. Additional information regarding construction effects is detailed in Appendix C (page 28).

Operational Effects

The Build Alternative emissions, due to annual combined construction and locomotive operation emissions were determined to be below the *de minimis* levels listed in the General Conformity rules, and therefore, implementation of the Project would be in conformity with CAA requirements.

Locomotive emissions resulting from increased Amtrak Cascades service frequency would be offset to a degree by the reduction in track miles traveled on the Build Alternative alignment compared to the existing alignment. The location of emissions would change on a regional basis with locomotive-related pollutants being emitted in the proposed Build Alternative corridor rather than on the existing Puget Sound alignment.

The Build Alternative is not expected to cause exceedance of the CO NAAQS at roadway intersections as a result of project operation. The CO hot-spot analysis shows that both the 1-hour and 8-hour averaged CO concentrations would be below the NAAQS in the existing year (2010), the year of opening (2017), and the planning horizon year (2040).

The Build Alternative is not predicted to increase regional highway vehicle miles traveled and thus not affect regional CO, O_3, and PM levels. MSAT levels are predicted to decrease significantly in the future due to federally mandated vehicle emissions programs.

Based on these findings, the Build Alternative would not be expected to result in significant air quality impacts. Additional information regarding operational effects is detailed in Appendix C (page 29) and Appendix D (page 5).

4.1.4 Minimization Measures – Air Quality

Although the Build Alternative would not have a significant effect on air quality requiring mitigation, effects associated with construction activities would be reduced by the following minimization measures:

- Spraying water and operating water trucks on haul roads to reduce dust and PM_{10} emissions.
- Covering and/or wetting materials onsite and during transport, or providing adequate freeboard (space from the top of the material to the top of the vehicle) to reduce PM_{10} emissions.
- Providing wheel washers to remove PM that vehicles would otherwise carry offsite.
- Removing PM (mud and windblown dust) deposited on paved roadways.
- Properly maintaining construction equipment with required pollution-control devices.

4.2 Noise and Vibration

4.2.1 Study Area and Methodology – Noise and Vibration

The study area for the noise and vibration analysis is the project corridor, including the station relocation at Freighthouse Square. Noise and vibration effects were evaluated at sensitive receptors within 1,000 feet of the track centerline.

4.2.1.1 Noise

The existing and future operational noise levels were evaluated based on the methodology outlined in the *Transit Noise and Vibration Impact Assessment* (FTA 2006). Project-related noise impact thresholds are identified in Table 2. Shown in column 1 of Table 2 is the existing noise exposure. The remaining columns show the level of effect (moderate effect or severe effect) for future noise exposure. The future noise exposure is the combination of the existing noise exposure and the additional noise exposure caused by the Project. For example, if the existing noise exposure is 53 dBA for a residential land use (Category 1 or 2), a moderate effect would occur at 55 dBA and a severe effect would occur at 60 dBA.

***Sensitive Receptors** are land uses where noise has the potential to disrupt the activities that take place there. The noise impact criteria for sensitive receptors depend on land use, designated as Category 1, Category 2 or Category 3. Category 1 includes uses where quiet is an essential element in their intended purpose, such as indoor concert halls or outdoor concert pavilions or National Historic Landmarks where outdoor interpretation routinely takes place. Category 2 includes residences and buildings where people sleep. Category 3 includes institutional land uses with primarily daytime and evening use such as schools, places of worship and libraries.*

Based on the methodology, existing noise exposure levels were initially measured at selected monitoring sites (Figure 4). From Table 2, noise impact thresholds were then identified for each noise monitoring site. Future noise levels were then modeled using the FTA noise spreadsheet model (FTA, 2006). The future operational noise levels were then compared to the existing noise levels to determine if the project would result in impacts at sensitive receptors. If changes to noise levels did occur they were evaluated to determine if they would exceed the identified FTA noise impact thresholds (Table 2). In general, the higher the level of existing noise, the less potential exists for the project to cause noise impacts.

Table 2. FTA Noise Impact Criteria

Existing Noise Exposure L_{eq} or L_{dn}[1]	Project Noise Exposure Impact Thresholds: Ldn or Leq1 (all noise levels in dBA[2])			
	Category 1 or 2 Sites		Category 3 Sites	
	Moderate Effect	Severe Effect	Moderate Effect	Severe Effect
<43	Existing +10	Existing +15	Existing +15	Existing +20
43-44	52	58	57	63
45	52	58	57	63
46-47	53	59	58	64
48	53	59	58	64
49-50	54	59	59	64
51	54	60	59	65
52-53	55	60	60	65
54	55	61	50	66
55	56	61	61	66
56	56	62	61	67
57-58	57	62	62	67
59-60	58	63	63	68
61-62	59	64	64	69
63	60	65	65	70
64	61	65	66	70
65	61	66	66	71
66	62	67	67	72
67	63	67	68	72
68	63	68	68	73
69	64	69	70	74
70	65	69	70	74
71	66	70	71	75
72-73	66	71	71	76
74	66	72	71	77
75	66	73	71	78
76-77	66	74	71	79
>77	66	75	71	80

Source: Transit Noise and Vibration Impact Assessment (FTA 2006).

[1] Ldn is used for land uses where nighttime sensitivity is a factor; Daytime L_{eq} is used for land uses involving only daytime activities.

[2] dBA means A-weighted decibels.

Category Definitions:

Category 1: Buildings or parks where quiet is an essential element of their purpose.

Category 2: Residences and buildings where people normally sleep. This includes residences, hospitals, and hotels where nighttime sensitivity is assumed to be of utmost importance.

Category 3: Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches.

4.2.1.2 Vibration

Vibration effects from train operations were assessed using the FTA vibration impact assessment procedures (FTA 2006). Estimates of ground-borne vibration are taken by monitoring select representative sites for 24-hours. Those baseline vibration measurements are then compared to the FTA vibration impact thresholds (Table 3) to determine potential effects. If the monitored vibration levels exceed the ground-borne vibration criteria thresholds, then measures are assessed to reduce potential vibration effects. With respect to the noise and vibration construction assessment, because the means and methods of construction will not be known until a contractor is selected; the analysis of construction noise and vibration was based on typical activities and equipment used for construction.

As a reference for the vibration impact thresholds in (Table 3), the existing background building vibration usually ranges from 40-50 VdB, which is well below the range of human perception. Although the perceptibility threshold is about 65-70 VdB, human response (or the percent of people that would typically be annoyed) to vibration is usually not significant unless vibration levels exceed 70 VdB. A vibration level of 70 VdB is typical of the vibration experienced 50 feet from railroad tracks.

Table 3. Ground-borne Vibration Impact Criteria

Land Use Category	Ground-borne Vibration Impact Levels (VdB[1] re: 1 micro-inch/sec)		
	Frequent Events[2]	*Occasional Events[3]*	*Infrequent Events[4]*
Category 1: Buildings where low existing vibration is essential for interior operations	65 VdB	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

[1] *VdB = vibration velocity units*

[2] *"Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.*

[3] *"Occasional Events" is defined as between 30 and 70 vibration events of the same sources per day. Most commuter trunk lines have this many operations*

[4] *"Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.*

Source: Transit Noise and Vibration Impact Assessment (FTA 2006)

4.2.2 Affected Environment – Noise and Vibration

4.2.2.1 Noise

Noise monitoring was performed at 23 locations noted as "sensitive receptors" in the study area to determine baseline noise levels in relation to the current track operations and noise receivers typical of the study area (Figure 4). Long-term (24-hour) measurements were conducted at 19 of the 23 sites. These locations included residences and other buildings where people normally sleep. Short-term (15-minute) noise measurements were taken at the remaining four sites. These locations were representative of typical recreational, institutional, and commercial land uses with primarily daytime and evening activity. Current noise levels at the 19 residential receptors in the study corridor ranged from 54 to 75 A-weighted decibels (dBA). Noise levels at the four institutional receptors ranged from 49 dBA (Mountainview Memorial Park and Southgate Elementary School) to 69 dBA (Camp Murray) during short-term measurements (Table 2).

Neighborhoods within the study area currently experience noise from train mounted horns on Tacoma Rail freight trains south of Bridgeport Way Southwest, and wayside horns at intersections from

Freighthouse Square to Bridgeport Way Southwest.[3] No corridor-specific noise measurements for existing wayside horns or train-mounted horns were available for this project.[4] Instead, modelled contour lines at the Bridgeport Way Southwest intersection (considered a typical intersection within the study area) were created to show the areas potentially affected by both wayside horn or train mounted horns. With the project, wayside horns would be located at the intersection and based on the modeling, the area affected by wayside noise would be limited to the vicinity of the intersection and noise levels would be as follows:

- 80 dBA L_{dn} noise levels would be experienced at up to 28 feet from the intersection for less than a distance of 300 feet along the tracks.
- 70 dBA L_{dn} noise levels would be experienced at up to 70 feet from the intersection over a distance of 300 feet along the tracks.
- 60 dBA L_{dn} noise levels would be experienced at up to 190 feet from the intersection over a distance of 500 feet along the tracks.

By way of illustration, based on the FRA horn blowing requirements at grade-crossings, train-mounted horns modeled at the intersection would generate noise along the tracks for several thousand feet as the trains approach the intersection, significantly greater than the few hundred feet for wayside horns. With train-mounted horns,

- 80 dBA L_{dn} noise levels would be experienced at up to 20 feet from the tracks over a distance of between 2,500 and 3,000 feet along the tracks.
- 70 dBA L_{dn} noise levels are experienced at up to 90 feet from the tracks over a distance of 3,000 feet along the tracks.
- 60 dBA L_{dn} noise levels are experienced at up to 400 feet from the tracks over a distance of 3,700 feet along the tracks.

4.2.2.2 Vibration

Vibration levels were monitored for 24-hour periods at two sites representative of the land uses and buildings in the study area (Figure 4): one was the Arsenal/Museum building at Camp Murray (Site #CM2), and the other was at a residence along Kline Street Southwest (Site #3). The existing vibration levels at these locations were measured at 67 and 65 VdB, respectively.[5]

Additional information regarding affected environment for noise and vibration is detailed in Appendix E (page 31).

[3] *Wayside horns have been installed at intersections from Freighthouse Square to Bridgeport Way Southwest, such that noisier train-mounted horns need no longer be sounded for this section of the Point Defiance Bypass route. Sounder train noise has been addressed during environmental review and construction. Sound Transit conducted a noise analysis in conformance with FTA's methodology and requirements and no noise impacts requiring mitigation were identified. (USDOT/ST 2002).*

[4] *No corridor-specific noise measurements for wayside horns or train-mounted horns were conducted as no Cascades trains were running along the Point Defiance Bypass route at the time of the study.*

[5] *The threshold of vibration perception for most humans is around 65-70 VdB; levels from 70-75 VdB are often noticeable but acceptable; and levels greater than 80 VdB are usually considered unacceptable (equivalent to a freight train going by at close range).*

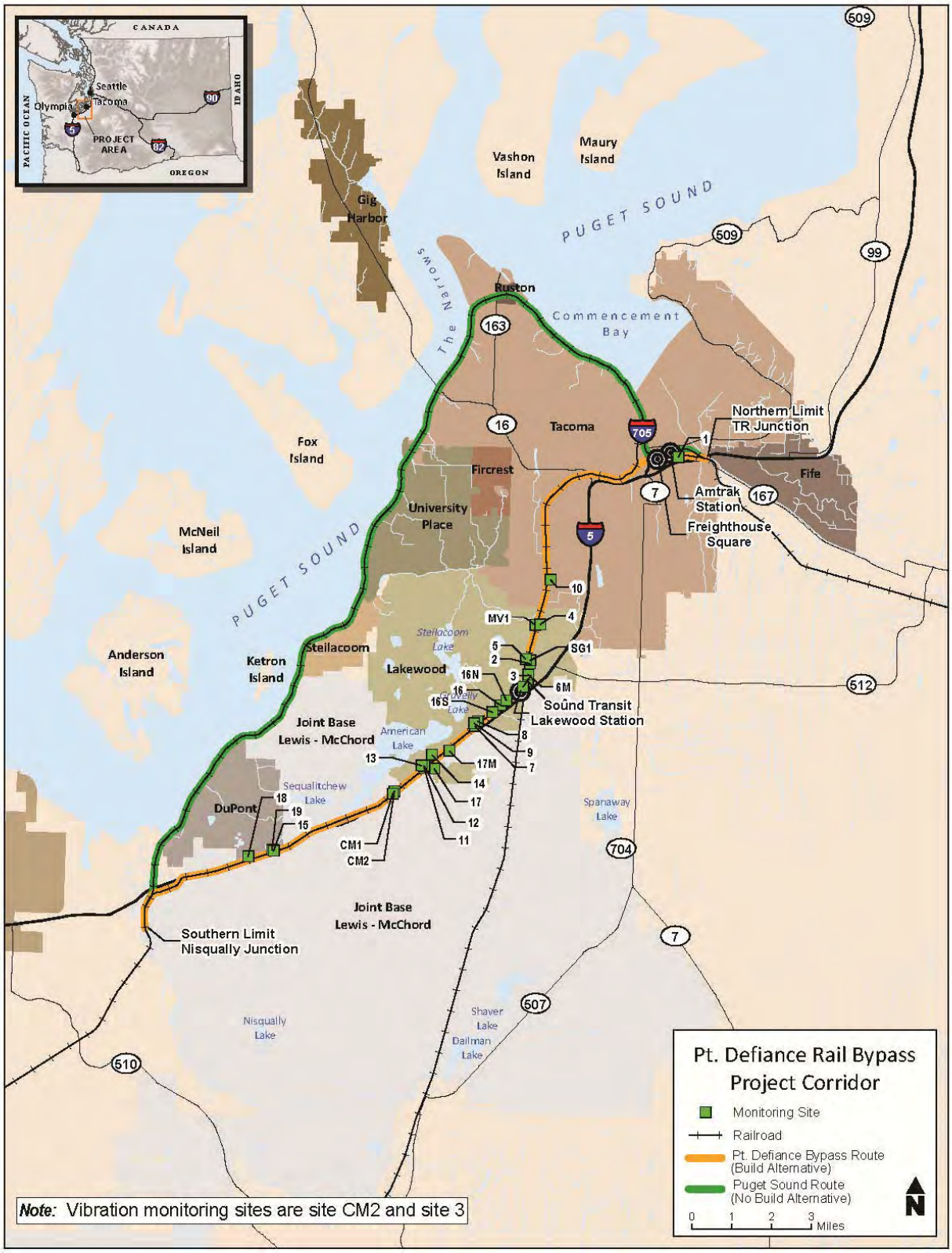


Figure 4. Noise and Vibration Monitoring Locations

4.2.3 Environmental Consequences – Noise and Vibration

4.2.3.1 No Build Alternative – Noise and Vibration

The existing noise and vibration conditions in the project corridor would remain unchanged under the No Build Alternative.

4.2.3.2 Build Alternative – Noise and Vibration

Construction Effects – Noise and Vibration

Noise

Construction noise would be intermittent, occurring at various locations and would depend on the type, amount, and location of construction activities. Construction noise would be temporary and would vary widely both spatially and temporally over the course of the Project's construction. The maximum noise levels of construction equipment would be similar to the typical maximum construction equipment noise, which range from 71 to 98 dBA at 50 feet. Assuming a maximum construction noise level of 98 dBA at 50 feet, Sites 1, TRM, 3, 6, 6M, 7, 11, 15, 16, 16N, and 16S (see Figure 4) have the potential to experience temporary daytime construction noise levels equal to or above the FTA one hour L_{eq} construction noise impact criteria for residential properties of 90 dBA (FTA, 2006). Because various pieces of equipment would be turned off, idling, or operating at less than full power at any given time and because construction machinery is typically used to complete short-term tasks at any given location, average daytime noise levels would be less than the maximum noise levels indicated above. In addition, based on standard distance attenuation, construction noise levels experienced at far away sensitive receptors would decrease at a rate of 6 to 8 dBA per doubling of distance from a source,[6] significantly lower than maximum construction noise emission levels. Given that construction noise is intermittent and there is a reduction in perceptible sound for sensitive receptors farther away from the construction activities, noise effects to sensitive receptors are not anticipated to be significant.

Vibration

Common vibration-producing equipment used during aboveground construction activities includes jackhammers, pavement breakers, bulldozers, backhoes, and ballast tampers. Typical vibration-producing equipment would produce vibration levels in the range of 66 to 112 VdB at a distance of 25 feet. Vibration levels from vibratory rollers were estimated to be the most substantial source of vibration during normal construction activities. Based on the limit for an acceptable level of infrequent ground-borne vibration to residential properties of 80 VdB, construction-related vibration effects are predicted at Sites 3 and 11. Site 3 represents approximately five residences, and Site 11 represents approximately 11 residences located 25-50 feet from the nearest track. For Site 3 and 11 residents, construction related vibration would be noticeable during construction but because of the linear nature of rail construction, activities would be temporary and occur infrequently. As such, vibration effects would not be significant.

Additional information regarding construction effects is detailed in Appendix E (page 50).

[6] *For example, a sound that is 50 dBA at 50 feet from the source of the sound would be 42 dBA 100 feet (assumes a decrease of 8 dBA), and 34 dBA at 200 feet from the sound source. Since a decrease of 10 dB in noise represents half the perceived noise to the human ear, the difference in the perceived sound at 50 and 100 feet would be almost half.*

Operational Effects – Noise and Vibration

Noise

Noise exposure would be generated by several sources, including passing trains, trains going over special track work (such as joints or frogs), and warning equipment (either wayside horns or on-train horns). Moderate noise impacts are predicted at two sensitive receptors for the Project: Site 6M and Site 16N (Figure 4). Site 6M is located near the at-grade railway crossing on 108th Street Southwest, just east of the intersection of 108th Street Southwest and Lakewood Drive Southwest in the City of Lakewood, Washington. Site 16N is located near the at-grade railway crossing on Bridgeport Way Southwest, just north of the intersection of Bridgeport Way Southwest and Pacific Highway Southwest in the City of Lakewood. Each sensitive receptor represents six residences. The increased noise levels at these sensitive receptors would be caused by new warning devices at signalized at-grade crossings located near the noise-sensitive land uses. Warning devices such as wayside horns (which are proposed as part of the Project) must be heard to be effective and therefore volumes cannot be reduced; however the use of wayside horns by both Amtrak and freight trains would replace train mounted horns with quieter wayside mounted horns that would reduce this particular source of noise. The noise effects from their use would be localized (as compared to on-train horns) and below the maximum noise level of 92 dBA at 100 feet, as set by FRA. Also, there would be no noise effects during common sleeping hours (10 p.m. to 7 a.m.) due to the proposed Amtrak Cascades and Coast Starlight schedule (trains will run after 7 a.m. and until 10 p.m). As noise effects to sensitive receptors are below the FTA noise impact threshold for severe effects and wayside train horn volumes are below the maximum noise level allowed by FRA for train-mounted horns, noise effects to sensitive receptors would not be significant.

Vibration

Vibration effects above the FTA vibration impact criteria of 80 VdB for infrequent events are predicted to occur at two sensitive receptors: Site 3 (85 VdB) and Site 11 (82 VdB), representing 5 and 11 residences, respectively, located 25-50 feet from the nearest track (Figure 4). Site 3 is located at the south end of Kline Street Southwest, just north of the existing rail line in the City of Lakewood. Site 11 is located on the south side of Union Avenue Southwest, between Maple Street Southwest and Lake Street Southwest, just north of the existing rail line in the City of Lakewood. Increased vibration levels at these locations are a result of the small distance between the sites and the tracks. Additional impacts resulting from a 3 VdB or more increase over the existing vibration levels in the corridor shared with Sound Transit *Sounder* service (Lakewood Station to TR Junction) are predicted at Sites 2 (72 VdB), 4 (66 VdB), 5 (70 VdB) and 10 (66 VdB), but these would be below the FTA impact criteria of 80 VdB for infrequent events. Existing condition vibration monitoring was also performed at the Arsenal/Museum building at Camp Murray (Site CM2) and this site is not expected to experience vibration effects under the Build Alternative.

In summary, the Project would have infrequent events as there would be less than 30 vibration events from the same source per day in the study area. This correlates to a FTA vibration impact criteria of 80 VdB throughout the study area for Category 2 (residential) land uses, and 83 Vdb for Category 3 (institutional) land uses[7] which would be exceeded at Sites 3 and 11. There would be no vibration effects during common sleeping hours due to the proposed Amtrak Cascades and Coast Starlight schedule (trains will run after 7 a.m. and until 10 p.m). Vibration levels to sensitive receptors would exceed the FTA vibration impact thresholds (80 VdB for Category 2 land uses, and 83 Vdb for Category 3 land uses). However, minimization measures described in Section 4.2.4 would reduce the vibration effects

[7] *Vibration levels of 80 VdB and 83 VdB would be noticeable to people (similar to a freight train passing by at close range) but would not be severe enough to cause property damage.*

below FTA vibration impact thresholds. These measures will be further analyzed during final design. Therefore, vibration effects to sensitive receptors would not be significant.

Additional information regarding operational effects is detailed in Appendix E (page 39).

4.2.4 Minimization Measures – Noise and Vibration

Although the Build Alternative would not have a significant effect on noise or vibration sensitive receptors requiring mitigation, effects associated with construction and operational activities at sensitive receptors would be reduced by the following minimization measures:

Construction Minimization Measures for Noise and Vibration

- Ensure all construction activities comply with local noise regulations, including no nighttime work unless a variance is obtained.
- Use artificial barriers (e.g. baffles, or stockpiles of construction materials) to shield against construction noise.
- Strategically place stationary equipment, such as compressors and generators, to reduce effects to noise-sensitive receivers.
- Equip each internal combustion engine with a manufacturer-recommended muffler.
- Use vibratory or hydraulic insertions for pile driving, or use drilled shafts in place of pile driving at locations determined during final design.

Operational Minimization Measures for Noise and Vibration

- Use wayside horns at at-grade crossings to limit the sounding of on-train horns and reduce the area exposed to train warning sounds.
- Vibration impacts at Sites 2, 3, 4, 5, 10 and 11 would be reduced through use of track treatments (such as resiliently supported ties, or ballast mats) to reduce the vibration transmitted to the ground. Sites 2, 4, 5, and 10 were measured below the FTA vibration impact criterion. For Sites 3 and 11, the use of track treatments would reduce the vibration effects to below the FTA vibration impact criterion of 80 VdB.

4.3 Transportation

4.3.1 Study Area and Methodology – Transportation

The study area includes the existing Point Defiance Bypass route between Nisqually Junction on the south and TR Junction in Tacoma on the north, including all at-grade rail crossings (Figure 6). The Puget Sound route and the station relocation at Freighthouse Square are also included in the study area.

Roadway traffic analysis involved assessing traffic volumes and turning movement data at each at-grade crossing intersection and adjacent intersections affected by the additional train crossings. Traffic was then evaluated to determine how the road system would work today and how the roads would operate in 2030 for each alternative.[8] To determine roadway conditions, current and

*A **queue length** is the distance that vehicles extend back from an intersection while waiting to move through. Queue lengths are typically longest during morning and afternoon 'rush hours.'*

[8] *Although 2040 is now the planning horizon for the Puget Sound Regional Council, the appropriate year to use for future impacts was 2030. This is based on the standard 20 year planning horizon (also called the "design year" used by WSDOT). As the Project's environmental evaluation commenced in 2010, the 20 year planning horizon projected out to 2030.*

future traffic volumes on roadways were modeled (both with and without the Project), and those modeled volumes were then used to calculate intersection delay (the average time in seconds vehicles wait before moving through an intersection) and vehicle queue length for major intersections.

The models used measure the effects of railroad operations on surrounding roadways and intersections in the study area. Intersection delay is expressed as a Level of Service (LOS) (Figure 5) using methods established by the *Highway Capacity Manual, Special Report 209*. Vehicle queue lengths were analyzed to determine both average and maximum queue lengths. Analysts also evaluated the effects on pedestrian and bicycle traffic by comparing the non-motorized connections proposed with the Build Alternative to existing facilities. Two rail study models were completed as part of the Project, the *Service Development Plan – Pacific Northwest Rail Corridor Cascades High-Speed Rail Program* (WSDOT 2011a) and the *D to 66th Street Operational Analysis Review* (WSDOT 2010). Both models include Cascade and Coast Starlight trains.

***LOS** ranges from 'A' to 'F,' with the letter A describing the least amount of congestion and best operations, and the letter F indicating the highest amount of congestion and worst operations.*

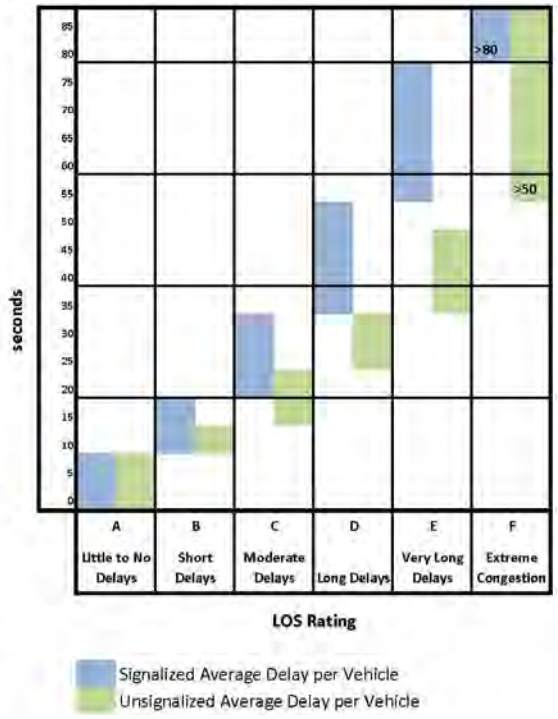


Figure 5. Level of Service Criteria for Signalized and Unsignalized Intersections

4.3.2 Affected Environment – Transportation

The existing Puget Sound rail route is near capacity and has physical and operational constraints that adversely affect both passenger and freight train scheduling and reliability. Tacoma Rail and BNSF are the operators of freight trains in the study area. Tacoma Rail operates as many as two trains per day on some portions of the Point Defiance Bypass route to as few as two trains per week on other portions of the Point Defiance Bypass route. BNSF operates intermittent freight trains on the Point Defiance Bypass route to serve military transportation needs at JBLM. Any increase in freight train use of the Point Defiance Bypass route would be subject to the terms of the various operating agreements between Sound

Transit, Tacoma Rail, WSDOT, and Amtrak.[9] There are no plans to increase freight on the Point Defiance Bypass route at this time. Tacoma Rail switches railcars while it builds trains in the Barksdale Avenue crossing area. During this switching operation, Barksdale Avenue can be closed to street traffic for several minutes, which affects the movement of vehicular and non-motorized traffic in the City of DuPont.

Roadway LOS was measured for each of the at-grade rail crossing intersections for the peak hours (Figure 6). The results of the study area traffic analysis show that in the 2010 morning peak hour, the study area intersections range from LOS A through D; all acceptable LOS. In the 2010 afternoon peak hour, intersections operate at LOS A through D except for two intersections that operate at LOS F: North Thorne Lane Southwest and Union Avenue Southwest, and Berkeley Street Southwest/Union Avenue Southwest. Queue length analysis of the intersections identified in the cities of Tacoma and Lakewood showed that most intersections currently have at least one movement where queuing causes delays or interference with traffic flow. Additional information regarding queue length is in Appendix F (page 29).

*The **peak hours** are the time of day when the highest amount of vehicles travel on the roadway network. The morning peak period is 7:00 AM to 9:00 AM and afternoon peak period is 4:00 PM to 6:00 PM.*

Pedestrians are served by sidewalks along most of the streets in the study area,[10] while bike lanes are present on a few of the streets. Pedestrians and bicyclists are permitted to cross the tracks at all at-grade intersections in the study area. Many of the railroad crossings provide sidewalks and paved walkways. For all railroad crossings, the rails are recessed into the pavement, which increases pedestrian and bicyclist crossing safety. In the City of Lakewood, the Lakewood Station Connection Project, a pedestrian overcrossing, is under construction near Lakewood Station. The Lakewood Station Connection Project will provide a pedestrian overpass connecting the Lakewood Station to Kendrick Street on the north side of the Point Defiance Bypass tracks.

For study area jurisdictions, LOS D or better is an acceptable standard for intersection function; LOS E or F represents unacceptable intersection function.

Bus service in the study area is provided by Olympia Express (Intercity Transit), Pierce Transit, and Sound Transit. Sound Transit bus routes in the study area provide passenger service between the cities of DuPont, Lakewood, Tacoma, and Seattle. Pierce Transit provides routes connecting Lakewood, Tacoma, and JBLM. Intercity Transit operates Olympia Express routes that connect downtown Tacoma to downtown Olympia. All three bus services utilize a bus transit center located one block north of the Freighthouse Square Station. The Greyhound bus station is located across from the bus transit center. Sound Transit's Lakewood Station, is located within the study area and includes a side platform and shelters for passengers. A parking garage at the station provides more than 600 commuter parking spaces. Additional information regarding affected environment is in Appendix F (page 29).

[9] *Operating agreements are between the track owners and the operators. Several operating agreements are in place between the various owners and operators along the Point Defiance Bypass, and include operating agreements between BNSF (owner) and WSDOT, Amtrak, and Tacoma Rail (operators); Sound Transit (owner) and BNSF, Tacoma Rail, WSDOT, and Amtrak; and, Tacoma Rail (owner) and Sound Transit (operator).*

[10] *Pedestrians also use the existing rail tracks and railroad ROW illegally as a means to travel within the area, especially in areas where sidewalks are intermittent or not available.*

4.3.3 Environmental Consequences – Transportation

4.3.3.1 No Build Alternative – Transportation

Minor maintenance and repair activities along the Puget Sound Route would occur as part of the No Build Alternative. These activities are minor and temporary and not expected to result in construction or operational effects to transportation. The No Build Alternative would not affect bus transit, pedestrians and bicyclists, stations, or parking. However, intercity passenger rail service on the Puget Sound route would continue to have a limited ability to expand service and would continue to be delayed by freight operations. With the No Build Alternative, traffic volumes would increase and intersection delay and queues are projected to increase by 2030, but most of the intersections are expected to continue to operate within LOS A through D.

4.3.3.2 Build Alternative – Transportation

Construction Effects

Sounder train service would not be affected by construction because the trains operate on adjacent tracks. Connections between the second track and the existing track would be made when *Sounder* trains are not operating. During construction, it is anticipated that south of Lakewood, the Point Defiance Bypass route (currently used by Tacoma Rail) would be out of service for a maximum of up to 4 days per week for up to 15 months. Tacoma Rail freight service would be rerouted to other available Tacoma Rail tracks as needed. WSDOT will coordinate with Tacoma Rail to maintain continued freight access during construction.

Upgrading the existing crossing warning systems at Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue would cause many of the crossing signal warning systems to be out of service until the new warning system is installed. These crossings would be manually controlled by construction traffic management personnel to control train, vehicle, and non-motorized traffic. This action would not delay freight trains because they travel at only about 10 mph, often stopping before proceeding through the five crossings to allow vehicles to clear the crossing.

Construction vehicles would increase traffic delay during the construction period. The truck routes would not be known until construction, but it is anticipated that the majority of construction vehicles would use I-5 and major arterials. Temporary lane closures and occasional weekend road closures would be required to rebuild the track across the Clover Creek Drive Southwest, North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue roadways. These actions would minimize the effect on the morning and afternoon commute periods, but would cause an increase in travel times during those times. Traffic control plans for these closures would include signage and prior notice to alert local and I-5 drivers of the work. Construction activities would similarly disrupt and delay transit, pedestrians and bicyclists, and parking. Additional information regarding construction effects is in Appendix F (page 159).

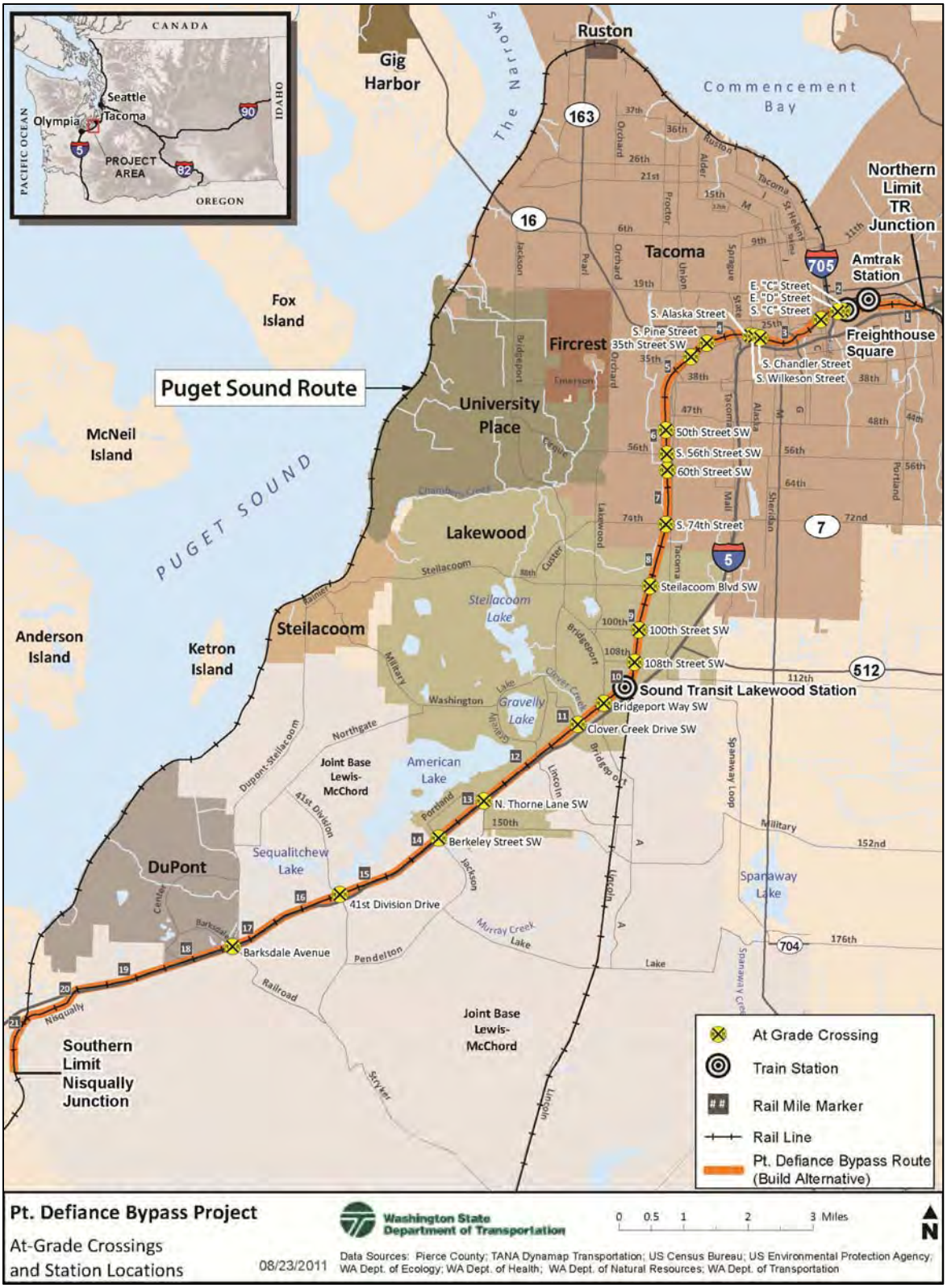


Figure 6. At-Grade Crossings and Station Locations

Operational Effects

Relocating passenger rail service to the Point Defiance Bypass route would improve travel time of the Amtrak Cascades service by 10 minutes because of the shorter distance (approximately six miles shorter) and because the trains will operate at higher speeds on the less congested tracks, and would improve on-time performance by avoiding potential delays from freight trains on the existing route. Additionally, trains traveling on the Point Defiance Bypass route would avoid some operational delays affecting reliability and travel time currently experienced on the Puget Sound route from landslides, weather-related delays and closures, and drawbridge openings. The Amtrak Cascades schedule would also be coordinated with Sound Transit to preserve the line capacity needed for Sound Transit to operate existing commuter rail service. Table 4 details the existing and future rail operations on the Point Defiance Bypass route.

Freight trains on the Puget Sound route would not be affected by relocating passenger trains to the Point Defiance Bypass route but could experience a slight benefit by removing passenger rail operations from the Puget Sound route.

Table 4. Existing and Future Daily Rail Operations Along the Project Rail Line

	No Build Alternative (Existing)	Build Alternative (Future)
Freight (TR and BNSF)	2[11]	2[12]
Sound Transit	26	26
Cascades	0	12
Starlight	0	2
Totals	28	42

No new at-grade highway or rail crossings are planned and no at-grade road crossings would be closed with the Build Alternative. The addition of Amtrak passenger service to the Point Defiance Bypass route would increase the number of short-term roadway blockages by 14 from train crossings throughout the day and during the morning and evening peak hour, compared to the No Build Alternative. The 2030 morning and evening peak hour roadway volumes are the same for the No Build and Build Alternatives, but the additional blockages would cause an increase in the overall time roadways are blocked for the Build Alternative. The average additional blockage time per crossing for the Project is approximately one minute during the morning and afternoon peak hour.

In 2030, queue lengths are anticipated to increase slightly with the addition of Amtrak Cascades service for the Build Alternative. The road closure time for a train crossing would be similar to crossing closures for *Sounder* trains (approximately one minute or less). The anticipated maximum queue length increase would be approximately two to four more vehicles compared to the No Build Alternative because of signal control system enhancements incorporated into the Build Alternative. At some locations, the queue length, when compared to the No Build Alternative, would be reduced because signal improvements needed for safety would also optimize the movement of vehicle travel (for example, “free” right or left turns would be available when crossing traffic is stopped due to a train crossing).

[11] *Tacoma Rail and BNSF are the operators of freight trains in the project study area. Tacoma Rail operates as many as two trains per day on some portions of the Bypass route to as few as two trains per week on other portions of the Bypass route. BNSF operates intermittent freight trains on the Point Defiance Bypass route to serve military transportation needs at JBLM. This condition applies to the Build and No Build Alternative.*

[12] *Any increase in freight train use on the Point Defiance Bypass route in the future would be subject to the terms of the operating agreement between Sound Transit, Tacoma Rail, WSDOT, and Amtrak. There are no plans at this time to increase freight trains on the Point Defiance Bypass route. Any increases in freight train use on the Puget Sound route would be determined by BNSF.*

The Build Alternative would reduce the number of intersections exceeding the LOS D standards set by local jurisdictions and WSDOT from nine to eight, compared to the No Build Alternative. The Build Alternative would improve substandard LOS conditions at the locations summarized in Table 5.

Table 5. Year 2030 Intersections Improved by the Build Alternative

Intersection	AM Peak Hour LOS and Delay (sec./veh.)		PM Peak Hour LOS and Delay (sec./veh.)	
	No Build Alternative	*Build Alternative*	*No Build Alternative*	*Build Alternative*
North Thorne Lane Southwest and I-5 Southbound Ramps	E (70.3)	D (44.3)	D (40.7)	C (30.9)
North Thorne Lane Southwest and I-5 Northbound Ramps	E (75.2)	E (70.7)	F (91.3)	E (74.8)
Berkeley Street Southwest and Union Avenue Southwest	F (102.2)	F (83.5)	F (64.1)	D (42.9)
Barksdale Avenue/Locust Road and I-5 Northbound Ramps	E (62.5)	E (57.6)	E (56.0)	E (55.8)

With the Build Alternative, several intersections experience minor impacts resulting in decreased LOS but would continue to meet LOS A through D standards (Table 6). The remaining intersections would experience some change in delay (seconds per vehicle) but no LOS changes.

Table 6. Year 2030 Intersections Experiencing a Decrease in LOS by the Build Alternative

Intersection	AM Peak Hour LOS and Delay (sec./veh.)		PM Peak Hour LOS and Delay (sec./veh.)	
	No Build Alternative	*Build Alternative*	*No Build Alternative*	*Build Alternative*
Steilacoom Boulevard Southwest and Lakeview Avenue Southwest	No LOS change	No LOS change	A (9.9)	B (10.2)
Berkeley Street Southwest and I-5 northbound ramps	No LOS change	No LOS change	C (29.8)	D (41.9)
41st Division Drive and I-5 southbound ramps	No LOS change	No LOS change	A (9.7)	B (11.9)
Barksdale Avenue and DuPont-Steilacoom Road	B (19.4)	C (22.2)	No LOS change	No LOS change

Bus transit would experience the same intersection delay and queue lengths at intersections as vehicles with the Build Alternative. The Build Alternative would not affect the location of bus stops or provide other transit service enhancements.

While stopped at Freighthouse Square, the Coast Starlight train would extend beyond the existing station platform and across East C Street and East D Street. The blockage of these two streets would affect vehicular traffic during the time the Coast Starlight is at the station (dwell time of approximately six minutes). Infrequently, the Coast Starlight stop may coincide with an event at the nearby Tacoma Dome. During an event at the Tacoma Dome, the dwell time of the Coast Starlight train at Freighthouse Square would result in a decline of LOS to below LOS D (Appendix G, page 6). The temporary blockage of these two streets would result in a decline of LOS to below LOS D during an event at the Tacoma Dome. Minimization of operational effects on traffic as a result of the Coast Starlight dwell time at Freighthouse Square, and during a Tacoma Dome event, would include implementation of a detour plan that could include static signs identifying the detour routes, dynamic message signs that identify the detour routes during a train blockage, lane striping and controller modification. FRA and WSDOT would provide

additional modeling detail and design at the C and D Street intersections as part of the Final Design process.

The Tacoma Amtrak Station relocation to Freighthouse Square would improve pedestrian connections between Amtrak passenger rail and transit services provided at the Tacoma Dome Station. This reduction in connection time would improve passenger connections and convenience when connecting between Amtrak, *Sounder*, Tacoma Link light rail, and bus transit. The Build Alternative would also improve sidewalks at North Thorne Lane Southwest, Berkeley Street Southwest, and Barksdale Avenue thus improving pedestrian access and safety. Elsewhere, pedestrians and bicyclists would experience similar intersection delays as vehicles with the Build Alternative.

With the Build Alternative, parking for Amtrak would be located closer to the new Tacoma Dome Station at Freighthouse Square. This new parking would provide the same amount or more parking than is available at the existing Tacoma Station. In addition to this proposed parking, there would be some available on-street parking near the station (Puyallup Avenue, East 25th Street, East 26th Street, East C Street, East D Street, and East G Street) and in the existing parking garage. Remaining parking elsewhere would be largely unaffected by the Build Alternative. Additional information regarding operational effects is in Appendix F (page 80).

4.3.4 Minimization Measures – Transportation

Although the Build Alternative would not have a significant effect on transportation requiring mitigation, effects associated with construction activities would be minimized by using a process similar to the coordination framework that was established during the design and construction of the *Sounder* D to M Street commuter rail project. The framework would ensure that rail freight delivery meets customer needs during construction. A traffic control plan would also be developed in coordination with local jurisdictions to minimize traffic delays and periodic lane and/or access revisions during construction of at-grade crossing improvements. WSDOT will coordinate local jurisdictions regarding the construction schedule, construction areas, and detour routes during Project development to minimize community disruption including for events such as the US Open.

Minimization of operational effects on traffic as a result of the Coast Starlight dwell time at Freighthouse Square, and specifically during a Tacoma Dome event, will include implementation of a detour plan that may include static signs identifying detour routes and/or dynamic message signs that identify the detour routes during a train blockage. FRA and WSDOT would provide additional modeling detail and design at the C and D Street intersections as part of the Final Design process.

4.4 Geology and Soils

4.4.1 Study Area and Methodology – Geology and Soils

The study area is defined as the corridor that lies within 1,000 feet both left and right of the centerline of the Project, including relocating the Tacoma Amtrak Station to the Tacoma Dome Station at Freighthouse Square.

Geologic information for the corridor was obtained by collecting and reviewing existing data from federal, state, and local information sources. A geologic and geotechnical reconnaissance was conducted to assess surface conditions, geologic hazards, and likely subsurface conditions in the project corridor.

*In **lateral spreading**, soil behaves like a liquid, has an inability to support weight, and can flow down slopes.*

4.4.2 Affected Environment – Geology and Soils

The study area lies in the southern portion of the Puget Lowland, which formed as the result of glacial and non-glacial processes. Soil across most of the study area is relatively dense and strong. Along rivers and lakes sediment deposits have occurred that are less dense and have lower strength than the glacial deposits. Table 7 summarizes geologic-related critical areas within the study area, which include seismic, volcanic, landslide, erosion, and aquifer recharge hazard areas. There are no unique, of local interest, or protected soil or geologic resources present in the study area. Additional information regarding affected environment is in Appendix H (page 13).

Table 7. Geologic Critical Areas within the Study Area

Geologic Critical Area	Definition	Location within Study Area
Seismic Hazards Areas	Areas subject to severe risk of damage as a result of seismic-induced settlement, shaking, lateral spreading, surface faulting, slope failure, or soil liquefaction.	Several localized areas of potentially liquefiable soil were identified in the study area between near I-705 (rail MP 2.1) and South "M" Street (rail MP 3.2). Areas of potential slope instability within the study area comprise localized steep slopes (slopes greater than 40 percent) between Pacific Avenue (rail MP 2.3) and about South "M" Street (rail MP 3.2) and immediately north of the I-5 overcrossing (rail MP 20.0) and a broad area of steep slopes south of the I-5 overcrossing. The track section between TR Junction (rail MP 1.0) and about East "G" Street (rail MP 1.8) crosses through a designated seismic hazard area.
Volcanic Hazard Areas	Areas subject to pyroclastic flows, lava flows, and inundation by lahars, debris flows, or related flooding resulting from geologic and volcanic events on Mount Rainier.	The track is located within this mapped volcanic hazard area from TR Junction (rail MP 1.0) to about East "G" Street (rail MP 1.8).
Landslide Hazard Areas	Areas potentially subject to mass movement due to a combination of geologic, seismic, topographic, hydrologic, or man-made factors.	Landslide hazard areas within the study area include the slope instability areas described under Seismic Hazards Areas.
Erosion Hazard Areas	Areas where the combination of slope and soil type makes the area susceptible to erosion by water flow, either by wave action, channel migration, or surface runoff.	The mapped erosion hazard areas are primarily associated with potential erosion from channel migration of rivers or streams. Soil susceptible to erosion is present along the railroad corridor when cleared of vegetation or exposed on cut or fill slopes.
Aquifer Recharge Areas	Areas that are a highly used source of groundwater, and are tapped by public and private wells as a source of drinking water.	The study area from north of the I-5 DuPont Interchange (rail MP 18.5) to Yakima Street (rail MP 2.8).

Table Note: In lateral spreading, soil behaves like a liquid, has an inability to support weight, and can flow down slopes.

4.4.3 Environmental Consequences – Geology and Soils

4.4.3.1 No Build Alternative – Geology and Soils

The geology and soils in the study area would remain undisturbed. Existing conditions and geologic hazards as summarized in Table 7 would persist under the No Build Alternative.

4.4.3.2 Build Alternative – Geology and Soils

Construction Effects

Construction activities could temporarily disturb soils in the study area. For example, land clearing and excavation into existing slopes and embankments could expose soil, making it susceptible to wind and water erosion. Additional information regarding construction effects is in Appendix H (page 26).

Operational Effects

As a general matter, the geology and soils in the project corridor would remain undisturbed as a result of Project operation. Areas currently susceptible to geologic hazards would continue to be susceptible. The Build Alternative would not affect (increase or decrease) the susceptibility of the area to these hazards. Shallow landslides may occur adjacent to steep slopes or in areas identified as landslide hazard areas. Additional information regarding operational effects is in Appendix H (page 26).

4.4.4 Minimization Measures – Geology and Soils

Although the Build Alternative would not have a significant effect on geology and soils requiring mitigation, effects associated with construction activities would be addressed by using BMPs during construction, including:

- Preparing and following a TESC Plan to implement proper erosion control and surface water runoff BMPs.
- Paving or permanently restoring disturbed areas as soon as possible.
- Designing temporary excavation slopes to prevent surface sloughing and shallow landsliding.
- Designing all fill and pavement areas to drain away from construction areas and prevent ponding of water and softening of subgrade soils.
- Limiting cut slopes to two horizontal feet to one vertical foot (2H:1V) or using retaining walls, and including permanent drainage facilities designed for anticipated water flows.

4.5 Water Resources

4.5.1 Study Area and Methodology – Water Resources

The study area includes water resources that exist within the footprint of the Build Alternative, their associated drainage basins, and downstream receiving waters. Water resources in the study area include surface waters, floodplains, groundwater (including critical aquifer recharge areas), and shorelines. The station relocation at Freighthouse Square is also included in the study area.

Existing conditions of water resources were identified using field observations, literature review, and aerial photographic analysis. The potential effects of each alternative on water resources were qualitatively compared to existing conditions. Additionally, WSDOT's *Highway Runoff Manual (HRM)* was used to determine if the alternatives met the requirements of the *HRM* (WSDOT 2010a).[13] Alternatives meeting the minimum treatment standards of the *HRM* would have no significant effect on water resources and are expected to meet applicable regulations without the use of additional BMPs. See

[13] *As the project proponent WSDOT's manual is appropriate to use as it has been approved by the Washington State Department of Ecology, and provides guidelines to achieve compliance with federal and state water quality regulations. The HRM does provide guidance in conjunction with local ordinances regarding treatment standards for rail projects.*

Appendix I for more information about the study area and methodology for the analysis of potential water resource impacts.

4.5.2 Affected Environment – Water Resources

Within the study area the following water resources were identified. Appendix I provides additional information on affected environment (page 19).

- Surface Waters – The study area occurs within three major watersheds known as the Puyallup/White, Chambers/Clover, and Nisqually Water Resource Inventory Areas (WRIAs) and seven watercourses described in Table 8 and shown on Figure 7.
- Floodplains – There are 100- and 500-year floodplains associated with surface waters in the study area. The floodplains for Clover Creek and Murray Creek are regulated by Federal Emergency Management Agency (FEMA), while the floodplains for Streams 1 and 2 are flood hazard areas designated by Pierce County.
- Groundwater – The study area lies within an EPA-designated sole source aquifer area. In addition, Pierce County has designated critical aquifer recharge and wellhead protection areas that occur within the study area.
- Shorelines – Within the study area, the Puyallup River, Nisqually River, and American Lake have shorelines of statewide significance.[14] Clover Creek, Sequalitchew Creek (which flows between American Lake and Sequalitchew Lake), and Gravelly Lake also have regulated shorelines.[15]

Table 8. Surface Waters within the Study Area

Surface Water	Description
First Creek	An urbanized stream network managed by the City of Tacoma as a stormwater conveyance system and utility corridor. First Creek flows through the study area in a 6-foot-diameter pipe before discharging to the Puyallup River.
Tacoma Eastern Gulch/B-Street Gulch	A large open channel that is typically dry, but may convey flows to the Thea Foss Waterway during large storms. The gulch flows are conveyed through the study area in a 6-foot-diameter culvert.
Stream 1	A small tributary stream to Flett Creek that crosses the study area corridor through a 3-foot-diameter culvert.
Clover Creek	The largest stream in the study area, with documented water quality problems related to fecal coliform bacteria (Ecology 2009). The existing rail line crosses over the stream on a 70-foot-long wood trestle bridge.
Stream 2	A small tributary stream to American Lake that only flows during certain times of the year. Though it is a small, intermittent stream, it has an associated 500-year floodplain and crosses the study area in a 5-foot-diameter culvert.
Murray Creek	A continuously-flowing tributary stream to American Lake that crosses the study area in a 9-foot-diameter culvert.
Stream 3	A small tributary to the Nisqually River that only flows during certain times of the year. It passes through the study area in a 3-foot-diameter culvert.

[14] *WAC 173-18-310, WAC 173-20-570.*
[15] *WAC 173-18-310, WAC 173-20-560.*

Figure 7. Wetland and Surface Water Resources

4.5.3 Environmental Consequences – Water Resources

4.5.3.1 No Build Alternative – Water Resources

The water resources in the study area would not change under the No Build Alternative, and would be same as the existing conditions.

4.5.3.2 Build Alternative – Water Resources

Construction Effects

The Build Alternative could affect surface and groundwater from erosion, sedimentation, and pollutant spills during construction. Clover Creek, Stream 2 and Murray Creek would be more susceptible to construction effects due to their proximity to the Point Defiance Bypass route. However, through the implementation of required BMPs, effects would be minimized or avoided. Therefore, no construction effects are expected.

Operational Effects

The Build Alternative would add new impervious surfaces for roadway and sidewalk upgrades; however, the changes from pervious to impervious surfaces would be below the thresholds for flow control and water quality treatment requirements outlined in the *HRM* (WSDOT 2010a). Therefore, the Build Alternative is not expected to result in effects to surface waters through changes in volume or water quality. No changes would be made within the boundaries of regulated shorelines or floodplains.

No effects are anticipated to surface waters, critical aquifer recharge or well protection areas. Additional information regarding operational effects is in Appendix I (page 31).

4.5.4 Minimization Measures – Water Resources

Although the Build Alternative would not have an effect on water resources requiring mitigation, minimization measures would be implemented during construction of the Build Alternative to avoid and minimize potential effects to water quality. Under Section 402 of the CWA the contractor would be required to prepare and implement a *Construction Stormwater Pollution Prevention Plan* to serve as the overall construction stormwater minimization plan. The CSWPPP would include a *Temporary Erosion and Sediment Control Plan, Spill Prevention, Control, and Countermeasures Plan, Concrete Containment and Disposal Plan*, and *Fugitive Dust Plan*.

4.6 Wetlands

4.6.1 Study Area and Methodology – Wetlands

The study area is defined as the railroad right-of-way, which varies in width from approximately 80-100 feet. The station relocation at Freighthouse Square is also included in the study area. Wetlands in the study area were delineated in 2006 and 2011 using the three parameter approach described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) and the *Corps of Engineers Wetland Delineation Manual* (USACE 1987).[16] For each wetland identified, the functions and values were evaluated using the *Wetland Functions Characterization Tool for Linear Projects*

[16] *The results of the HDR wetland delineation were verified by WSDOT in the field on June 7, 2011. Verified data were transferred to current data sheets derived from the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version. 2.0).*

(Null 2000). Buffer widths were also assigned to each wetland. Potential effects were then qualitatively evaluated for each wetland and associated buffer.

4.6.2 Affected Environment – Wetlands

Four wetlands were identified in the study area (Figure 7). A description of the characteristics of each wetland is provided in Table 9. With the exception of Wetland AB, these wetlands have low to moderate values for various habitat, water quality, and water quantity functions (e.g., flood storage, erosion control, organic production). Wetland AB has a high value for aquatic invertebrate and amphibian habitat functions. Additional information regarding affected environment is in Appendix J (page 13).

Table 9. Wetland Descriptions

Wetland ID	Cowardin Classification[1] and HGM Class[2]	Estimated Size (Acres)	Rating[3]	Jurisdiction and Buffer	Dominant Vegetation
A	PSS Depressional	0.27	III	Lakewood 75 feet	Pacific willow and Himalayan blackberry
E	PEM Riverine	0.3	III	JBLM (Pierce County) 80 feet	Common cattail, reed canarygrass
C	PFO Slope	1.7	IV	Pierce County 50 feet	Red alder, Himalayan blackberry, and scouring rush
AB	PFO Slope	1.2	III	Pierce County 80 feet	Red alder, salmonberry, and youth-on-age

[1] *Cowardin et al. 1979*

[2] *Brinson 1993*

[3] *Hruby 2004, and City of DuPont Municipal Code, DMC Chapter 25-105.*

4.6.3 Environmental Consequences – Wetlands

4.6.3.1 No Build Alternative – Wetlands

The wetland resources in the study area would not change under the No Build Alternative and existing conditions would persist.

4.6.3.2 Build Alternative – Wetlands

Construction Effects

> ***Wetland functions*** *are properties that a wetland naturally provides such as habitat for waterfowl or retaining water during floods.* ***Wetland values*** *are properties that are valuable to humans such as uniqueness or educational use.*

While construction activities associated with the Build Alternative could result in temporary effects to adjacent wetlands, the effects on wetlands would not be significant. Construction could result in a short-term loss of wetland functions associated with habitat and water quality and ground disturbance could result in minor erosion of disturbed soils into wetlands and buffer areas, impairing vegetation and habitat. Clearing and grading activities in the vicinity of wetlands would have the potential to affect surface water quality during seasonal events when surface water is present. However, through the implementation of required BMPs, effects during construction would be minimized or avoided.

Operational Effects

The operation of the Build Alternative would not affect wetlands. The Build Alternative would result in an increase in rail traffic that could affect the use of wetlands by wildlife. Potential effects to wildlife are discussed in Section 4.7 (Fish, Vegetation, and Wildlife). Additional information regarding the effects are included in Appendix J (page 18).

4.6.4 Minimization Measures – Wetlands

Although the Build Alternative would not have a significant effect on wetlands requiring mitigation, effects associated with construction activities would be reduced by the following minimization measures:

- Clearing limits would be clearly marked and protected with construction fencing.
- Various sediment control BMPs would be used to remove sediment prior to any stormwater runoff leaving the site.
- Exposed soils would be stabilized to prevent erosion (i.e., hydroseeding, straw wattles, etc.).
- A temporary erosion control blanket would be placed immediately after seeding, fertilizing, and mulching.
- All on-site pollutants, including waste materials and demolition debris, would be handled and disposed in a manner that does not cause contamination of stormwater.
- On-track vehicle/machinery maintenance and fueling locations would be established away from aquatic resources.
- Any on-site fuel storage would have secondary containment equal to 150 percent of storage capacity.
- All waste oils and machinery fluids would be removed by a maintenance vehicle when they are generated. No waste oils or fluids would be stored on site.
- Application of chemicals such as fertilizers and pesticides would be conducted in a manner and at application rates that would not result in loss of chemicals to stormwater runoff.
- Highly turbid or contaminated dewatering water would be handled separately from stormwater and not allowed to enter local drainage systems.

4.7 Fish, Vegetation, and Wildlife

4.7.1 Study Area and Methodology – Fish, Vegetation, and Wildlife

The study area is limited to within a 200-foot radius of the railroad right-of-way centerline, including the station relocation at Freighthouse Square. Background research and field surveys were conducted to collect information on fish, wildlife, and vegetation. Wildlife species and plant communities observed along the right-of-way during field surveys were documented. For fisheries, documentation included visual inspection of potential habitat for threatened and endangered species and identification of fish passage barriers.

4.7.2 Affected Environment – Fish, Vegetation, and Wildlife

Fish habitat associated with the study area surface waters is described in Table 10 and surface waters are shown on Figure 7. Fish presence was documented in Murray Creek and Clover Creek. Clover Creek is documented as supporting winter steelhead[17] and Coho salmon.[18]

[17] *Federally listed as Threatened.*
[18] *Federally listed as a Species of Concern.*

Table 10. Fish Habitat and Presence within the Study Area

Surface Water	Documented Fish Presence: Salmon and Steelhead Presence (Listing Status*)	Documented Fish Presence: Critical Habitat Present	Documented Fish Presence: Other Resident Fishes	Fish Habitat Description
Stream 1	None	No	None	Narrow, densely vegetated ditch that runs between large, paved parking lots before it is directed through long culverts.
Clover Creek	Steelhead (FT) Coho (FSC)	No	Cutthroat trout, Rainbow trout, Pacific lamprey (FSC, SM)	Substrate is composed of gravels with a few cobbles. Habitat in the creek is largely riffle type. Vegetative cover on the creek banks is approximately 50 percent.
Stream 2	None	No	None	Channel is poorly defined, and substrate is largely sands with areas of gravels and spalls that have fallen from the railroad embankment. Habitat is largely run type, but backwater areas are present. Fine organic debris is common in the water, and the channel is well shaded by vegetation.
Murray Creek	None	No	Cutthroat trout	Habitat is entirely pool type. Vegetative cover on the banks is dominated by common cattail and reed canarygrass.
Stream 3	None	No	None	Defined channel approximately 5-15 feet in width and about 6 inches deep. Substrate is largely silt, with small areas of gravel. Organic debris (twigs and leaves) are common. The habitat is mostly runs type, with a few smaller pools and a single large pool just upstream of the culvert. Vegetative cover is approximately 100 percent.

** (FT) Federal Threatened; (FSC) Federal Species of Concern, (SM) State Monitor*

Most of the study area has little to no vegetation. This is by design, as vegetation near the tracks inhibits safety by reducing sight lines, and may foul the track itself. Vegetation generally occurs at or near the edge of the railroad right-of-way. Vegetation types located in the study area include maintained vegetation (Scotch broom, Himalayan blackberry, and mixed grasses that is either mowed, trimmed or treated with herbicide), disturbed mixed forest (Douglas fir, Pacific madrone, Lombardi poplar and Oregon white oak; that have been altered by development, including thinning, trimming, or fragmentation), scattered trees, and wetland vegetation (Table 9).

Nine plant species are protected by the United States Fish and Wildlife Service (USFWS) and Washington Department of Natural Resources (WDNR) in Pierce County. However, no protected species were observed during the field surveys and based on vegetation communities and habitats observed during site visits, it is unlikely that any protected plant species occur in the study area.

Most of the habitat in the study area is fragmented and provides poor habitat for most wildlife species, except those that have adapted to urban areas. Therefore, wildlife likely to be in the study area includes birds, rodents, and raccoons. Feral cats and dogs may also be present. No Federally-listed wildlife species are documented within the study area. Bald eagles nest outside the study area on the southeast shore of

American Lake, over 600 feet from the right-of-way. The nests are not visible from the railroad due to screening by trees and large buildings. Additional information regarding affected environment is in Appendix K (page 11).

4.7.3 Environmental Consequences – Fish, Vegetation, and Wildlife

4.7.3.1 No Build Alternative – Fish, Vegetation, and Wildlife

Existing conditions for fish, vegetation, and wildlife in the study area would persist under the No Build Alternative.

4.7.3.2 Build Alternative – Fish, Vegetation, and Wildlife

Construction Effects

No in-water work is proposed and no effects to fish are anticipated during construction. Approximately 24 acres of maintained vegetation, 2.5 acres of disturbed mixed forest, and one acre of scattered trees would be removed from the study area as a result of the Build Alternative. These resources do not support habitat for protected species. The removal of maintained and disturbed vegetation would have no effect to wildlife, as the quality of habitat is poor and individuals would relocate to other vegetated areas in the vicinity. Visual disturbance and elevated noise are expected to be marginally higher than baseline levels during construction and would disturb terrestrial wildlife that may be present within the right-of-way, but, in the context of urban development, vehicular traffic, and pedestrian activity, the effects on wildlife would be minimal. The Project would have no effect to listed species. Appendix S includes concurrence correspondence and the no effect determination letters submitted to the USFWS and National Marine Fisheries Service (NMFS). Additional information regarding construction effects is in Appendix K (page 24).

Operational Effects

As discussed in Section 4.5.2, no effects to water quality are anticipated; therefore, no effects to fish species would occur. No operational effects to wildlife or vegetation are anticipated from the Build Alternative. Additional information regarding operational effects is in Appendix K (page 24).

4.7.4 Minimization Measures – Fish, Vegetation, and Wildlife

The Build Alternative would not have significant effects to fish, vegetation, or wildlife requiring mitigation. Effects associated with construction activities would be reduced by the following minimization measures:

- Confine construction activities to the minimum area necessary.
- Develop and implement a TESC Plan and CSWPPP for clearing, vegetation removal, grading, ditching, filling, embankment compaction, or excavation. The BMPs in the plans would be used to control sediments from ground-disturbing activities.
- For construction activities that occur within 200 feet of surface water or wetland habitat as identified by the Project biologist, use BMPs to ensure that no foreign material, such as railroad ballast or other material, is sidecast, and to control and prevent sediments from entering aquatic systems.
- Native species would be used for reseeding where possible.
- Minimize removal of native vegetation to the greatest extent possible.

4.8 Hazardous Materials

4.8.1 Study Area and Methodology – Hazardous Materials

The study area included areas where hazardous material encounters or ground disturbance work would occur: a quarter mile around Freighthouse Square and the rail corridor between rail MP 10.4 and rail MP 21.5 (between Bridgeport Way Southwest and the end of the Project).

Historic land use and geologic information as well as regulatory records were reviewed to identify land use or business operations that may have used hazardous materials and had the potential to contaminate soil or groundwater, and assess possible contaminant migration routes. Identified sites of concern were then screened to eliminate sites that pose low risk. Sites that remained after screening were assigned a risk level based on the probable extent of contamination, and evaluated to determine whether there may be an effect that cannot be reasonably minimized.

Site risk level categories included the following:
Low: *The risk of encountering contamination is low.*
Moderate: *The risk of potential contamination to exist on the site is probable, yet, if encountered, the contamination is straightforward to manage.*
High: *The risk of extensive and/or highly toxic contamination is known or suspected to exist on the site.*

4.8.2 Affected Environment – Hazardous Materials

Nineteen sites were identified to have either a moderate or high effect where excavation work is planned to go below 2 feet of the existing ground surface. The sites of highest concern include documented contaminated sites and sites that have a potential for a release immediately adjacent to or within the construction area where subsurface construction work is probable (see Figure 8). The sites of highest concern identified within the study area are summarized in Table 11. Additional information regarding affected environment is in Appendix L (page 35).

Table 11. Hazardous Materials Sites of Concern within the Study Area

High Effect Site	Contamination Concern
Freighthouse Square (Site #2)	Contamination above Model Toxics Control Act (MTCA) Method A cleanup levels and is subject to an environmental restrictive covenant.
Industrial Parts Frictions I (Site #26/PP3)	Located in a historically heavy commercial and industrial area; the business has handled or generated hazardous materials. Past and current business operations on or adjacent to the property may have contaminated the site.
Airspares (Site #53/PP1)	Located in a historically heavy commercial and industrial area; the business has handled or generated hazardous materials. Past and current business operations on or adjacent to the property may have contaminated the site.
Stone Property Transit (Site #58/PP2)	Soil is known to be contaminated with arsenic and other metals, along with petroleum products and polynuclear aromatics. Solvents are also in the soil; however, the concentrations are reportedly below Ecology's current cleanup levels. These substances are suspected to also be in the groundwater, which is shallow in this area.
Sound Transit Rail Property (Site #83)[1]	Existing rail sections are underlain by ballast material, which may include slag from the ASARCO smelter that historically operated in Ruston.
Tacoma Smelter Plume (Site #84)	Contaminated surface soils caused by the historical operation of the ASARCO smelter plant. Surface soils may contain lead and arsenic concentrations in soils above the MTCA Method A cleanup (WSDOT 2007).
USEPA Lakewood Superfund Site (Site #80)	The Lakewood Superfund site (aka Ponder's Corner or Plaza Cleaners) has contaminated groundwater beneath the rail right-of-way.
Fort Lewis Logistics Center Superfund Site (Site #82)	The Superfund site has trichloroethylene (TCE)-contaminated groundwater that extends under the rail alignment.

Table 11. Hazardous Materials Sites of Concern within the Study Area

High Effect Site	Contamination Concern
Major Site of Note: Commencement Bay, Nearshore/Tideflats Superfund Site (Sites #46/#50)	Superfund site is a potentially moderate effect because the study area does not intercept the boundaries of the Superfund site's cleanup areas. However, the former ASARCO smelter is the source of the slag that was generated from the copper smelting process that was either disposed of in Commencement Bay or used as crushed rock applications (i.e., driveways and roadbed material). Also, airborne emissions from the ASARCO smelter facility contaminated surface soil with arsenic and lead.
Major Site of Note: American Lake Gardens Superfund Site (Site #81)	The site has contaminated groundwater with VOCs, including trichloroethene (TCE) and dichloroethylene (DCE). Superfund site is a potential moderate effect because the contaminated groundwater plume does not extend under the rail alignment.

[1] Although the site is referred to as Sound Transit Rail Property (Site #83), the contamination is found along the entire Point Defiance Bypass route which is owned by Sound Transit, Tacoma Rail, and BNSF.

4.8.3 Environmental Consequences – Hazardous Materials

4.8.3.1 No Build Alternative – Hazardous Materials

Minor maintenance and repair activities along the existing rail line would occur as part of the No Build Alternative. The current commodity mix hauled by both BNSF and Tacoma Rail, which may include hazardous materials, would continue to be transported along the Puget Sound route and Point Defiance Bypass route. Existing conditions and hazardous materials would persist under the No Build Alternative.

4.8.3.2 Build Alternative – Hazardous Materials

Construction Effects

If encountered during construction, the presence of contaminated soil or groundwater could result in public health or environmental effects through the releasing and spreading of contaminated soil, sediment, or groundwater; altering the flow of or generating contaminated groundwater; and creating pathways for contamination to migrate through the soil column. Contaminants in airborne particulates can migrate off-site in dust particles and may cause an exposure concern. Accidental hazardous materials spills or releases from construction activities, equipment, or materials may also occur.

In general, earthwork activities are shallow and not likely to reach contaminated groundwater associated with the USEPA Lakewood Superfund Site (Site #80). Earthwork associated with utility work in the Freighthouse Square area (Site #2) may encounter an area where contaminated groundwater is known to exist. Due to the potential concern for surface soils to be contaminated from the ASARCO smelter plant operations (Site #46 and 50), ground disturbance work may release contaminated dust particles to the surrounding populace in that area. However, minimization measures would avoid, control, and manage these effects. Additional information regarding construction effects is in Appendix L (page 43).

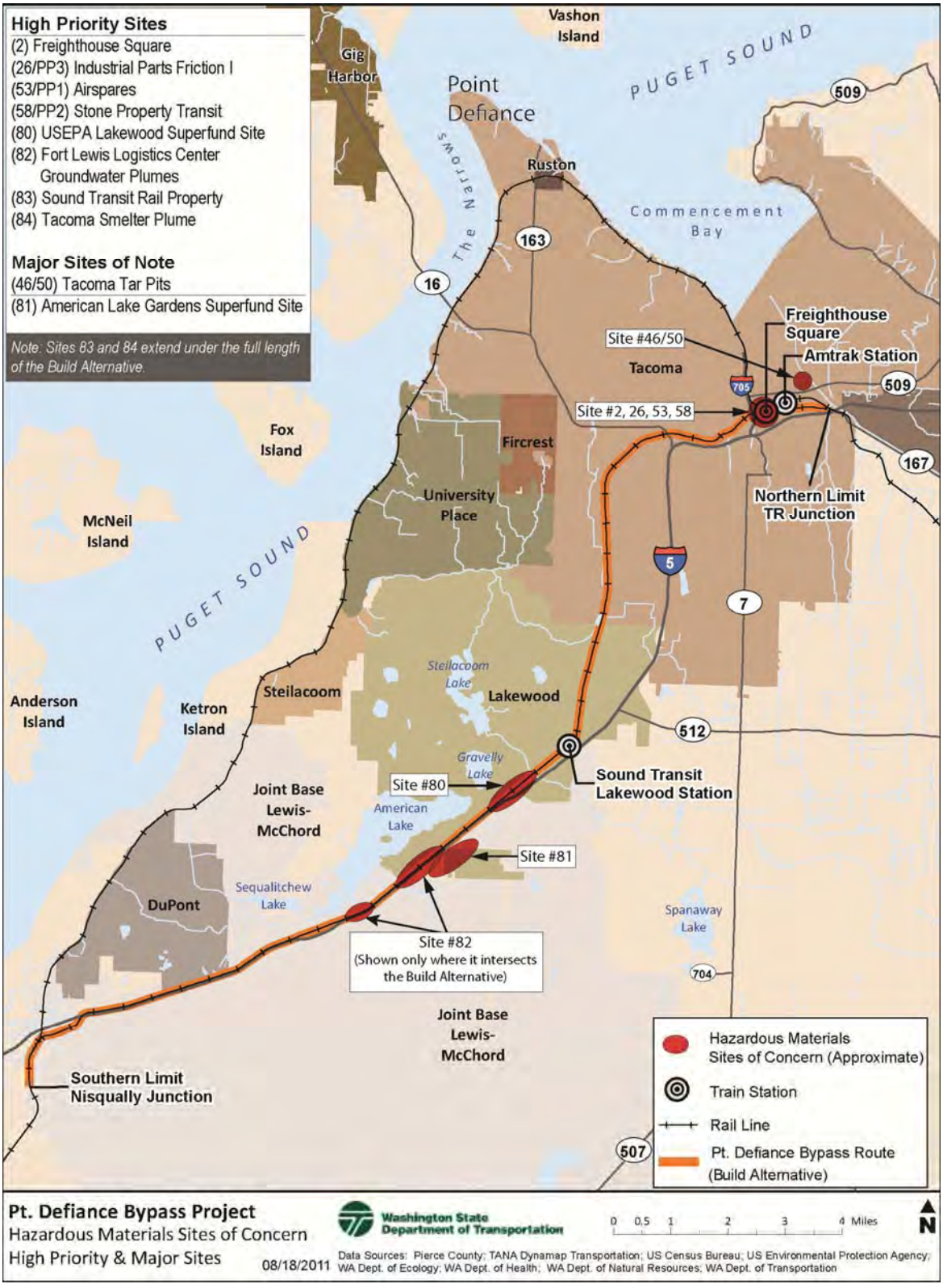


Figure 8. Hazardous Materials Sites of Concern–High Priority and Major Sites

The Build Alternative would acquire property for parking areas near Freighthouse Square in Tacoma. The property is located in a historically heavy commercial and industrial area with businesses that have handled or generated hazardous materials (Sites #26, 53, and 58 in Table 11). Past and current business operations on or adjacent to the property may have a strong potential to have contaminated these sites. Any acquisition in a historically heavy commercial and industrial area should be considered a high risk with respect to inheriting cleanup liability.

Operational Effects

Amtrak Cascades trains would not be carrying hazardous material in bulk and there would be no increase in freight trains on the Point Defiance Bypass route. The current commodity mix hauled by both BNSF and Tacoma Rail freight trains, which may include hazardous materials, would continue to be transported along the Puget Sound route and Point Defiance Bypass route. Therefore there would be no increase in the freight rail transport of hazardous material through the study area. Additional information regarding operational effects is in Appendix L (page 43).

4.8.4 Minimization Measures – Hazardous Materials

Although the Build Alternative would not have a significant effect on hazardous materials requiring mitigation, it would employ standard measures that help avoid, control, and manage potential effects from hazardous materials during construction, including:

- Performing site-specific hazardous material investigations where and when necessary.
- Preparing and implementing a project-specific hazardous material management plans.
- Preparing and implementing a CSWPPP.
- Preparing and implementing a TESC Plan, including dust control measures as described in Section 4.1.4 Air Quality.
- Preparing and implementing an SPCCP.
- Coordinating with Ecology during acquisition and construction for work completed within the environmental restrictive covenant at Freighthouse Square.

4.9 Visual Quality

4.9.1 Study Area and Methodology – Visual Quality

The study area includes the area within approximately one-half mile from the tracks for both alternatives. Specific viewpoints for an assessment of effects are generally between 20 and 100 feet from the tracks of the Point Defiance Bypass route. The station relocation at Freighthouse Square is also included within the study area. The process for evaluating visual effects included first identifying the locations where viewers would likely experience the most visible change. This first step identified 12 key viewpoints that were selected because of their key location within the study area, or they represented an area of potential effects, and/or represented a land cover type (e.g. commercial or residential area).Additional information on selection of key viewpoints is described in Appendix M (page 10). Photographs were taken from the 12 key viewpoints (Table 12 and Figure 10), and the likely changes to the scene were described for each alternative. The changes to views from the key viewpoints are intended to represent the types of changes that could potentially be experienced for each alternative. Each viewpoint was given a numerical evaluation of visual quality based on a methodology from the Federal Highway Administration *Visual Impact Assessment for Highway Projects* (FHWA 1981). This methodology is intended to reduce the subjectivity of visual analysis.

Table 12. Key Viewpoints in the Study Area

View	Key Viewpoint
From the Point Defiance Bypass route Railroad Tracks	P1 – Freighthouse Square
	P2 – Southgate Elementary School
	P3 – Nyanza Single-Family Residential Neighborhood
	P4 – Gravelly Lake Townhomes
	P5 – Union Avenue Southwest Mixed Residential Neighborhood
	P6 – DuPont Multifamily Residential
From Road Crossings adjacent to the Point Defiance Bypass route	R1 – South 74th Street (City of Tacoma)
	R2 – 100th Street Southwest (City of Lakewood)
	R3 – 108th Street Southwest (City of Lakewood)
	R4 – North Thorne Lane Southwest (City of Lakewood)
	R5 – Berkeley Street Southwest (City of Lakewood)
	R6 – Barksdale Avenue (aka DuPont-Steilacoom Road, City of DuPont)

4.9.2 Affected Environment – Visual Quality

The landscape setting in the study area includes urban and industrial areas, suburban residential neighborhoods, parks and schools, undeveloped areas and the region's largest military base. The study area along the Build Alternative is a railroad corridor (Point Defiance Bypass route) that is typically unvegetated and includes tracks supported by ties and a gravel base and edged with a chain link fence. Additional information regarding affected environment is in Appendix M (page 15).

4.9.3 Environmental Consequences – Visual Quality

4.9.3.1 No Build Alternative – Visual Quality

Minor maintenance and repair activities, as well as, existing rail operations on the existing corridor would not affect the visual quality in the study area under the No Build Alternative. Existing conditions and visual quality would persist under the No Build Alternative.

4.9.3.2 Build Alternative – Visual Quality

Construction Effects

Construction would be relatively short in duration and would not affect any single location along the tracks for a long period of time; therefore, effects to visual quality would be minor from construction of the Build Alternative. Additional information regarding construction effects is in Appendix M (page 41).

Operational Effects

Changes to the rails, crossings, and similar elements would be inconspicuous, and in most locations the existing and proposed views would be similar; thus, physical effects to scenery would be minor. Operational changes would likely have the most visual effect along the corridor. Although trains are present only for a short time, they are quite large, and can be a prominent element in a view (Figure 9). Train tracks make up a fairly small part of the overall view, even when viewed from close up. The addition of passenger trains under the Build Alternative would decrease privacy for occupants of buildings adjacent to the rail line for a short period of time.

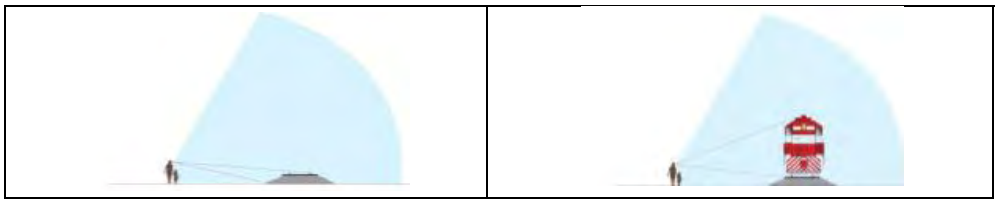


Figure 9. Visual View of Tracks vs. Train

Changes to the Freighthouse Square building and platform to accommodate use by Amtrak would be minor. The massing, detail, and character of the building would be nearly indistinguishable from current conditions. The parking at Freighthouse Square would also be compatible with surrounding land uses and existing visual conditions.

The current passenger train route (Puget Sound route) offers a scenic ride for passengers along the shoreline of Puget Sound. Views from the passenger train along the Point Defiance Bypass Route would have a different character, with more views of developed landscapes, I-5, and urban commercial neighborhoods. Overall, the visual quality of the traveler experience aboard the passenger railroad system would be lower through the Point Defiance Bypass route, when compared to the Puget Sound route. Additional information regarding operational effects is in Appendix M (page 41).

4.9.4 Minimization Measures – Visual Quality

Although the Build Alternative would not have a significant effect on visual quality requiring mitigation, effects associated with construction activities would be reduced by the following minimization measures:

- Maintain existing vegetation at the edge of the railroad right-of-way to screen the rail line at locations determined during final design.
- Enhance vegetative buffers and screening where the rail line is adjacent to residential and institutional properties at locations determined during final design.

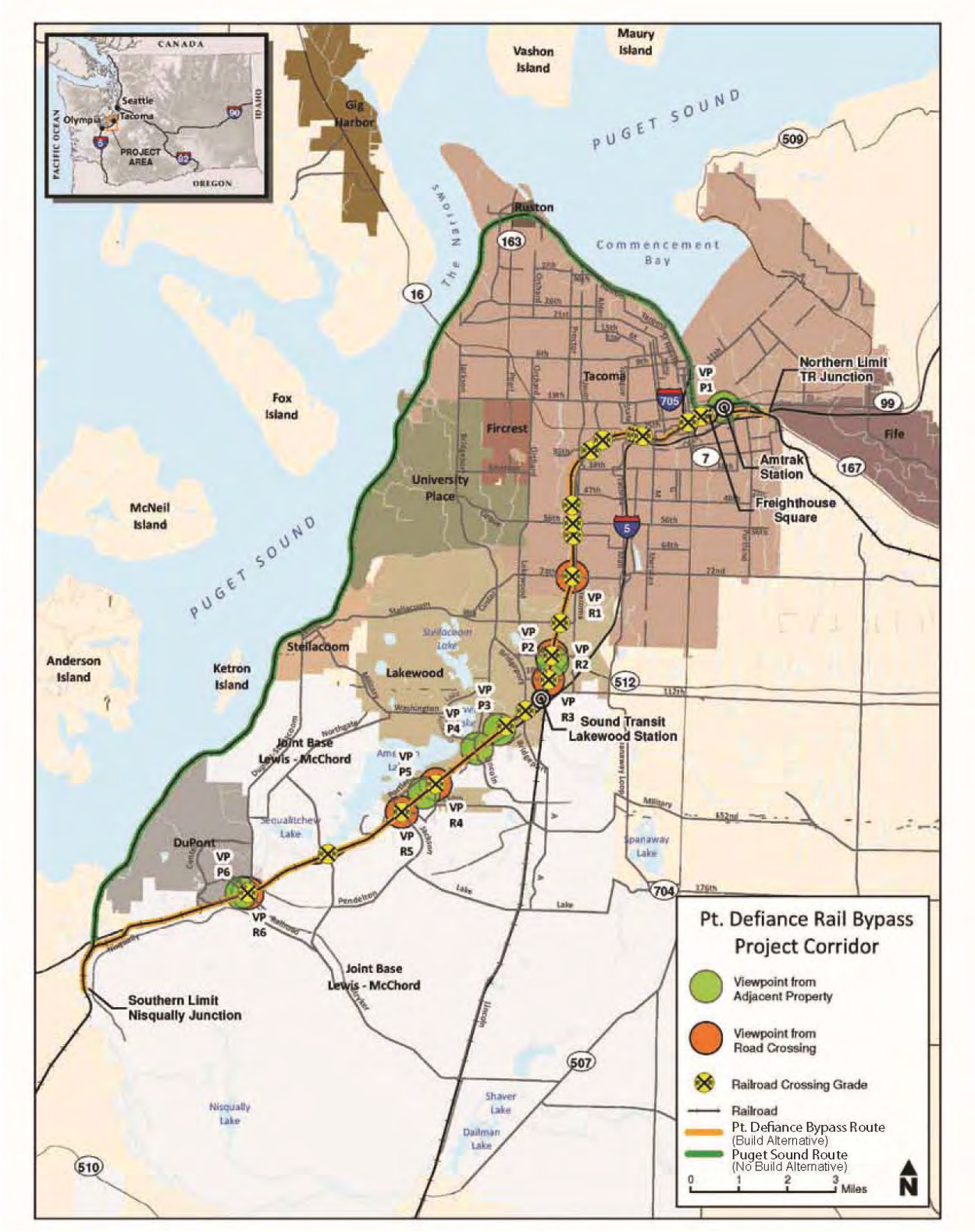


Figure 10. Key Viewpoints from Adjacent Properties in the Project Area

4.10 Cultural Resources

4.10.1 Study Area and Methodology – Cultural Resources

The study area for cultural resources is the Area of Potential Effect (APE) extends 75 feet from the centerline of the rail line from Freighthouse Square in Tacoma south to the connection with the BNSF main line near Nisqually. The Puget Sound route was not included in the study area because no changes that would potentially affect historic properties were planned as part of the No Build Alternative. Historical records were reviewed and a pedestrian and shovel probe survey were conducted within the APE from 66th Street in Lakewood south to the connection with the BNSF main line. In addition, an architectural resources survey was completed for the APE to identify structures 50 years old or older that may be eligible for listing in the NRHP. Pursuant to the NHPA (36 CFR § 800.2(a)), FRA delegated authorization to WSDOT to consult with DAHP on behalf of FRA (Appendix S). A no adverse effect determination letter was submitted to DAHP in July 2012 (Appendix S).

4.10.2 Affected Environment – Cultural Resources

Cultural materials were identified within the APE but were disturbed and not eligible for listing in the NRHP. Nine properties 50 years or older were identified within the APE and two have been determined eligible for listing in the NRHP:

- The Northern Pacific Railway[19] has been determined eligible for listing in the NRHP by DAHP under NRHP Criterion A because of the rail line's profound influence on economic and residential development in the Pacific Northwest and under Criterion B for its associations with E. S. "Skookum" Smith and Smith's instrumental role in the completion of this section of rail line. The alignment in the APE begins north of the Nisqually River, parallels I-5 in the southern portion of the APE, and then parallels South Tacoma Way, in Lakewood. This alignment accommodates three rail spurs that are no longer operational within the APE.
- The 66th Street overcrossing bridge has been determined eligible for listing in the NRHP by DAHP on the local level, under Criteria A and B. The recommended listing under Criterion B is for its associations with E. J. Felt.

4.10.3 Environmental Consequences – Cultural Resources

4.10.3.1 No Build Alternative – Cultural Resources

Minor maintenance and repair activities would not affect cultural or historic resources and existing conditions would persist under the No Build Alternative.

4.10.3.2 Build Alternative – Cultural Resources

Construction Effects

The Build Alternative would have no adverse effect on the existing Northern Pacific Railway as no realignment, destruction, or damage that would change the use or intrinsic character would occur to the railway during construction. The Build Alternative would also have no adverse effect on the 66th Street OC Bridge during construction, as there would be no changes to the character of the bridge's use or physical features, or introduction of visual, atmospheric, or audible elements that diminish the integrity of the bridge's significant features.

[19] *On July 2, 1864, the US Congress passed an act incorporating the Northern Pacific Railway Company for the purpose of constructing a rail line from Lake Superior to Puget Sound. The Point Defiance Bypass route follows a portion of the original alignment that was constructed by the Northern Pacific Railway Company.*

In addition, tribal consultation has not identified any potential adverse construction effects to Native American traditional cultural or ceremonial places or resources within the APE. Tribal consultation is further detailed in Section 5.0, Coordination and Consultation. Federally-recognized tribes and SHPO were consulted, as required by Section 106 of the National Historic Preservation Act. The SHPO concurred with the determination of no adverse effect on cultural and historic resources (see Appendix S).

Operational Effects

The operation of the Build Alternative would have no adverse effect on the existing Northern Pacific Railway as no realignment, destruction, or damage would occur to the railway change the use or intrinsic character. The Build Alternative would also have no adverse effect on the 66th Street OC Bridge during operation, as there would be no changes to the character of the bridge's use or physical features, or introduction of visual, atmospheric, or audible elements that diminish the integrity of the bridge's significant features. The Project would continue to use the 66th Street OC Bridge for rail traffic over 66th Street Southwest. In addition, tribal consultation has not identified any potential adverse operation effects to Native American traditional cultural or ceremonial places or resources within the APE. Tribal consultation is further detailed in Section 5.0, Coordination and Consultation. Federally-recognized tribes and SHPO were consulted, as required by Section 106 of the National Historic Preservation Act. The SHPO concurred with the determination of no adverse effect on cultural and historic resources (Appendix S).

4.10.4 Minimization Measures – Cultural Resources

Although the Build Alternative would not have a significant effect on cultural resources an inadvertent discovery plan would be developed using the WSDOT template and approved by DAHP prior to construction. If during construction, unanticipated cultural deposits, artifacts, or human remains are encountered, work in the vicinity would be halted and local law enforcement officials and DAHP staff contacted immediately.

4.11 Section 4(f) Resources

4.11.1 Study Area and Methodology – Section 4(f) Resources

The study area for Section 4(f) resources correlates to study areas noted in Section 4.10.1 Cultural Resources and Section 4.13.1 Land Use. The study area for cultural resources is the APE that extends 75 feet from the centerline of the rail line from Freighthouse Square in Tacoma south to the connection with the BNSF main line near Nisqually. The study area for land use includes the existing railroad right-of-way along the Point Defiance Bypass route and land uses within 500 feet of each side of the route, including the station relocation at Freighthouse Square.

Projects using federal funds or requiring a permit or license from the USDOT must meet the requirements of Section 4(f) of the USDOT Act of 1966 (49 USC 303). Section 4(f) protects public parks, recreation lands, wildlife and waterfowl refuges, and historic sites from being "used" in transportation projects carried out or funded by modal administrations of the U.S. Department of Transportation, including the FRA. Because no acquisition of parks, recreation areas, wildlife and waterfowl sites is proposed as a part of the Project, Section 4(f) provisions do not apply to these resources.

Potential historical sites that may meet the requirements of Section 4(f) were evaluated by reviewing existing documentation, including a literature search and field investigation that was performed as part of the cultural resources survey. Cultural resources (historic sites) are considered Section 4(f) resources and thus the cultural resources surveys that were conducted to identify and evaluate NRHP eligible resources

also identified Section 4(f) resources. Effects of the project were determined by comparing design information with data on the existing Section 4(f) resources present in the study area.

4.11.2 Affected Environment – Section 4(f) Resources

As described in Section 4.10.2 Cultural Resources, two resources have been determined eligible for listing in the NRHP:

- The Northern Pacific Railway; and,
- The 66th Street overcrossing bridge.

These two resources would potentially qualify as Section 4(f) resources.

4.11.3 Environmental Consequences – Section 4(f) Resources

4.11.3.1 No Build Alternative – Section 4(f) Resources

Minor maintenance and repair activities would not affect cultural or historic resources and existing conditions would persist under the No Build Alternative.

4.11.3.2 Build Alternative – Section 4(f) Resources

Construction Impacts

As described in Section 4.10.3.2 Cultural Resources, the Build Alternative would have no effect on the existing Northern Pacific Railway as no realignment, destruction, or damage that would change the use or intrinsic character would occur to the railway during construction. The Build Alternative would also have no effect on the 66th Street OC Bridge during construction, as there would be no changes to the character of the bridge's use or physical features, or introduction of visual, atmospheric, or audible elements that diminish the integrity of the bridge's significant features.

Operational Impacts

As described in Section 4.10.3.2 Cultural Resources, the operation of the Build Alternative would have no effect on the existing Northern Pacific Railway as no realignment, destruction, or damage would occur to the railway that would change the use or intrinsic character. The Build Alternative would also have no effect on the 66th Street OC Bridge during operation, as there would be no changes to the character of the bridge's use or physical features, or introduction of visual, atmospheric, or audible elements that diminish the integrity of the bridge's significant features. The Project would continue to use the 66th Street OC Bridge for rail traffic over 66th Street Southwest.

4.11.4 Minimization Measures – Section 4(f) Resources

As no use of Section (4)f resources would occur no minimization measures are required.

4.12 Socioeconomics and Environmental Justice

4.12.1 Study Area and Methodology – Socioeconomics and Environmental Justice

The study area for socioeconomics includes a half mile on either side of the Point Defiance Bypass route. The environmental justice (EJ) study area includes a half mile on either side of the Puget Sound and Point Defiance Bypass routes, and included whole census block or neighborhood boundaries within the

analysis. The study area also includes the station relocation at Freighthouse Square. A half mile on either side of the Puget Sound and Point Defiance Bypass route centerlines was defined, because this area would contain the direct and indirect effects that could be attributed to the Build and No-Build conditions. The Puget Sound route is included in the EJ study area for consideration of any effects on EJ populations from the No Build Alternative, which would include the continued use of the existing Puget Sound route for Amtrak service.

*A **low-income person** is defined as an individual whose household income falls below the federal poverty guidelines, as defined by the U.S. Department of Health and Human Services. For 2011, the federal poverty guideline for a household of four was $22,350.*
*A **minority** is an individual who identifies themselves as Black; Hispanic; Asian American; or American Indian/Alaskan Native.*

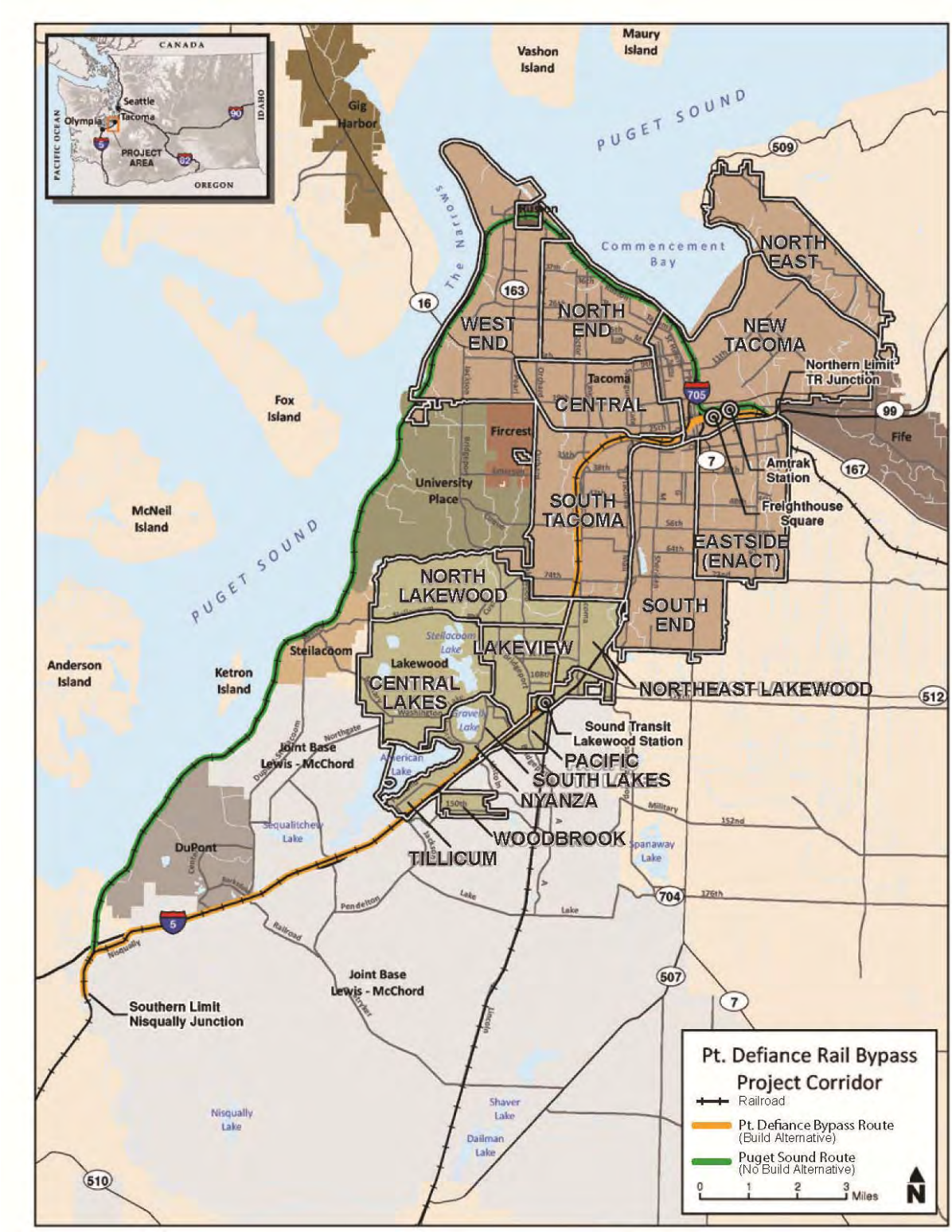
Census data were gathered for all of Pierce County and evaluated for representation of minority and low-income populations. Literature searches, field visits were also gathered to determine community demographics related to elderly people, people with disabilities, Limited English Proficiency, low income, and minority populations. Within the defined study area, demographic and community characteristics, including connectivity and cohesion were evaluated and EJ communities were identified. The EJ analysis was conducted in conformity with Executive Order 12898 and the US Department of Transportation Updated Environmental Justice Order 5610.2(a), which set forth a policy to consider the principles of environmental justice in agency programs, policies and activities. In addition, as required by Executive Order 12898, FRA and WSDOT are actively pursuing public involvement and outreach efforts, including providing information and opportunities for input from LEP populations, with materials translated into Spanish, Korean, Vietnamese and Russian. EJ populations within the project corridor were contacted as part of the larger information distribution efforts. A number of outreach events occurred within EJ population centers, including Lakewood's Tillicum Community Center and South Tacoma's South Park Community Center. Public involvement is further discussed in Section 5.0, Coordination and Consultation.

4.12.2 Affected Environment – Socioeconomics and Environmental Justice

Socioeconomics

Community Characteristics. The community characteristics in the study area vary widely as the existing and proposed rail corridors traverse industrial, commercial, and residential areas.

Community Connectivity and Cohesion. In general, connectivity through neighborhoods in the study area is good, although there are some neighborhoods (Tillicum, Woodbrook, and Nyanza neighborhoods) that have reported limited connections to adjacent areas. The limited connection, and thus some isolation is due to transportation features such as I-5 and the rail corridor, military installations (i.e. JBLM) as well as natural geographic features such as Gravelly Lake and American Lake (Figure 11). Connectivity is also affected by traffic congestion between the neighborhood and adjacent areas within the Point Defiance Bypass route. This is primarily related to congestion at intersections adjacent to I-5, especially during peak travel times, affecting the general public and emergency services such as fire, police, and ambulance services. Permitted access points along the Point Defiance Bypass route occur at at-grade crossings, where there can be some public safety risk to pedestrians or unsafe traffic movements. Currently, there are some locations where pedestrians cross the tracks illegally, and not all at-grade rail crossings are improved with crossing areas. There have been two accidents in the Point Defiance Bypass route in the last 12 years at intersections when automobiles were driven through the closed intersection when a train was passing.



Source: Tacoma 2010 and Lakewood 2011

Figure 11. Tacoma and Lakewood Neighborhoods

The neighborhoods within the study area currently experience noise from train mounted horns on Tacoma Rail freight trains and wayside horns at intersections from Freighthouse Square to Bridgeport Way Southwest.[20]

Economics. The unemployment rate in Pierce County is 9.6 percent compared to 9.0 percent for Washington, and 9.3 percent for the US (ESD-WA 2011). Economic trends show that Pierce County is expected to continue to grow in population and economic activity into the future at modest rates. Government, including JBLM, is a major employer in Pierce County, and the planned increase in personnel stationed at JBLM would likely continue the growth trend.

According to the Pierce County Assessor-Treasurer, property values have declined county-wide with an average value decline from 2010 to 2011 of about 7 percent for residential and commercial properties (Pierce County 2011). A review of real estate market information indicates there is still a depressed real estate market with foreclosures and short sales dragging prices down, along with poor consumer confidence (Realty Times 2011, News Tribune 2011). However, there are indications that property values and sales could trend upward in 2012. Generally older stock houses (pre-1950s) without a view of Puget Sound were priced lowest, with newer houses, those with views of the Puget Sound, and historic homes being priced higher.

Public Services and Facilities. As shown in Figure 15, within the study area, there are 26 public and private schools in three school districts, several medical facilities, two hospitals, 11 recreational facilities, and two facilities for disadvantaged people in the study area. There are 52 religious facilities and four cemeteries. Pierce Transit and Sound Transit provide public transportation services. Public services and utilities in the study area are further described in Section 4.14, Public Services, Utilities, and Safety and the *Public Services and Utilities Discipline Report* (Appendix P, page 15).

Environmental Justice

Census tract data from the 2010 Census was used to assess minority and income characteristics in the study area (for the Puget Sound route and Point Defiance Bypass route), which were then compared to statistics for Pierce County as a whole. This comparison of data allows for the identification of areas that may have a high concentration of minority or low-income residents, the first step in an Environmental Justice evaluation. A summary of this analysis is presented below; the *Socioeconomic and Environmental Justice Discipline Report* (Appendix N, page 21) provides additional information.

Minority. The population in the Point Defiance Bypass portion of the study area reflects a greater diversity of race, ethnicity, and income than either the existing Puget Sound route or Pierce County (Table 13). High percentages of minority populations relative to Pierce County are noted on Figure 12 as areas with greater than 60 percent minority populations in the Lakeview, South End, Eastside neighborhoods. High percentages of low-income populations (greater than 40 percent) relative to Pierce County include portions of the Tillicum/Woodbrook neighborhoods and downtown Tacoma (Figure 13).

Limited English Proficiency. Proficiency in English was reviewed for the study areas to gauge LEP populations. The data indicates that the LEP populations were not concentrated in specific areas within the study areas. There are more LEP populations in the Build Alternative study area. The populations of people with disabilities and the elderly in the study areas are similar to county-wide statistics.

[20] *Wayside horns have been installed at intersections from Freighthouse Square to Bridgeport Way Southwest, such that noisier train-mounted horns need no longer be sounded for this section of the Point Defiance Bypass route. Sounder train noise has been addressed during environmental review and construction. Sound Transit conducted a noise analysis in conformance with FTA's methodology and requirements and no noise impacts requiring mitigation were identified. (USDOT/ST 2002).*

Table 13. Population and Race/Ethnicity Statistics[21]

	Point Defiance Bypass Route	Point Defiance Bypass Route (%)	Puget Sound Route	Puget Sound Route (%)	Pierce County	Pierce County (%)
White	66,824	59.6	98,376	74.7	590,040	74.2
Black or African American	14,567	13.0	10,079	8.1	53,998	6.8
American Indian and Alaska Native	2,268	2.2	1,971	1.7	10,879	1.4
Asian	8,426	7.2	7,633	5.8	47,501	6.0
Native Hawaiian and other Pacific Islander	2,445	2.2	1,053	0.9	10,588	1.3
Two or More Races	10,274	8.8	8,510	6.5	54,347	6.8
Some Other Race	7,457	6.9	2,895	2.4	27,872	3.5
Total Hispanic or Latino[22]	17,453	16.2	10,305	7.9	72,849	9.2
Total Population[23]	112,261	100.0	130,517	100.0	795,225	100.0

Low-Income. Table 14 shows persons below the poverty level for the Puget Sound route, the Point Defiance Bypass route, and Pierce County. The data indicates that for persons living below the poverty level, the Puget Sound route study area is similar to Pierce County as a whole. The census tracts comprising the Point Defiance Bypass route have a greater concentration of persons at or below the poverty level when compared to Pierce County. Figure 13 maps the census tracts where the greatest concentrations of persons at or below the poverty level are located. There are several areas in the Point Defiance Bypass study area with higher percentages of low-income households south of the Sound Transit Lakewood Station. The Tillicum and Woodbrook neighborhood areas also have a higher percentage and a greater density of low-income households, on either side of I-5. The Puget Sound route has a low percentage of low-income households and no communities that would be considered EJ communities.

Table 14. Poverty Status[24]

Area	Puget Sound Route	Point Defiance Bypass Route	Pierce County
Population for Whom Poverty Status is Determined	130,039	110,408	748,122
Living Below Poverty Level	17,600	21,883	86,468
Living Below Poverty Level (%)	13.5%	19.8%	12%

Additional information regarding affected environment is in Appendix N (page 21).

[21] *2010 100% Data Tables (Block Group; P7)*
[22] *Total population of Hispanic or Latino for which races were tallied*
[23] *Total populations, not Hispanic or Latino for which races were tallied*
[24] *2005-2009 American Community Survey 5-Year Estimates (Census Tract)*

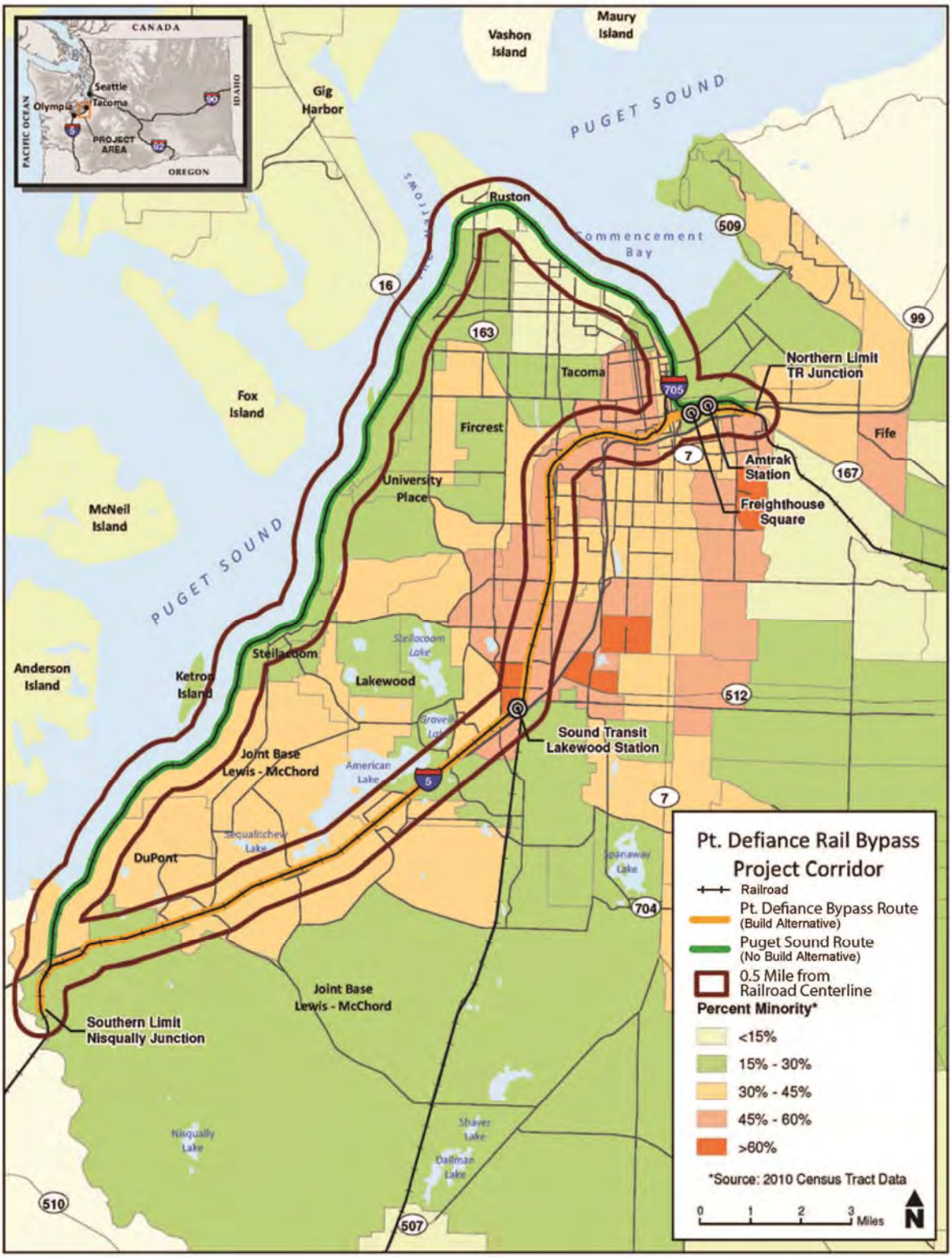


Figure 12. Minority Populations by Census Block

Figure 13. Poverty by Census Block

4.12.3 Environmental Consequences – Socioeconomics and Environmental Justice

4.12.3.1 No Build Alternative – Socioeconomics and Environmental Justice

Minor maintenance and repair activities along the Puget Sound route would not affect socioeconomic and EJ conditions. Existing socioeconomic and EJ conditions would persist under the No Build Alternative.

4.12.3.2 Build Alternative – Socioeconomics and Environmental Justice

Construction Effects

Socioeconomics

The Build Alternative would have effects to neighborhoods and businesses adjacent to the railroad corridor during construction. Effects would include localized increases in noise and air emissions from construction activities. Localized traffic circulation and accessibility to neighborhoods and businesses would be affected by proposed improvements at at-grade crossings. The Build Alternative would affect access to some public services adjacent to, or accessed via at-grade crossings, during construction. Access for emergency response services also would be affected, but would also be protected during construction. These effects are expected to be minor and would only occur temporarily for the duration of construction activities.

There is no anticipated effect to local businesses due to disruption during construction. Most of the construction occurs within the railroad right-of-way, away from intersections. No additional rail right-of-way would be required to construct the project, although some additional parking lots would be acquired in Tacoma, to provide additional parking for the Project in the vicinity of Freighthouse Square. FRA and WSDOT would develop a traffic control plan that minimizes effects during peak travel times, and maintain access to businesses. Further, WSDOT would coordinate with Tacoma Rail to assure continued freight access during construction.

Construction employment expected for the Build Alternative would be small and specialized, so there may be a slight benefit for employment and gross income during construction due to housing, food, and entertainment expenditures by the crew. This benefit would be temporary. There is no anticipated effect to local businesses due to disruption during construction. Most of the construction occurs within the railroad right-of-way, away from intersections.

Environmental Justice

The construction activities associated with the Build Alternative, as described above, would affect low-income and minority populations in the study area. These effects are expected to be temporary and limited to the duration of construction activities. No construction is planned for the Puget Sound route, so no construction related effects would occur in this area. Therefore, no disproportionately high or adverse effect on EJ populations would result from construction of the project and the project meets the requirements of Executive Order 12898 and the USDOT Environmental Justice Order, as it is supported by Title VI of the Civil Rights Act.

Additional information regarding construction effects is in Appendix N (page 35).

Operational Effects

Socioeconomics

Community Characteristics. The Build Alternative would not cause a direct change in the demographics, land use patterns, neighborhoods, or other related community characteristics. The Build Alternative would continue to use the existing railroad right-of-way, which was constructed in 1873 and 1891, and has been in service since. When compared to conditions without the Project (No Build), operation of the Build Alternative would not alter community characteristics.

Community Connectivity and Cohesion. The increased number of trains (14 additional train crossings per day in addition to up to 18 *Sounder* trains) under the Build Alternative would reduce connectivity during train crossings of local roads; however upgrades to the intersections and signaling would overall maintain or improve traffic flow; therefore, improving connectivity compared to the No Build Alternative. Intersection and signal improvements would improve connectivity and safety for pedestrians, bicyclists and vehicles as well as improve traffic flow for some intersections, which is more fully discussed in Section 4.3 (Transportation). The Build Alternative would have minor effects to emergency service vehicles, public access and safety as a result of increased train traffic on track intersecting local roads. Institution of the *Operation Lifesaver* program, as discussed in Section 4.14, Public Services, Utilities, and Safety, would help reduce this effect.

The Tillicum, Woodbrook, and Nyanza neighborhoods would continue to experience some isolation because of the lack of existing non-vehicular pathways and trails. The operation of the Project may increase residents' feelings of isolation in a few neighborhoods during train pass-bys, which would be very short in duration. Upgrades to the intersections and signaling would overall maintain or improve traffic flow; therefore, improving connectivity and safety for pedestrians, bicyclists and vehicles as well as improve traffic flow for some intersections. Therefore, with the Project and the proposed traffic improvements, community connectivity would experience a minor benefit.

While there would be increased train noise levels as Amtrak trains are added to the corridor, the noise from train pass-bys would not be the most significant new source of noise. With the project, there would be wayside horns added from Lakewood to Nisqually, like those installed with the Sound Transit extension of service to Lakewood. Wayside horns have a much lower noise effect than train-mounted horns. Although there would be an increase in noise levels, the noise analysis demonstrates that the noise level effects to sensitive noise receptors would be moderate. There would be a corollary benefit from the use of wayside horns, which would be that freight trains from Lakewood to Tacoma would no longer sound their train mounted horns through intersections equipped with wayside horns, which would reduce this particular source of noise in the communities. There would be no effect in community cohesion due to noise.

Economics. Economic effects would be associated with property values of adjacent residential and business properties. Property values tend to increase in the vicinity of stations and decrease for properties located adjacent to tracks, however the findings on decreased property value are not conclusive (Rudick 2001). The Project is not anticipated to affect property values given that the rail corridor already exists, is used for freight and commuter service, and measures to minimize or eliminate noise and vibration would be implemented by the Project. Operation of the Project would result in a minor benefit to the limited freight operations due to safety improvements at crossings, and the replaced rail infrastructure at the southern end. Tacoma Rail may gain improved access to Tacoma suppliers. No additional freight traffic is anticipated. The use of the corridor by freight is negotiated through multiple operating agreements with the rail owners, Sound Transit, Tacoma Rail, and BNSF. Freight movements are independent of the Sound Transit and Amtrak operations along the Point Defiance Bypass route. There would be no change

to the operation of freight trains on the Point Defiance Bypass route under the Build Alternative. Tacoma Rail and BNSF would continue to operate as many as two trains per day or as few as two trains per week. BNSF would continue to operate intermittent freight trains on the Point Defiance Bypass route to serve military transportation needs at JBLM.

Public Services. No public services would be displaced by the Project and would continue to be available to individuals in the study area. Operational effects would be similar for all the public service sectors, including schools, emergency services, access to medical centers and government offices, and transit. The most common effect is intersection traffic delays due to the addition of the Amtrak service, which could delay public services, including school bus service. Additional information on this effect is presented in Section 4.3 (Transportation), Section 4.14, Public Services, Utilities, and Safety.

Additional information regarding operational effects is in Appendix N (page 35).

Environmental Justice

FRA and WSDOT evaluated the environmental effects of the Project to determine whether the anticipated effects would be experienced differently for Environmental Justice populations than by the community as a whole. Each environmental descriptor considered in this EA was reviewed for potential disproportionate effects on Environmental Justice populations, and following that evaluation, vibration and noise were identified as those areas with the potential to affect Environmental Justice populations. The findings are presented below.

Two sites where potential vibration effects would be above the FTA vibration impact criteria of 80 VdB are also identified as areas with a high percentage of minority/ethnic and low-income populations. Site 3 is located at the south end of Kline Street Southwest and Site 11 is located on the south side of Union Avenue Southwest. These populations would experience minor vibration effects under the Build Alternative. Additional impacts resulting from a 3 VdB or more increase over the existing vibration levels in the corridor shared with Sound Transit *Sounder* service (Lakewood Station to TR Junction) were predicted at Sites 2, 4, 5 and 10. These four sites also exhibit a high percentage of minority/ethnic populations.

Minority/ethnic and low-income populations would also experience moderate project related noise effects at two noise monitoring sites. Moderate noise impacts are predicted at Site 6M and Site 16N. Site 6M is located near the at-grade railway crossing on 108th Street Southwest, just east of the intersection of 108th Street Southwest and Lakewood Drive Southwest in the City of Lakewood. Site 16N is located near the at-grade railway crossing on Bridgeport Way Southwest, just north of the intersection of Bridgeport Way Southwest and Pacific Highway Southwest in the City of Lakewood. Both sites exhibit a high percentage of minority/ethnic and low-income population.

The transfer of passenger rail service from the existing BNSF main line route to the proposed route may decrease noise, and to a lesser extent traffic delays, along the existing BNSF main line route. These effects may result in a negligible benefit to persons living along the Puget Sound Route.

The effects described above would affect low-income and minority/ethnic populations, however the effects would not be appreciably more severe or greater in magnitude than the effect on non-minority or non-low-income populations in the vicinity of the project. Therefore, no disproportionately high or adverse effect on EJ populations would result from the Project and the Project meets the provisions of Executive Order 12898, as it is supported by Title VI of the Civil Rights Act.

Additional information regarding operational effects is in Appendix N (page 35).

4.12.4 Minimization Measures – Socioeconomics and Environmental Justice

Although the Build Alternative would not have a significant effect on socioeconomics and EJ requiring mitigation, effects associated with construction and operational activities would be reduced by minimization measures which are summarized in the topical areas. See project measures for air quality, noise and vibration, transportation, hazardous materials, and public services, utilities, and safety.

4.13 Land Use

4.13.1 Study Area and Methodology – Land Use

The study area includes the existing railroad right-of-way along the Point Defiance Bypass route and land uses within 500 feet of each side of the route, including the station relocation at Freighthouse Square. Land uses were identified in the context of existing and planned land uses and zoning, Shoreline Management Act and Critical Area Ordinance designations, resource lands (agricultural, timber, and mineral), and development trends. Land uses were evaluated by comparing effects of the alternatives on existing land uses, regulations, and trends and determining if the alternatives would result in more than a moderate effect due to incompatibility with adjacent land uses and/or inconsistency with land use plans, and relocation and displacement of a substantial number of housing units or commercial uses. Park and recreation facilities were also identified along the Point Defiance Bypass route.

Section 6(f)(3) of the Land and Water Conservation Fund Act (LWCFA)provides protection for parks that were acquired or developed with LWCFA grants. Because parks and recreation areas often receive LWCFA assistance, Section 6(f) applies to any federal agency action. Because no acquisition of parks, recreation areas, wildlife and waterfowl sites or property is proposed as a part of the Project, Section 6(f) provisions do not apply to the Project. Section 4(f) of the USDOT Act of 1966 (49 USC 303) is discussed in Section 4.11.

4.13.2 Affected Environment – Land Use

The Puget Sound route portion of the study area includes a mix of land uses, including park, residential, forestry, shoreline, wildlife refuges, industrial, and open areas. The Point Defiance Bypass route portion of the study area is an existing railroad corridor, approximately two-thirds of which are located within or adjacent to the incorporated cities of Tacoma, Lakewood, and DuPont. Within this corridor are industrial, commercial, residential (single and multifamily), transportation and utility, vacant, and other land uses such as open space, recreation, and educational (Figure 14). An estimated 25-30 percent of land within the urban-developed portion of the study area is identified for redevelopment according to land use plans. The remainder lies within an unincorporated area of Pierce County, the majority of which is occupied by JBLM and Camp Murray National Guard military complexes. There are no resource lands[25] in the study areas.

[25] *Resource lands include those lands used or have physical characteristics that make them ideal for agricultural, forestry or mineral extraction purposes.*

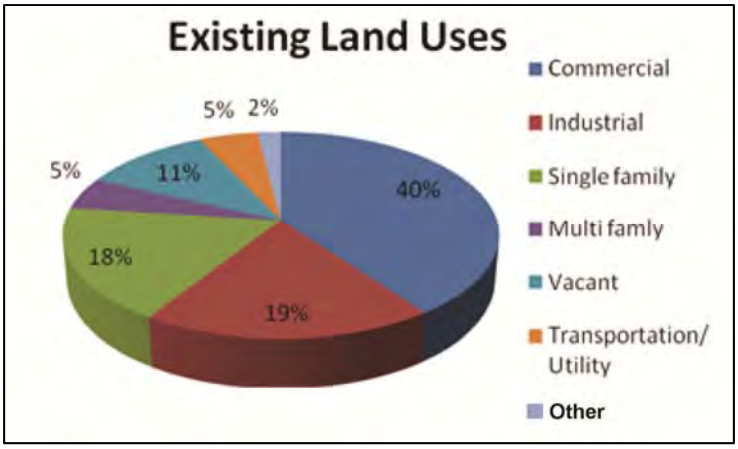


Figure 14. Existing Land Uses –Incorporated Areas along the Point Defiance Bypass Route

Throughout the existing rail corridor, several adjacent land uses occupy portions of the railroad right-of-way with parking lots, outside storage, fences, and two buildings. Some occupied areas have leases with the railroad right-of-way owner. A 2010 inventory identified approximately 50 right-of-way encroachments by commercial or industrial uses. All of these encroachments have been resolved.[26]

There are 21 park and recreational resources within the study area. Additional information regarding affected environment is in Appendix N (page 17).

4.13.3 Environmental Consequences – Land Use

4.13.3.1 No Build Alternative – Land Use

Minor maintenance and upgrades to the Puget Sound track would not affect surrounding land use. Existing conditions and land use would persist under the No Build Alternative along the Point Defiance Bypass Route.

4.13.3.2 Build Alternative – Land Use

Construction Effects

Construction activities associated with the Build Alternative would not displace any existing land uses or acquire additional property aside from potential acquisitions adjacent to Freighthouse Square and for parking in that vicinity. The Project would not affect park or recreation resources (including historic sites, see Section 4.10, Cultural Resources). Additional information regarding construction effects are described in Appendix O (page 67).

Operational Effects

Overall, the Build Alternative is consistent with adopted land use policies. Land use adjacent to the Point Defiance Bypass route would be affected by the increased speeds and more frequent trains traveling through the communities and the potential effect on future development, however the rail corridor would continue to be compatible with surrounding land uses. Effects of the Build Alternative to adjacent land use would be minor. The Project would not affect park or recreation resources (including historic sites,

[26] *Resolution of encroachments occurred as part of ongoing negotiation between ST and property owners, in collaboration with the WSDOT rail program.*

see Section 4.10, Cultural Resources). Additional information regarding operational effects is in Appendix O (page 65).

4.13.4 Minimization Measures – Land Use

No adverse effects to land use would occur as part of the Build Alternative; therefore, no minimization measures are proposed.

4.14 Public Services, Utilities, and Safety

4.14.1 Study Area and Methodology – Public Services, Utilities, and Safety

The study area is a half mile on either side of the Puget Sound route, Point Defiance Bypass route and the station relocation at Freighthouse Square. Multiple sources were used to collect information on the location and routing of public service providers and utilities. These sources include publically available data and mapping, 2010 Census data, and information obtained from local jurisdictions.

4.14.2 Affected Environment – Public Services, Utilities, and Safety

Public services include police, fire, schools, churches, recreational facilities, and medical facilities. Utilities can be provided by public or private entities and include water, sewer, storm drainage, electricity, natural gas, and telecommunications. In the study area corridor for the Build Alternative, there are 26 public and private schools within the study area from the 3 school districts: Tacoma, Clover Park, and Steilacoom Historical. All three school districts provide busing through the study area. There are 5 medical facilities, 2 hospitals (Saint Clare Hospital and Madigan Army Medical Center), 11 recreational facilities, and 2 facilities for disadvantaged people in the study area. Fifty-two religious facilities were identified, as were four cemeteries in the study area. Pierce Transit and Sound Transit provide public transportation services. Police services are provided by the City of Tacoma, City of Lakewood, and City of DuPont. The Puyallup Tribe police provide police services for the tribal properties. Fire services are provided by the City of Tacoma, West Pierce Fire and Rescue, and the City of DuPont. JBLM provides police and fire services on military installations only. The 10 panels represented in Figure 15 show the public facilities in the study area.

Private and public utilities in the study area include water, wastewater, stormwater, telephone, cable, internet, electricity, and gas. Solid waste facilities and services are provided by the City of Tacoma, City of Lakewood, City of DuPont, and JBLM. The facilities and services include solid waste handling, recycling, and yard debris, and household hazardous waste facility.

Over the 5 year period from October 2006 through September 2011, three at-grade crossing collisions have occurred between roadway vehicles and trains on the Puget Sound route and one on the Point Defiance Bypass route (http://safetydata.fra.dot.gov/OfficeofSafety/default.aspx). Additional information regarding affected environment is in Appendix P (page 15).

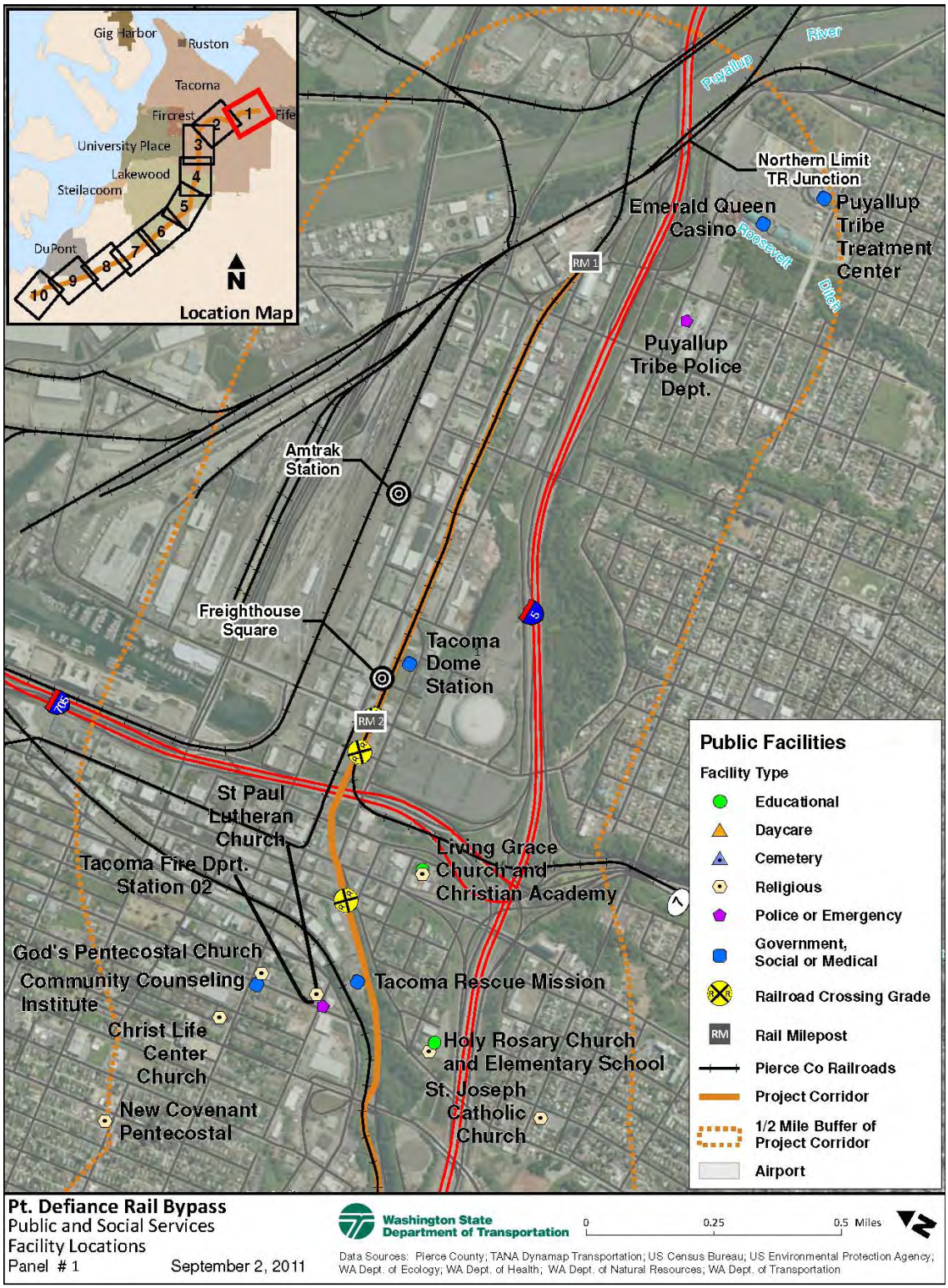
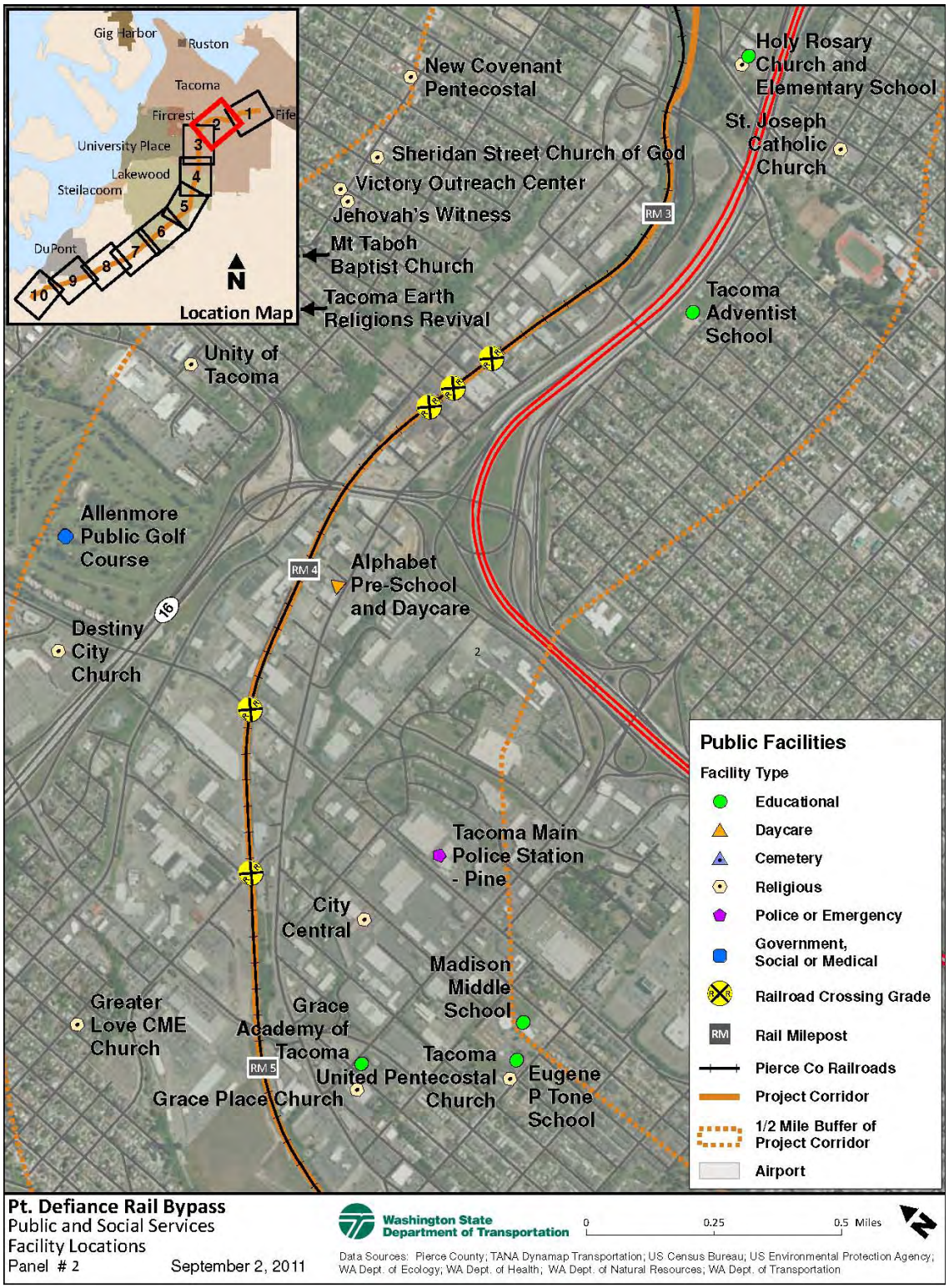


Figure 15. Public Facilities in the Study Area (Panels 1-10)


Gig Harbor
Ruston
Tacoma
Fircrest
Fife
University Place
Lakewood
Steilacoom
DuPont
Location Map
New Covenant Pentecostal
Holy Rosary Church and Elementary School
St. Joseph Catholic Church
Sheridan Street Church of God
Victory Outreach Center
Jehovah's Witness
Mt Taboh Baptist Church
Tacoma Earth Religions Revival
Tacoma Adventist School
Unity of Tacoma
Allenmore Public Golf Course
Alphabet Pre-School and Daycare
Destiny City Church
Tacoma Main Police Station - Pine
City Central
Madison Middle School
Greater Love CME Church
Grace Academy of Tacoma
Tacoma United Pentecostal Church
Eugene P Tone School
Grace Place Church
RM 3
RM 4
RM 5
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 2
September 2, 2011
Washington State Department of Transportation
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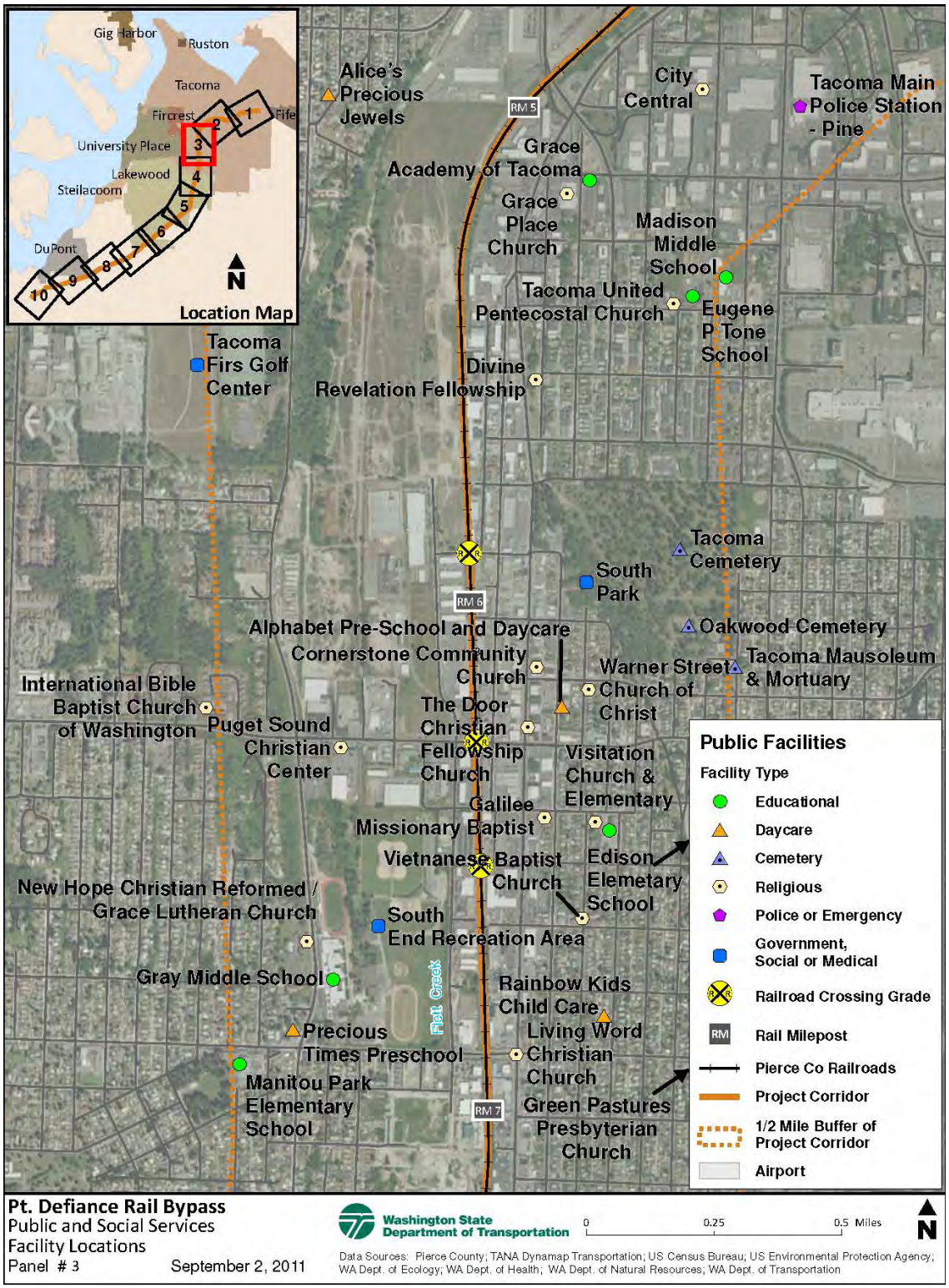
0.25
0.5 Miles
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation


Gig Harbor
Ruston
Tacoma
Fircrest
Fife
University Place
Lakewood
Steilacoom
DuPont
1
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7
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10
N
Location Map
Alice's Precious Jewels
RM 5
City Central
Tacoma Main Police Station - Pine
Grace Academy of Tacoma
Grace Place Church
Madison Middle School
Tacoma United Pentecostal Church
Eugene P Tone School
Tacoma Firs Golf Center
Divine Revelation Fellowship
Tacoma Cemetery
South Park
RM 6
Alphabet Pre-School and Daycare
Oakwood Cemetery
Cornerstone Community Church
Warner Street Church of Christ
Tacoma Mausoleum & Mortuary
International Bible Baptist Church of Washington
Puget Sound Christian Center
The Door Christian Fellowship Church
Visitation Church & Elementary
Galilee Missionary Baptist
Vietnanese Baptist Church
Edison Elemetary School
New Hope Christian Reformed / Grace Lutheran Church
South End Recreation Area
Gray Middle School
Rainbow Kids Child Care
Flett Creek
Precious Times Preschool
Living Word Christian Church
Manitou Park Elementary School
RM 7
Green Pastures Presbyterian Church
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
RM
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 3
September 2, 2011
Washington State Department of Transportation
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0.25
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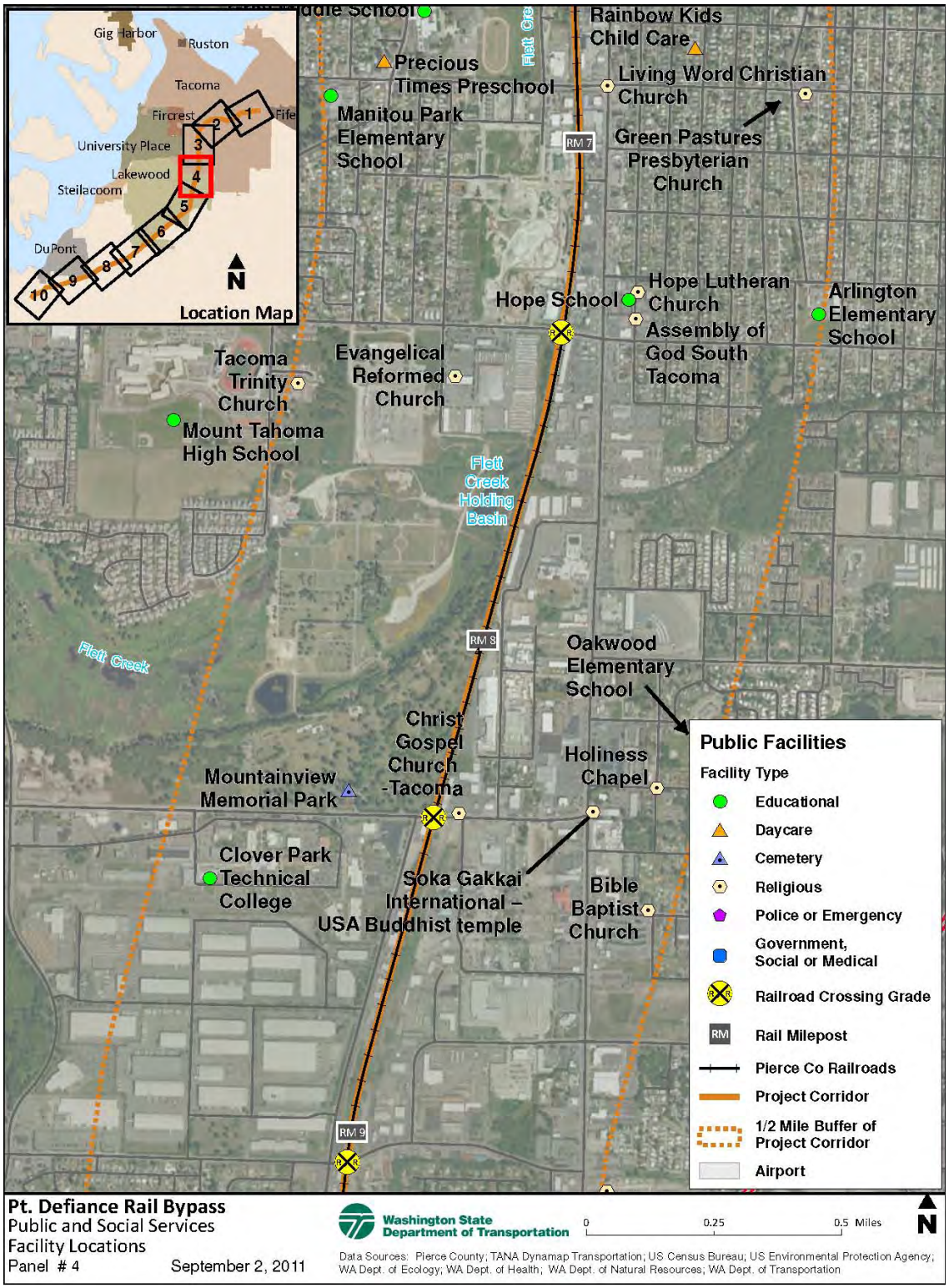
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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Location Map
Rainbow Kids Child Care
Precious Times Preschool
Living Word Christian Church
Manitou Park Elementary School
Green Pastures Presbyterian Church
RM 7
Hope School
Hope Lutheran Church
Assembly of God South Tacoma
Arlington Elementary School
Tacoma Trinity Church
Evangelical Reformed Church
Mount Tahoma High School
Flett Creek Holding Basin
Flett Creek
RM 8
Oakwood Elementary School
Christ Gospel Church -Tacoma
Holiness Chapel
Mountainview Memorial Park
Clover Park Technical College
Soka Gakkai International – USA Buddhist temple
Bible Baptist Church
RM 9
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 4
September 2, 2011
Washington State Department of Transportation
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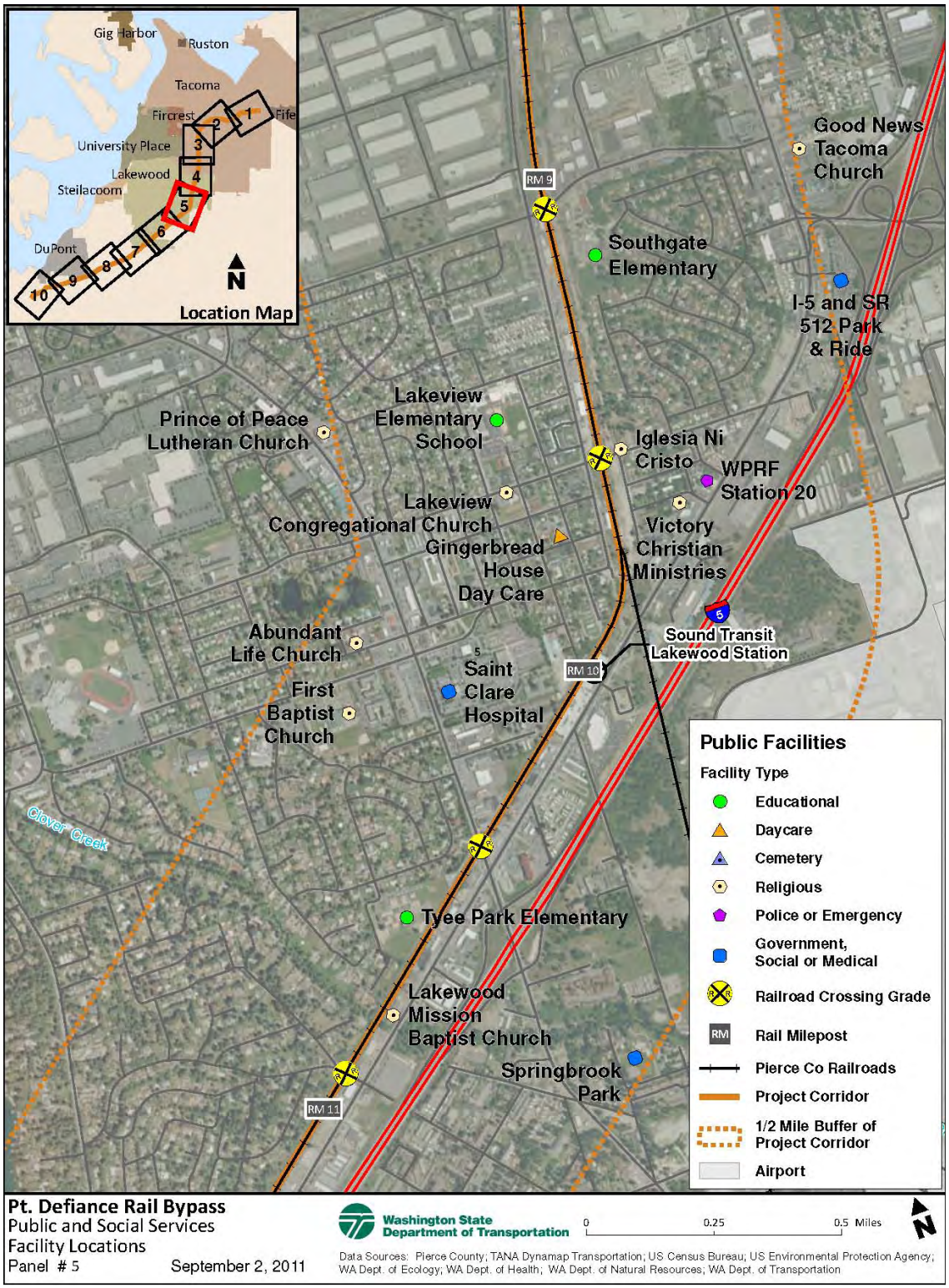
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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Location Map
Good News Tacoma Church
RM 9
Southgate Elementary
I-5 and SR 512 Park & Ride
Prince of Peace Lutheran Church
Lakeview Elementary School
Iglesia Ni Cristo
WPRF Station 20
Lakeview Congregational Church
Gingerbread House Day Care
Victory Christian Ministries
Abundant Life Church
Sound Transit Lakewood Station
RM 10
Saint Clare Hospital
First Baptist Church
Clover Creek
Tyee Park Elementary
Lakewood Mission Baptist Church
Springbrook Park
RM 11
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 5
September 2, 2011
Washington State Department of Transportation
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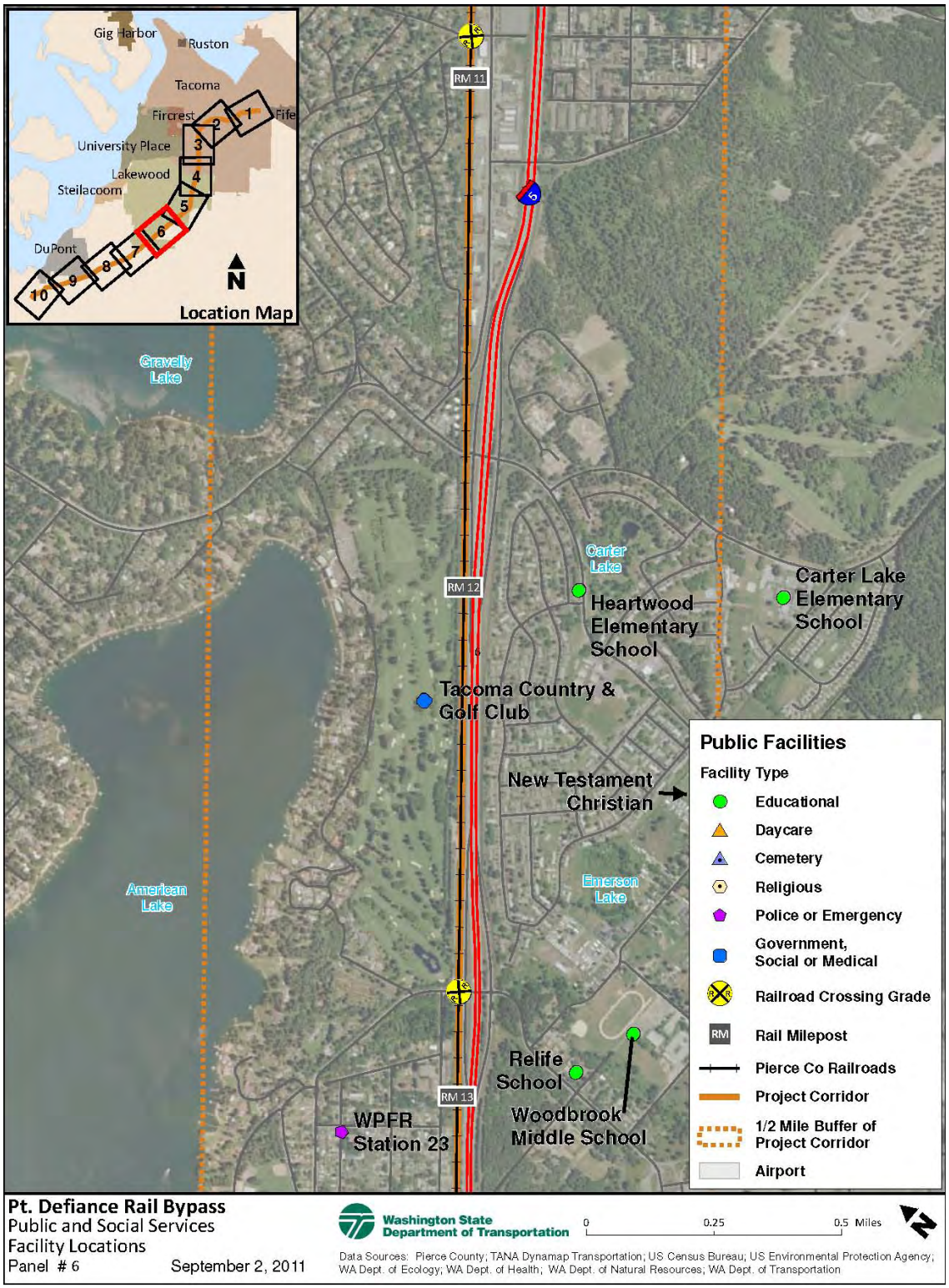
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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Location Map
Gravelly Lake
RM 11
RM 12
RM 13
Carter Lake
Heartwood Elementary School
Carter Lake Elementary School
Tacoma Country & Golf Club
New Testament Christian
American Lake
Emerson Lake
Relife School
Woodbrook Middle School
WPFR Station 23
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 6
September 2, 2011
Washington State Department of Transportation
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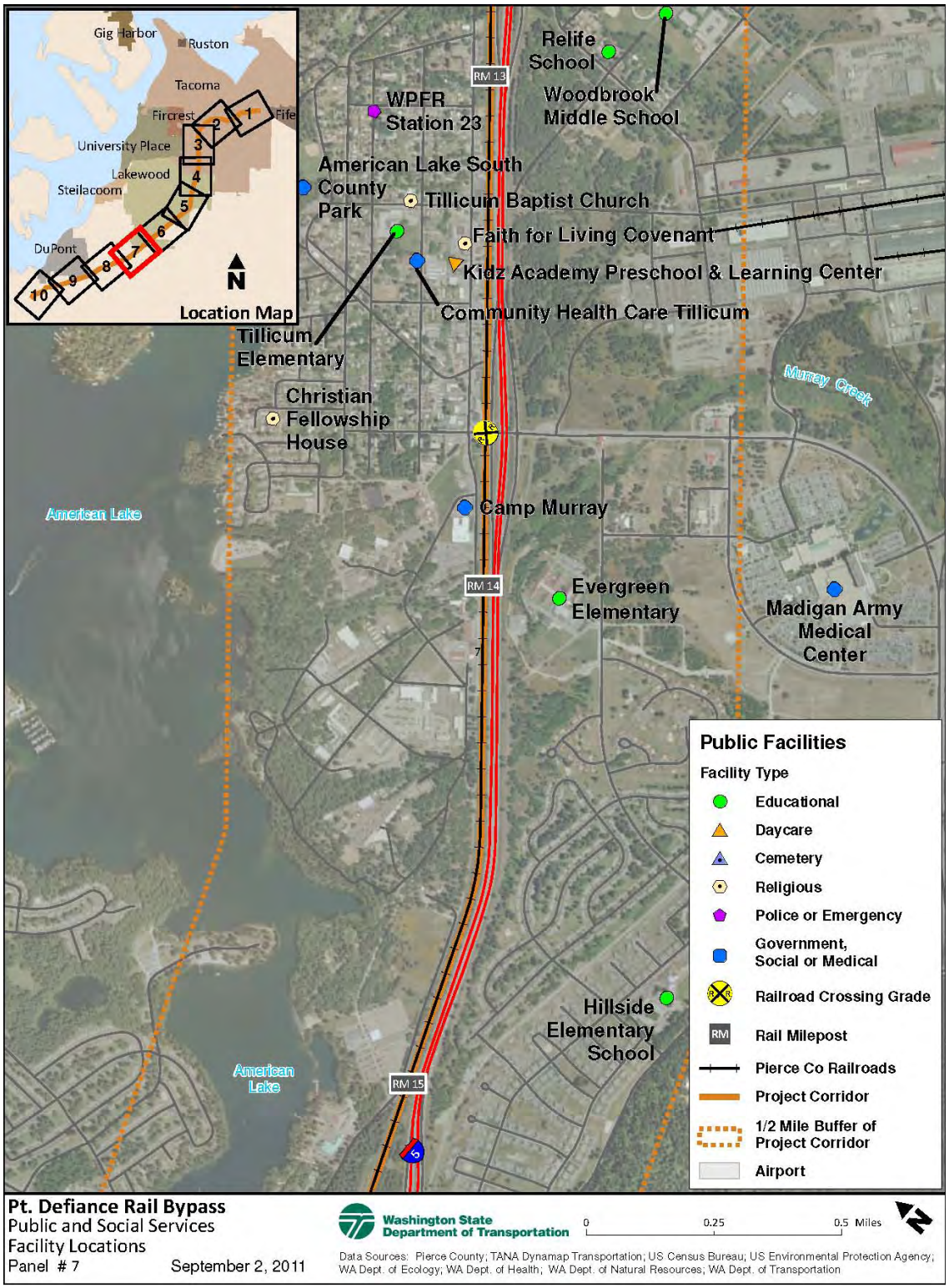
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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DuPont
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Location Map
RM 13
Relife School
Woodbrook Middle School
WPFR Station 23
American Lake South County Park
Tillicum Baptist Church
Faith for Living Covenant
Kidz Academy Preschool & Learning Center
Community Health Care Tillicum
Tillicum Elementary
Christian Fellowship House
Murray Creek
American Lake
Camp Murray
RM 14
Evergreen Elementary
Madigan Army Medical Center
Hillside Elementary School
American Lake
RM 15
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 7
September 2, 2011
Washington State Department of Transportation
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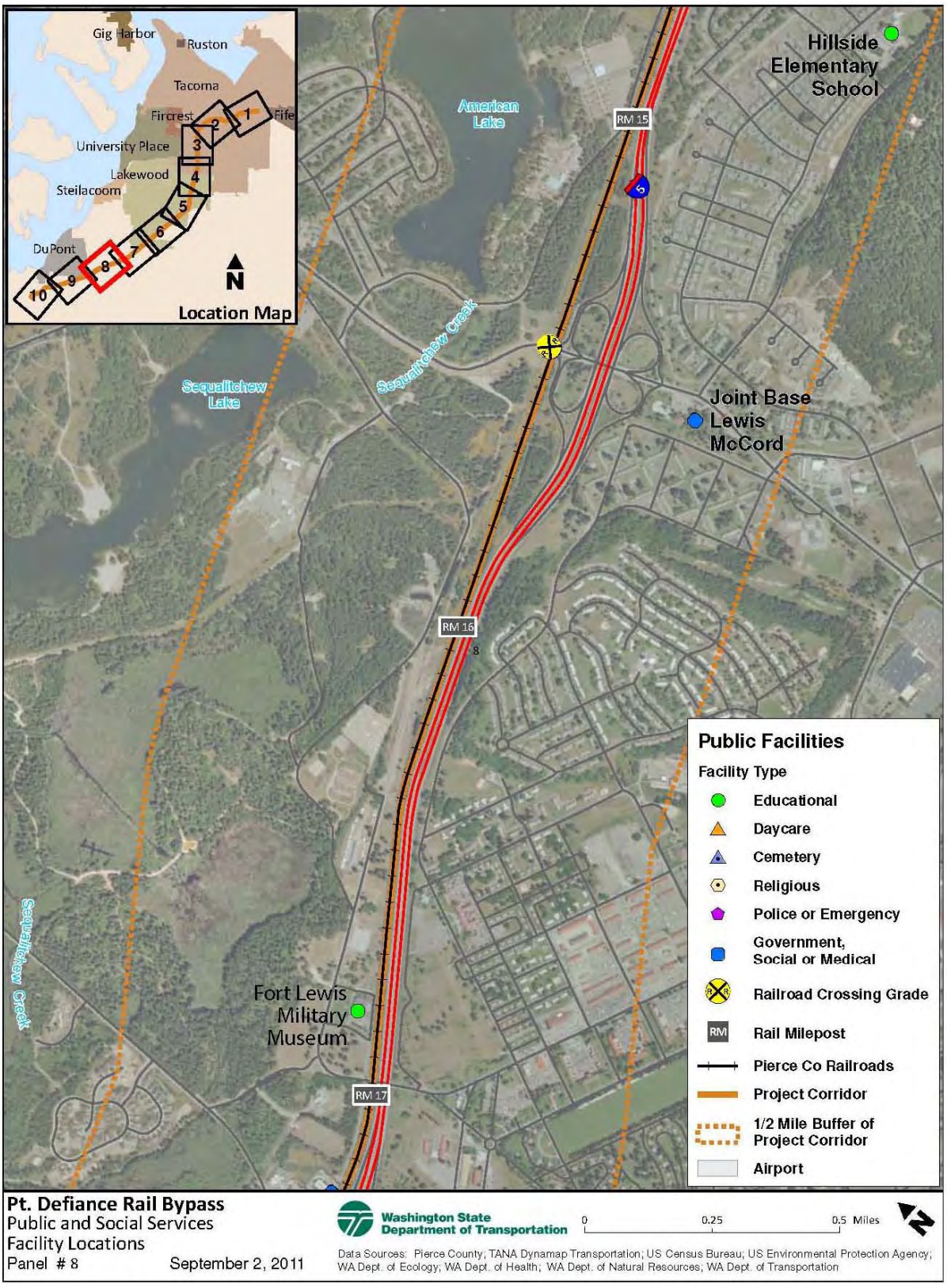
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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Location Map
American Lake
Hillside Elementary School
RM 15
Sequalitchew Creek
Sequalitchew Lake
Joint Base Lewis McChord
RM 16
Fort Lewis Military Museum
RM 17
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 8
September 2, 2011
Washington State Department of Transportation
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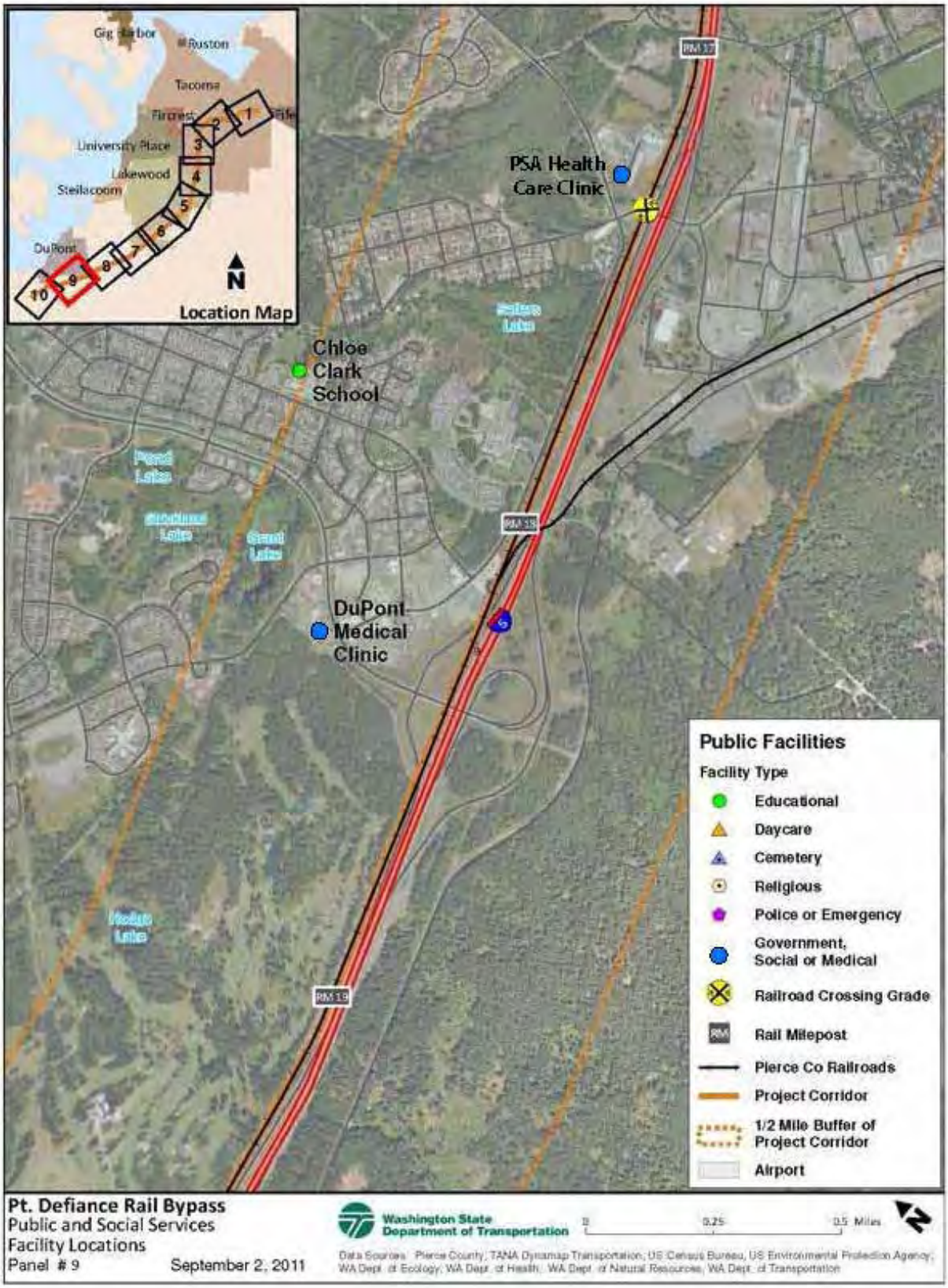
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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Location Map
PSA Health Care Clinic
Chloe Clark School
DuPont Medical Clinic
RM 17
RM 15
RM 13
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 9
September 2, 2011
Washington State Department of Transportation
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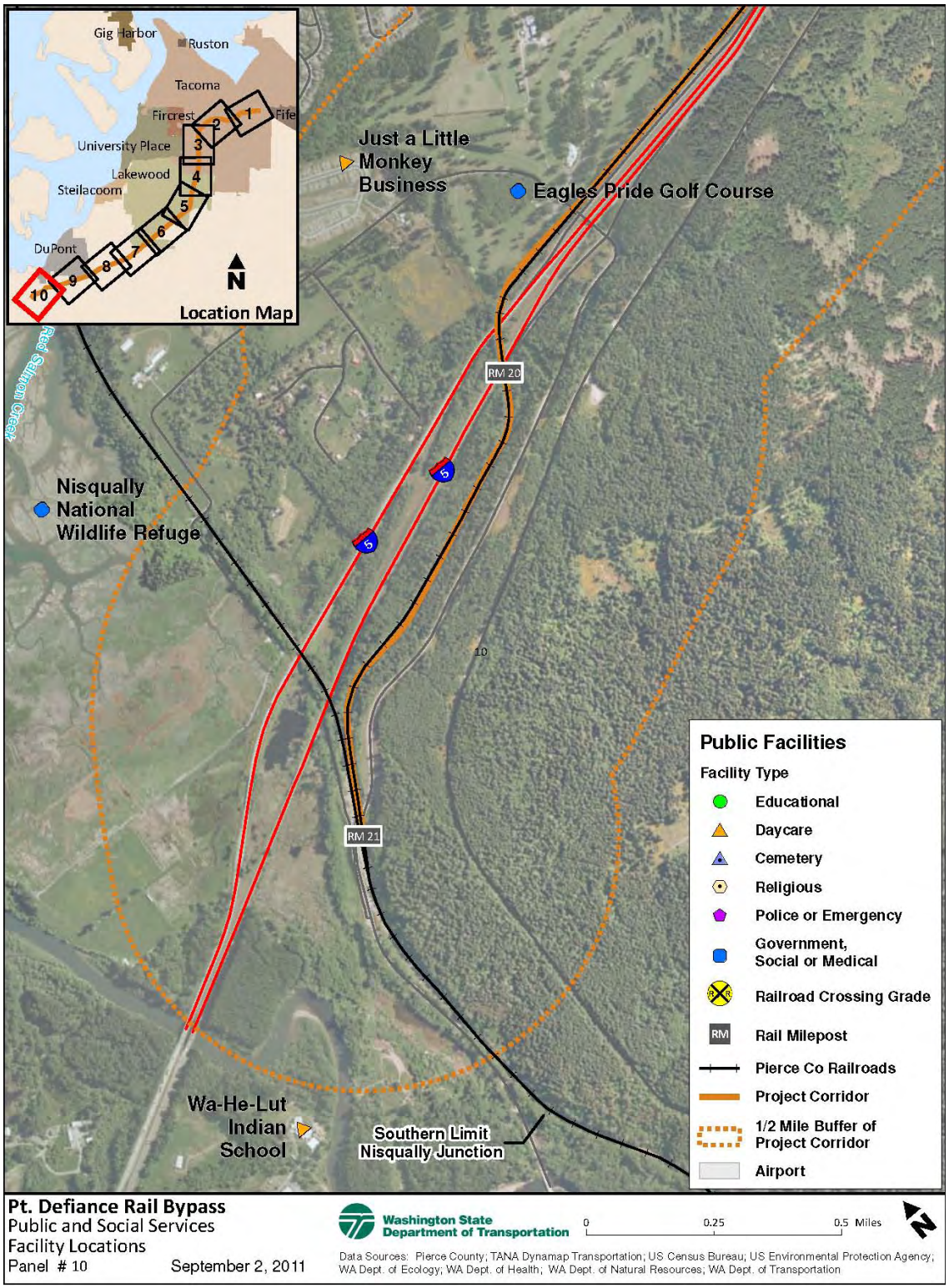
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation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Location Map
Just a Little Monkey Business
Eagles Pride Golf Course
Red Salmon Creek
Nisqually National Wildlife Refuge
RM 20
RM 21
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Wa-He-Lut Indian School
Southern Limit Nisqually Junction
Public Facilities
Facility Type
Educational
Daycare
Cemetery
Religious
Police or Emergency
Government, Social or Medical
Railroad Crossing Grade
Rail Milepost
Pierce Co Railroads
Project Corridor
1/2 Mile Buffer of Project Corridor
Airport
Pt. Defiance Rail Bypass
Public and Social Services
Facility Locations
Panel # 10
September 2, 2011
Washington State Department of Transportation
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0.5 Miles
Data Sources: Pierce County; TANA Dynamap Transportation; US Census Bureau; US Environmental Protection Agency; WA Dept. of Ecology; WA Dept. of Health; WA Dept. of Natural Resources; WA Dept. of Transportation

4.14.3 Environmental Consequences – Public Services, Utilities, and Safety

4.14.3.1 No Build Alternative – Public Services, Utilities, and Safety

The public services and utilities in the study area would remain unchanged by the minor maintenance and repair activities associated with the No Build Alternative. Existing conditions and public services and utilities would persist under the No Build Alternative.

Under the No Build Alternative, 3.6 accidents are anticipated for every million train crossings based on the expected number of average daily train crossings and predicted annual accident frequencies.

4.14.3.2 Build Alternative – Public Services, Utilities, and Safety

Construction Effects

While construction of track upgrades along most of the corridor would have little or no effect on public services or safety, construction would cause traffic delays during intersection construction. Delays for emergency vehicles and school and public buses would be similar to typical construction-related traffic discussed in 4.3, Transportation. Potential utility conflicts and relocation needs have been identified from the Clover Creek Drive intersection to the southern terminus of the Point Defiance Bypass route. As part of construction, FRA and WSDOT would relocate, deepen, and/or harden utilities within the railroad right-of-way. Additional information regarding construction effects are detailed in Appendix P (page 37).

Operational Effects

At an average closure time of less than one minute per crossing, gates would be closed for less than 12 minutes per day.

Operational effects would be similar for all the public service sectors, including schools, emergency services, access to medical centers and government offices, and transit. The most common effect is intersection traffic delays due to the addition of the Amtrak service. Traffic delays are anticipated to be minor as the intersections typically clear (time required to clear vehicles from the intersection after the train has passed) within one to two cycles of the traffic signal (or 3-5 minutes during peak traffic hours), as described in 4.3, Transportation. Train or track malfunctions could cause an unanticipated intersection closure but these are not common, typically of short duration, and detours would be available. Relocation of the Tacoma Amtrak station to the Tacoma Dome at Freighthouse Square would have minor effects to public services or utilities related to the potential for increased traffic.

No effects are anticipated for utilities as utility owners requiring access to buried or aerial utilities for maintenance and upgrades because access would be provided.

FRA and WSDOT do not anticipate that the Project would increase trespass on rail right-of-way; however increased passenger rail traffic may cause more opportunities for trespassers on rail right-of-way to interact with trains, causing potential safety issues. In addition to state and federal safety requirements, the infrastructure owner is responsible for developing and implementing security procedures to reduce the likelihood of rail trespass. These security procedures implement and follow the BNSF Railway's *Transportation Security Administration: 24 Security Action Items* flyer, *49 CFR 1580: TSA Rail Regulations Regarding Rail Security Sensitive Materials,* Sound Transit's Safety and Security Plan, and the system safety program plans for both BNSF Railway and Tacoma Rail.

With the Build Alternative, 3.2 accidents for every million train crossings are anticipated. This accident rate would be a decrease in accidents from the No Build Alternative (3.6 accidents per million train

crossings). The Build Alternative would also improve safety at several existing at-grade crossings by adding the following improvements:

- Signage: "Do Not Stop On Tracks" signs would be installed at the crossings.
- Wayside Horns: This automated warning system would be installed at rail/roadway at-grade crossings to warn people of an approaching train.
- Median Barriers: Median barriers would be installed in the middle of the roadway approaching the railroad tracks to discourage vehicles from driving around the railroad crossing gates.
- Sidewalks: Sidewalks provide an ADA-accessible route over the tracks. Additionally, tactile strips provided with the improvements alert the sight-impaired to changes ahead.
- Pre-signals: Pre-signals control vehicle traffic approaching a railroad crossing and minimize queuing across the at-grade railroad crossing.

The Build Alternative would also install more advanced signal controllers at North Thorne Lane Southwest, Berkeley Street Southwest, 41st Division Drive, and Barksdale Avenue. The more advanced signal controllers synchronize operations of nearby signals to reduce the likelihood of vehicles on the tracks. Additional information regarding operational effects is detailed in Appendix P (page 37).

4.14.4 Minimization Measures – Public Services, Utilities, and Safety

Although the Build Alternative would not have a significant effect on public utilities, services, and safety requiring mitigation, effects associated with construction activities would be reduced by the following minimization measures:

- FRA and WSDOT will coordinate and communicate with public service providers, including school districts, emergency service organizations, and agencies such as Sound Transit to ensure they are fully informed of construction progress and identify ways to minimize delays.
- Coordination with utility owners to determine conflicts and determine a suitable resolution to avoid or minimize disruption. This would include coordination with the local fire department if there would be effects to fire suppression water and/or pressure.
- Post construction schedules near affected crossings and provide the information to local newspapers for publication or to the local jurisdictions for distribution by mail to residents and businesses in the area. Project construction updates could also be posted on WSDOT's project website.

Minimization measures for potential traffic delays and access issues are discussed in Section 4.3 (Transportation).

In terms of safety, FRA and WSDOT would continue the *Operation Lifesaver* program training on track safety for community members and continue to work with communities to ensure there are safe routes that avoid the illegal use of the railroad right-of-way for pedestrians and non-vehicular travel. Infrastructure owners would continue to develop and implement security procedures to reduce the likelihood of rail trespass.

4.15 Energy

4.15.1 Study Area and Methodology – Energy

The study area for this analysis includes the Puget Sound and Point Defiance Bypass routes and the station relocation at Freighthouse Square. Construction energy use was calculated using the California Department of Transportation (CalTrans) methodology that correlates project cost information to project

energy use. Operational energy use was estimated from train fuel efficiency information prepared as part of the PNWRC EA, combined with route distance through the Build Alternative. Motor vehicle and electrical energy were not included.

Greenhouse gas (GHG) emissions were derived from the energy use and based on emission factors from The Climate Registry's *General Reporting Protocol* (GRP 2008). The GHG emissions analysis assumed all construction energy would be provided by diesel and used the diesel CO_2 emission factors provided by The Climate Registry's *General Reporting Protocol* (GRP 2008). Nitrous oxide (N_2O) and methane (CH_4) emissions were assumed to be a similar proportion as for a highway project and estimated to be 5 percent of the total CO_2 emissions; they were converted and reported as CO_2 equivalents (CO_2e). Using CO_2e allows various GHG emissions to be reported as a single unit.

4.15.2 Affected Environment – Energy

A passenger train consumes about 55,000 British thermal units (BTUs) of energy per vehicle mile; in comparison, a typical automobile consumes about 5,517 BTUs of energy per vehicle mile. The energy for a passenger train is in the form of diesel fuel, and the average fuel economy of a passenger train is approximately 0.7 miles per gallon (mpg). Information regarding current trip distance on the Puget Sound Route, fuel and energy use, and GHG emissions are shown in Table 15. Additional information regarding affected environment is detailed in Appendix Q (page 13).

Table 15. Existing Emissions

Train Travel Through the Study Area (via Puget Sound route)	2009 – Existing
Daily Amtrak Cascades trips per day	8
Daily Amtrak Coast Starlight trips per day	2
Distance Through the Project Area (miles)	26.5
Total Miles Amtrak Travel Through the Project Area (miles)	265
Fuel Use at 0.7 mpg	186 (gallons)
Energy Use (Mbtu*)	57
GHG Emissions (MT CO_2e)	4.2

** Mbtu = one million British Thermal Units*

4.15.3 Environmental Consequences – Energy

4.15.3.1 No Build Alternative – Energy

Currently, there are 4 daily Amtrak Cascades round trips and 1 daily Coast Starlight round trip for a total of 10 trips. Under the No Build Alternative, the 10 trips travel 265 miles daily, resulting in 407 gallons of diesel fuel per day and 4.2 CO_2e of GHG emissions per day (Table 16). The energy required in the project corridor would remain unchanged. Existing conditions, energy, and GHGs would persist under the No Build Alternative.

4.15.3.2 Build Alternative – Energy

Construction Effects

Energy is required for construction of the Build Alternative; the analysis included both on-site emissions from operating construction equipment and emissions produced off-site to create and transport construction materials. The majority of construction emissions are from fuel combustion from equipment

used on-site. Construction energy requirements are estimated to be 539,000 Mbtu and GHG emissions are estimated to be 41,000 CO_2e. Additional information regarding construction effects is detailed in Appendix Q: Energy Discipline Report (page 14).

Operational Effects

The Build Alternative would add 2 daily Amtrak Cascades round trips for a total of 14 daily trips between Seattle and Portland. Table 16 compares the energy and GHG effects of the alternatives. The Build Alternative would produce slightly less total emissions (3.3 CO_2e versus 4.2 CO_2e) and would accommodate two additional round trips per day. The Build Alternative would result in an annual reduction of 321 CO_2e when compared to the No Build Alternative because the proposed alignment is shorter and allows for more energy efficient travel than the current alignment. Additional information regarding operational effects is detailed in Appendix Q: Energy Discipline Report (page 14).

Table 16. Alternatives Operation Comparison

	2009	2018	
Travel from Seattle to Portland	***Existing***	***No Build***	***Build***
Amtrak Cascades Trips Daily	8.0	8.0	12.0
Amtrak Coast Starlight Trips Daily	2.0	2.0	2.0
Distance through Project Area (miles)	26.5	26.5	19.5
Total Distance Daily (miles)	265.0	265.0	273.0
Diesel Fuel Use Daily (gal)	407.0	407.0	322.0
GHG Emissions (MT CO2e) Daily	4.2	4.2	3.3
Annual Difference [Build Minus No Build] (MT CO2e)			-321.0

4.15.4 Minimization Measures – Energy

Although the Build Alternative would not have a significant effect on energy requiring mitigation, measures that reduce energy use would also reduce GHG emissions during construction and would include:

- Limited equipment idling.
- Encouraging construction workers to carpool.
- Locating staging areas near work sites.
- Scheduling the delivery of materials during off-peak hours to allow trucks to travel to the site with less congestion and at fuel-efficient speeds.

Operationally, additional fuel efficiency would be realized with the use of the new models of locomotives that are 10 to 12 percent more energy efficient than currently used locomotives. Therefore, it is assumed that new passenger locomotives purchased in the next several years would be at least 10 percent more fuel efficient than the existing locomotives.

4.16 Indirect and Cumulative Effects

4.16.1 Indirect Effects

4.16.1.1 No Build Alternative – Indirect Effects

The No Build Alternative would have no indirect environmental effects. The existing conditions in the study area would remain unchanged.

4.16.1.2 Build Alternative – Indirect Effects

Study Area and Methodology

FRA and WSDOT included the consideration of potential indirect effects along with direct effects throughout all of the discipline studies. As described in the NEPA implementing regulations, indirect effects occur as a result of a project, but take place later in time or are further removed in distance from the project. "Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[27] The study area for each resource was used to assess the potential for indirect effects on each resource. Analysts also sought regional data and studies prepared by Pierce County, JBLM and the Puget Sound Regional Council. The method for assessing the potential for indirect effect on each resource was similar to the methods for assessing direct affects described in the corresponding discipline reports.

Indirect Effects Findings

The Project is located within an existing rail corridor and urbanized area. FRA and WSDOT considered whether the Project would facilitate an increase in growth or development in the study area. FRA and WSDOT determined that the project is not likely to directly or indirectly affect growth or land use patterns in these locations. As there would be no new Amtrak stops within the corridor, individuals utilizing passenger trains would continue to travel through the study area to their destinations, in the same way as the current Amtrak inter-city passenger train service. Generally, inter-city passenger rail transports passengers between well-defined urban centers, rather than other commuter rail or mass-transit modes which may transport passengers from an urban center to suburban areas. Growth and development in the study area would occur as forecasted and planned by each jurisdiction regardless of Project implementation as transportation is only one of the many complex factors that affect and influence the location and extent of urban and rural growth (see Land Use Discipline Report, Appendix O: Land Use Discipline Report).

The Project uses an existing right-of-way rather than creating a new rail corridor. FRA and WSDOT did not identify any indirect effects from the proposed improvements to the rail line or the crossings. FRA and WSDOT also considered other features of the Project (such as utility improvements) to assess whether they may influence growth or indirectly facilitate other developments.

FRA and WSDOT considered the potential indirect effects to all resource areas included in the affected environment sections of this EA and found that the only potential indirect effect tied to the Project is related to the relocation of the Tacoma Amtrak Station from Puyallup Avenue to Freighthouse Square.

[27] *CEQ NEPA Regulation Section 1508.8 [40 C.F.R. § 1508.8.]*

The relocation of Amtrak services to Freighthouse Square[28] may indirectly influence redevelopment near Freighthouse Square. The consolidation of passenger rail service in one station may strengthen Freighthouse Square's role as a transportation center and may increase demand for retail services in the immediate vicinity to serve persons coming to or from Amtrak or switching to Sound Transit or other service. This could in turn attract public or private developers to invest in the area. Redevelopment would be consistent with existing land uses and would likely take place in the existing footprint of the vacant lots or as renovation of existing structures (see Land Use Discipline Report, Appendix O: Land Use Discipline Report). In this assessment of the potential indirect effect due to relocation the analysis considered the likely scale of future redevelopment. It was determined that any redevelopment would be minor because of the available building stock and zoning. FRA and WSDOT use the term "limited redevelopment" to qualify that major redevelopment is not anticipated as a result of the Amtrak station relocation. The redevelopment at Freighthouse Square would be consistent with local zoning and approved by state and local agencies, therefore it is unlikely to result in indirect effects to the following resources: air quality, noise and vibration, public services and utilities, or energy. The redevelopment at Freighthouse Square would not result in indirect effects to fish, wildlife and vegetation, geologic and soils, wetlands, or water resources because these resources are not present. Effects to hazardous materials, visual quality, land use, transportation and socioeconomic and environmental justice resources from the redevelopment at Freighthouse Square are described below.

Hazardous Materials. The area surrounding Freighthouse Square is historically a heavy commercial and industrial area with several sites of concern (see Hazardous Materials Discipline Report, Appendix L: Hazardous Materials Discipline Report). If redevelopment were to occur at any sites of concern (Figure 8), coordination with Ecology would be required prior to construction to ensure any ground disturbance work is in compliance with established restrictions and regulations. Cleanup activities associated with redevelopment would benefit the environment and community. Thus the Project could lead to a beneficial indirect effect on hazardous materials.

Visual Quality. The potential indirect effect on visual quality will be guided by existing zoning. Because of the City of Tacoma's recent efforts to rehabilitate the area, it is likely that any redevelopment indirectly tied to station relocation would improve the visual quality of the area through renovation of deteriorating buildings or vacant lots. This could have a beneficial indirect effect on visual resources.

Land Use. Any limited redevelopment near Freighthouse Square would occur in accordance with City of Tacoma land use zoning ordinances and plans. Indirect effects within the area may include new tax revenues and localized neighborhood revitalization.

Transportation. Redevelopment near Freighthouse Square could attract additional vehicle or pedestrian traffic. Any changes to transportation facilities or services in the area would undergo review by local, state and/or regional transportation providers. WSDOT and FRA do not anticipate an adverse effect as a result of potential redevelopment.

Socioeconomics and Environmental Justice. The redevelopment near Freighthouse Square would generally take place in the existing footprint of vacant lots or renovating existing buildings and would not affect community characteristics, cohesion or connectivity. Construction could provide some short-term employment and commercial development could provide longer term jobs to community members in the study area. Environmental Justice communities in the vicinity of Freighthouse Square and could benefit from improved transportation access. Redevelopment could provide a minor beneficial indirect effect to Environmental Justice communities.

[28] *WSDOT and FRA also considered the potential for indirect effects resulting from the vacation of the Puyallup Avenue Station. No primary or secondary businesses appear to depend on the Puyallup station, thus the relocation of Amtrak services to Freighthouse Square would not affect resources present, including economic resources.*

4.16.1.3 Minimization Measures – Indirect Effects

No adverse indirect effects would occur as part of the Build Alternative; therefore, no minimization measures are proposed.

4.16.2 Cumulative Effects

4.16.2.1 Study Area and Methodology

Under NEPA, cumulative effects result from the incremental effects of the project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the action.

Past and present actions affecting environmental resources are reflected in the existing conditions of the study area. Reasonably foreseeable future actions include those that are being implemented or have been implemented recently, including planned and funded transportation improvements, and other local and regional infrastructure proposals. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

For the cumulative effects analysis, FRA and WSDOT considered both a temporal (timeframe) and geographic, resource-specific study areas. In framing the historic and future context, analysts looked at the land use and transportation development patterns. The existing rail right-of-way was established in the late 1800s (American Lake in 1891, Prairie Lines in 1873) and I-5 was completed in the 1960s. WSDOT and FRA looked to the planning horizons used by local agencies in their comprehensive planning under the state Growth Management Act, JBLM and the "Grow the Army" Final EIS, and the Puget Sound Regional Council's Vision 2040; all these planning horizons lay between 2020 and 2040.

FRA and WSDOT used the same study area for each resource as identified in the discipline report assessing direct effects. Analysts also sought regional data and studies prepared by Pierce County, JBLM and the Puget Sound Regional Council. With regard to traffic congestion on I-5, FRA and WSDOT also considered Thurston County and through-traffic. See the Transportation and Land Use Discipline Reports (Appendix F: Traffic and Transportation Discipline Report and Appendix O: Land Use Discipline Report) for more information.

In identifying and analyzing potential cumulative impacts FRA and WSDOT used joint guidance issued by WSDOT, FHWA Washington Division, and the EPA Region 10, entitled: *Guidance on Preparing Cumulative Impact Analyses* (2008) (Joint Guidance). The Joint Guidance outlines eight steps for identifying and assessing cumulative impacts:

1. Identify the resources that may have cumulative impacts to consider in the analysis;
2. Define the study area and timeframe for each affected resource;
3. Describe the current status and historical context for each;
4. Identify direct and the indirect impacts that may contribute to a cumulative impact;
5. Identify other historic, current and reasonably foreseeable actions that may affect resources;
6. Assess potential cumulative impacts to each resource; determine magnitude and significance;
7. Report the results; and
8. Assess and discuss potential mitigation issues for all adverse impacts.

For the Project, FRA and WSDOT relied on the affected environment section of each of the discipline studies and several of the regional and local studies referenced in the Land Use Discipline Report (Appendix O: Land Use Discipline Report) to complete Joint Guidance Steps 1 through 5. Information provided in the affected environment and direct effects analysis helped to characterize the trend and

current conditions. In assessing the potential for cumulative impacts, FRA and WSDOT used Joint Guidance Steps 5 through 8. The result of this assessment is summarized later in this section.

FRA and WSDOT considered the potential for cumulative impacts to all resource areas analyzed in this EA. In addition, the measures to minimize direct effects of the Project were evaluated in making the cumulative effect determination. For example, temporary construction effects that are fully mitigated during construction are not likely to contribute to a cumulative effect. In general, the study focused on operational effects of the Project.

In developing the list of reasonably foreseeable actions FRA and WSDOT applied the following criteria from the Joint Guidance:

- Is the project included in a financially constrained plan (e.g., a capital improvement program).
- Is it permitted or in the permit process?
- How reasonable is it to assume that the project will be constructed?
- Is the action identified as high priority?

FRA and WSDOT examined Puget Sound Regional Council's current program, which includes many preservation projects (also known as "state of good repair") and the funded improvement projects in the state transportation improvement program (STIP). Reasonably foreseeable future projects are listed below (Table 17).

Table 17: Transportation Related Projects – Current and Reasonably Foreseeable

Pedestrian and Transit Improvements	Responsible Entity
Dower Elementary Safe Route to School – Construct curb, gutter and sidewalk, flashing pedestrian signal, and two marked crosswalks on John Dower Rd.	Lakewood
ADA Service – Provide complementary ADA service for disabled patrons in Pierce County	Pierce Transit
Lakewood Station Connection – Construct pedestrian crossing of rail road tracks, bus stop facilities, and bus turn around.	Lakewood
Tacoma/Lakewood Commuter Rail Project – Design and construct stations, parking, bus/transfer, pedestrian, and bike facilities; grade separated crossing at Pacific Avenue and South 26th Street; complete environmental documentation.	Sound Transit
Tacoma Link Expansion Project – FTA Small Starts alternatives analysis for Link service expansion in downtown Tacoma, conceptual engineering and NEPA Scoping.	Sound Transit
Local Roadway Improvements	**Responsible Entity**
Gravelly Lake Drive – Construct curb, gutter and sidewalk, street lighting, upgrade signals and ADA ramps on both sides of Gravelly Lake Drive between 100th Street and Bridgeport Way.	Lakewood
Madigan Access Improvement – Construct roadway, bridge, ramp and signal modifications to improve safety from Berkeley Street to Union Avenue Southwest	Lakewood
Bridgeport Way – Steilacoom Blvd. to 83rd Street Southwest – Widen to provide continuous two-way left-turn lane, street lighting, bicycle facilities, storm drainage and landscaping. Signalize 86th Street intersection.	Lakewood
Steilacoom Blvd. – Farwest Drive to 87th Avenue Southwest – Upgrade traffic signal and improve intersection lighting. Upgrade cross-walk and trim vegetation to improve sight distance.	Lakewood
Lakewood Traffic Signal Upgrades Phase 3 – Fiber Interconnect – Provide fiber cable interconnect to upgrade signals for ITS.	Lakewood

Table 17: Transportation Related Projects – Current and Reasonably Foreseeable

Camp Murray Gate Relocation to Portland Avenue – Extend the existing sidewalk to Harry Todd Park, re-route traffic and improve vehicle movements and safety through the North Thorne Lane SW, Berkeley Street SW intersections with Union Avenue SW, the current railroad right-of-way, and Interstate 5.	Lakewood
JBLM: Proposed Wharf Road Access Control Point – Construct a new access control point off the Steilacoom-DuPont Road into Lewis North to reduce traffic flows at or near existing access control points, allow for an alternative truck traffic access, and allow for alternative access options to avoid delays during maintenance interruptions.	JBLM
Interstate 5 – Joint Base Lewis-McChord Area Congestion Management Project: SR 510 to SR 512 – Increase capacity on I-5 with traffic management strategies, operational enhancements, HOV/express bypass lanes at ramp meters, rebuilding key connections within JBLM to improve the distribution of traffic, improving military gate access points and signals at local intersections.	JBLM
Regional Roadway Improvements	**Responsible Entity**
I-5 DuPont to Lakewood Corridor Planning – Joint Base Lewis-McChord and cities of Lakewood and DuPont in coordination are submitting grants for the Interchange Justification Report and NEPA. $1,001,000 (including $630,000 in federal funds, balance in state/local funds)	WSDOT
I-5 Fort Lewis Congestion Fiber Optics – Extend fiber optic cable from Olympia to Thorne Lane to enable ITS project intertie.	WSDOT
I-5 and I-705 and Railroad Crossing SB Seismic Retrofit – Retrofit southbound bridge to meet current earthquake standards.	WSDOT
I-5 and I-705 and Railroad Crossing NB Seismic Retrofit – Retrofit northbound bridge to meet current earthquake standards.	WSDOT
I-5 M Street to Portland Avenue Northbound Widening and Bridges – Add NB and SB HOV lanes to I-5 from M Street to Portland Avenue to I-5. Demolish and reconstruct Pacific Avenue, McKinley Avenue and L Street overcrossings.	WSDOT
I-5 M Street Bridge Seismic Retrofit – Retrofit bridge to meet current earthquake standards.	WSDOT
I-5 Port of Tacoma Rd. to King Co. Line HOV Lanes – Construct HOV lanes from MP 136.61 to MP 139.50 (completed project).	WSDOT
I-5 Portland Avenue to Port of Tacoma Rd Northbound HOV – Construct NB HOV lanes, new northbound bridges across the Puyallup River, begins work to reconstruct I-5/SR 167 interchange and replaces I-5/Portland interchange.	WSDOT
I-5 Portland Avenue to Port of Tacoma Rd. Southbound HOV – Construct SB HOV lanes, new southbound bridges across the Puyallup River, and completes work on the I-5/SR 167 interchange.	WSDOT
I-5 SR 16 Interchange: Rebuild Interchange – Replaces the Nalley Valley bridge, reconstructs ramps and structures. Prepares I-5 and SR 16 for HOV lanes (completed project).	WSDOT
I-5 SR 16 Eastbound Nalley Valley HOV – Reconstruct eastbound Nalley Valley interchange, ramps, and structures. Prepares for HOV lanes on I-5 and SR 16.	WSDOT
I-5 SR 16 Interchange: South to North Ramp Seismic Retrofit – Retrofit south to north ramp bridge to meet current earthquake standards.	WSDOT
I-5 Vicinity Center Drive – Realign Center Drive and change access control to improve JBLM egress.	WSDOT
SR 162 Puyallup River Bd. Replacement – Construct new bridge to replace existing structurally deficient bridge.	WSDOT
SR 512 108th Street East to SR 167 Install Cable Barrier – Upgrade existing 3-cable median barrier to 4-cable median barrier.	WSDOT

Table 17: Transportation Related Projects – Current and Reasonably Foreseeable

Regional Rail Improvements	Responsible Entity
Vancouver – Rail Yard Bypass Track – Construct new bypass tracks in rail yard to allow passenger trains to bypass congestion caused by freight trains and new vehicle/pedestrian/bicycle bridge overcrossing.	FRA / WSDOT
Kelso Martins Bluff – Toteff Siding Extension - Extend existing siding one and construct overcrossing at Toteff Road.	FRA / WSDOT
Kelso Martins Bluff – New Siding – Construct new and upgrade existing siding track to allow freight trains to move on and off of main line at higher speeds.	FRA / WSDOT
Kelso Martins Bluff – Kelso to Longview Junction – Construct new track segment and upgrade existing track to allow freight and passenger trains to pass each other and reduce congestion.	FRA / WSDOT
Seattle – King Street Track Upgrade – Reconfigure main line tracks accessing King Street Station to improve passenger train access and increase service for Amtrak, Sound Transit, and BNSF.	FRA / WSDOT
Everett – Storage Track – Construct two new departure/receiving tracks parallel to existing delta Yard tracks to eliminate passenger/freight conflicts.	FRA / WSDOT
Corridor Reliability Upgrades (South) – Clean ditches and grading to improve drainage, cleaning and replacing ballast, replace ties and resurface rail as needed to improve track reliability and improve travel time.	FRA / WSDOT
Advanced Wayside Signal System – Upgrade advanced signal systems components at all control points, sidings and turnouts between the US-Canada border and Vancouver, WA.	FRA / WSDOT

Source: WSDOT 2012a, PSRC 2011, and WSDOT 2012b

Other projects that are on the horizon, though not on near-term fiscally constrained plans include the Cross-base Highway (SR 704) a new six-mile-long, multi-lane divided highway beginning at the I-5 Thorne Lane Interchange at the west end, connecting to 176th Street at State Route 7 at the east end. This new alternate east-west route is designed to ease congestion on I-5, State Route 512, State Route 7 and Spanaway Loop Road by providing a route through Joint Base Lewis-McChord. Environmental review and approval was completed by FHWA in 2004. Project 1, Spanaway Loop Road to SR 7 was completed in August 2009. The remainder of the project is currently suspended awaiting funding.

Land use and development trends within the region and study area are summarized in the Land Use Discipline Report (Appendix O: Land Use Discipline Report). The expansion of JBLM includes numerous projects and projects as outlined in the Grow the Army FEIS and other documents. FRA and WSDOT carefully considered the prior studies related to the JBLM plans, and the comprehensive assessment conducted by the South Sound Military and Communities Partnership, JBLM Growth Coordination Plan (US Army 2010). JBLM disclosed a significant cumulative effect to transportation and social elements from the Combat Aviation Brigade (CAB) stationing and in the FEIS for the Fort Lewis Army Growth and Force Structure Realignment. FEIS / ROD (US Army Environmental Command 2011) and references the Grow the Army FEIS. The Point Defiance Bypass is listed as one of the "multiple long-term capital improvements that are being planned in the region that will accommodate the increase in traffic" (US Army Environmental Command 2011).[29]

[29] *The FEIS for the Fort Lewis Army Growth and Force Structure Realignment adequately assesses the potential environmental and socioeconomic consequences associated with implementing, at Fort Lewis and the Yakima Training Center (YTC) 1, the December 2007 (updated in June 2010) ROD for the Final Programmatic EIS for Army Growth and Force Structure Realignment (also known as "Grow The Army"). The FEIS was issued in July 2010 and the ROD issued in February 2011. The action consists of several components including stationing, construction, and training. The FEIS analyzed the environmental and*

In addition, FRA and WSDOT examined the recent activities posted on the state SEPA Register to get a sense for current and near future projects (Table 18) (Ecology 2012). While this is not an exhaustive list, it is helpful to see the general types of private and public developments in the area.

socioeconomic impacts of stationing approximately 5,700 additional soldiers, and their families at Fort Lewis. This includes approximately: 1,900 soldiers; 1,000 Combat Service Support (CSS) soldiers; and, 2,800 soldiers for a medium CAB.

Table 18: Recent Development Proposals in Project Area

Residential Development	Jurisdiction
Subdivide 7 acres into 33 single family residential lots – 11604 Interlaaken Drive Southwest	Lakewood
Creekside Village – construct 14 buildings to create 160 multifamily dwelling units, parking, recreation and park facility on 12.8 acre site – North of Sequalitchew Creek west of Center Drive	DuPont
Commercial/Nonresidential Development	
Olympic Moving and Storage – 7.17 Acre, 7010 150th Southwest	Lakewood
Kenworth Truck Dealership – 12507 Pacific Highway	Lakewood
Reddy Ice – demolish storage building and construct 14,000 sf ice warehouse and distribution facility – 9635 32nd Avenue	Lakewood
Boo Han International Village – 100,000 sf with 3-story multitenant retail facility – 9122 South Tacoma Way and South Steilacoom Blvd.	Lakewood
McDonald's – construct 3,900 sf drive-through restaurant – 15004 Union Avenue Tillicum	Lakewood
DuPont Learning Center – 9,275 sf single story building and 42 stall parking lot on 1.16 acres site, McNeil Street	DuPont
CalPortland North Parcel Mining Request – mine 142 acre parcel of existing mineral resource site – Sec 14, 15, 22 T19N, R1E	DuPont
Port of Tacoma Industrial Area – extend rail line and install new 6-car facility with associated private road and stormwater facilities – 3001 Marshal Avenue, Port Industrial District	Tacoma
Demolish 104 residential units and construct 140 residential units and community center with parking – 1800 Block South G Street and 2500 Block South G (downtown north of glass museum)	Tacoma
Construct 108,00 sf 4-story parking garage – 1202 Martin Luther King Jr Way (downtown north of glass museum)	Tacoma
Port of Tacoma Industrial Area – construct container terminal and associated widening of Blair Waterway and Puyallup Tribe-owned site – 3320 Lincoln Avenue, Port Industrial District	Tacoma
Install two sugar storage tanks (74,879-gallon capacity) at manufacturing facility – 115 East 27th Street (near I-5/705 I/C)	Tacoma
Construct new Clover Park Elementary School – 1901 Lakewood Drive	Lakewood

4.16.2.2 Cumulative Effects Findings

Consistent with the Joint Guidance (WSDOT 2008) and CEQ guidance (1997; 2005), FRA and WSDOT did not consider cumulative effects on resources that were not directly affected by the Project. Considering that the Build Alternative would have no effect on air quality, geology and soils, water resources, wetlands, fish and wildlife, and cultural resources, it would not contribute to a cumulative effect on these resources.

As described in other sections of this EA, there is a potential for minor effects of the Build Alternative on noise and vibration, vegetation, hazardous materials, visual quality, land use, energy, public services and utilities, and energy. Therefore, FRA and WSDOT considered the potential for cumulative impacts resulting from the Project for these resources. A discussion of the potential cumulative impacts for each resource area is included below. The analysis concluded that that the Project is not anticipated to result in significant cumulative impacts.

Noise and Vibration. At sensitive locations north of Lakewood Station, moderate increases in noise would likely result from a combination of future Sound Transit operations and project-related Amtrak operations. FRA and WSDOT found that the Project's contribution to noise in the area would not lead to a significant cumulative effect.

Vibration effects from the Project were also considered in combination with other reasonably foreseeable actions, which for this rail corridor, includes the extension of the Sound Transit Sounder service in October 2012, plus the continuing Tacoma Rail service and occasional BNSF freight deliveries. FRA and WSDOT found that the Project's vibration minimization measures are adequate to ensure no contribution to an adverse cumulative effect.

Hazardous Materials. The potential for exposure to hazardous materials is generally a construction effect. The Project is not expected to result in a discharge of hazardous materials. If any inadvertent discharges occur, these would be contained and adverse effects avoided. In general, development projects improve conditions. Therefore, this Project is not likely to contribute to a cumulative environmental effect from hazardous materials releases.

Visual Quality. The Project is located within an existing rail corridor and urbanized area; visual elements that have been and continue to be present in the area are primarily related to transportation, commercial and industrial land uses. The Project adds trains in a rail corridor that is currently used by other trains and would be used by more trains in the future. In the context of the existing environment and anticipated future rail operations, the visual elements of the Project would not contribute to a cumulative visual impact because it would not change the visual quality of the area.

Vegetation. The Project has a minor, short-term construction effect on the vegetation along the rail right-of-way which would not lead to long-term impacts. FRA and WSDOT considered the Project's minimization measures for effects to vegetation in combination with other current and future projects that provide habitat improvements such as the Nisqually National Wildlife Refuge, environmental projects on JBLM, and local agencies' critical area ordinances. FRA and WSDOT found that the Project's vegetation measures are adequate to ensure no contribution to an adverse cumulative effect.

Land Use. The Project would not affect land use or induce growth and development in the region. While noted under potential indirect effects, redevelopment around Freighthouse Square could occur and would be consistent with land use plans and policies for that area. The land is highly urbanized in the project corridor. The Project would not contribute to a cumulative effect on land use because its direct and indirect effects are negligible relative to the overall development in the region.

Energy. The long-term energy use associated with the Project would be reduced from current conditions. Thus, there would be a beneficial cumulative effect to energy from the Project.

Public Services, Utilities, and Safety. According to FRA and WSDOT analysis, there would be a slight beneficial cumulative effect throughout the project corridor since the improvements that would be made to the intersection signals would not otherwise occur for both the opening year of the Project and the horizon year of 2030.

Transportation. Future planned transportation projects that could also affect traffic conditions in the study area were considered for the cumulative effects analysis. These projects include: the Cross-Base Highway (ROD issued by FHWA in 2004), Berkeley Street Freedom Bridge Improvements (funded; under construction), the Relocation of Camp Murray Gate (funded; under construction) and the projects listed above in Table 17. The reasonably foreseeable future projects would improve traffic conditions in

the study area. Therefore, the Build Alternative, when considered with the reasonably foreseeable future actions, would not result in significant cumulative effects on transportation.

Socioeconomic and Environmental Justice. FRA and WSDOT considered the Project's anticipated direct and indirect effects on social elements including environmental justice populations to evaluate whether the project contributes to any adverse cumulative effects. For most of the social elements (community character & cohesion, relocation/disruption, environmental justice), FRA and WSDOT found no contributions to cumulative effects.

Connectivity in the study area north of Bridgeport Way Southwest would be unchanged by the Project and any other reasonably foreseeable future action; Sound Transit has already installed wayside horns that reduce train noise in all communities between Tacoma and Lakewood. South of Bridgeport Way Southwest, construction of the Cross-Base Highway and moving the Camp Murray main gate would improve connectivity by relieving congestion. Improvements as part of the Camp Murray Gate Relocation would divert traffic away from the Berkeley Street Southwest interchange to the North Thorne Lane Southwest interchange thus alleviating congestion at Berkeley Street Southwest. In conjunction with the Project's intersection and signaling improvements, the result would be a slight beneficial contribution to the cumulative effect on community connectivity.

The Tillicum, Woodbrook, and Nyanza neighborhoods have a long history of isolation due to the geographic and land use patterns around them. Neighborhood areas lack walkways and bike paths except for the travel lane and there are few entry/exit points to the neighborhood areas. Occasional, illegal pedestrian use of the railroad tracks as a trail is a safety concern. The future projects to improve mobility in the area (i.e., SR-704 and improvements around the military installations) would not improve connectivity within neighborhoods, but may enhance connectivity between neighborhoods. The lack of connecting streets and nonmotorized pathways in the Tillicum, Woodbrook, and Nyanza neighborhoods, combined with increased train activity with the Project, would result in a minor contribution to the isolation associated with the cumulative effects of past and present land use and transportation patterns in these areas.

Consistent with NEPA guidance,[30] FRA and WSDOT reviewed past project proposals to see where similar concerns have been addressed. For example, measures to improve local mobility and non-motorized access are discussed in the JBLM Growth Coordination Plan, and several other local and regional planning efforts. The Cross-Base Highway (State Route 704) environmental documents contain possible measures to improve bicycle and pedestrian mobility in this area. Federal, state, and local entities are engaged in efforts to improve transportation modes including non-motorized access through the area.

Climate Change. The Pacific Northwest Rail Corridor EA (WSDOT 2009) includes a discussion of greenhouse gases and climate change. Since 2008, FRA and WSDOT has advised its project teams preparing documents in compliance with the national and state policy acts (NEPA and SEPA) to consider the anticipated changes in local and regional conditions due that may affect the project. The department developed internal guidance to assist project teams in using available scientific data, and provided template language for inclusion in the cumulative effects discussions. Refer to: *Guidance for Project Level Greenhouse Gas and Climate Change Evaluations* (WSDOT 2012c). Accordingly, FRA and WSDOT considered the results of WSDOT's recent vulnerability assessment (WSDOT 2011b) in assessing potential cumulative effects on the Project.

The results of WSDOT's recent vulnerability assessment (WSDOT 2011b) show the section of I-5 along the Project to be of low vulnerability to climate-related threats. WSDOT assessment was conducted on

[30] *CEQ 1997*

state-owned transportation infrastructure, therefore did not include the current route along BNSF-owned railway. WSDOT is coordinating with Sound Transit on a vulnerability assessment of all Sound Transit facilities which will be complete in spring 2013. The Project corridor appears resilient to future climate-related effects (WSDOT 2012d).

4.16.2.3 Minimization Measures –Cumulative Effects

No adverse cumulative effects would occur as part of the Build Alternative; therefore, no minimization measures are proposed.

5.0 COORDINATION AND CONSULTATION

Agency coordination and public involvement for the Project were conducted and are summarized in the following sections. Appendix R contains the details of agency correspondence.

5.1 Public Involvement

Appropriate coordination of outreach with the public, community organizations, stakeholders, and other interested parties is critical to the successful adoption and implementation of the Point Defiance Bypass Environmental Assessment. Opportunities for public involvement on the Project begin with the scoping process and other outreach efforts before a decision concerning the Project is made. Table 19 identifies the briefings and public outreach efforts conducted for the Project between spring 2010 and summer 2012. Materials provided at these events and briefings included electronic PowerPoint presentations, Project maps, photos and videos, fact sheets and illustrated Project timelines.

Table 19. Summary of Public Involvement Activities

Meeting Date	Audience	Topic Discussed
08-06-2012	Joint Legislative staff	Briefing – Street tour of the project and update on EA status.
07-18-2012	South Tacoma Neighborhood	Public outreach – status report and overview of study areas.
03-21-2012	South Tacoma Neighborhood Council	Public outreach – general overview and status report.
11-29-2011	Gyro Club of Tacoma	Public outreach – general overview and status report.
09-22-2011	Broadway Tacoma Farmers Market	Public outreach – general project information.
09-20-2011	Tacoma City Council	Briefing – update on the status of the EA.
09-11-2011	South Tacoma Farmers Market	Public outreach – general project information.
09-01-2011	Broadway Tacoma Farmers Market	Public outreach – general project information.
08-31-2011	Alternatives Open House	Public outreach – update on preferred route milestone and current progress.
08-25-2011	Broadway Tacoma Farmers Market	Public outreach – general project information.
08-23-2011	DuPont City Council	Briefing – update on the status of the EA.
08-21-2011	South Tacoma Farmers Market	Public outreach – general project information.
08-16-2011	Pierce County Council	Briefing – update on the status of the EA.
08-15-2011	Lakewood City Council	Briefing – update on the status of the EA.
08-14-2011	South Tacoma Farmers Market	Public outreach – general project information.
03-29-2011	Lakewood Pacific Neighborhood	Public outreach – update on the status of the EA.
03-02-2011	Pierce County Building and Construction Trades Council	Public outreach – discussion of types of work that will be available to contractors.
03-01-2011	Steilacoom Town Council	Briefing – general project information.
02-09-2011	Debra Entenman, Rep. Adam Smith's office	Briefing – general project information.

Table 19. Summary of Public Involvement Activities

Meeting Date	Audience	Topic Discussed
02-02-2011	RAMP	Public outreach – discussion on effects of Project to surrounding businesses.
01-14-2011	Coffee with the Mayor	Public outreach – update on the status of the EA.
01-06-2011	Tillicum/Woodbrook Neighborhood Assoc.	Public outreach – update on the status of the EA.
01-04-2011	Tacoma City Council	Briefing – update on the status of the EA.
11-17-2010	Lakewood Planning Committee	Briefing – update on the status of the EA.
11-15-2010	Tillicum Community	Public outreach – Open House featuring status update on the EA.
11-04-2010	Tacoma Univ. District	Public outreach – Open House partnering w/ Sound Transit featuring general project information on Point Defiance and D to M Street project.
10-28-2010	Lakewood United	Public outreach – update on the status of the EA.
10-26-2010	DuPont City Council	Briefing – update on the status of the EA.
10-18-2010	Tillicum Citizens Advisory Committee	Public outreach – general project information.
09-30-2010	Rep. Tami Greene	Briefing – general project information.
09-20-2010	Lakewood City Council	Briefing – update on the status of the EA.
09-16-2010	Broadway Tacoma Farmers Market	Public outreach – general project information.
09-08-2010	KOMO Radio listeners	Public outreach – general project information.
08-19-2010	Sen. Mike Carrell	Briefing – general project information.
08-18-2010	Camp Murray, WSDOT	Briefing – EA update and discussion on the Camp Murray Gate relocation.
08-18-2010	South Tacoma Neighborhood Council	Public outreach – general project information.
08-17-2010	Claudia Thomas – Lakewood City Councilmember	Briefing – general project information.
08-03-2010	National Night Out	Public outreach – general project information.
08-03-2010	Sen. Murray's staff	Briefing – general project information.
07-09-2010	Sen. Murray's staff	Briefing – general project information.
06-22-2010	Rep. Dicks' staff	Briefing – update on the status of the EA.
05-21-2010	Rep. Smith's staff	Briefing – update on the status of the EA.
05-11-2010	JTC Rail Tour	Briefing – Point Defiance Tour.
04-28-2010	Port of Tacoma	Briefing – Panel of transportation and industry leader discussion of supply chain challenges.
04-15-2010	Gov. Gregoire's communications staff	Briefing – general project information.

Other outreach efforts included a four-page project folio mailed in November 2007 to over 200 adjoining property owners and interested parties. Updated Project information is also available on the Project web site at <http://www.wsdot.wa.gov/Projects/Rail/PNWRC_PtDefiance/>.

A two-page Project fact sheet was translated into four languages in the fall of 2012, including Spanish, Korean, Vietnamese, and Russian. Per the Clover Park School District's annual report (page 3), the top 5 student ethnicities as represented in student enrollment are: White; Hispanic; African American; Multiple ethnicities; Asian American. These ethnicity numbers align with 2010 census data within the project corridor as reported in the socioeconomic discipline report. School district data is a valid data source for the Project, as the district includes most of Lakewood and South Tacoma.

The handout was translated to Spanish as Hispanics make up the largest non-white ethnicity. The handout was also translated to Korean and Vietnamese based on observations that these two languages are the primary non-English communication form for business and social signage (e.g., garage sale and 'lost pet' signs posted on utility poles) within the project corridor. The handout was translated to Russian based on Lakewood's translated materials for the recent Tillicum sewer improvement project (Lakewood published those materials in English, Spanish, and Russian). Availability of translated material was also posted on the Project's online website.

The EA was issued by FRA and WSDOT for public review on October 9, 2012 for a period of 30 calendar days (comment period closed on November 9, 2012). A total of 62 comments on the EA were received from individuals or agencies, including comments from one federal agency, two state agencies, one regional agency, and five local agencies.

5.2 Agency Coordination

To provide meaningful engagement and to maintain steady progress on the Project, key stakeholders and municipalities within the study area were asked to sign the Point Defiance Bypass Project Technical Advisory Group Operating Plan and be part of two advisory teams: a Technical Advisory Group and an Executive Advisory Team. The Technical Advisory Group provides technical review and feedback on the Point Defiance Bypass Project Environmental Assessment, and to submit recommendations for review by the Executive Advisory Team. The Executive Advisory Team meets regularly to review and comment on updates to transportation analyses and other environmental work produced by project staff and technical advisory team – specifically focusing on potential traffic effects. The Operating Plan is presented in Appendix R. The advisory team partners include:

- Federal Railroad Administration
- Washington State Department of Transportation
- Federal Highway Administration
- Sound Transit
- City of Lakewood, WA
- DuPont, WA
- Pierce County, WA
- City of Tacoma, WA
- Joint Base Lewis-McChord
- National Guard
- Clover Park School District

WSDOT provides regular updates and receives input from the governor's office, Washington State U.S. Senators and Representatives, and Washington legislators. Meetings with both the Technical Advisory Team and Executive Advisory Team have been held since 2010 (Table 20).

Table 20. Summary of Advisory Team Meetings

Technical Advisory Team Meetings	Executive Advisory Team Meetings
June 29, 2010	June 29, 2010
July 15, 2010	August 5, 2010
July 29, 2010	September 9, 2010
August 12, 2010	October 7, 2010
August 26, 2010	November 4, 2010
September 23, 2010	February 3, 2011
October 21, 2010	April 7, 2011
January 20, 2011	June 2, 2011
March 17, 2011	July 7, 2011
May 19, 2011	December 1, 2011
June 16, 2011	January 9, 2012
October 18, 2011	March 29, 2012
November 15, 2011	
January 19, 2012	
March 29, 2012	

In December 2011, FRA sent letters to the chairpersons of the Nisqually Tribe, Snoqualmie Nation, Puyallup Tribe, Squaxin Island Tribe, and the Yakama Nation, initiating formal government-to-government consultation and advising of the change in the Project's termini. None of the tribes accepted the invitation to consult; however, several expressed interest in or support of the Project.

In compliance with Section 7 of the Endangered Species Act (ESA), FRA and WSDOT completed a biological evaluation to document potential Project effects to ESA-listed species and designated critical habitats. The assessment indicated that the Project would be constructed entirely with the existing right-of-way of the established rail corridor within a developed region with high ambient noise and human activity levels. The assessment concluded that the Project would have no effect on any federally-listed terrestrial species or any designated critical habitat, or on any federally-listed aquatic species or any Essential Fish Habitat under the Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996. FRA provided copies of this correspondence to the US Fish and Wildlife Service, the NMFS in July 2012. Concurrence from NMFS was received on August 23, 2012. Consultation letters are presented in Appendix S.

In compliance with Section 106 of the National Historic Preservation Act, FRA and WSDOT submitted a no adverse effect determination letter to SHPO. Concurrence on the no adverse effect determination was received on September 26, 2012 from SHPO. The consultation letters are presented in Appendix S.

6.0 LIST OF PREPARERS

The following list of prepares includes those individuals that collaboratively prepared this EA for the FRA.

Name/Title	Affiliation	Education	Years of Experience
Buffington, Lori – Technical Editor	HDR	Business Administration studies, Portland Community College	34
Cleveland, Leandra – Environmental Scientist	HDR	Bachelor of Science, Environmental Sciences/Studies	13
Gregory, James – Environmental Scientist	HDR	Bachelor of Science, Biological/Life Sciences	27
Mattson, Larry – Environmental Manager	WSDOT	MS, Natural Resource Management; BA, Political Science	18
Metcalf, Josh – Transportation Engineer	HDR	Master of Engineering, Engineering Management; Bachelor of Civil Engineering	12
Ostrem, Meagan – Environmental Scientist	HDR	Bachelor of Science, Environmental Sciences/Studies	10
Roalkvam, Carol Lee – Policy Branch Manager	WSDOT	Master of Arts, Environmental Studies/Political Science	19
Snead, Carol – Environmental Scientist	HDR	Master of Science, Geological and Related Sciences	27
Turano, Tony – Graphics	HDR	Associate of Arts, General Studies	17

7.0 ABBREVIATIONS AND ACRONYMS

ACM	Asbestos-containing material
ADA	Americans with Disabilities Act
APE	area of potential effect
BMP	best management practice
BNSF	Burlington Northern-Santa Fe
BTU	British thermal units
CAA	Clean Air Act
CalTrans	California Department of Transportation
CAO	Critical Areas Ordinance
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2e	CO_2 equivalents
Corps	United States Army Corps of Engineers
CSWPPP	Construction Stormwater Pollution Prevention Plan
CWA	Clean Water Act
DAHP	Department of Archaeology and Historic Preservation
dBA	A-weighted decibel
DCE	dichloroethylene
DMC	DuPont Municipal Code
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EFH	essential fish habitat
EJ	environmental justice
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FR	Federal Register
FRA	Federal Railroad Administration
FSC	Federal Species of Concern
FT	Federally Threatened
FTA	Federal Transit Administration
GHG	greenhouse gas
GRP	General Reporting Protocol
HRM	Highway Runoff Manual
HSIPR	High-Speed Intercity Passenger Rail
I-5	Interstate 5
JBLM	Joint Base Lewis McChord
LEP	Limited English Proficiency
LMC	Lakewood Municipal Code
LOS	level of service
LUST	leaking underground storage tank
LWCFA	Land and Water Conservation Fund Act
Mbtu	one million British Thermal Units

MP	mile post
mpg	miles per gallon
MSAT	Mobile Source Air Toxics
MTCA	Model Toxics Control Act
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_X	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
Pb	lead
PM	particulate matter
PM_{10}	particles of 10 micrometers (microns) or less
$PM_{2.5}$	particles less than 2.5 micrometers (microns) in aerodynamic diameter
PNWRC	Pacific Northwest Rail Corridor
RCFB	Recreation and Conservation Funding Board
RCW	Revised Code of Washington
SAFETEA-LU	Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users
SCUP	Shoreline Conditional Use Permit
SEPA	State Environmental Policy Act
SIP	State Implementation Plan
SM	State Monitor
SMA	Shoreline Management Act
SO_2	sulfur dioxide
SPCCP	Spill, Prevention, Control, and Countermeasure Plan
SSDP	Shoreline Substantial Development Permit
TCE	Trichloroethene
TESC	Temporary Erosion and Sediment Control
TMC	Tacoma Municipal Code
TR	Tacoma Rail
USC	United States Code
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
VdB	vibration velocity units
VOC	volatile organic compound
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
§	Section

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Appendices

The following appendices are available under separate cover:

Appendix A: Alternatives Analysis
Appendix B: Grade Separation Concept Evaluation
Appendix C: Air Quality Discipline Report
Appendix D: Air Quality Discipline Report Erratum
Appendix E: Noise and Vibration Discipline Report
Appendix F: Traffic and Transportation Discipline Report
Appendix G: Railroad Crossing Traffic Effect Analysis at C and D Streets
Appendix H: Geology and Soils Discipline Report
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Appendix K: Fish, Vegetation, and Wildlife Discipline Report
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