North Wenatchee Capacity Improvements
Risk Assessment
October 2017

Prepared for

Chelan-Douglas TRANSPORTATION COUNCIL
CDTC

October 2017

Prepared by

Parametrix

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Chelan-Douglas Transportation Council
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ACRONYMS AND ABBREVIATIONS

CDTC	Chelan-Douglas Transportation Council
City	City of Wenatchee
cm	centimeters
Corps	U.S. Army Corps of Engineers
CFR	Code of Federal Regulations
DAHP	Department of Archaeology and Historic Preservation
DPS	Distinct Population Segment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
GMA	Growth Management Act
HAER	Historical American Engineering Record
HGM	hydrogeomorphic
IDP	Inadvertent Discovery Plan
IP	Individual Permit
LOS	Level of Service
MOA	Memorandum of Agreement
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OHWM	ordinary high water mark
PUD	Public Utility District
RM	river mile
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SFA	Sustainable Fisheries Act
SHPO	State Historic Preservation Office

ACRONYMS AND ABBREVIATIONS (CONTINUED)

SMP	Shoreline Master Program
SR	State Route
TCP	Traditional Cultural Property
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WCC	Wenatchee City Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
WVTC	Wenatchee Valley Transportation Council

EXECUTIVE SUMMARY

Introduction

Traffic congestion on State Route (SR) 285 in North Wenatchee has grown in recent years, and will continue to increase as more residents and jobs come to the Wenatchee Valley. Congestion makes travel slower, impedes access to businesses, hinders economic development, and creates safety issues for pedestrians and bicyclists as well as vehicles. Because of the SR 285 corridor's importance in the regional transportation network and economy, addressing this congestion is a critical regional issue.

Over the last several years, a number of planning studies (discussed in Chapter 2 of this Risk Assessment) have assessed the expected future levels of congestion in North Wenatchee and identified alternatives for addressing it through new roadway capacity, traffic and access management strategies, or a combination of these. The recommended solution was a north-south bypass east of SR 285, called Confluence Parkway, which would provide a new connection across the Wenatchee River between the developing Olds Station and Sunnyslope areas and points to the south. Traffic modeling demonstrated that the bypass would benefit passenger vehicles, freight, and transit as well as providing an important alternative route to and from Wenatchee in emergency situations.

While Confluence Parkway would have substantial transportation benefits, it would also have the potential for impacts on park and wildlife areas, cultural resources, shorelines, wetlands, and habitat for endangered salmon and steelhead. For the project to proceed, impacts to these resources would need to be evaluated under the National Environmental Policy Act (NEPA) and receive permits under a variety of federal, state, and local environmental regulations. In anticipation of these requirements, the Chelan-Douglas Transportation Council (CDTC) initiated this pre-NEPA study in 2016. Its purpose is to determine whether any of the potential impacts of a new crossing is substantial enough to present a fatal flaw. Specifically, the goals of the pre-NEPA study are to:

- Identify whether the alternatives, as currently planned, are likely to result in denials of environmental permits or approvals because of its expected level of impact.
- Determine whether the alternatives pose a high risk of NEPA appeal due to concerns regarding the purpose and need or alternatives evaluation.

- Determine whether mitigation costs would be sufficiently high enough to make the alternatives financially infeasible.
- Assess whether design refinements and/or alternative alignments could reduce the level of regulatory risk and/or lower mitigation costs.

Project Purpose and Need

An early task for the study was to develop a draft Purpose and Need statement for the project. The Purpose and Need statement is a critical aspect of NEPA analysis, setting the stage for the identification and evaluation of project alternatives. Alternatives that fail to meet the Purpose and Need can be eliminated from consideration. The Purpose and Need statement also helps support the selection of a preferred alternative; all other factors being equal, an alternative that meets the project purpose better than others is likely to emerge as the preferred. A final Purpose and Need statement would be developed in partnership with, and ultimately approved by, the Federal Highway Administration during development of a NEPA document. The following draft Purpose and Need statement was developed for the pre-NEPA study and is recommended as starting point for a formal NEPA evaluation:

> The purpose of the project is to provide capacity for general-purpose, freight, nonmotorized, and transit traffic, and to improve system connections and redundancy within North Wenatchee in order to meet predicted travel demand, relieve congestion, improve safety, and support planned economic development in North Wenatchee and the city as a whole.

Chapter 3 of this Risk Assessment provides more detail on the needs that the project is intended to meet. Figure ES-1 shows the highway network and existing choke points in the urban area of Wenatchee (this urbanized area is not served by an interstate highway).

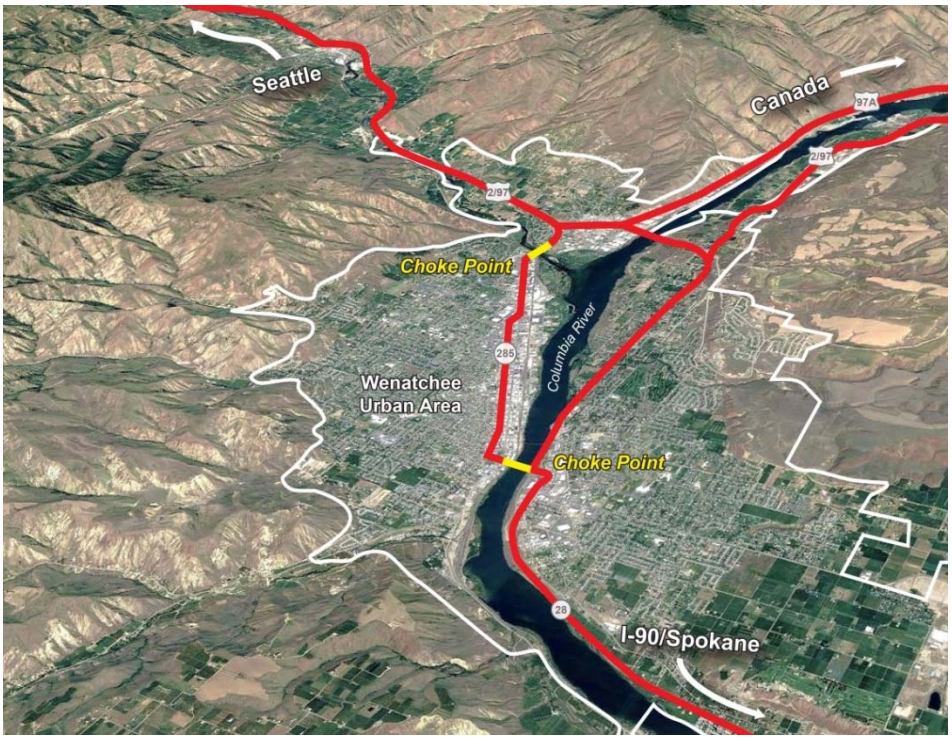


Figure ES-1. Wenatchee Urban Area Transportation Network

Alternatives Evaluated and Impact Analysis

To evaluate the potential environmental impacts of Confluence Parkway, project engineers developed a conceptual design layout that made it possible to gauge the approximate level of impact the new roadway was likely to have. Because the analysis of alternatives is an important component of the NEPA process, a concept was also developed to provide approximately the same amount of new traffic capacity by widening North Wenatchee Avenue to six through lanes. These alternatives are described in Chapter 4 of this Risk Assessment. Chapters 5 through 9 evaluate both alternatives for their impact in the areas the consultant team identified as most likely to result in potential NEPA and permitting concerns: cultural resources, wetlands, fisheries, parks, and land use and displacements.

In general, impacts on elements of the natural environment studied (wetlands and fisheries) were assessed to be relatively minor and straightforward to mitigate. Impacts on the built environment (parks, cultural resources, and land use) were greater and could potentially, in some cases, require substantial mitigation. Confluence Parkway could require the use of property from Wenatchee Confluence State Park and could affect a documented archaeological site within the park; these resources are protected by strict federal laws, including Section 4(f) of the Department of Transportation Act and Section 106 of the National Historic Preservation Act. Widening of North Wenatchee Avenue, while it would not affect park lands, would require extensive right-of-way acquisition along the corridor and displace or disrupt access to a number of businesses, conflicting with City and regional goals for economic development.

Risk Assessment

The matrices below (Tables ES-1 through ES-3) summarize the risk evaluation for each alternative and environmental element related to risks associated with environmental permits and approvals, mitigation cost and complexity, and support for the project Purpose and Need. A full discussion of the risk analysis is presented in Chapter 10 of this Risk Assessment.

The Confluence Parkway Alternative presents a moderate-to-high degree of risk. This risk stems primarily from the potential use of a portion of Wenatchee Confluence State Park to construct the proposed roadway. Chelan County Public Utility District (PUD), which owns the park property, has expressed significant concerns about potential park impacts. The PUD has also expressed openness to exploring mitigation to address these concerns through the NEPA process, and has acknowledged the possibility that park impacts could be satisfactorily mitigated. The nature and cost of mitigation have yet to be determined and could significantly affect project costs. In addition, while both the Colville Tribes and Yakama Nation have indicated that impacts to the Wenatchee Flat site can likely be mitigated, archaeological survey work will be required during the design process to ensure that significant cultural resource deposits can be avoided or appropriately collected and documented. If disturbance of cultural deposits cannot be avoided, a full survey of the site, as well as extensive documentation, may be necessary. The combined costs of park and cultural resource mitigation measures are not likely to make the project infeasible, but could be substantial.

Table ES-1. Summary of Risk Related to Environmental Permits and Approvals

Resource	Confluence Parkway	North Wenatchee Avenue
Cultural		
Wetlands		
Fisheries		
Parks and Section 4(f)		
Land Use		

Color Key:

Low Risk Moderate Risk High Risk

Table ES-2. Summary of Relative Mitigation Cost and Complexity

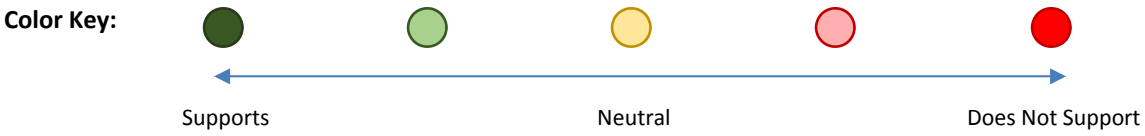
Resource	Confluence Parkway	North Wenatchee Avenue
Cultural		
Wetlands		
Fisheries		
Parks and Section 4(f)		
Land Use		

Color Key:

Low Cost/Complexity Moderate Cost/Complexity High Cost/Complexity

Table ES-3. Summary of Alternatives' Support for Purpose and Need

Project Need	Confluence Parkway	North Wenatchee Avenue	No Action
Transportation Capacity/Congestion Relief			
Connectivity to Regional System			
Support for Transit/Reduced Bus Travel Times			
Community and Economic Development			
Safety and Emergency Response			



The North Wenatchee Avenue Alternative was assessed as having moderate risk. The greatest area of potential risk and cost would be the displacement of businesses and acquisition of property along North Wenatchee Avenue. The value of the businesses displaced would be substantial, and would come with an as-yet-unknown expenditure for access revisions, signage replacement, and potential acquisition of additional businesses that were unable to remain viable on the portion of the parcel not needed for right-of-way. Beyond the cost risk, however, perhaps the greatest concern related to this alternative is its inconsistency with local planning and policy priorities. While widening North Wenatchee Avenue would add capacity and improve congestion, these benefits would come at the cost of impacts to existing businesses and a reduced ability to support future economic development as characterized in the City's adopted planning documents. The City would continue to rely on a single crossing of the Wenatchee River for access to and from the north, creating a potentially high-risk situation if evacuation is required; in addition, safety and accessibility for pedestrians and bicyclists would be compromised by the wider cross-section and increased traffic flow.

The No Action Alternative would not result in risks or capital costs related to new infrastructure. However, it would fail to meet all aspects of the project Purpose and Need. It would not provide new transportation capacity, which over time would result in steadily increasing congestion along North Wenatchee Avenue and elsewhere in the city. Ultimately, this congestion would undermine community and economic development goals, discouraging new development in the corridor and potentially affecting business revenues. Congestion would also increase transit travel times, slow emergency response, and reduce the safety and desirability of walking and bicycling in the corridor. For all these reasons, No Action would be inconsistent with the City's and region's planning and policy direction.

Conclusion

Despite the potential risks and costs of the Confluence Parkway Alternative, it would be the most effective of the alternatives studied in meeting the project Purpose and Need. In addition to providing needed new capacity to support population and employment growth, Confluence Parkway would improve connectivity to the regional transportation system and within Wenatchee, and would enhance safety and emergency response by relieving congestion and providing alternative north-south access across the Wenatchee River. Confluence Parkway would support economic development through its consistency with current planning processes, and by avoiding impacts to existing business districts while improving access to growing areas. It is fully consistent with the local and regional plans evaluated for this study. Although rated as moderate-to-high risk, the element of potential high risk for Confluence Parkway is narrowly related to the uncertainty at this early stage as to whether Confluence Parkway can be designed in a manner that protects or enhances Confluence State Park to the satisfaction of key stakeholders. Because that cannot be known in advance, this report indicates the possibility of high risk. However, there may be opportunities to reduce the risk level for Confluence Parkway based on ongoing dialogue among CDTC, the City of Wenatchee, Chelan PUD, and Washington State Parks.

The North Wenatchee Avenue Alternative, while it would provide congestion relief and would be lower in several risk areas, would not meet several aspects of the Purpose and Need and would conflict with a number of adopted transportation and land use plans and policies.

The No Action Alternative—because it fails to meet the Purpose and Need and is inconsistent with applicable plans and policies—is not considered a viable option.

1. INTRODUCTION

The need for congestion relief on State Route (SR) 285 in North Wenatchee was identified in the 2010 *Confluence 2030* regional transportation plan. This plan, along with the 2011 *North Wenatchee Transportation Master Plan,* determined that existing congestion in Wenatchee—particularly in North Wenatchee—would increase substantially by 2030 due to predicted growth in population and employment. The plans concluded that growth in travel demand would increase travel times, exacerbate existing access and safety issues, and hinder economic vitality throughout the region, with North Wenatchee Avenue identified as the major problem area and traffic bottleneck.

Prior planning efforts considered a variety of alternatives to address the forecasted congestion. These alternatives included a new Columbia River crossing, widening and other improvements on North Wenatchee Avenue, transit and nonmotorized enhancements, and north-south bypasses of North Wenatchee Avenue to the west (Western Avenue alignment) and east (Confluence Parkway) of SR 285. The final recommendation was that the Confluence Parkway bypass, in combination with access management and related multimodal improvements to North Wenatchee Avenue, would best enhance mobility and support planned economic development. The 2015 *Transportation 2040* regional plan confirmed the previous plans' growth forecasts and emphasized the importance of added north-south capacity; it identified Confluence Parkway as a "Phase 2" project for implementation between 2028 and 2040. All three plans included extensive involvement by agencies with jurisdiction, project stakeholders, and the public.

While the proposed Confluence Parkway project with a new Wenatchee River crossing would have substantial transportation benefits, it would also have the potential for impacts on park and wildlife areas, cultural resources, shorelines, wetlands, and habitat for endangered salmon and steelhead. For the project to proceed, impacts on these resources would need to be evaluated under the National Environmental Policy Act (NEPA) and receive permits under multiple federal, state, and local environmental regulations. In anticipation of these requirements, the Chelan-Douglas Transportation Council (CDTC) initiated this "pre-NEPA" study in 2016. Its purpose is to determine whether any of the potential impacts of a new crossing are substantial enough to present a fatal flaw. Specifically, the goals of this pre-NEPA Risk Assessment study are to:

- Identify whether Confluence Parkway, as conceptualized, is likely to result in denials of environmental permits or approvals because of its expected level of impact.
- Determine whether Confluence Parkway, as conceptualized, poses a high risk of NEPA appeal due to concerns regarding the Purpose and Need or the evaluation of alternative solutions.
- Determine whether environmental impact mitigation costs would be sufficiently high enough to make Confluence Parkway, as conceptualized, financially infeasible.
- Assess whether design refinements and/or alternative alignments to Confluence Parkway, as conceptualized, could reduce the level of regulatory risk and/or lower mitigation costs.

The analysis completed for this Pre-NEPA Risk Assessment study will inform a decision on an appropriate range of alternatives in a NEPA environmental review. These alternatives will focus on providing needed transportation system capacity, connectivity, and redundancy to support sustainable long-term local and regional growth, while meeting the project's Purpose and Need. This study will also help to serve as a foundation for future NEPA analysis should a decision be made to proceed with the project. However, it is important to note that this study is based on early schematic design concepts that support only a high-level evaluation of potential environmental impacts, and should not be considered to constitute a full NEPA analysis. More detailed and refined information, along with agency and tribal consultation, will be required to support formal review under NEPA. Figure 1 shows the project vicinity.

Figure 1.
Project Vicinity

2. PLANNING BACKGROUND

SR 285 in North Wenatchee has been identified in several transportation plans as a corridor that will experience increasing levels of congestion by 2030 due to planned growth in population and employment. *Confluence 2030*, *North Wenatchee Transportation Master Plan*, and *Transportation 2040* are three regional and local plans concluding that, without additional capacity and connectivity across rivers within the urbanized area, growth in travel demand would drastically increase travel times, exacerbate existing access and public safety issues, and hinder economic vitality throughout the region, with North Wenatchee Avenue identified as a major problem area.

2.1 Confluence 2030

Prepared in 2010 by the Wenatchee Valley Transportation Council (WVTC), the CDTC's predecessor, *Confluence 2030* was a long-range metropolitan transportation plan for the urban areas of Wenatchee, East Wenatchee, and Rock Island. *Confluence 2030* served as a 20-year regional transportation plan that identified transportation improvements in support of community and economic development goals. The plan built on previous efforts, including *Confluence 2025* and the 1997 *Wenatchee Area Transportation Study*. It has since been superseded by *Transportation 2040* (described below), but many of its recommendations continue to serve as a foundation for current planning.

Confluence 2030 recognized SR 285/North Wenatchee Avenue as a "Regional Mobility Corridor" that provides primary access into and out of Wenatchee for both residents and regional commuters. Although mobility at the time of the plan's development was good, with short commute times and little congestion, by 2030 the corridor was forecasted to operate at a deficient level with lengthy commute times and increased congestion. A number of alternatives were evaluated to address these deficiencies; they are described further in Appendix A of this report.

Confluence 2030 included recommendations for unfunded major regional mobility improvements and fiscally constrained transportation project priorities for 2010 to 2030. North Wenatchee Avenue corridor improvements and a new Wenatchee River bridge (from Western Avenue to US 2/US 97) were included in the list of potential major regional mobility improvements that did not have an identified funding source.

2.2 North Wenatchee Transportation Master Plan

The *North Wenatchee Transportation Master Plan* established a blueprint for improving safety and traffic flow in a manner that supports economic growth in the SR 285/North Wenatchee Avenue corridor. The corridor plan was prepared by CDTC (then known as WVTC) and adopted in February 2011. The plan specifically focused on North Wenatchee Avenue between US 2 and 5th Street, north of downtown Wenatchee, and identified improvement projects, programs, and policy direction to enhance the transportation function of the corridor in order to support land use plans and economic development. The goal of the plan was to "identify and implement strategies to improve transportation safety, traffic flow, and connectivity while enhancing the environment for businesses and residents in the corridor and accommodating planned growth and development within the Valley."

The plan identified a number of potential alternatives for improving traffic flow and safety in North Wenatchee. These alternatives are discussed in Appendix A of this report. The plan's final recommendations included a "Confluence Parkway" concept, which would construct a new two-lane arterial corridor to increase north-south capacity and connectivity parallel to SR 285/North Wenatchee

Avenue. The recommendations also included several safety, circulation, and streetscape improvements to SR 285/North Wenatchee Avenue.

2.3 Transportation 2040

Transportation 2040 was adopted in 2015 by the CDTC as the Regional Transportation Plan for the urban, rural, and small city areas in Chelan and Douglas counties. It replaced *Confluence 2030* as the guiding metropolitan/regional transportation plan. *Transportation 2040* identifies transportation deficiencies and opportunities, and recommends transportation system investment in three categories—system preservation, system improvements, and system expansion. Projects are programmed over three phases based on year of expenditure. As in *Confluence 2030*, there is an emphasis on continued regional growth in population and employment, coupled with an imbalance between the location of jobs versus housing exacerbated by topography, rivers, and limited roadway connections. This is projected to put increased strain on the regional transportation system—especially for trips across the Columbia and Wenatchee Rivers, which is problematic because of lack of river crossing options in the Wenatchee urban area. The plan concludes that current short commute times would likely increase due to the limited options available for increasing the capacity of the existing road network.

Transportation 2040 confirmed the previous plans' growth forecasts and emphasized the importance of added north-south capacity. The plan identified Confluence Parkway as a "Phase 2" project for implementation between 2028 and 2040. North Wenatchee area corridor improvements are listed for Phase 1, for implementation between 2016 and 2027.

3. PURPOSE AND NEED

A project's Purpose and Need statement is a critical aspect of NEPA analysis, setting the stage for the identification and evaluation of project alternatives. It begins with a concise statement of the positive outcomes the project is intended to achieve—the "purpose statement"—which in turn is supported by a discussion of the factors driving the need for these changes. For roadway transportation projects, the Federal Highway Administration (FHWA) has identified nine specific factors that may be helpful in establishing the need for a given project. Six of these factors apply to the North Wenatchee Capacity Improvements Project and are discussed below.

Once it is agreed upon by the project sponsor, FHWA, and other agencies with permitting authority, the Purpose and Need statement becomes a tool for establishing a range of reasonable alternatives to consider in a formal NEPA document. Alternatives that fail to meet the project's Purpose and Need can be eliminated from consideration. The Purpose and Need statement also provides justification for the selection of a preferred alternative; all other factors being equal, an alternative that meets the project purpose better than others is likely to emerge as the preferred.

The draft Purpose and Need statement presented in this chapter for the North Wenatchee Capacity Improvements Project has been reviewed by members of the project steering committee, but has not been formally reviewed or approved by the Washington State Department of Transportation (WSDOT), FHWA, or other agencies with jurisdiction over potentially affected environmental resources. However, it accurately reflects the CDTC's and the City of Wenatchee's goals for the project and the needs that it is intended to address. Should the project advance to formal NEPA analysis, the Purpose and Need statement would be updated and revised as necessary in coordination with WSDOT, FHWA, and cooperating agencies.

3.1 Purpose of the Project

The purpose of the project is to provide capacity for general-purpose, freight, nonmotorized, and transit traffic, and to improve system connections and redundancy within North Wenatchee in order to meet predicted travel demand, relieve congestion, improve safety, and support planned economic development in North Wenatchee and the region as a whole.

3.2 Need for the Project

3.2.1 Project Status

The future need for congestion relief on SR 285 was identified in the 2010 *Confluence 2030* regional transportation plan. This plan, along with the 2011 *North Wenatchee Transportation Master Plan,* determined that existing congestion in Wenatchee—particularly in North Wenatchee—would increase substantially by 2030 due to predicted growth in population and employment. The plans concluded that growth in travel demand would increase travel times, exacerbate existing access and safety issues, and hinder economic development throughout the region, with North Wenatchee Avenue identified as a major problem area.

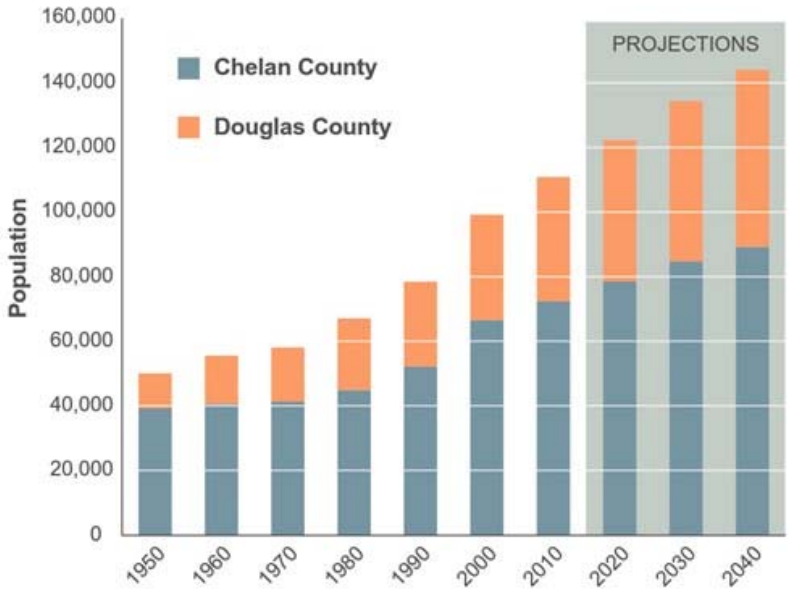
Prior planning efforts considered a broad range of alternatives to address the forecasted congestion. These alternatives included new Columbia River crossings, widening and other improvements on North Wenatchee Avenue, transit and nonmotorized enhancements, and north-south bypasses of North Wenatchee Avenue to the west (Western Avenue alignment) and east (Confluence Parkway) of SR 285.

The final recommendation was that the Confluence Parkway bypass, in combination with access management and related multimodal improvements to North Wenatchee Avenue, would best enhance mobility and support planned economic development. The 2015 *Transportation 2040* regional plan confirmed the previous plans' growth forecasts and emphasized the importance of added north-south capacity; it identified Confluence Parkway as a "Phase 2" project for implementation between 2028 and 2040. All three plans included extensive involvement by agencies with jurisdiction, project stakeholders, and the public.

While the proposed Confluence Parkway project would have substantial transportation benefits, it would also have the potential for impacts on park and wildlife areas, cultural resources, shorelines, wetlands, and habitat for endangered salmon and steelhead. As a result, CDTC initiated a pre-NEPA study in 2016 to further define the parkway concept, determine whether any of the potential impacts are substantial enough to present a fatal flaw to the Confluence Parkway concept, and identify whether potential alternative approaches exist to address the project's purpose and need. This analysis will inform a decision on an appropriate range of alternatives for providing needed transportation system capacity, connectivity, and redundancy to support sustainable long-term local and regional growth.

3.2.2 Transportation Demand and Capacity

Confluence 2030, the *North Wenatchee Transportation Master Plan,* and *Transportation 2040* all concluded that North Wenatchee Avenue would experience significant capacity constraints from 2030 to 2040 due to growth in regional population and employment (see Figure 2). While overall mobility is relatively good today, with traffic delays mainly limited to individual bottleneck locations where no parallel routes exist, future conditions without transportation system improvements are predicted to result in a level of congestion that would affect the entire regional system and economy. Delays and longer trip lengths resulting from congestion would impose a substantial burden on travelers, businesses, transportation operators, and emergency responders.



Source: *Transportation 2040*

Figure 2. Regional Population Growth

Recent origin-destination studies show that North Wenatchee Avenue is the focus of a large proportion of travel demand not only within the city of Wenatchee, but in Chelan and Douglas counties. As a result, the corridor would need to accommodate a large share of the traffic resulting from regional growth. Studies completed in 2010 to 2011 forecasted significant congestion in the North Wenatchee Avenue corridor by 2030; the studies predicted that a number of key intersections would have failing Level of Service (LOS), and that general-purpose, freight, and transit traffic in the corridor as a whole would experience considerable delay. The *Confluence 2030* analysis estimated that traveling along North Wenatchee Avenue between US 2 and the N. Miller Street intersection would take 33 minutes in 2030, an almost five-fold increase from the 7 minutes at that time.

Recent traffic counts (2016) demonstrate that growth in traffic volumes is occurring at a faster rate than predicted in those prior forecasts. The predicted congestion would impede access to businesses in the corridor and make it more difficult to move between designated employment centers.

Nonmotorized system capacity is also inadequate in the North Wenatchee Avenue corridor. Pedestrians and cyclists currently have very limited accessibility and connectivity due to high traffic volumes, wide crossing distances, and discontinuous sidewalks resulting from wide curb cuts and lack of access management. The *Transportation 2040* plan identifies most of North Wenatchee Avenue as having both relatively high pedestrian demand and extensive pedestrian deficiencies. This situation would only become worse and more unsafe as congestion grows over time. The City's Comprehensive Plan emphasizes the importance of nonmotorized transportation in the overall transportation system, and includes a goal of significantly improving pedestrian and bicycle facilities and transit service in order to expand the capacity and effectiveness of the existing system's infrastructure.

3.2.3 System Linkage

The topography of the Wenatchee Valley presents various challenges that limit options for addressing transportation needs as depicted in Figure 3. The region lies at the confluence of two river valleys, and is bordered on the east and west by steep terrain that is infeasible to develop in some areas and cost-prohibitive to develop in others. As a result of these constraints, North Wenatchee Avenue is a focal point for traffic within the entire Chelan-Douglas counties region, and the existing pair of two-lane SR 285. The existing SR 285 Wenatchee River bridges form one of only two roadway connections in and out of the city (the other being the Sellar Bridge across the Columbia River at the south end of Wenatchee).

The roadway north of the existing Wenatchee River bridges provides eight to twelve lanes of arterial network capacity, and the roadway to the south is a five-lane section with turn lanes. However, the section of SR 285 crossing the river is only four lanes wide. As a result, it has become the region's primary traffic bottleneck, restricting traffic flow during peak travel periods and limiting access between downtown Wenatchee and the growing Olds Station and Sunnyslope areas north of the Wenatchee River. The fact that this constrained crossing forms the sole link across the Wenatchee River limits overall system connectivity and fails to provide redundancy should the existing SR 285 bridges require repairs, or in the event of a catastrophic event such as the 2015 Sleepy Hollow wildfires, or a significant flood. Incomplete system linkages also impair freight mobility. Freight and commercial traffic is forced to use the already congested SR 285 corridor to travel between US 2, industrial properties in the Olds Station area, and downtown Wenatchee. Freight vehicles must use SR 285 to connect between designated City freight routes north of the river (Euclid Avenue) and south of the river (E. Hawley and N. Miller Streets).

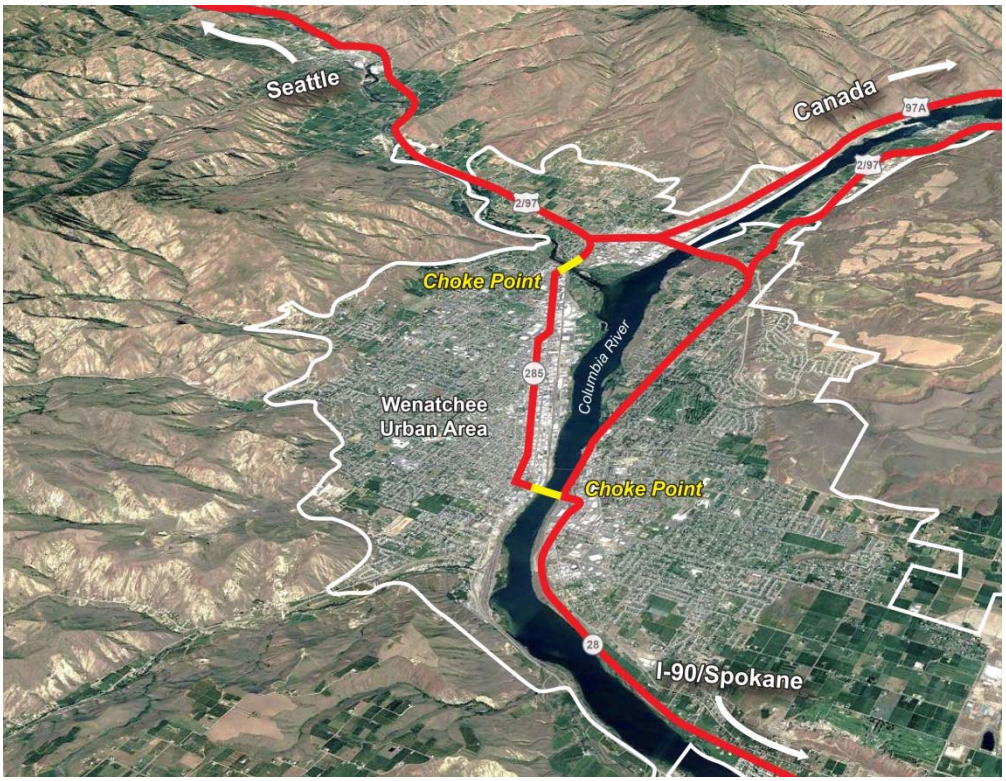


Figure 3. Wenatchee Urban Area Topography

At a more regional level, added capacity across the Wenatchee River on the Confluence Parkway alignment would improve connectivity and make better use of existing system assets by increasing utilization of the already constructed US 2/SR 97A interchange. This would enhance access to the State Highway system and the Odabashian Bridge across the Columbia River, which has considerable excess capacity.

3.2.4 Multimodal Transportation

North Wenatchee Avenue is served by two Link Transit routes: Route 8W, which provides local service between Olds Station and the Valley North Center; and Route 22, which provides intercity service between Wenatchee and Leavenworth. Connections to other routes are available at Olds Station and at Valley North Center. In addition to the transit center and park-and-ride at Olds Station, Link Transit's Operations Base is located there and contains fleet, fueling, and support facilities. Link's *Transit Development Plan* identifies near-term enhancements to transit service and facilities, which include upgraded equipment at bus shelters and stops, marketing to attract a larger ridership, and updates to service performance standards. A strategic planning effort is currently underway with input from riders, community partners, and other stakeholders; completion of the *Strategic Plan* is anticipated in 2017.

Demand for transit has increased strongly in recent years as a result of population and employment growth, traffic congestion, and demographic trends. Between 2003 and 2014, Link Transit's fixed-route ridership more than doubled from approximately 463,000 riders per year to approximately 987,000. The *North Wenatchee Transportation Master Plan, Confluence 2030,* and *Transportation 2040* all identify the importance of transit as a tool for effectively expanding the person-carrying capacity of primary transportation corridors, and emphasize the need to improve connections between nonmotorized transportation facilities and the transit system.

However, while increased transit use will help to alleviate future congestion in the North Wenatchee Avenue corridor, buses are unable to bypass congested conditions in the corridor and therefore are likely to experience increasing service delays as traffic volumes grow over time. In addition, as development patterns change, further improvements to transit service may be necessary to ensure that transit is adequately supporting and connecting designated business districts, activity centers, and development nodes such as the Olds Station and Sunnyslope areas, the North Wenatchee Avenue commercial corridor, and the Wenatchee Waterfront.

3.2.5 Social or Economic Development

The economy of Wenatchee and Chelan County has historically been resource-based, and agricultural processing, distribution, and business services continue to be the area's dominant industry and source of employment. The seasonality of many agricultural jobs tends to result in relatively low wages; median household income in Chelan County was $50,876 in 2014, compared to $60,294 for the state of Washington, and the poverty rate in the county was 16 percent, compared to 13.2 percent for the state. To achieve its economic development goals and increase wages and opportunities, the City of Wenatchee has focused on diversifying its economy. In addition to growth in the health care and tourism industries, the City is encouraging startups and innovative technologies, especially those that take advantage of the area's agricultural traditions and its access to low-cost power. Because of the large geographic spread of employment opportunities and the fact that much of the labor force lives in South Wenatchee, both the traditional employment base and the newer, more diverse opportunities rely heavily on efficient and reliable transportation between home and work. North Wenatchee Avenue serves, and will continue to serve, much of the travel demand for this growing economy.

In addition to the general capacity needs created by regional growth, specific planned development areas on both sides of the Wenatchee River require additional north-south roadway capacity to reach their full potential, and to allow these mixed-use infill redevelopment nodes to be adequately served by transit. North of the river, the Olds Station area, which was recently annexed by the City of Wenatchee, is designated for industrial and commercial development. This area includes properties owned by the Port of Chelan County, including the Confluence Technology Center and Olds Station Business Park, as well as a substantial amount of developable land. Farther to the north of US 2 and within the newly annexed portion of the city, the industrial area along SR 97A is a major employment node with a labor force based primarily in the low-income neighborhoods in South Wenatchee. Job access is a significant challenge for this low-income community and the employers that provide economic opportunity, due to the transportation bottleneck in the North Wenatchee corridor.

South of the river, approximately 60 acres of land in the vicinity of the Hawley Street/Miller Street intersection is undergoing a master planning process for mixed-use residential, commercial, office, and light industrial development. The availability of new capacity providing efficient connections north and south of the river would allow these areas to develop in a manner that increases employment and multifamily housing in the city, in keeping with adopted land use plans. It would also support the existing businesses in the North Wenatchee Avenue corridor by improving access and providing faster and more reliable travel for general-purpose, transit, and delivery vehicles. Without improvements, these businesses would be increasingly affected by congestion, which over time would result in a disincentive to shop and use services in this important commercial area.

At a broader level, additional north-south capacity for general-purpose and freight traffic would support economic development by facilitating travel between designated employment centers, including the Olds Station area, the North Wenatchee commercial area, the waterfront area, and downtown Wenatchee. It would also improve conditions for the automobile-oriented businesses along North

Wenatchee Avenue by alleviating congestion in that corridor, which in turn would enhance access and reduce disincentives to patronizing those businesses. Furthermore, additional north-south capacity is critical for intercity commuter transit services that are negatively affected by the bottlenecks along the north end of SR 285.

3.2.6 Safety

North Wenatchee Avenue and its extension to US 2 experience a significant number of collisions each year. Between 2010 and 2014, collisions resulting in injuries occurred at 21 locations along SR 285 between US 2 and Miller Street, with six of these locations experiencing multiple injury collisions. Many of these collisions are related to poor traffic flow and congestion, which result in drivers making unsafe maneuvers or decisions. City police cite congestion as a primary traffic safety concern. High traffic volumes at intersections contribute to driver confusion and frustration, resulting in violations such as vehicles running red lights, changing lanes in an intersection, or blocking an intersection. The width of the corridor and the high traffic volumes have a negative impact on pedestrian safety at intersections, particularly for slower-paced or disabled people. The pedestrian deficiencies in the corridor also contribute to safety hazards, due to the large number of curb cuts and the tendency of vehicles to turn rapidly into driveways to avoid oncoming traffic.

Railroad crossings are another important safety issue in North Wenatchee. The BNSF mainline rail corridor runs parallel to North Wenatchee Avenue, with at-grade crossings located at Miller and Hawley Streets. North of the Wenatchee River, a spur track crosses Olds Station Road and Euclid Avenue at-grade. As traffic volumes increase in the future, the risk of vehicle-train or pedestrian-train collisions increases accordingly. This is of particular concern along the mainline tracks, which carry transcontinental rail traffic between Seattle and Chicago. The 2014 *Washington State Rail Plan* forecasts that rail traffic along the BNSF mainline through Wenatchee would increase from approximately 16 trains per day in 2010 to approximately 44 trains in 2035. This growth in rail traffic, compounded with the growth in vehicle traffic, has the potential to lead to increased safety hazards.

As noted above under System Linkages, North Wenatchee Avenue provides the City's only access and egress to the north. This poses safety concerns in cases where evacuation may be necessary, or where emergency situations require timely access to medical facilities in downtown Wenatchee. Congestion or closure of North Wenatchee Avenue could impede access to Confluence Health, the Wenatchee Valley's largest medical provider and trauma center.

4. RANGE OF ALTERNATIVES

Options for increasing capacity and improving traffic flow and safety in the Wenatchee Valley generally, and in North Wenatchee specifically, have been studied extensively over the past decade. The planning documents described in Chapter 2—*Confluence 2030,* the *North Wenatchee Transportation Master Plan,* and *Transportation 2040*—identified increasing congestion as a problem likely to impede future mobility, economic development, and safety. The plans looked at potential solutions for the regional network, such as new bridges across the Columbia River, but ultimately determined that congestion on SR 285 was one of the region's main bottlenecks, and that it would worsen considerably over the next 20 years.

Accordingly, several potential concepts were developed to address the problem. While these concepts were not part of a formal NEPA alternatives analysis, they were developed within the context of regional transportation planning efforts that were conducted with stakeholder input and the involvement of local and state agencies. Appendix A summarizes the previous concepts considered. A travel demand analysis, which was performed to confirm that capacity needs remain consistent with those described in the 2011 *North Wenatchee Transportation Master Plan*, is provided in Appendix B.

This chapter describes the alternatives considered in this study. These alternatives, which are based on the previous planning efforts, were developed to a schematic level of design to allow for preliminary environmental analysis. They include two action alternatives for adding north-south capacity in North Wenatchee—a new arterial, Confluence Parkway, and widening of North Wenatchee Avenue to six lanes. A No Action Alternative is also included to provide a baseline for evaluation of the potential improvements.

4.1 North Wenatchee Capacity Improvements Alternatives

The alternatives considered in this study continue to build on previous planning efforts. As noted above, Confluence Parkway was initially identified as a preferred concept in the *North Wenatchee Transportation Master Plan*, and then included in *Confluence 2030* and *Transportation 2040* as a priority for future implementation when funding became available. This solution repeatedly emerged as the preference because of its clear benefits in adding north-south capacity, improving multimodal mobility, supporting planned economic development, and enhancing safety. However, CDTC and the City of Wenatchee recognized that the environmental considerations and risks related to Confluence Parkway needed to be explored before a decision could be made to move forward with a project.

To address the potential that Confluence Parkway could have unacceptable environmental risks, an additional alternative was identified for consideration in this study. Building on the North Wenatchee Avenue corridor improvements identified in the *North Wenatchee Transportation Master Plan,* this alternative would include those recommended corridor improvements, but would also widen SR 285 to six through lanes to achieve the needed north-south traffic capacity. Both of these alternatives—Confluence Parkway and widening North Wenatchee Avenue—are described in this section along with a No Action Alternative, which is included as a baseline.

4.1.1 Confluence Parkway

The Confluence Parkway alternative, as conceptualized for the purpose of this study, would be a new two-lane arterial street that would begin on Euclid Avenue just north of Penny Road, bridge the Wenatchee River, and extend south to Miller Street, as shown in Figure 4. The parkway would have one 11-foot-wide travel lane and a 5-foot-wide bicycle lane in each direction. Other specific features, such as sidewalks and pedestrian/bicycle facilities, would vary by location and are described below.

From Euclid Avenue, Confluence Parkway would run southwest, crossing the BNSF spur tracks at-grade to join with the existing Isenhart Avenue. Penny Road would be extended eastward to intersect with Confluence Parkway, and the existing Euclid Court "stub" would form a T-intersection with the Penny Road extension. Several residential structures north of the "stub" would be acquired and demolished to construct this intersection; three of these buildings now house commercial businesses. Technology Center Way would also be extended across the BNSF spur and would form a T-intersection with the parkway. A block farther south, the current intersection of Isenhart Avenue with Olds Station Road would be realigned and moved to the west.

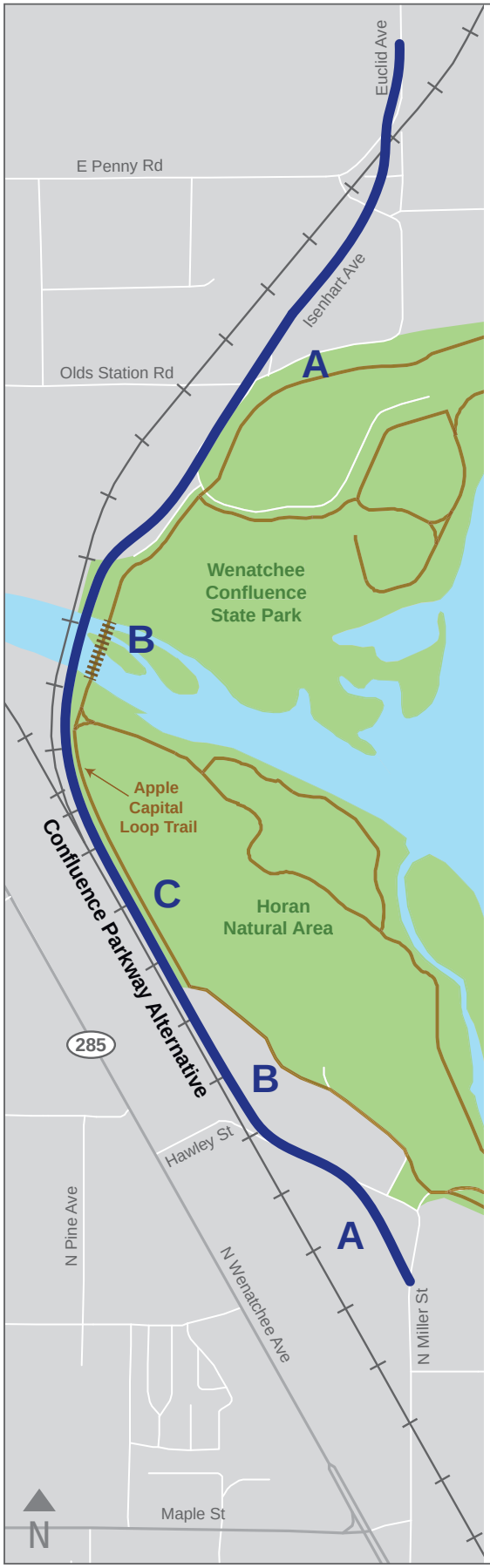
South of Isenhart Avenue, the new parkway would generally follow the alignment of the south branch of Olds Station Road that serves as the existing access road along the west side of Confluence State Park. Due to grade differential between the proposed alignment and the main entrance to the park facilities, the entrance may require a realignment to meet the new roadway. South of where the existing access road ends, the new road would hug the western edge of the park as closely as possible to minimize right-of-way acquisition. Three existing park structures (caretaker and maintenance facilities) would likely need to be relocated.

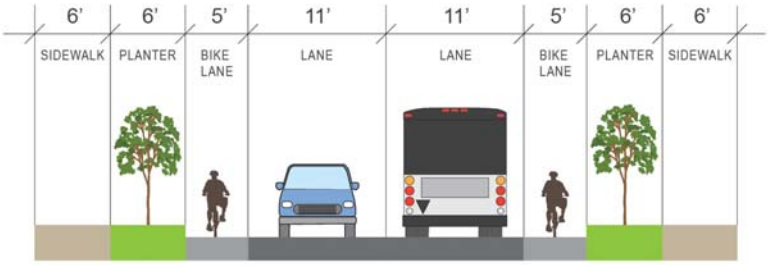
Between Penny Road and the Wenatchee Confluence State Park entrance, there would be a 6-foot-wide planted buffer adjacent to the curb and a 6-foot-wide sidewalk. North of the Wenatchee River, pedestrians would connect from the sidewalk to the existing Apple Capital Recreational Loop Trail (Apple Capital Loop Trail) and would use the trail's pedestrian/bicycle bridge to cross the river.

Confluence Parkway would cross the Wenatchee River on a new bridge approximately midway between the existing BNSF rail bridge and the Apple Capital Loop Trail pedestrian/bicycle bridge. The bridge would be a single span, with no structures (piers or abutments) in the water. The bridge structure would include an 11-foot-wide travel lane and a 5-foot-wide bicycle lane in each direction; there would not be a sidewalk on this new structure.

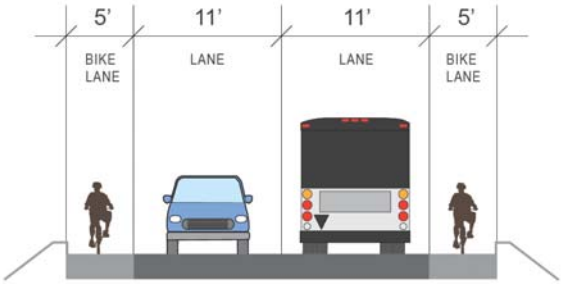
From the river crossing south to Hawley Street, the parkway would abut the east side of the BNSF right-of-way, which is east of and parallel to the existing alignment of North Wenatchee Avenue. The Apple Capital Loop Trail would converge with the parkway, running along its east side with a 10-foot-wide vegetated berm separating the trail from vehicle traffic. There would not be a sidewalk on the west side of the parkway between the Wenatchee River and Hawley Street because of its proximity to the railroad tracks; all pedestrians would use the trail on the east side. Between the Wenatchee River and Hawley Street, filling to the east of the Confluence Parkway alignment would be necessary at two "pinch points," where there is limited space between the BNSF right-of-way and the top of the bank that borders the west edge of the wetlands in the Horan Natural Area of Wenatchee Confluence State Park.

At the north end of the Chelan County Public Utility District (PUD) maintenance yard, located between Hawley Street and the park, the trail would diverge from the parkway, running along the east side of the PUD property. The Confluence Parkway alignment would skirt the west side of the PUD property. The parkway would join the existing alignment of Hawley Street just south of where it currently crosses the BNSF mainline at-grade; the at-grade crossing would be closed, with Hawley Street becoming a cul-de-sac west of the railroad tracks. Confluence Parkway would then curve to "cut the corner" on the existing intersection of Hawley and Miller Streets. This configuration is consistent with current assumptions for the North Wenatchee Master Plan, which will guide the redevelopment of an approximately 90-acre area east of North Wenatchee Avenue from primarily industrial to mixed uses. From Hawley Street to the south terminus of the parkway on Miller Street, there would be a 6-foot-wide planted buffer adjacent to the curb and a 6-foot-wide sidewalk on both sides of the street.

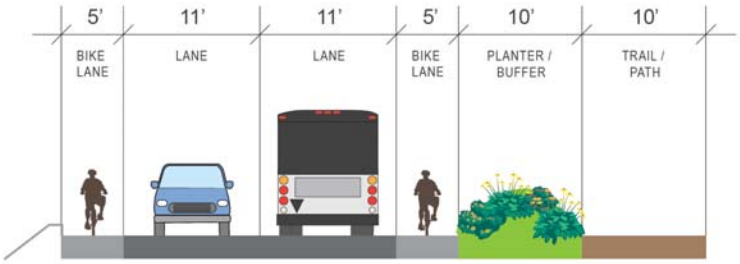




SECTION A
CONFLUENCE PARKWAY



SECTION B
CONFLUENCE PARKWAY



SECTION C
CONFLUENCE PARKWAY

0 0.25
MILES

Pedestrian Bridge
Trail
Railroad
Alternative
Park

Figure 4.
Confluence Parkway Alternative Cross-Sections

Land would be acquired from approximately 30 parcels on either side of the existing right-of-way in order to construct this alternative; up to 13 structures would potentially be displaced. Chapter 9 provides more information on land use impacts.

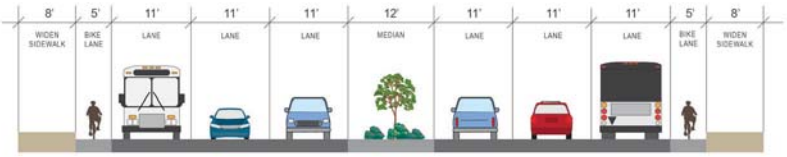
4.1.2 North Wenatchee Avenue

This alternative would add an additional lane in each direction on North Wenatchee Avenue from just north of the Wenatchee River to Miller Street (Figure 5). The two existing Wenatchee River bridges would be rebuilt to current standards or replaced with a new structure. The reconstructed roadway south of the river would be approximately 104 feet wide, with three 11-foot-wide vehicle lanes and a 5-foot-wide bicycle lane in each direction. There would be a 12-foot-wide center lane that would be a planted median between blocks and a left-turn lane at intersections. Pedestrian improvements would include providing a continuous 8-foot-wide sidewalk on both sides of the street. This configuration would be approximately 20 to 30 feet wider than the existing roadway. Access management for existing businesses would be provided consistent with existing City recommendations in the *North Wenatchee Transportation Master Plan.*

Widening North Wenatchee Avenue would affect existing businesses and future development in the corridor. Land would be acquired from approximately 60 properties on either side of the existing right-of-way in order to widen the road; structures belonging to up to eight existing businesses would be displaced, along with a substantial amount of signage and parking adjacent to the corridor. Access to many businesses would also need to be modified, which in some cases could result in additional displacements. It is possible that some of the building displacements could be avoided during detailed design, and that signage and parking could be relocated and/or reconfigured on the remaining portions of some of the affected lots. Chapter 9 includes more information on land use impacts.

4.1.3 No Action Alternative

Under the No Action Alternative, some improvements are assumed to have been made in the North Wenatchee Avenue corridor. Access management treatments were assumed between Miller Street and Horse Lake Road; generally, these improvements would replace the existing two-way center-turn lane with limited mid-block left-turn pockets. U-turns would be provided at the Horse Lake Road intersection (north-to-south only), McKittrick Street intersection (both directions), and Maple Street intersection (south-to-north only). In addition, intersection and frontage improvements would be made around the Maiden Lane intersection to improve safety and corridor traffic operations. However, new roadway capacity would not be added in North Wenatchee. Other planned improvements assumed to be part of the No Action Alternative are a new leg of McKittrick Street extending from North Wenatchee Avenue, crossing the rail corridor at-grade, and connecting with Miller Street. Miller Street would also be upgraded between Maple Street and North Wenatchee Avenue to provide two-way traffic (rather than the existing one-way northbound traffic). These two improvements are part of the *North Wenatchee Master Plan*, which is discussed further in Chapter 9.



SECTION D
NORTH WENATCHEE AVE

0 0.25
MILES

Pedestrian Bridge
Trail
Railroad
Alternative
Park

Figure 5.
North Wenatchee Avenue Alternative Cross-Section

4.2 Environmental Analysis of Project Alternatives

In order to determine whether either of the potential alternatives for new traffic capacity in North Wenatchee might be fatally flawed, the project team identified the environmental disciplines that posed the highest likelihood for permits to be denied or for NEPA documentation to be successfully appealed. Of more than 20 categories of environmental resources that are subject to evaluation under NEPA, the team focused on five resource categories that had the potential to experience significant impacts, based on the conceptual roadway alignment and footprint, and/or had the most stringent regulatory protections. These categories are:

- Cultural resources
- Wetlands
- Fisheries
- Parks and Section 4(f)
- Land use and displacements

These disciplines were then evaluated at a high level, based on the conceptual design developed for the pre-NEPA study effort. While the resulting analyses are not at the level of detail that would be found in a NEPA document, their assessment of project-related risk is accurate based on the current design and regulatory information available. More detailed and refined information, along with agency and tribal consultation, will be required to support formal review under NEPA.

Chapters 5 through 10 of this report present the analysis of environmental impacts to cultural resources, wetlands, fisheries, parks, and land use. Each chapter summarizes the regulatory framework, existing conditions, potential impacts, potential mitigation, and summary of risks to each resource for the three alternatives described in this chapter.

5. CULTURAL RESOURCES

The purpose of this chapter is to evaluate the potential for the project alternatives to adversely affect historic or archaeological resources. The discovery of significant cultural resources during construction is a potential risk for any transportation project, in particular when the project area is known to have existing cultural resources and/or is in a culturally sensitive area. This analysis evaluated the potential for historic and cultural resources within an approximately 1-mile radius of the potential improvements.

This preliminary evaluation is based on a review of existing documents and a 'windshield' survey of the project area based on conceptual design information. It is not part of a formal NEPA process. More detailed and refined information will be required to support formal review under NEPA and Section 106 of the National Historic Preservation Act (NHPA).

The No Action Alternative would not have any cultural resource impacts or mitigation. Only the potential action alternatives, the Confluence Parkway and the North Wenatchee Avenue alternatives, are discussed in this chapter. The project's Section 4(f) implications for cultural resources are described in Chapter 8 of this report.

5.1 Regulatory Framework

This project is expected to receive funding from FHWA making the project subject to NHPA. Section 106 of the NHPA requires the lead federal agency to consider the effects of their undertakings on historic properties. Historic properties are those historic resources (archaeological sites, historic buildings or structures, cultural landscapes) that are eligible for or listed on the National Register of Historic Places (NRHP). FHWA has delegated its Section 106 responsibilities, up to a No Effect determination, to WSDOT. Therefore, WSDOT would initially be leading Section 106 consultation, although it is anticipated that FHWA would resume the lead agency role as the project moves forward. If the preferred alternative results in Adverse Effects to Historic Properties (36 Code of Federal Regulations [CFR] 800.4(d)(2)), and the effects cannot be avoided or minimized, mitigation will be required. Depending on the resource and the type of adverse effect, mitigation measures could vary greatly. Section 106 also requires consultation with the State Historic Preservation Office (SHPO) and interested parties including local historic preservation boards, affected tribes, and landowners; collectively, these groups are designated as "Consulting Parties."

If the preferred alternative involves historic sites or archaeological sites (protected properties), then approvals under Section 4(f) of the Department of Transportation Act of 1966 will be required as well. Section 4(f) applies to the use of a protected property. FHWA may not approve the use of a Section 4(f) protected property unless there is no feasible and prudent avoidance alternative, and the action includes all possible planning to minimize harm to the property resulting from such use. As noted above, Section 4(f) compliance is discussed in Chapter 8.

The project would also be subject to compliance with state of Washington cultural resource regulations, including Indian Graves and Records (Revised Code of Washington [RCW] 27.44), Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60), and Human Remains (RCW 68.50). These laws outline the procedures to be followed if suspected human remains are found on private or non-federal public lands in Washington.

5.2 Existing Conditions

5.2.1 Geology and Soils

The project area is situated at the confluence of the Wenatchee and Columbia Rivers, near the boundary of the Columbia Basin and North Cascades geological province. The Columbia Basin province, which extends eastward and is the drainage for the Columbia River, is characterized by gently undulating to hilly plateau lands separated by deeply incised river canyons and drainages (Gresens 1975, 1983; Tabor et al. 1982, 2005; WDGER 2016). To the west lies the geologically complex North Cascades province, which is characterized by a rugged terrain of folded and faulted sedimentary and metamorphic bedrock covered by younger lava and ash.

Approximately 18,000 to 20,000 years ago during the Late Pleistocene, the Okanogan Lobe of the Cordilleran Ice Sheet entered the Columbia Basin. At its maximum, the ice sheet reached the vicinity of Waterville some 20 miles northeast of Wenatchee before retreating (Kovanen and Slaymaker 2004). Although the sheet ice appears not to have reached the project area, alpine glaciers building out of the Cascades intruded into the region around Wenatchee, resulting in formation of glacial deposits. The Cordilleran Ice Sheet retreated, vast quantities of meltwater became impounded in glacial Lake Columbia and, especially, glacial Lake Missoula. Failure of the ice damming these lakes resulted in a series of catastrophic floods that carved a series of river terraces through glacial deposits as well as bedrock (Bretz 1923; Bjornstad 2006). Evidence of these violent episodes is seen in the giant sand and gravel bar deposits along the east bank of the Columbia River and also underlying the northern portion of the project area.

Starting in the south, the project area extends along an area of Holocene-aged alluvial fans building out the Chumstick Formation hills to the south and west. At the Wenatchee River, the North Wenatchee Avenue corridor extends along gravelly fluvial terrace deposits. Near Wenatchee Confluence State Park, the BNSF railroad corridor parallels and then crosses over an area of Wenatchee River alluvium, which consists of cobble-to-boulder gravel deposited at the river mouth. North of the Wenatchee River, the BNSF rail corridor portion extends along an area underlain by Pleistocene-aged flood outburst deposits. Eolian processes, including deposition of loess and volcanic tephra, have also contributed to deposition during the Holocene.

5.2.2 Cultural Setting

The Columbia River has for thousands of years been a corridor for trade and travel, an avenue for exploration, and a provider of resources. The channel is surrounded by scores of precontact and historic archaeological sites upstream and downstream of its confluence with the Wenatchee River. Humans have been in the Wenatchee area for at least 11,000 to 11,500 years. One of the oldest and most important sites in Washington, the East Wenatchee Clovis site, also known as the Richey-Roberts Clovis Cache, is situated downstream approximately 7 miles as the crow flies. This site, which included stone and bone tools, and which provides important insights into the technology and mobility of early hunter-gatherers, was discovered on a landform sharing characteristics with portions of the project area.

In order to evaluate the potential for cultural resources, archaeologists routinely evaluate a 1-mile radius from a proposed project area. There are 26 recorded archaeological sites and isolates within approximately 1 mile of the Confluence Parkway study area. The majority of these resources are precontact, and an additional two sites are multicomponent sites containing both precontact and historic remains. The precontact remains range from lithic isolates and lithic scatters to midden sites containing lithics, shell and animal bone, and fire-modified rocks. Human burials have been reported at three of

these sites. Precontact sites tend to cluster near the edges of the bluff tops overlooking the Columbia River or along the lower benches and terraces flanking the Columbia and Wenatchee Rivers. Recorded historic resources near the project area are associated with early Euroamerican traders and settlers.

The most substantial site in this area is the Wenatchee Flat site (45-CH-209), which encompasses most of Wenatchee Confluence State Park east of the railroad corridor (Figure 6). The landform consists of an early Holocene alluvial terrace overlying upper Pleistocene flood deposits. This site was listed on the NRHP in 1973 based primarily upon historical and archival records. Wenatchee Flat is a place that tribes gathered in council, and it was reputedly the birthplace of *Kwiltalahun*, later *Sulk-stalk-scosum* (The Sun Chief, also known as Chief Moses). In the 1820s, employees of the Hudson's Bay Company began stopping off at Wenatchee Flat. The site was subsequently visited by Lieutenant Robert Johnson of the U.S. Navy Wilkes Expedition, and later by the future commander of Union forces during the American Civil War George B. McClellan. By the late 1860s Wenatchee Flat was the site of Wenatchee's first trading post. At the time of its NRHP nomination, the Wenatchee Flat site reportedly contained six undisturbed archaeological sites (Odegaard 1973). The specific nature and location of these sites is unknown because, as the nomination form acknowledged, little archaeological research had been done (Odegaard 1973). In intervening years, however, cultural resources management efforts have revealed areas with sparse scatters containing lithics, shell, and bone (see, for example, Masten et al. 1987). In 2010, a lithic debitage flake was recovered beneath a layer of ash erupted from Mount Mazama approximately 6,850 years ago at a depth of approximately 185 centimeters (cm) below ground surface (Hartmann et al. 2013). The site has also yielded sparse historic debris.

5.2.3 Archaeological Potential

The Washington State Department of Archaeology and Historic Preservation's Statewide Predictive Model classifies the entire project area as Very High Risk for archaeological sites. The model considers multiple environmental factors, such as proximity to water, elevation, and soils, to estimate the potential for archaeological remains on various parts of the landscape, although the model is generally not sensitive to the effects of historical and recent actions, such as filling and grading. The Very High Risk classification for the project area is likely driven by its proximity to the Columbia and Wenatchee Rivers, the relative youthfulness of landforms, and the existence of flat to gently sloping (and habitable) landforms. In addition to the resources provided within and along the rivers, the project area provided access to nearby exposures of Columbia River basalt as toolstone, and was also situated close to sources of cryptocrystalline silicate (chert) lying to the north and west. The area is considered to have a high sensitivity for buried and intact precontact archaeological sites; these sites have the potential to be particularly old and could date to the Late Pleistocene-Early Holocene transition. The project area is also considered to have a high sensitivity for historic period archaeological sites, which may include components related to continued Native American use of the landscape well after the arrival of Euroamericans.

5.2.4 Historic Resources

There are four historic aboveground resources in the project area that are eligible for or listed on the NRHP, as shown in Figure 6. NRHP-listed resources include the southbound SR 285 bridge (built 1955) and the Michael Horan House (built 1899). NRHP-eligible resources include the northbound SR 285 bridge (built 1933) and the BNSF railroad corridor.

There are a few historic-aged buildings adjacent to each alternative; these have not been formally inventoried or evaluated, but do not appear to be historically significant.

Figure 6.
Historic and Cultural Resources

5.3 Potential Impacts

5.3.1 Confluence Parkway Alternative

Ground disturbance, such as trenching, utility relocation, excavation for retaining walls and sidewalks, and grading, has the potential to intersect with archaeological deposits in the Wenatchee Flat site. The potential to encounter archaeological deposits is particularly likely east of the BNSF railroad alignment from north of Hawley Street to the northern extent of this alternative. Because archaeological deposits are a non-renewable resource, any impact is usually considered a significant impact.

If an alternative involves a "use" of a protected Section 4(f) archaeological resource, then additional evaluation of the site will be required (evaluating whether the resource merits preservation in place). Because of the significance of the Wenatchee Flat site, it seems likely to meet this benchmark; however, the site boundaries are not particularly well-defined. Further fieldwork, including archaeological investigations, could resolve this issue.

Depending upon the final design, the Confluence Parkway Alternative also has the potential to affect aboveground historic resources, including the Michael Horan House and the BNSF railroad corridor. Further evaluation will be needed to determine if the impacts result in an Adverse Effect to Historic Properties. It is likely that impacts can be avoided or minimized through "measures to minimize harm," as defined in Section 4(f).

5.3.2 North Wenatchee Avenue Alternative

The North Wenatchee Avenue Alternative could require demolition of at least one of the parallel SR 285 bridges across the Wenatchee River. Because one bridge is listed and the other is eligible for listing in the NRHP, both bridges are protected Section 4(f) resources; therefore, this alternative will require review under Section 4(f), as discussed in Chapter 8.

Depending upon the final design, the North Wenatchee Avenue Alternative also has the potential to affect the Michael Horan House and the BNSF railroad corridor; further evaluation will be needed to determine if the impacts result in an Adverse Effect to Historic Properties.

This alternative would not affect any known archaeological resources. However, given the high archaeological sensitivity of areas along the river and the known presence of a site just downstream, the potential exists to encounter a previously undiscovered site or artifacts on one or both riverbanks. Archaeological investigations of areas near the river that would be disturbed by construction could be used to determine the likelihood of encountering deposits.

5.4 Potential Mitigation

Mitigation for cultural resources can vary greatly, depending on the resource being affected and the severity of the impact. Mitigation measures under Section 106 are developed through consultation with the Consulting Parties. Based on the expectation that either alternative would result in adverse effects, a Section 106 Memorandum of Agreement (MOA) will likely be required. The MOA will outline the mitigation measures for the project.

5.4.1 Confluence Parkway Alternative

For aboveground historic resources such the Michael Horan House or BNSF railroad corridor, if adversely affected, potential mitigation might include documentation of the resource.

Discussions with the Colville and Yakama Tribes (summarized in Chapter 8 of this report) indicate that the Wenatchee Flat site is a significant cultural resource, but that the impacts of roadway development are likely to be mitigable. For archaeological resources, a common mitigation measure is to conduct systematic investigations of the archaeological site prior to construction. The breadth of these investigations is typically focused on the areas of greatest impacts. Any investigation would be conducted under a Treatment Plan that would be approved by the Consulting Parties. Any artifacts or specimens collected would be analyzed and the results documented in a site report. The resulting artifacts must be curated at a repository that meets the standards outlined in 36 CFR Part 79 "Curation of Federally Owned and Administered Archaeological Collections." Additional mitigation measures might include analyzing or reanalyzing previously excavated collections from the Wenatchee Flat site, a Traditional Cultural Property (TCP) study, an oral history study, interpretive signage or design elements at the site, and/or a documentary.

5.4.2 North Wenatchee Avenue Alternative

For aboveground historic resources such as the Wenatchee Avenue bridges that are proposed for demolition, mitigation is likely to include extensive historic documentation of the bridges and possibly evaluating the potential for relocating the bridges. Other mitigation might include public education projects such as a documentary about the bridges or interpretive panels about the historic bridges along the route of the new widened road. If the Michael Horan House or BNSF railroad corridor are adversely affected, potential mitigation might include additional documentation of the resource.

Given the potential sensitivity of the river crossing area, an Inadvertent Discovery Plan (IDP) and/or archaeological monitoring may be required for construction in this area if archaeological investigations are not pursued in advance. If cultural resources were discovered, mitigation would be similar to that described above for the Confluence Parkway Alternative.

5.5 Summary of Risks

Based on the expected level of impacts to cultural resources under each action alternative and the need for an MOA, the greatest risk to both alternatives is project schedule delay, because many mitigation measures would need to be conducted before demolition or construction begins. Developing and finalizing the MOA is likely to take 6 to 18 months. However, an MOA can also outline expectations for level of effort and cost for mitigation, which allows management of risk.

If archaeological resources are identified during construction, there is a risk of construction delays while the find is evaluated. Mitigation of inadvertent discoveries of cultural resources can add cost to the project; analysis and curation costs will depend on the nature and extent of the discovery and the volume of materials recovered.

5.5.1 Confluence Parkway Alternative

While the Wenatchee Flat site has not been fully investigated, input from the Colville and Yakama Tribes indicate that the site is important to them. Given the project's potential to disturb unknown cultural resources at this site, at a minimum, extensive and time-intensive archaeological investigations would be required prior to construction. Mitigation costs, although unknown until investigations have been completed, could pose an additional moderate-to-high risk if cultural resources are discovered.

If this alternative involves a "use" of a protected Section 4(f) archaeological resource, then additional evaluation of the site will be required. Because of the significance of the Wenatchee Flat site, it seems

likely to meet this benchmark and would trigger additional requirements under Section 4(f), as further discussed in Chapter 8.

5.5.2 North Wenatchee Avenue Alternative

Alteration or replacement of one or both historic Wenatchee River bridges would be required under this alternative. Formal documentation of the bridges would result in some costs and could pose the potential for delay, but these risks are considered low to moderate. Because of the lack of known archaeological sites in the bridge crossing location or elsewhere in the corridor, risks associated with cultural resources are also considered low to moderate for this alternative.

6. WETLANDS

This chapter evaluates the potential for the project alternatives to adversely affect jurisdictional wetlands eligible for protection under Section 404 of the Clean Water Act. Wetlands play important roles that provide valuable benefits to the environment and society. They provide fish and wildlife habitat, control floodwater, recharge groundwater, remove pollutants, and perform many other social and ecological functions. They also provide economic services because of their connection to hunting, fishing, agriculture, and recreation. Several agencies regulate activities in and near wetlands in accordance with local, state, and federal laws, making it critical that wetland impacts be considered when evaluating project feasibility and risk.

This is a high-level evaluation of potential wetland impacts based on conceptual design and is a preliminary evaluation that is not part of a formal NEPA process. More detailed and refined information will be required to support formal review under NEPA.

The No Action Alternative would not have any wetlands impacts or mitigation. Therefore, only the Confluence Parkway and North Wenatchee Avenue alternatives are discussed in this chapter.

6.1 Regulatory Framework

Agencies that regulate and permit wetland impacts include the U.S. Army Corps of Engineers (Corps), Washington State Department of Ecology (Ecology), and the City of Wenatchee. Their requirements are summarized below.

6.1.1 U.S. Army Corps of Engineers

The Corps regulates discharges of dredged or fill materials into waters of the United States, including wetlands, under Section 404 of the Clean Water Act (404 permit). The fill of wetlands triggers the requirements for a Section 404 permit from the Corps.

The Corps permits dredge or fill in wetlands via two pathways: Nationwide Permits (NWP) and Individual Permits (IPs). Nationwide Permits cover standard activities that have minimal project impacts. The NWPs that the Corps could consider for the Confluence Parkway Alternative are summarized in Table 1.

Table 1. Applicable U.S. Army Corps of Engineers Nationwide Permits

Nationwide Permit (NWP)	Impact Threshold Limit	Permitted Activities
NWP 14 – Linear Transportation Projects	< 0.5 acre of wetland	Construction, expansion, modification of linear transportation projects (includes airport runways and taxiways).
NWP 33 – Minor Discharges	< 0.1 acre of wetland	Minor discharges of dredge or fill material associated with most types of activities.

Based on the initial information, the project would likely qualify for an NWP, because the impact areas would be relatively small and are not expected to exceed the thresholds for an NWP 14. It is also likely that there would not be any cumulative adverse impacts on wetlands and rivers as a result of the project. An IP would be required if the project resulted in more than minimal individual and cumulative adverse effects.

The Section 404 Corps permit will also trigger consultation with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act. The federal Services evaluate the proposed activities and their direct and indirect effects on species and habitats that are listed or candidates for listing under the Endangered Species Act.

6.1.2 Washington State Department of Ecology

State permitting for activities in wetlands is administered by Ecology. The state certification process under Section 401 of the federal Clean Water Act is usually triggered through a Section 404 permit application. Section 401 directs each state to certify that proposed activities would not adversely affect water quality or violate state aquatic protection laws. In Washington, Ecology is responsible for administering the state certification program. Ecology may approve, approve with conditions, or deny a request for delay due to lack of information. Any conditions attached to the 401 Certification become part of the Corps Section 404 permit.

Ecology also provides oversight to local governments in regulating activities near Shorelines of the State, which include the Columbia and Wenatchee Rivers. The City's Shoreline Master Program (SMP) (October 2014) prioritizes protection for shorelines, promotes preservation and enhancement of shoreline public access, encourages appropriate development in support of water-oriented uses, and ensures no net loss of ecological functions associated with shorelines. The City's SMP identifies portions of the shoreline and several wetlands in the Confluence Parkway study area within shoreline jurisdiction, and designates them as Urban Conservancy. The intent of the Urban Conservancy designation is to protect and restore ecological functions of open space, floodplain, and other sensitive lands in urban and developed settings, while also allowing for a variety of compatible uses.

6.1.3 City of Wenatchee

At the local level, wetland impacts are regulated by the City of Wenatchee and trigger a critical areas review under the City's code (Wenatchee City Code [WCC] 12.08). Impacts to wetlands and their buffers would be subject to the mitigation requirements described in WCC 12.08.130.3. The City's mitigation standards allow for flexibility provided that mitigation is consistent with Ecology's *Guidance on Wetland Mitigation in Washington Wetlands in Washington State, Volume 1,* and *Wetlands in Washington State, Volume 2*, or can be supported by best available science.

6.2 Existing Conditions

The USFWS National Wetlands Inventory (NWI) maps several wetlands in the study area (Figure 7) (USFWS 2016a). One wetland complex is mapped at the confluence of the Wenatchee and Columbia Rivers, and consists of five palustrine emergent, forested, and scrub-shrub wetlands. The wetlands are approximately 1.5 to 11.3 acres and their hydrogeomorphic (HGM) class is riverine. These wetlands provide fish and wildlife habitat, as well as flood protection and streamflow maintenance for the Wenatchee River.

A second wetland complex in the study area is mapped within the Horan Natural Area (see Figure 7). The complex includes one palustrine emergent wetland and two palustrine unconsolidated bottom (ponded) wetlands. The wetlands are approximately 1.2 to 4.6 acres, and their HGM class is depressional. Another palustrine emergent wetland is located adjacent to the central portion of the Horan Natural Area. The wetland is approximately 1.8 acres and has a depressional HGM class. These

wetlands provide water quality functions by removing pollutants from stormwater runoff and providing fish and wildlife habitat.

The NWI mapping provides a general level of information on wetland location, type, and size based on high altitude imagery. There is a margin of error inherent in its use; therefore, it is likely wetland boundaries or classifications in the project area are different than what they are on the ground. Based on a reconnaissance survey of the project area, there are likely additional wetlands in the project area, specifically in the Horan Natural Area and within the Wenatchee River. The wetlands in the Horan Natural Area that are within the project area are elevated above the Columbia and Wenatchee Rivers and do not appear to be connected to the rivers. However, several wetlands in the Horan Natural Area appear to be connected to each other via a series of culverts. In addition, hydric soils (riverwash) are mapped by the Natural Resources Conservation Service in the wetland areas of the Wenatchee River within the project area.

6.3 Potential Impacts

6.3.1 Confluence Parkway Alternative

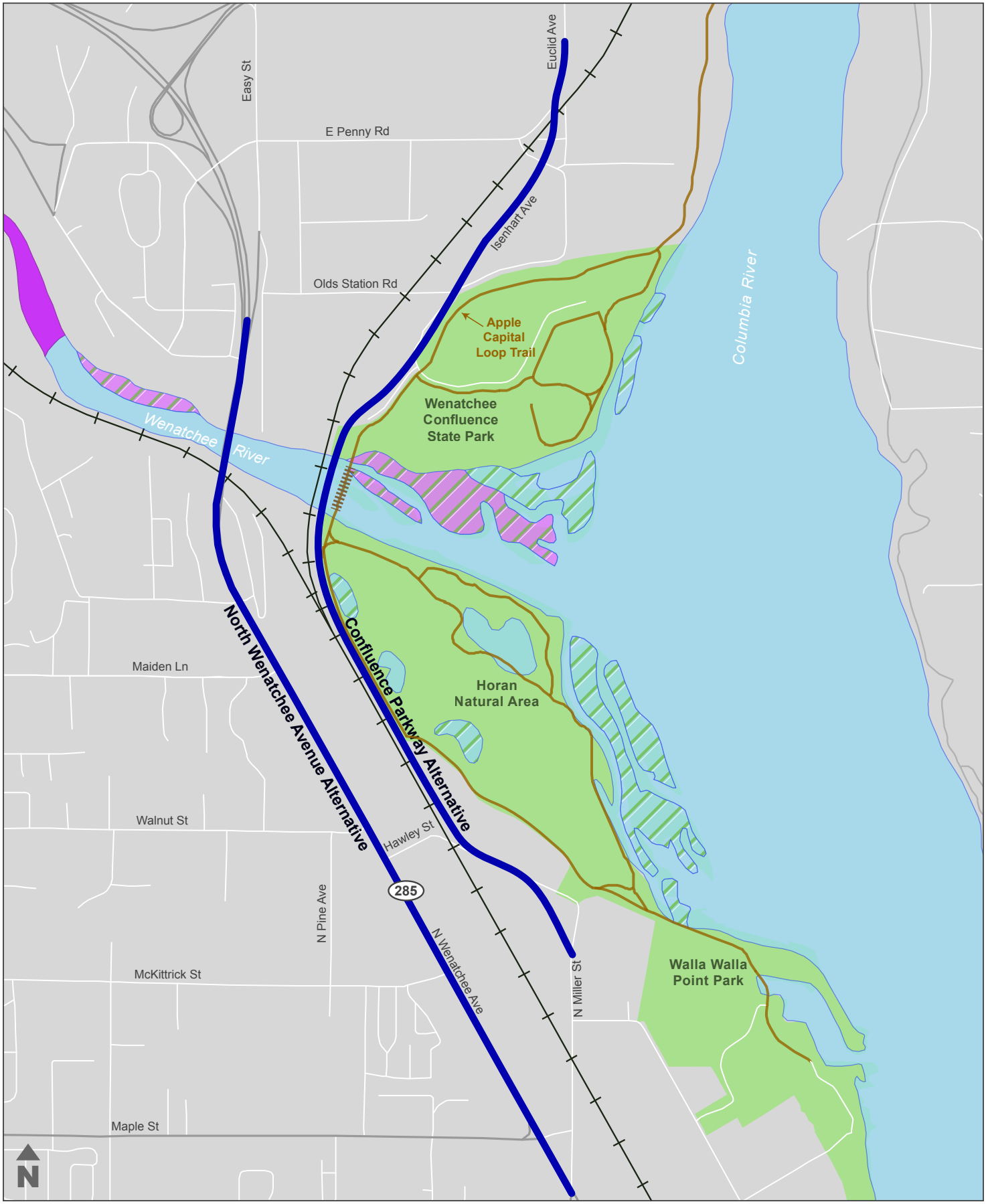
Construction of the proposed road and trail improvements under the Confluence Parkway Alternative would fill small amounts of wetland and wetland buffer. The fill would occur primarily on the eastern side of the proposed roadway and trail along the western border of the Horan Natural Area. Wetlands and their buffers would likely be temporarily affected to facilitate construction of the roadway and the trail. In addition, the northern and southern bridge abutments would require fill within wetlands and their buffers.

6.3.2 North Wenatchee Avenue Alternative

Under the North Wenatchee Avenue Alternative, minimal wetland impacts are anticipated because the proposed roadway expansion is within an existing right-of-way. However, there could be some temporary impacts to wetlands and their buffers to facilitate construction of the expanded roadway at the bridge crossing.

6.4 Potential Mitigation

The City of Wenatchee, the Corps, and Ecology require project applicants to demonstrate that impacts to wetlands have been avoided and minimized to the extent possible before compensatory mitigation for unavoidable impacts is implemented. Where wetland impacts cannot be avoided, the agencies will require compensation according to specific ratios. The ratios vary depending on both the type and category of wetlands that would be affected, and the type of wetland mitigation that is proposed. Local mitigation requirements are included in WCC 12.08.130, and are consistent with Corps and Ecology guidelines (Ecology et al. 2006a, 2006b).



Source: US Fish and Wildlife, National Wetlands Inventory (NWI).

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MILES

- Alternative
- Pedestrian Bridge
- Trail
- Railroad
- Park
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Riverine
- Freshwater Pond; Lake

Figure 7. Wetlands

6.4.1 Confluence Parkway Alternative

A small amount of wetland fill would be required for the Confluence Parkway Alternative unless the project can be designed to minimize or avoid wetland impacts. While potential mitigation is assumed to take place within the Horan Natural Area, there are substantial space constraints because of the existing railroad, trails, and several other surrounding critical areas (wetlands, fish and wildlife habitat conservation areas). Thus, compensatory mitigation on or directly adjacent to the impact area may not be feasible or sustainable. No approved mitigation banks in the area or authorized in-lieu fee programs are available to allow an alternative approach to compensatory mitigation. Off-site mitigation may be possible in reaches of the lower Wenatchee River identified as having the greatest potential for restoration by the Yakama Nation Department of Fisheries Resource Management Upper Columbia Habitat Restoration Program in the *Lower Wenatchee River Reach Assessment* (2016). Several restoration opportunities to reconnect historic floodplains and enhance off-channel and side channel habitat riparian and off-channel areas in Reach 3 (River Mile [RM] 2.10-5.40) and Reach 4 (RM 5.40 to 10.80) of the Wenatchee River were identified in the assessment. The mitigation would be designed to improve wetland functions and values, which could have benefits to the local ecosystem.

6.4.2 North Wenatchee Avenue Alternative

No wetland fill would be required for the North Wenatchee Avenue Alternative; therefore, no mitigation is required. Temporary impacts to wetlands during construction may require mitigation in accordance with local wetland and shoreline regulations.

6.5 Summary of Risks

6.5.1 Confluence Parkway Alternative

A small amount of wetland fill would be required for the Confluence Parkway Alternative unless the project can be designed to minimize or avoid wetland impacts. Therefore, there is a low to moderate risk that the project, as currently defined, would be denied permits or approvals for activities on account of wetland impacts. Compensatory mitigation for unavoidable losses of wetland area would increase the project costs and create logistical challenges, but would not create substantial risk. The mitigation would be designed to improve wetland functions and values, which could have benefits to the local ecosystem.

6.5.2 North Wenatchee Avenue Alternative

No wetland fill would be required for the North Wenatchee Avenue Alternative; therefore, there is no risk of denial of environmental permits or approval. Temporary construction impacts to wetlands may require mitigation but would unlikely be costly enough to make this alternative infeasible or pose a risk to denial of permits or approvals.

7. FISHERIES

This chapter evaluates the anticipated impacts to federally-protected fisheries or essential fish habitat related to potential North Wenatchee capacity improvements in order to identify whether the project alternatives, as designed, would likely result in a denial as part of environmental permitting. This is a high-level, preliminary evaluation of potential fisheries impacts based on conceptual design and is not part of a formal NEPA process. More detailed and refined information, including analysis of non-federally protected species, will be required to support formal review under NEPA.

The No Action Alternative would not have any fisheries impacts or mitigation. Therefore, only the Confluence Parkway and North Wenatchee Avenue alternatives are discussed in this chapter.

7.1 Regulatory Framework

Resource agencies with permitting or regulatory authority for fisheries and habitat in the project area include NMFS, USFWS, the Washington Department of Fish and Wildlife (WDFW), the Corps, Ecology, and the City of Wenatchee. The Colville and Yakama Tribes also have stewardship interests in fisheries resources in conjunction with their treaty fishing rights in the project area, which are typically exercised through federal permitting processes.

The following federal regulations govern decisions concerning the potential for impacts on fisheries and associated habitat:

- Endangered Species Act (ESA): Section 7 of the ESA requires federal agencies to ensure that any action authorized, funded, or carried out by a federal agency is not likely to jeopardize the continued existence of any threatened or endangered species or to adversely modify or destroy their critical habitat. The ESA further requires the federal government to designate "critical habitat" for any species it lists under the ESA.

- Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act): Passed in 1976, this Act was enacted to promote long-term biological and economic sustainability of the nation's marine fisheries. Key objectives of the Magnuson-Stevens Act are to prevent overfishing, rebuild overfished stocks, increase long-term economic and social benefits, and ensure a safe and sustainable supply of seafood.

- Sustainable Fisheries Act (SFA): Enacted in 1996, the SFA made significant amendments to strengthen conservation efforts under the Magnuson-Stevens Act.

State and local regulations that apply to fisheries and fish habitat include the State Hydraulic Code, the Shoreline Management Act, and applicable Wenatchee Municipal Code requirements, including Chapter 12.08, Resource Lands and Critical Areas Development. The general goal of these regulations is to protect water quality, shorelines, aquatic habitat, wetlands, riparian areas, and associated terrestrial habitats, as well as the species that depend on these areas.

7.2 Existing Conditions

The Wenatchee River is home to fish listed under the ESA, as well as their critical habitats. The following species and their critical habitats are listed or designated in the Wenatchee River system.

7.2.1 Affected Fisheries

Upper Columbia River Spring Chinook Salmon* (*Oncorhynchus tshawytscha*)*—Endangered/Upper Columbia River Spring Chinook Salmon Critical Habitat

The Wenatchee River population of the Upper Columbia River spring Chinook salmon is included in the ESA listing. Spring Chinook adults return to the Wenatchee River from April through June, holding until spawning in late summer (NMFS 2016). Juveniles emerge and spend 1 year in freshwater before beginning outmigration to the ocean (NMFS 2016). Juvenile Chinook are expected to rear farther upstream than the project area, and outmigrate past the project area in summer and fall as sub-yearlings (Don Chapman Consultants Inc. 1989; Chelan County and Yakama Nation 2004). Once in the ocean, Chinook will typically spend 2 to 3 years before returning to spawn (NMFS 2016).

Based on the WDFW SalmonScape map (WDFW 2017), the project area is used by Chinook for migration and potentially for rearing by juveniles. Spawning is not mapped as occurring in the project area (Figure 8). Critical habitat for spring Chinook is designated in the Wenatchee River. The lateral extent of the designation is the ordinary high water mark (OHWM) of the river.

Upper Columbia River Steelhead* (*O. mykiss*)*—Threatened/Upper Columbia River Steelhead Critical Habitat

The Wenatchee River population is one of four populations of ESA-listed Upper Columbia River steelhead. Adult steelhead return to the Columbia River in late summer and early fall. Many adults overwinter in the Columbia River, then move into tributaries to spawn in April and May of the following year (NMFS 2016). Juveniles emerge and generally remain in freshwater for 1 to 3 years before migrating to the ocean (NMFS 206). Outmigration past the project area is expected to occur between spring and late fall (French and Wahle 1959). Adult steelhead typically return to freshwater after 1 or 2 years in the ocean (NMFS 2016). Based on WDFW's SalmonScape map (WDFW 2017), the project area is used by adult and juvenile steelhead for migration, and potentially for juvenile rearing; no spawning is mapped (see Figure 8).

Critical habitat for steelhead is designated in the Wenatchee River. The lateral extent of the designation is the OHWM of the river.

Columbia River Bull Trout* (Salvelinus confluentus)*—Threatened/Columbia River Bull Trout Critical Habitat

The Columbia River bull trout Distinct Population Segment (DPS) is listed as threatened, and its habitat includes the Columbia River mainstem and tributaries. Bull trout includes migratory and resident forms, and it is suspected that bull trout give rise to offspring that can exhibit either resident or migratory behavior (Rieman and McIntyre 1993). Migratory bull trout exhibit a wide variety of life history strategies. In the Wenatchee River system, bull trout generally spawn in upper tributaries such as the Chiwawa River, White River, Chiwaukum Creek, and Nason Creek (Kelly Ringel 2014) from August through November (Pratt 1992). Juveniles hatch after 100 to 145 days and emerge from gravel after approximately 200 days (Pratt 1992). Juveniles remain in the upper rivers to rear for 1 to 3 years. Sub-adults and adults migrate within the river system. Most adult bull trout overwinter in Lake Wenatchee, but the Wenatchee River and Columbia River mainstems are also used for overwintering (Kelly Ringel et al. 2014). Thus, the project area is likely only used by migrating sub-adult and adult bull trout; juvenile bull trout are not known to use the lower Wenatchee River and Columbia River (USFWS 2016b). WDFW's SalmonScape map (WDFW 2017) indicates that the project area is used by bull trout for rearing and migration; however, the mapped rearing may refer to sub-adults (see Figure 8).

Critical habitat for steelhead is designated in the Wenatchee River. The lateral extent of the designation is the OHWM of the river.

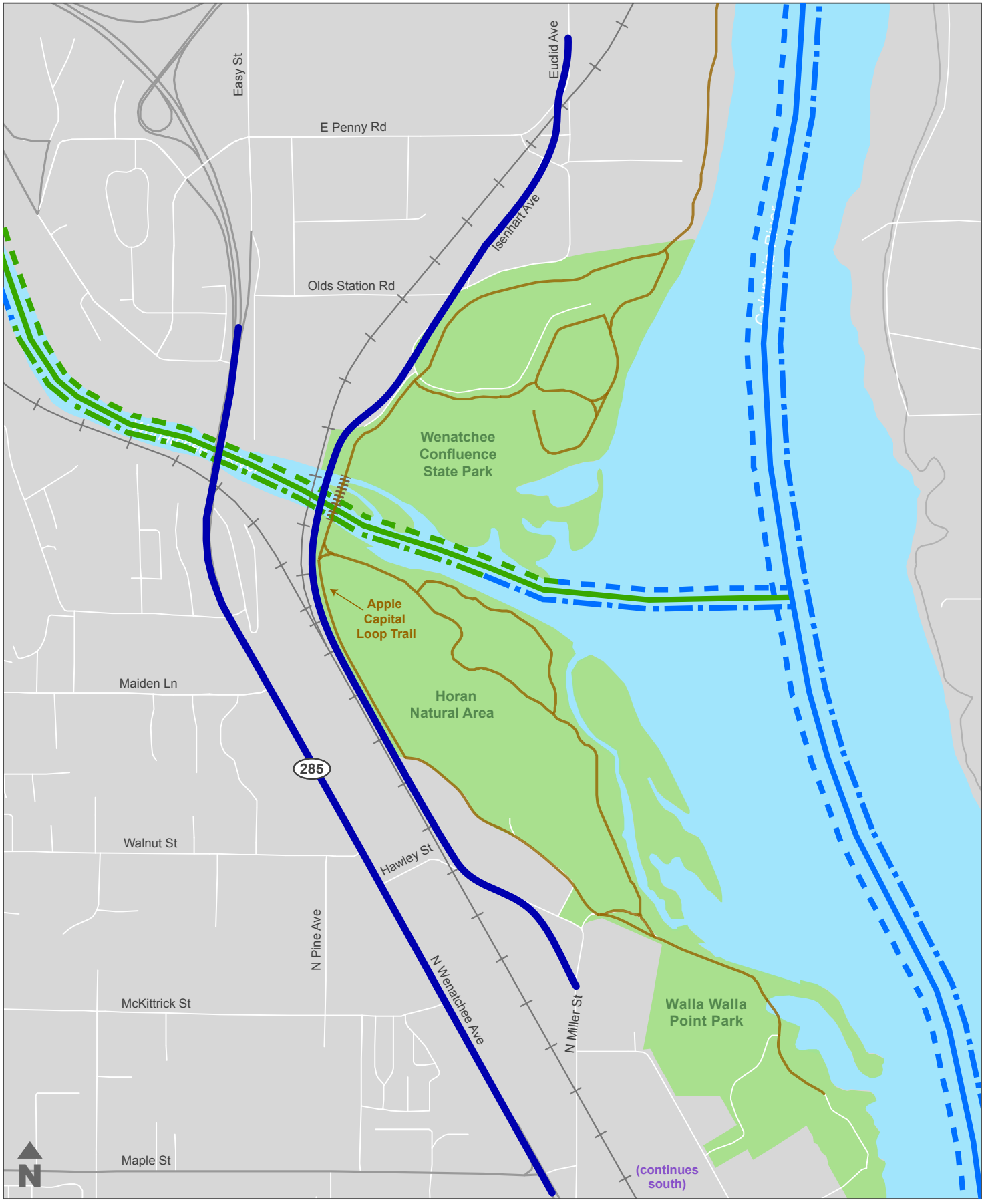

Figure 8.
Wenatchee River Fisheries

7.2.2 Essential Fish Habitat

Pursuant to the Magnuson-Stevens Act and the 1996 SFA, an evaluation of Essential Fish Habitat (EFH) impacts would be necessary for the project. EFH is defined by the Magnuson-Stevens Act in 50 CFR 600.905-930 as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Further definitions include:

- Waters: Aquatic areas and associated physical, chemical, and biological properties that are used by fish.
- Substrate: Sediment, hard bottom, structures underlying the waters, and associated biological communities.
- Necessary: The habitat required to support a sustainable fishery and managed species' contribution to a healthy ecosystem.

The Wenatchee River and its tributaries are designated as EFH for two salmonid species—coho salmon (*O. kisutch*) and Chinook salmon (PFMC 1999).

7.3 Potential Impacts

The analysis of potential impacts assumes the following:

- The project includes a clear, strong purpose and need statement that demonstrates why a new river crossing is unavoidable.
- The bridge design will span the river without the need for in-water abutments or piles to support the structure. The bridge will only require abutments above the OHWM of the Wenatchee River. In-water work such as abutments or piles would significantly increase the aquatic impacts, as well as the level of review and potential mitigation needs.

7.3.1 Water Quality and Riparian Vegetation Impacts

Both action alternatives would likely have similar water quality and riparian impacts. The permitting agencies would likely be concerned about the potential for water quality impacts from typical highway runoff, such as petroleum products, sand, and salt. Potential pathways of contamination include runoff from rain or snow and spray from passing vehicles. In addition, it is likely that construction of the proposed bridge under each alternative would remove riparian vegetation at the bridge abutments on either shore.

7.3.2 Potential Tribal Fishing Impacts

Because no new in-water structures are proposed, there are no anticipated concerns for the project related to tribal fishing for either alternative.

7.3.3 Overwater Coverage Impacts

The main impact of both alternatives on fish habitat would be through shading resulting from new or additional overwater coverage. Such shading is considered a potential impact on migrating juvenile salmonids by permitting agencies, due to the potential reluctance of juvenile salmonids to cross substantially shaded areas. Shading from structures such as bridges can affect the visual acuity of juvenile salmonids, and has also been suspected of providing cover for predatory fish. Overwater coverage impacts are described below for each alternative.

Confluence Parkway Alternative

The proposed Confluence Parkway would cross over the Wenatchee River at approximately RM 1, near the existing railroad bridge and pedestrian bridge. The bridge would be designed to span the river without the need for in-water abutments or piles to support the structure, and would only require abutments above the OHWM.

Based on the current conceptual designs, the proposed bridge would be approximately 33 feet wide and between 520 feet and 580 feet long, and would be approximately 30 feet above the river. Maximum overwater coverage would be 19,140 square feet, or 0.44 acre. The effects of shading would be substantially reduced by the height of the bridge above the river, which would reduce the light/dark contrast by allowing additional ambient light to penetrate into the water column.

North Wenatchee Avenue Alternative

The North Wenatchee Avenue Alternative would entail a widened crossing of the Wenatchee River at approximately the same location as the current SR 285 bridges. Based on conceptual design, it is likely that the two-bridge configuration would be replaced by a single, wider span that would not require abutments or other supports below the OHWM.

The proposed bridge would be approximately 110 feet wide and 350 feet long, and would be approximately 69 feet above the river. Maximum overwater coverage would be 38,500 square feet, or 0.88 acre. The current bridges are approximately 75 feet wide and 350 feet long, resulting in an overwater coverage area of 26,250 square feet, or 0.60 acre. Under this alternative, the widened bridge would result in an additional 0.28 acre of overwater coverage.

7.4 Potential Mitigation

7.4.1 Water Quality

Water quality issues for both action alternatives could likely be mitigated by standard best management practices in bridge design and by treating stormwater runoff from the road and bridge prior to discharge to surface water. However, not all stormwater would be captured by typical management strategies, and some would inevitably reach the river (e.g., road spray). Specific mitigation requirements would be developed through consultation with permitting agencies in conjunction with the detailed project design.

Work waterward of the OHWM, even if elevated above the river and involving no in-water work, would be subject to in-water work windows. The Corps' listed work window for the Wenatchee River is July 15 through February 28, but may be negotiable and flexible based on project elements and location.

7.4.2 Riparian Vegetation Removal

Removal of riparian vegetation at the bridge abutments on either shore would likely trigger mitigation requirements, primarily from the City of Wenatchee through critical areas regulations, but also from state and federal agencies. Habitat mitigation for removal of riparian vegetation would be proportional to the area affected. The Corps has been requiring a 1:1 mitigation ratio for grass/forb and non-native tree/shrub impacts, and a 2:1 ratio for native riparian tree/shrub impacts. Typical mitigation and costs would be similar to those discussed below for new overwater coverage.

7.4.3 Overwater Coverage

ESA requirements are applied through the Corps permitting process. It is assumed that formal consultation would likely be required for both action alternatives based on the presence of three ESA-listed species and designated critical habitats in the river below the proposed bridges. However, this is ultimately the decision of the Corps. Potential ESA compliance requirements include mitigation for overwater coverage and removal of riparian vegetation. The quantity of mitigation is likely to be directly proportional to the acreage of overwater coverage and area of riparian vegetation removed.

The quantity of mitigation acreage would likely be directly proportional to the acreage of overwater coverage. The most common compensatory mitigation for overwater coverage is a riparian planting area equal to the area of overwater coverage. The planting area would consist of native trees and shrubs, with a native seed mix of grasses and forbs as groundcover. Hydroseeding is also a standard practice to exclude noxious weed species. Based on typical values, mitigation would likely cost approximately $20,000 to $36,000 per acre (not including the value of the land). Because the mitigation area would likely be proportional to the degree of overwater coverage, the Confluence Parkway Alternative is expected to require a mitigation planting area of approximately 0.44 acre, while the North Wenatchee Avenue Alternative would require approximately 0.28 acre of mitigation planting.

Mitigation planting is typically required to occur in the same watershed as the impacts. In this case, the most biologically defensible location for a mitigation planting area is along the Wenatchee River, where the planting area would theoretically benefit all three species that have potential to be affected by the bridge. Other compensatory mitigation options would include aquatic habitat enhancements such as removal of anthropogenic debris, creation or enhancement of aquatic habitat, or removal of overwater coverage.

7.5 Summary of Risks

Both action alternatives would result in less than half an acre of additional overwater coverage; therefore, their mitigation requirements are expected to be similar. Overwater coverage is not expected to be a major obstacle to this project as long as the purpose and need for the crossing is well-established. There is a low risk of denial of permits or approvals. Estimated mitigation costs are not expected to make either alternative financially infeasible.

8. PARKS AND SECTION 4(F)

This chapter evaluates the potential for the project alternatives to adversely affect parks, wildlife refuges, trails, NRHP-eligible properties, and other resources eligible for protection under Section 4(f) of the Department of Transportation Act of 1966. Section 4(f) declares a national policy to "preserve the natural beauty of the countryside, public parks and recreation land, wildlife and waterfowl refuges, and historic sites." It is one of the most stringent and complex environmental laws related to transportation. As a result, Section 4(f) is also one of the most frequently litigated environmental statutes and the most common cause of court injunctions delaying projects (FHWA Success in Stewardship Newsletter, March 2008).

The No Action Alternative would not have any Section 4(f) impacts or mitigation. Therefore, only the potential action alternatives, Confluence Parkway and North Wenatchee Avenue, are discussed in this chapter.

8.1 Regulatory Framework

8.1.1 Background and Definition of Section 4(f) "Use"

Section 4(f) is a federal requirement and must be considered in any NEPA document involving any U.S. Department of Transportation agency, including FHWA. The law protects the following basic types of properties: publicly owned park and recreation areas that are open to the general public, publicly owned wildlife and waterfowl refuges, and public or privately owned historic sites. The term "historic sites" includes prehistoric and historic districts, sites, buildings, structures, or objects listed in, or eligible for, the NRHP. This may also include places of traditional religious and cultural importance to an Indian tribe that meet the National Register criteria.

CFR Title 23, Part 774, which governs the use of Section 4(f) resources, states that:

> *The Administration may not approve the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge or site), unless a determination is made under paragraph (a) or (b) as follows:*
>
> *(a) The Administration determines that:*
>
> > *(1) There is no feasible and prudent avoidance alternative to the use of land from the property; and*
> >
> > *(2) The action includes all possible planning to minimize harm to the property resulting from such use; or*
>
> *(b) The Administration determines that the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, will have a de minimis impact on the property.*
>
> *(c) If the analysis concludes that there is no feasible and prudent avoidance alternative, then the Administration may approve only the alternative that causes the least overall harm in light of the statute's preservation purpose.*

While the statute does not articulate how an alternative is judged to be "prudent and feasible," case law has clarified the meaning of these terms. The U.S. Supreme Court, in ruling on the Overton Park case in

1971, found that alternatives may be considered not to be feasible or prudent if their use presents unique problems or unusual factors; if the cost of alternatives that avoid these properties is extraordinary; or if the social, economic, and environmental impacts or community disruption resulting from such alternatives reaches an extraordinary magnitude.

The law also protects Section 4(f) properties from proximity impacts that substantially diminish the use or value of the resource. Substantial proximity impacts are considered to be a "constructive use," even though the project does not actually intrude into the protected area. Such impacts may include noise, vibrations, changes to aesthetic character, or disruption of access to a 4(f) property.

An important factor in Section 4(f) evaluation is the input provided by the local officials with jurisdiction over the park, recreation area, refuge, or historic site. Officials with jurisdiction are consulted about the significance of each potential Section 4(f) resource that may be affected by the project, and also are involved in determining whether project-related impacts would impair the activities, features, or attributes that qualify the resource for protection under Section 4(f). While the federal lead agency has the final say in characterizing Section 4(f) uses, information provided by the local officials is weighed heavily in this determination.

8.1.2 *De Minimis* Use and Programmatic Evaluations

Section 6009(a) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was developed to simplify the processing and approval of projects that have only minor impacts on properties protected by Section 4(f). FHWA may make this finding when a project, including any measures to minimize harm that are committed to by the applicant (such as avoidance, minimization, mitigation, or enhancement measures), is determined to have a *de minimis* impact on the property.

- For parks, recreation areas, and refuges, this finding may be made only if public notice and an opportunity for public comment are provided (this can occur in conjunction with the NEPA public comment process) and if officials with jurisdiction over the Section 4(f) resource concur in writing that the project will not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection.
- For historic properties, a *de minimis* finding can be made only if, in accordance with Section 106 of the NHPA and with concurrence from the state and/or Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation, it is found that the project will have no impact or no adverse impact on historic properties.

In addition to the *de minimis* finding, FHWA has developed several categories of nationwide Section 4(f) programmatic evaluations, designed as a time-saving procedural alternative to preparing individual Section 4(f) evaluations for certain minor uses of Section 4(f) property. Programmatic Section 4(f) evaluations are developed based on experience with a specific set of conditions that includes project type, degree of use and impact, and evaluation of avoidance alternatives. An approved programmatic Section 4(f) evaluation may be relied upon to cover a particular project only if the specific conditions in the programmatic evaluation are met. The categories include:

- Independent Walkway and Bikeways Construction Projects
- Historic Bridges
- Minor Involvements with Historic Sites
- Minor Involvements with Parks, Recreation Areas and Waterfowl and Wildlife Refuges
- Net Benefits to a Section 4(f) Property

8.1.3 Least Harm Analysis

As stated in 23 CFR 774.3(c)(1), if there is no feasible and prudent alternative that avoids Section 4(f) resources altogether, then the Administration may approve only the alternative that causes the least overall harm. The least overall harm is determined by balancing the following factors:

> (i) The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
>
> (ii) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
>
> (iii) The relative significance of each Section 4(f) property;
>
> (iv) The views of the official(s) with jurisdiction over each Section 4(f) property;
>
> (v) The degree to which each alternative meets the purpose and need for the project;
>
> (vi) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
>
> (vii) Substantial differences in costs among the alternatives.

In addition, the alternative selected must include all possible planning, as defined in §774.17, to minimize harm to Section 4(f) properties.

8.2 Section 4(f) Properties in the Study Area

Figure 9 shows parks, recreation facilities, and NRHP-listed sites in the study area that are protected by Section 4(f). This section briefly describes each of these resources and identifies the agencies with jurisdiction over the resource. Historic and cultural resources protected under Section 106 of the NHPA are further discussed in Chapter 5; the discussion here is in the context of those resources' Section 4(f) status.

8.2.1 Parks, Recreational Areas, and Wildlife Refuges

8.2.1.1 Wenatchee Confluence State Park

Wenatchee Confluence State Park is a 197-acre property located north and south of the Wenatchee River at its confluence with the Columbia River. The park is owned by PUD #1 of Chelan County, and is operated by the Washington State Parks Department through a lease agreement with the PUD. All of the park property lies within the PUD's Rock Island Hydroelectric Project boundary, and is designated for recreational use as part of the PUD's license from the Federal Energy Regulatory Commission (FERC) for operation of the Rock Island Dam.

The areas of the park north and south of the river have a distinctly different character. The northern portion is developed for camping, water sports, and active recreation and includes the following facilities:

- 59 tent/RV sites
- RV dump station
- 2-lane boat launch, boat trailer parking
- Swimming area
- Restrooms and showers
- Picnic shelter

Figure 9.
Parks and Other Section 4(f) Resources

- Baseball/soccer field
- Volleyball field
- Tennis courts
- Playground equipment
- Buildings used for park operation and maintenance

South of the Wenatchee River is the 100-acre Horan Natural Area, a former pear orchard that the PUD acquired in 1990 for the purpose of building a manmade wetland. The wetland was named the Horan Natural Area to honor the Horan family, longtime Wenatchee residents who had previously owned the property. The wetland areas are accessed by 2 miles of 10-foot-wide gravel trail that connect 15 viewing stations for walkers. These viewing stations allow individuals to learn about and experience a variety of habitats.

Lands within the Rock Island Hydroelectric Project boundary, including Confluence State Park, are regulated by Standard Article 5 and Land Use Article 412 of the PUD's FERC license for the dam. Standard Article 5 requires the PUD to acquire and retain—either in fee or through rights granted in perpetuity—all property necessary to construct, maintain, and operate the hydroelectric project. Land Use Article 412 gives the PUD the authority to grant permission for "non-project" uses of land, subject to specific conditions. Some non-project uses can be authorized by the PUD alone, while others must also be reviewed and approved by FERC. The PUD's Land Management Program (December 2013) provides information on land use goals and objectives, current land and shoreline use within the project boundary, and the process for obtaining approval for non-project uses. Construction of new roads or bridges within the boundary is a use that requires both PUD and FERC approval.

8.2.1.2 Apple Capital Loop Trail

The 10-mile-long Apple Capital Loop Trail runs along the east and west banks of the Columbia River. It crosses the Columbia River on the Odabashian Bridge at the north end of Wenatchee, and on a pedestrian bridge north of the Sellar Bridge near the south end of the city. The 5 miles of trail on the Chelan County (western) side of the river were completed in 1990, and the Douglas County (eastern) portion was completed in 1994. The west side of the trail connects the City of Wenatchee's urban waterfront park system, while the east side passes through natural habitat along the river. The trail runs within Confluence State Park along the park's north and west edges, crossing the Wenatchee River on a pedestrian bridge.

Since its opening, the trail has become a major transportation corridor that serves thousands of commuters and recreational users each year, including cyclists, walkers, joggers, skaters, cross-country skiers, and snowshoers. It is managed by six agencies (Chelan County PUD, Eastmont Parks and Recreation, the Cities of Wenatchee and East Wenatchee, Washington State Parks, and WSDOT). A "Loop Trail Advisory Committee" includes these agencies as well as representatives from local law enforcement agencies, the Wenatchee Reclamation District, two "special interest organization" representatives and two "special perspective/trail user at large" representatives.

8.2.2 Historic Properties

8.2.2.1 Wenatchee Flat Site

The NRHP-eligible Wenatchee Flat site, described in Chapter 5 of this report, lies largely within the northern, developed portion of Wenatchee Confluence State Park. Although multiple archaeological sites were noted at the time of the site's nomination to the NRHP in 1973, little exploration has been done; as a

result, the full extent of the site and the exact nature of the materials present are not known. As noted in Chapter 5, cultural resource management efforts and excavations for public works projects have yielded prehistoric materials including lithics, shell, and bone along with some historic-era debris. While only the area north of the Wenatchee River is included in the NRHP-listed site, a larger area—encompassing the entire park north and south of the river and extending west past the BNSF tracks—has been identified as an archaeological site associated with former Native American use of the river confluence.

The Wenatchee Flat site is within an area formerly used by the Colville and Yakama Tribes, which maintain cultural resource interests in the area. As an NRHP-protected property, the site is under the jurisdiction of the Washington Department of Archaeology and Historic Preservation (DAHP), which administers Section 106 of the NRHP in Washington. DAHP and the federal lead agency participate in government-to-government consultation with affected tribes under Section 106 of the NHPA as part of the NEPA process.

Currently, the Wenatchee Flat site is listed on the NRHP under Criterion D. This means that its eligibility is based on the fact that it has yielded, or may be likely to yield, information important in history or prehistory. Archaeological sites that are listed only under Criterion D are not subject to Section 4(f), because it is assumed that their value can be realized through data recovery even if they are disturbed. However, discussions with the Colville and Yakama Tribes have indicated that they consider it possible that the site is also eligible under Criteria A and B (association with events that have made a significant contribution to the broad patterns of history, or that are associated with the lives of significant persons in the past). In addition, the tribes have suggested that the NRHP site boundary should be reevaluated to determine whether it should expand to encompass the larger archaeological site. Such decisions would be made in conjunction with Section 106 coordination if Confluence Parkway were to become a formal proposal. For purposes of this report, it is assumed that the Wenatchee Flat site will be subject to Section 4(f).

8.2.2.2 Michael Horan House

Built in 1899, the Michael Horan House is a two-story Victorian/Queen Anne-style residence located at 2 Horan Road, overlooking the north bank of the Wenatchee River between SR 285 and the BNSF railroad bridge. At one time used as a restaurant but currently vacant, it was listed on the NRHP in 1992 under Criterion B (association with the lives of significant persons) and Criterion C (embodiment of distinctive characteristics of a type, period, or method of construction).

8.2.2.3 SR 285 Northbound and Southbound Bridges

The two bridges on which SR 285 crosses the Wenatchee River have both been determined eligible for listing on the NRHP. The northbound bridge was built in 1933 and the southbound bridge in 1955. The 1955 bridge has been nominated to the NRHP, but is not yet listed; WSDOT has designated it as functionally obsolete (WSDOT, February 2017).

8.3 Potential Impacts

This section identifies the potential for “use” of parks, recreational areas, refuges, and NRHP-eligible sites that are protected by Section 4(f). Both direct use (land acquisition) and indirect or constructive use are discussed. The assessment of impacts is preliminary and is based on current early design concepts and initial discussions with the local agencies with jurisdiction.

Because this is a pre-NEPA study, a comprehensive evaluation of Section 4(f) avoidance alternatives was not completed. If the project advances into a formal NEPA process, a full avoidance analysis will be prepared unless FHWA and the agencies with jurisdiction agree that either (1) one or more

programmatic Section 4(f) evaluations apply, or (2) impacts on Section 4(f) resources can be reduced to a *de minimis* level through avoidance, minimization, and mitigation measures.

8.3.1 Confluence Parkway Alternative

8.3.1.1 Confluence State Park and Apple Capital Loop Trail

Confluence Parkway would result in a Section 4(f) use of Wenatchee Confluence State Park. Based on the current conceptual design, the Confluence Parkway Alternative would convert approximately 8.7 acres of land from park use to right-of-way. This land would be located along the western edge of the park. North of the Wenatchee River, the new right-of-way would avoid the developed portion of the recreational area, but would displace several existing buildings at the far west edge of the site that are used for maintenance and as the park caretaker's residence. Relocation of the buildings may result in displacement of other uses or utilization of areas identified for future expansion of recreational opportunities. South of the river, the roadway would abut the BNSF right-of-way, staying on top of the bluff above the wetlands and trails in the Horan Natural Area. Some of the impacts in this area would result from realignment of the Apple Capital Loop Trail onto park property to the east of the existing PUD maintenance yard; although this alignment would improve safety and trail user experience compared to the existing alignment, the option remains for the trail to remain along the road in order to reduce the amount of land acquired from the park. This would reduce the amount of impact by 0.4 acre. Fill would be needed to extend into the wetland area at topographic "pinch points," but fill volumes and total acreage needs could be substantially minimized through the use of retaining walls (see "Potential Mitigation" below).

The new parkway would also result in some degree of indirect impact to the park in the form of increased noise and changes in the visual setting. These impacts would be more pronounced in the northern portion, where the road would likely be somewhat elevated above the level of the main park facilities as it descends the slope south of Olds Station Road to the crossing location. The proximity of the new roadway bridge to the Apple Capital Loop Trail and its pedestrian/bicycle bridge would also increase noise levels along this section of the trail. South of the river, a landscaped berm on the east side of Confluence Parkway would buffer traffic noise in the Horan Natural Area while also providing visual separation between trail users and the parkway. Rerouting the trail east of the PUD yard would provide a benefit over its current location on Hawley Street by reducing noise levels and potential conflicts with vehicle traffic.

In April 2017, the CDTC met with representatives of the PUD and Washington State Parks to discuss how the Confluence Parkway Alternative would affect the park and to seek feedback on impacts and mitigation. The PUD and State Parks provided the following observations during the meeting:

- Converting park property to right of way within the project boundary could only be accomplished in one of two ways: as an amendment to the FERC license, or as part of the periodic FERC relicensing process. Both methods would be subject to FERC approval, substantial public involvement requirements, and NEPA review. In either case, mitigation would be required.
- The PUD expressed concerns about potential damage to the habitat in the Horan Natural Area, as well as the change in the character of the park and trail (views, noise, etc.) that could be caused by the presence of a new arterial. The PUD also expressed reluctance to provide recommendations for potential mitigation measures, and preferred that they be presented with mitigation recommendations to review.
- State Parks staff noted that the park maintenance buildings and employee parking, which could be displaced by the proposed alignment, would be difficult to replace within the park. They also

noted that two new wellheads had recently been installed near the river crossing area on the north side, which would need to be avoided or relocated.

- State Parks and PUD staff acknowledged and briefly discussed the potential for improvements to wetland hydrology in the Horan Natural Area, the benefits of relocating a section of the loop trail away from Hawley Street where conflicts exist between the trail and driveways to the PUD operations and storage facility, and the potential acquisition of a 7-acre parcel that is contiguous with the park but not within the FERC project boundary as a way to offset the acquisition of park lands.

The PUD followed up in May 2017 with a letter to the CDTC expressing its strong concerns about the project. In September 2017, the PUD sent a clarification of its position to the CDTC. The clarification noted that the PUD continued to have serious reservations about Confluence Parkway's potential impacts on Wenatchee Confluence State Park and the adjoining natural habitat area. However, the letter also stated that the PUD would welcome the opportunity to review and discuss mitigation alternatives identified through the NEPA process, and acknowledged the possibility that its concerns could be addressed through mitigation. The PUD also recommended a comprehensive public involvement process regarding the project.

8.3.1.2 Wenatchee Flat Site

Confluence Parkway is expected to result in a Section 4(f) use of the Wenatchee Flat site. As currently designed, Confluence Parkway would traverse near the western edge of the Wenatchee Flat site, resulting in some degree of grading and ground disturbance. For some distance north of the river, the roadway would likely be on a structure, and therefore the area of disturbance would be confined to support pier locations. South of the river, disturbance would involve grading of the roadbed and, in some locations, placement of fill. Given the known Native American use of the area and the fact that artifacts have been discovered during construction of several prior projects, it is likely that excavation for the project would yield additional artifacts.

In June 2017, the CDTC and the City of Wenatchee met with cultural resources staff from the Confederated Tribes of the Colville Reservation to discuss the project and receive feedback on potential impacts. Discussions with the tribe relevant to Section 4(f) are summarized below.

- The NRHP nomination for the site probably needs to be updated, both to revisit the NRHP site boundaries in relation to the larger archaeological site, and to determine whether the site qualifies under Criterion A and/or B, in addition to Criterion D. As noted above, eligibility under other criteria would make the site subject to Section 4(f).
- There are two ethnographic place names at the mouth of the river. The Colville Tribes would expect some ethnographic work (interviews) to better document the history and cultural significance of these locations, but the project is not expected to affect their traditional importance.
- An archaeological survey would be needed after Section 106 is initiated. The Colville Tribes' preference would be to avoid cultural deposits where possible, but they understand that avoidance is not always practical on a linear road project. If ancestral remains are found, they would prefer to leave them in place, and use engineering and design features (rocks, rebar) to deter access.
- Overall, impacts could likely be mitigated through a variety of measures, including investigation and documentation of the site, ethnographic studies, interpretive signage and exhibits, and other projects documenting the area's cultural heritage.

In July 2017, the CDTC and the City met with cultural resources staff from the Yakama Nation. Feedback on the impacts of the Confluence Parkway Alternative included the following:

- The Yakama have traditionally used the project area over a long period of time. The Wenatchee Flat site would likely be considered a TCP. However, TCP considerations would be different for the Yakama than for the Colville, because they have different languages and different histories in the area.
- The Yakama Nation would have concerns about cultural resource impacts resulting from disturbance for the bridge crossing. Archaeological survey of the areas to be disturbed by construction would be required during the design process to ensure that significant impacts would be avoided and/or mitigated. Tribal staff are available to contract to do this investigation. Given the proximity of the two sites and the traditional tribal use of riverbank areas, issues and concerns related to potential cultural resources would be similar for the North Wenatchee Avenue Alternative as they would for the Confluence Parkway Alternative.
- If human remains are found, they must be avoided (even if this requires a design change) and protected in place.
- Overall, the project is probably feasible from the tribe's perspective if the tribe remains closely involved and impacts are mitigated.

The CDTC and the City will follow up with the Colville Tribes and Yakama Nation to initiate Section 106 consultation if Confluence Parkway becomes a formal proposal.

8.3.1.3 Michael Horan House

Given the distance between the Horan House and the Confluence Parkway alignment, and the fact that heavy vegetation and the BNSF railroad bridge are between the house and the alignment, it is unlikely that the project would significantly alter the historic setting of the structure. As a result, no Section 4(f) use of the site is anticipated.

8.3.1.4 SR 285 Northbound and Southbound Bridges

The SR 285 bridges would not be affected by the Confluence Parkway Alternative; the construction of Confluence Parkway and the resulting diversion of traffic would extend the useful life of the bridges by decades.

8.3.2 North Wenatchee Avenue Alternative

The North Wenatchee Avenue Alternative would not involve the use of any park lands protected by Section 4(f), and is unlikely to significantly affect the Horan House. It would, however, require replacement and/or substantial structural alteration of one or both SR 285 bridges crossing the Wenatchee River. This would result in a Section 4(f) use of these NRHP-eligible structures. It is likely that this use could be addressed under the provisions of the *Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges.* In addition, as noted for the Confluence Parkway Alternative, this area is considered to have high probability for currently unidentified archaeological resources to be encountered during construction.

8.4 Potential Mitigation

8.4.1 Confluence Parkway Alternative

8.4.1.1 Wenatchee Confluence State Park and Apple Capital Loop Trail

If Confluence Parkway is advanced into the NEPA process, the Section 4(f) evaluation will include an analysis of measures to minimize harm to Wenatchee Confluence State Park and the Apple Capital Loop Trail. These measures would need to be approved by FHWA and FERC as well as the local agencies. Based on preliminary analysis and discussions, such measures might include:

Roadway Design Features (*= included in current design concept)

- Landscaping and vegetation to create an attractive parkway visual experience, while keeping the pavement width to the minimum needed to accommodate expected traffic volumes*
- Creation of a berm along the east side of the parkway where it would adjoin the Horan Natural Area to provide a noise and visual buffer from the park and increase physical separation between travel lanes and the Apple Capital Loop Trail*
- Relocation of trail away from Hawley Street and a section of BNSF mainline railroad*
- Design of roadway stormwater system to improve hydrology of wetlands in Horan Natural Area
- Use of retaining walls rather than fill slopes to minimize impacts on wetlands
- Incorporation of noise-reducing elements within the park, such as noise barriers or quieter pavement

Replacement/Restoration of Affected Land and Infrastructure

- In-kind replacement of land acquired for right-of-way as required by FERC regulations; compensation at fair market value otherwise. Replacement land would need to meet FERC requirements for replacement of the beneficial public use or a higher potential use.
- Replacement of park maintenance buildings and caretaker's residence in a location acceptable to PUD and State Parks
- Protection and/or relocation of water supply wells north of the river, if the bridge and roadway alignment cannot avoid them
- Relocation of trail access road and parking lot
- Protection-in-place of Native American interments (if required)

Potential Betterments to Park and Trail

- Accommodation and potential expansion of proposed water quality improvements in Horan Natural Area (currently in design process)
- Improvements to park trail systems that connect to the Apple Capital Loop Trail
- Development of new and more direct loop trail access points from North Wenatchee Avenue commercial district and North Wenatchee neighborhoods, e.g., connection across BNSF railroad from Maiden Lane vicinity
- Interpretive signage, landscaping, and/or other features commemorating Native American history and place names

- Creation of improvements for birders, e.g., an observation platform
- Improved, more direct vehicular access and wayfinding to Confluence State Park from south of the Wenatchee River

8.4.1.2 Wenatchee Flat Site

Mitigation for impacts to the Wenatchee Flat archaeological site will be determined through the Section 106 coordination process and documented in an MOA. The primary mitigation measure would be to conduct a systematic investigation of the site prior to construction and, if necessary, alter the project design to avoid significant impacts. The investigation would likely focus on areas of excavation or other ground disturbance, and would be conducted under a Treatment Plan that would be approved by the Consulting Parties. Any artifacts or specimens collected would be analyzed, with the results documented in a site report, and curated at a repository that meets the standards outlined in 36 CFR Part 79, "Curation of Federally Owned and Administered Archaeological Collections."

Other potential mitigation concepts include:

- Analyzing or reanalyzing previously excavated collections from the Wenatchee Flat site
- Updating the NRHP listing for the site to redefine the site boundaries and/or eligibility criteria, as appropriate
- Conducting TCP studies
- Conducting ethnographic or oral history studies
- Incorporating interpretive signage or design elements into the design of the project

8.4.2 North Wenatchee Avenue Alternative

Based on tribal input, an archaeological survey of the shoreline area that would be disturbed by replacement or reconstruction of the existing Wenatchee River bridges is recommended, due to the general archaeological sensitivity of this area. As noted above, alteration or removal of the existing spans would likely fall under FHWA's programmatic Section 4(f) procedures for historic bridges. Mitigation would typically involve documenting the bridges in accordance with Historical American Engineering Record (HAER) standards, including photographic documentation as well as compilation of available drawings and historical reports.

8.5 Summary of Risks

8.5.1 Confluence Parkway Alternative

The Confluence Parkway Alternative presents a moderate-to-high degree of risk. This risk stems primarily from the use of a portion of Wenatchee Confluence State Park to construct the proposed roadway, because Chelan County PUD has expressed significant concerns about potential park impacts. However, the PUD has also expressed openness to exploring mitigation to address these concerns through the NEPA process, and has acknowledged the possibility that park impacts could be satisfactorily mitigated. The nature and cost of mitigation have yet to be determined and could significantly affect overall project costs, but are not expected to make the project infeasible. Therefore, although risks remain, the park impacts are not considered a fatal flaw for purposes of this study.

At this point, impacts to the NRHP-eligible Wenatchee Flat site do not appear to pose a high risk to project implementation, even if the site is subject to Section 4(f). Discussions with the Colville Tribes and

Yakama Nation indicate that use and disturbance of the site is generally expected to be mitigable, even if artifacts are discovered during site investigation and construction. As long as the tribes and DAHP concur that impacts can be mitigated to a *de minimis* level, no evaluation of avoidance alternatives would be necessary.

8.5.2 North Wenatchee Avenue Alternative

Because mitigation for historic bridges is a straightforward process under the Section 4(f) programmatic agreement, risks associated with this alternative are low.

9. LAND USE AND DISPLACEMENTS

This chapter assesses each alternative's consistency with existing land use plans and policies, as well as the potential to require displacements of existing residences or businesses. The purpose of land use plans is to direct the types of land uses allowed in certain areas and to guide growth and development in both urbanized and rural areas. In order to receive federal funding, a transportation project must be consistent with adopted local land use plans; projects that are inconsistent with local planning are at risk for denial or appeals.

Transportation projects also have the potential for direct impacts on land use by requiring the purchase of additional right-of-way that may result in displacements of businesses or residences. Purchasing additional right-of-way and meeting mitigation requirements for displacements under the federal Uniform Relocation Assistance and Real Property Acquisition Act of 1970 can be costly and time consuming, and may elevate project risk.

This is a preliminary and high-level evaluation of land use impacts based on conceptual design; more detailed and refined information will be required to support formal environmental review under NEPA. The evaluation considers impacts, mitigation, land use consistency, and risks that may result from the action alternatives and the No Action Alternative.

9.1 Regulatory Framework

This section describes state, regional, and local regulations, plans, and policies that relate to the potential North Wenatchee capacity improvements, as well as regulations applicable to potential property acquisition and displacements.

9.1.1 State of Washington Land Use Regulations

9.1.1.1 Washington Growth Management Act

The Growth Management Act (GMA) requires state and local governments to manage Washington's growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive plans, and implementing them through capital investments and development regulations. The Act (Chapter 36.70A RCW) was adopted by the Legislature in 1990. Rather than centralize planning and decision-making at the state level, the GMA focuses on local control. The Act establishes state goals, sets deadlines for compliance, offers direction on how to prepare local comprehensive plans and regulations, and sets forth requirements for early and continuous public participation. Within the framework provided by the mandates of the Act, local governments have many choices regarding the specific content of comprehensive plans and implementing development regulations. The City of Wenatchee's Comprehensive Plan, *Planning to Blossom 2025,* is discussed below.

9.1.2 Regional Plans and Policies

9.1.2.1 Transportation 2040: The Regional Transportation Master Plan for Chelan and Douglas Counties (2015)

Transportation 2040 was adopted in 2015 as the Regional Transportation Plan for the urban, rural, and small city areas in Chelan and Douglas counties. *Transportation 2040* confirmed the growth forecasts and transportation needs identified in previous planning efforts, including *Confluence 2030* and the

North Wenatchee Transportation Master Plan. The plan emphasized the importance of added north-south capacity and identified Confluence Parkway as a "Phase 2" project for implementation between 2028 and 2040. Additional details on *Transportation 2040* are provided in Chapter 2 and Appendix A.

9.1.2.2 Chelan County PUD's Land Management Program for the Rock Island Hydroelectric Project (2013)

The Land Management Program provides defined strategies for the management of lands within the Rock Island Hydroelectric Project boundary, which includes Wenatchee Confluence State Park. All land uses within the project boundary require coordination with the Chelan County PUD. In addition, the construction of any new bridges or roadways within the project boundary must be reviewed and approved by FERC. More information on the specific requirements of this program as they relate to potential North Wenatchee transportation capacity improvements is provided in Chapter 8.

9.1.3 Local Plans and Policies

9.1.3.1 Planning to Blossom 2025: Wenatchee Urban Area Comprehensive Plan (2017 Update)

Developed in compliance with the GMA, *Planning to Blossom 2025* is Wenatchee's Comprehensive Plan. Key plan considerations, goals, and policies relevant to this study are described below by plan element.

- **Land Use/Urban Growth Area Element:**
    - Urban Growth Area Goal: Promote a compact urban form that encourages infill and discourages sprawl within a well-defined boundary.
        - Policy 2: Ensure that sufficient land is set aside for urban growth for population and economic growth.
        - Policy 3: Urban growth shall occur within urban growth boundaries where adequate public utilities and services exist or can be provided in an efficient manner.
    - Arterial Corridor Goal: Provide opportunities for infill, redevelopment, and neighborhood services along the city's arterial corridors that traverse residential neighborhoods.
    - Infill Goal: Promote infill opportunities within the urban areas.
    - Coordinated Planning Goal: Continue to work cooperatively within the region to address transportation, public services and facilities, and land use.
- **Transportation Element**:
    - Regional Connectivity Goal: Enhance regional connectivity within the Wenatchee Valley and to major destinations beyond.
        - Policy 3: Participate in short- and long-term regional transportation project planning including potential Columbia and/or Wenatchee River bridges.
        - Policy 8: Use the *North Wenatchee Transportation Master Plan* completed by the Wenatchee Valley Transportation Council as a guide for regional transportation planning and incorporation of transportation improvements into the City's Circulation Plan.
        - Policy 9: Use the *North Wenatchee Transportation Master Plan* as a guidance tool for evaluation of development applications to identify congestion improvements along North Wenatchee Avenue for consistency with the *North Wenatchee Transportation Master Plan*.

        - Policy 10: Prior to transportation improvements along North Wenatchee Avenue, perform a detailed analysis when needed of the *North Wenatchee Transportation Master Plan* components to improve implementation of the master plan.
    - Pedestrian, Bicycles, and Transit Goal: Provide a mix of transportation options that better meets the changing needs and preferences of Wenatchee residents.
    - Freight Management Goal: Provide for efficient movement of freight into, within, and out of the city of Wenatchee.
- **Economic Development Element:**
    - Regional Center Goal: Promote the continued developed of Wenatchee as the regional center of north-central Washington.
        - Policy 1: Promote mixed-use zoning and development standards that ensure the city's growth as an urban center.
    - Facilities and Infrastructure Goal: Work with regional partners to ensure that regional infrastructure needs are addressed.
        - Policy 1: Support regional partners in the addition of needed infrastructure (transportation, education, fiber optics, water) to further enhance the region.

9.1.3.2 North Wenatchee Master Plan (2017)

The purpose of this plan is to create a redevelopment strategy for parcels affected by the 2015 Sleepy Hollow fire that will also serve as a catalyst for additional redevelopment east of the North Wenatchee Avenue corridor. The Master Plan area is bordered by North Wenatchee Avenue on the west, Hawley Street on the north, the Columbia River waterfront and Walla Walla Point Park on the east, and Maple Street on the south. The area consists of aging, automobile-dominated commercial and industrial properties, some of whose buildings were damaged by the fire. The Master Plan concept envisions the creation of a neighborhood center supported by mixed uses; North Wenatchee Avenue would serve as a "Boulevard Gateway," with enhanced aesthetics and a new signalized intersection at McKittrick Street. Confluence Parkway would provide access to the master-planned area from the north. The plan was adopted as part of the 2017 updates to *Planning to Blossom: 2025.*

9.1.3.3 North Wenatchee Transportation Master Plan (2011)

The *North Wenatchee Transportation Master Plan* establishes a blueprint for improving safety and traffic flow in a manner that supports economic growth in the SR 285/North Wenatchee Avenue corridor. The plan identifies improvement projects, programs, and policy direction to enhance the transportation function of the corridor to support land use plans and economic development. The plan's final recommendation includes Confluence Parkway, a new 2-lane arterial corridor that would increase north-south capacity and connectivity parallel to SR 285/North Wenatchee Avenue. The plan's recommendations also include safety, circulation, and streetscape improvements to SR 285/North Wenatchee Avenue. Additional details on the plan are provided in Chapter 2 and Appendix A of this report.

9.1.3.4 Wenatchee Area Bicycle Master Plan (2013)

This is a planning document for incorporating bicycle transportation as a viable option for Wenatchee, East Wenatchee, Rock Island, and unincorporated areas of Chelan and Douglas counties. The goals of the plan are to increase bicycle use and improve bicycling safety. The plan lays the foundation for enhanced general mobility by creating a comprehensive, safe, and well-connected bicycle transportation

network. The plan identifies bicycle improvement projects for crossing North Wenatchee Avenue in order to improve access among neighborhoods, commercial areas, and the Apple Capital Loop Trail.

9.1.4 Regulations Governing Property Acquisition and Displacements

9.1.4.1 Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act)

This federal law establishes minimum standards for federally funded programs and projects that require the acquisition of property or displace persons from their homes, businesses, or farms. The Uniform Act's protections and assistance provide fair market compensation for acquired property and relocation assistance if displacements are required.

9.1.4.2 State of Washington Relocation and Property Acquisition Regulations

State regulations addressing relocation and property acquisition include Washington Administrative Code (WAC) 468-100, Regulation for Uniform Relocation Assistance and Real Property Acquisition, and RCW 8.26, Relocation Assistance—Real Acquisition Policy. These regulations establish policy for the fair and equitable treatment of persons displaced as a result of state and local government public works programs.

9.2 Existing Conditions

9.2.1 Confluence Parkway Alternative

The area through which the Confluence Parkway Alternative would pass is zoned Industrial and Waterfront Mixed Use (Figure 10). The alignment would begin in an area zoned for industrial development, north of the Wenatchee River. While uses in the area are primarily industrial, there are non-conforming residential buildings at the junction of E. Penny Road and Euclid Avenue, currently used as office space, that would be affected by the proposed alignment. At Olds Station Road, the alignment would continue between industrial areas on the west and traverse just inside the boundary of the Wenatchee Confluence State Park on the east. The park is owned by the Chelan County PUD and managed by Washington State Parks; as described above, park lands are within the Rocky Reach Hydroelectric Project boundary. Zoning in the park is Waterfront Mixed Use.

On the south side of the Wenatchee River, the proposed Confluence Parkway alignment would continue along the western edge of Confluence State Park, just east of and adjacent to the BNSF right-of-way. The properties west of the railroad tracks remain primarily industrial in this section. Midway between Maiden Lane and Hawley Street, the area to the east of the proposed alignment is also Chelan County PUD property, but is a maintenance and operations yard, rather than park land. In the vicinity of Hawley Street and Miller Street, the proposed alignment would connect back into the existing arterial street grid.

As described in the previous section, a master planning process for the North Wenatchee area is underway, with the final plan completed in 2017 and slated for adoption later in the year. The plan proposes a future mixed-use area of approximately 60 acres that includes residential, commercial, office, and light industrial development in the area south of the Wenatchee River and east of North Wenatchee Avenue. The plan also includes changes to the proposed roadway network and assumes that Confluence Parkway will be built to provide north-south access to the area.

9.2.2 North Wenatchee Avenue Alternative

The existing alignment of North Wenatchee Avenue in the project area passes through areas zoned North Wenatchee Business District and Industrial (Figure 10). The primary land uses along this corridor are commercial, including a strip mall on the east side of the alignment, just south of the Wenatchee River bridge; a Walmart store between Horse Lake Road and Maiden Lane on the west side of the alignment; a Sav-Mart warehouse and business complex with a Starbucks® drive-through at Maiden Lane on the east side of the alignment; and a drive-in restaurant at the southwest corner of Maiden Lane. From the south side of Maiden Lane to Hawley Street, land uses consist of an assortment of commercial uses, including restaurants, hotels, used car lots, gas stations, a car wash, and some retail. South of Hawley Street to Miller Street, land uses are similar to those to the north. However, approximately 60 acres of land on the east side of North Wenatchee Avenue, including a 7.5-acre WSDOT property just south of McKittrick Street, are being considered for redevelopment as part of the North Wenatchee Master Plan (described above). This entire area is proposed to become a mixed-use residential, commercial, office, and light industrial zone.

9.3 Potential Impacts

9.3.1 Direct Impacts

Both action alternatives would require the acquisition of right-of-way and would result in the displacement of existing structures. A summary of the total acreage potentially affected by each alternative is presented in Table 2; the estimated number of parcels and buildings potentially affected by each alternative is presented in Table 3. The No Action Alternative would not require any acquisition of land.

Table 2. Acres Potentially Affected by Alternative

Potential Impacts	Confluence Parkway Alternative	North Wenatchee Alternative
Total Acres	15.4	4.2
Acres affected for roadway right-of-way	10.2	4.2
Acres affected for cut and fill	5.2	0
Total Acres in Confluence State Park	8.7	0
Acres affected for roadway right-of-way (**in park only)**	5.2	0
Acres affected for cut and fill (**in park only)**	3.5	0

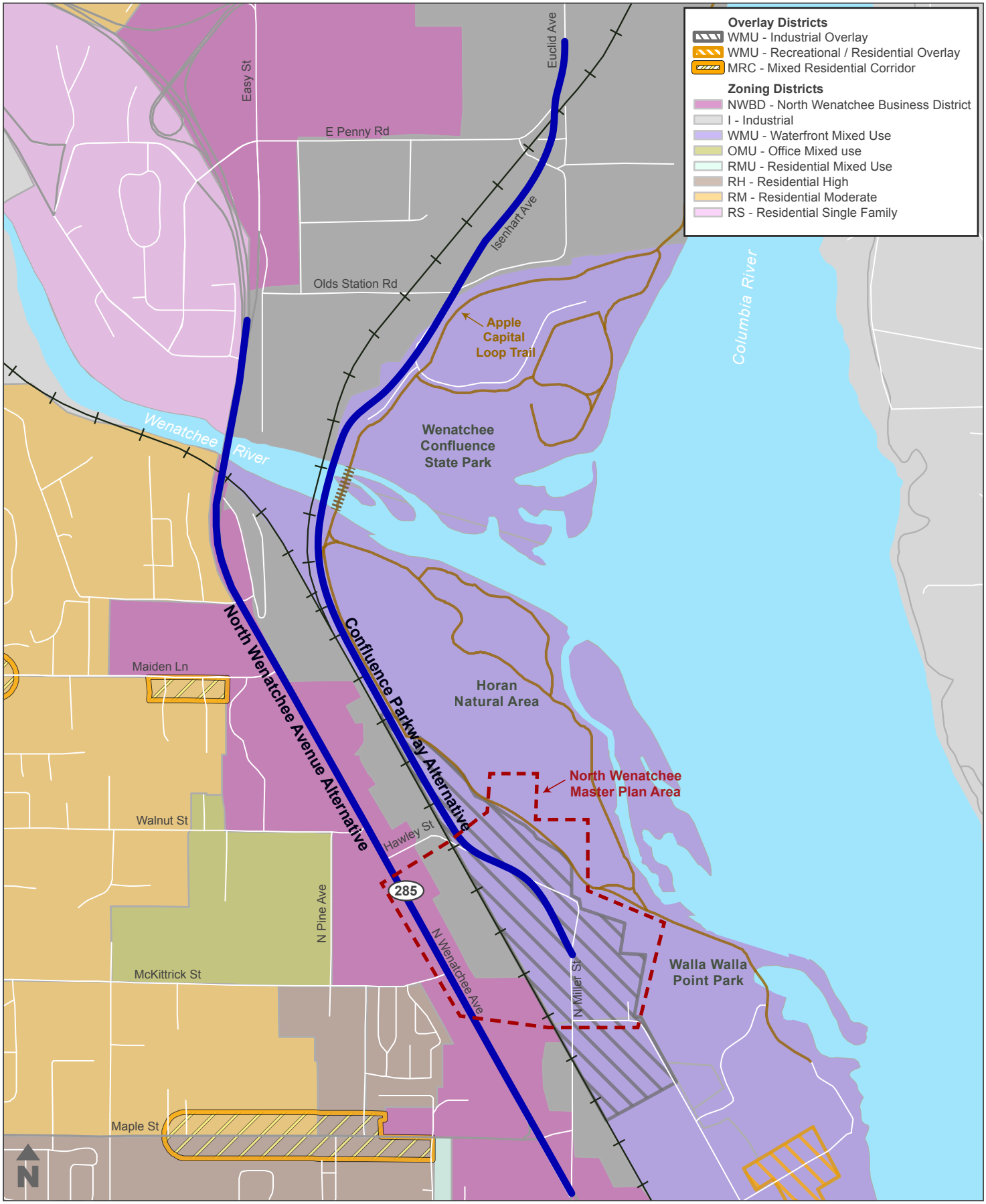

Figure 10. Wenatchee Urban Area Land Use Map

Table 3. Parcels and Buildings Potentially Affected by Alternative

Potential Impacts	Confluence Parkway Alternative	North Wenatchee Alternative
Number of Parcels Fully or Partially Acquired	30	60
Unique Parcel Owners	13	49
Buildings Potentially Displaced	13	8

9.3.1.1 Confluence Parkway Alternative

The Confluence Parkway Alternative would require the acquisition of approximately 10 acres of land for the roadway right-of-way and an additional 5 acres for cut-and-fill slopes, for a total of approximately 15 acres of land affected. Approximately 9 of these 15 acres are located within Wenatchee Confluence State Park, along the park's western boundary. Within the Wenatchee Confluence State Park, approximately 5 acres would be affected for roadway right-of-way and 4 acres would be affected by cut-and-fill slopes that extend outside the right-of-way boundary.

At this preliminary stage of analysis, it is estimated that approximately 30 parcels would be affected by the acquisition of land for roadway right-of-way and cut-and-fill slopes. These 30 parcels have 13 unique property owners. Up to 13 buildings on four parcels would be affected by the proposed alignment. Three of the buildings are park facilities, including a ranger residence, and maintenance structures located just north of the river within Wenatchee Confluence State Park. These structures would be relocated within the park. An additional five buildings are located on three parcels that would be fully acquired where the BNSF railroad tracks and Euclid Avenue cross near the north end of the project. Three of these buildings are houses that have been converted for commercial office space; the remaining two buildings are a house and its detached garage. The remaining five structures are located on Hawley Street east of the Chelan County PUD maintenance yard and include two residences, two outbuildings, and one office.

Approximately 9 of the 15 acres of land potentially affected by this alternative are owned by the Chelan County PUD. Because most of that area is park land or trail, the impacts to this land are discussed in more detail in Chapter 8. Along the west edge of the park lands, particularly south of the Wenatchee River, there are a large number of PUD-owned utility poles and electrical lines that would need to be relocated.

The section of land at the southern end of the alternative alignment adjacent to Hawley Street is primarily a PUD maintenance and operations yard and substation. There are approximately 18 total acres of PUD land in this area, of which approximately 5 to 6 acres could be affected by the proposed alignment. Chelan County PUD is considering a relocation of this facility (except for the transmission substation) to a new, consolidated PUD campus. However, there is one private parcel within the grouping of PUD parcels. This property includes a long driveway that accesses onto Hawley Street. The proposed trail realignment would follow the route of this private driveway. The relocation of Hawley Street would also split an existing parcel belonging to a major fruit processing and warehousing facility that was destroyed by the Sleepy Hollow fire.

The Confluence Parkway Alternative would require the acquisition of property for right-of-way along the edges of several parcels south of Technology Center Way that would affect existing parking. The alignment would create a new intersection with Technology Center Way and reconfigure the intersection of Isenhart Avenue and Olds Station Road. This would eliminate approximately 10 on-street parking spaces on Olds Station Road between the connection with Isenhart Avenue and the park

entrance. On-street parking on Isenhart Avenue would also be eliminated. As a result, employees of businesses in the vicinity may have to park farther away compared to existing conditions. On-street parking on most of Olds Station Road would continue to be available. The partial acquisitions may also reduce off-street parking spaces on a few of the bordering industrial properties.

9.3.1.2 North Wenatchee Avenue Alternative

The North Wenatchee Avenue Alternative would require the acquisition of approximately 4 acres of land for roadway right-of-way. These acquisitions would primarily be narrow strips of property that front North Wenatchee Avenue. Approximately 60 parcels would be affected by these acquisitions for roadway right-of-way. These parcels have 49 unique property owners.

Right-of-way acquisition is estimated to affect up to eight commercial buildings. Under the current conceptual design, this right-of-way acquisition would require the displacement of seven commercial structures:

- La Quinta Inn & Suites, 1905 North Wenatchee Avenue
- Washington Trust Bank, 1851 North Wenatchee Avenue
- RE/MAX, 1835 North Wenatchee Avenue
- Real Homes Office, 1833 North Wenatchee Avenue
- North Avenue Market, 1816 North Wenatchee Avenue
- Jerry's Auto Supply, 1754 North Wenatchee Avenue
- Taco Time, 1512 North Wenatchee Avenue

Although detailed roadway design may identify opportunities to avoid some of these impacts, some business displacements would be necessary to provide the needed roadway capacity. Widening North Wenatchee Avenue would also alter the access points of parcels between Maiden Lane and Miller Street. In some cases, this would reduce overall space for parking and travel through parking areas. In other cases, such as Starbucks, EZ's, Wendy's, Sonic, and other drive-through food services, it would affect and potentially limit customers' ingress and egress to the facilities. Existing signage and utilities, such as street lights, along the roadway would also need to be relocated for the majority of businesses along the corridor. Acquisition of commercial properties would have economic impacts due to disruption of existing businesses and loss of tax revenue from displaced businesses that do not relocate. No park lands or residential structures would be affected by the North Wenatchee Avenue Alternative.

9.3.2 Consistency with Applicable Land Use Plans and Policies

The alternatives would differ in terms of their consistency with the applicable land use plans and policies described above. In general, the Confluence Parkway Alternative would have the greatest degree of consistency, fully supporting all adopted City of Wenatchee plans and policies. The North Wenatchee Avenue Alternative would provide partial support for most plans and policies, but the width of the expanded corridor and the magnitude of its business impacts would be inconsistent with many plan goals for safety, access, economic development, and multimodal mobility. The No Action Alternative, by failing to provide the capacity needed to serve planned growth and economic development, would not support adopted land use goals and policies. Table 4 presents a summary of each alternative's consistency, with further discussion provided in the text below.

Table 4. Consistency of Alternatives with Applicable Land Use Plans and Policies

Land Use Plan	Confluence Parkway Alternative	North Wenatchee Avenue Alternative	No Action Alternative
Planning to Blossom 2025 – Wenatchee Comprehensive Plan			
Land Use/Urban Growth Area Element	**Supports**—alleviates congestion, adds capacity to serve planned growth	**Partially supports**—would alleviate congestion but displace businesses	**Does not support**—would not alleviate congestion
Transportation Element	**Supports**—expands roadway capacity, improves regional connectivity by adding a second bridge, includes pedestrian and bicycle infrastructure, and increases efficiency of freight movement	**Partially supports**—would expand north-south capacity and include pedestrian/bicycle infrastructure, but would not enhance regional connectivity or freight movement	**Does not support**—would not alleviate congestion, enhance regional connectivity, promote multimodal transportation, or facilitate freight movement
Economic Development Element	**Supports**—serves planned growth in urban areas, enhances regional transportation infrastructure, and would not result in the displacement of current commercial uses	**Does not support**—would reduce business parking and displace a number of businesses, resulting in a loss of economic revenues	**Does not support**—fails to meet regional transportation needs and would not accommodate anticipated growth in population and employment
North Wenatchee Master Plan (Draft)	**Supports**—would add capacity and improve access to serve proposed redevelopment in the area east of North Wenatchee Avenue	**Partially supports**—would add capacity to serve redevelopment, but would provide sub-optimal access to redeveloped area	**Does not support**—North Wenatchee Avenue would remain congested and unfriendly to pedestrians, constraining access to redevelopment area
North Wenatchee Transportation Master Plan	**Supports**—recommended in plan; would benefit regional traffic, freight, and transit by providing capacity, reducing the bottleneck on the Wenatchee River bridges, and providing a new access across the river	**Partially supports**—would add capacity, but was rejected during Confluence 2030 planning process because it would disrupt businesses and would not expand access to the regional transportation system	**Does not support**—would not provide additional roadway capacity needed to serve planned growth, thereby increasing congestion over time
Transportation 2040	**Supports**—included in Transportation 2040 plan to reduce congestion and provide capacity to serve planned growth	**Partially supports**—would add north-south capacity, but would not enhance regional connectivity or freight movement	**Does not support**—would not add north-south capacity to serve anticipated growth in population and employment within the region
Wenatchee Area Bicycle Master Plan	**Supports**—increases bicycle infrastructure and provides access and connection to the Apple Capital Loop Trail	**Partially supports**—incorporates bicycle improvements along North Wenatchee Avenue, but may present safety concerns due to increased traffic volumes and crossing distance	**Does not support**—does not include additional bicycle infrastructure

9.3.2.1 Confluence Parkway Alternative

The Confluence Parkway Alternative would be fully consistent with local land use plans and would support future land uses considered by the City of Wenatchee. Table 5 provides a summary of the alternative's consistency with the land use plans and policies discussed in Section 9.1.

Table 5. Summary of Confluence Parkway Consistency with Applicable Land Use Plans and Policies

Land Use Plan	Confluence Parkway Alternative
Planning to Blossom 2025	
Land Use/Urban Growth Area Element	**Consistent**—The alternative is consistent with the Land use/Urban Growth Area element, because it serves existing growth in areas within the urban growth boundary and adds capacity to serve planned growth through infill and redevelopment opportunities.
Transportation Element	**Consistent**—This alternative is consistent with the Transportation Element because it expands roadway capacity, improves regional connectivity by adding a second bridge, includes pedestrian and bicycle infrastructure, and increases efficiency of freight movement. It also is consistent with the recommendations from the North Wenatchee Transportation Master Plan, which is cited in the Transportation Element as a guide for regional planning.
Economic Development Element	**Consistent**—This alternative is consistent with the Economic Development Element because it serves planned growth in urban areas, enhances regional transportation infrastructure, and would not result in the displacement of current commercial uses.
North Wenatchee Master Plan	**Consistent**—This alternative would add capacity and improve access to serve proposed redevelopment in the area east of North Wenatchee Avenue.
North Wenatchee Transportation Master Plan	**Consistent**—This alternative is consistent with the final recommendation from the North Wenatchee Transportation Master Plan and would benefit regional traffic, freight, and transit by providing capacity, reducing the bottleneck on the Wenatchee River bridges, and providing a new access across the river. The Confluence Parkway concept is recommended in the plan.
Transportation 2040	**Consistent**—This alternative is included in Transportation 2040 to reduce congestion and provide capacity to serve planned growth. Confluence Parkway is recommended for construction in Phase 2 of Transportation 2040.
Wenatchee Area Bicycle Master Plan	**Consistent**—This alternative would increase bicycle infrastructure and provide access and connection to the Apple Capital Loop Trail.

9.3.2.2 North Wenatchee Avenue Alternative

This alternative is only partially consistent with local land use plans. While it would add transportation capacity that could support future growth and economic development planned by the City of Wenatchee, it would not provide new or improved access to growing areas. In addition, the greater width of North Wenatchee Avenue under this alternative would eliminate existing businesses and reduce land availability for future development, while also negatively affecting safety and multimodal options in the corridor. Table 6 provides a summary of the alternative's consistency with the land use plans and policies discussed in Section 9.1.

Table 6. Summary of North Wenatchee Avenue Alternative's Consistency with Applicable Land Use Plans and Policies

Land Use Plan	North Wenatchee Avenue Alternative
Planning to Blossom 2025	
Land Use/Urban Growth Area Element	**Partially consistent**—The alternative would serve planned growth in areas within the urban growth boundary and accommodate planned infill and redevelopment opportunities. However, although it would alleviate congestion, it would displace a number of businesses and impair access to others.
Transportation Element	**Partially consistent**—Although the alternative would expand north-south roadway capacity and include additional pedestrian and bicycle infrastructure, it would not enhance regional connectivity or freight movement, because North Wenatchee Avenue would remain the only route into and out of Wenatchee from the north.
Economic Development Element	**Inconsistent**—This alternative could inhibit economic development opportunities by reducing business access and parking. It would result in the displacement of eight businesses, resulting in a loss of economic revenues. It also would not facilitate planned growth and redevelopment in the Olds Station and North Wenatchee Master Plan areas.
North Wenatchee Master Plan	**Partially consistent**—The plan contemplates North Wenatchee Avenue as a "Boulevard Gateway" but does not envision widening of this facility. Although this alternative would add capacity to serve redevelopment, it would provide sub-optimal access to redeveloped areas.
North Wenatchee Transportation Master Plan	**Partially consistent**—Widening North Wenatchee Avenue would add capacity, but this was rejected during the Confluence 2030 planning process because it would disrupt businesses and would not expand access to the regional transportation system. This alternative would be inconsistent with the final plan recommendations.
Transportation 2040	**Partially consistent**—This alternative would add north-south capacity, but would not enhance regional connectivity or freight movement. North Wenatchee area corridor improvements are listed in Phase 1 of the plan, but do not include widening of North Wenatchee Avenue.
Wenatchee Area Bicycle Master Plan	**Partially consistent**—This alternative would incorporate bicycle improvements along North Wenatchee Avenue, which is recommended as part of the plan. However, the additional roadway width may present safety concerns, because it would increase the crossing distance for pedestrians and bicyclists crossing North Wenatchee Avenue. In addition, the six-lane cross-section and high traffic volumes could make cycling less desirable.

9.3.2.3 No Action Alternative

The No Action Alternative is inconsistent with local land use plans. No new capacity would be added to support planned growth, which would exacerbate predicted congestion, impair access to existing businesses, and limit the potential for future growth that would support the City's planning and economic development priorities. Table 7 provides a summary of the alternative's consistency with the land use plans and policies discussed in Section 9.1.

Table 7. Summary of No-Action Alternative's Consistency with Applicable Land Use Plans and Policies

Land Use Plan	No Action Alternative
Planning to Blossom 2025	
Land Use/Urban Growth Area Element	**Inconsistent**—This alternative would continue to serve automobile-dominated growth patterns and may encourage sprawl outside of the urban growth area.
Transportation Element	**Inconsistent**—This alternative would not alleviate congestion, enhance regional connectivity, or promote multimodal transportation and freight movement. The alternative is also inconsistent with the North Wenatchee Transportation Master Plan, which calls for new capacity to support planned growth.
Economic Development Element	**Inconsistent**—This alternative would not meet regional transportation needs and would not accommodate anticipated growth in population and employment. Increasing congestion would affect business access and viability.
North Wenatchee Master Plan	**Inconsistent**—Under this alternative, North Wenatchee Avenue would remain congested and unfriendly to pedestrians, constraining access to the redevelopment areas.
North Wenatchee Transportation Master Plan	**Inconsistent**—This alternative would not provide additional roadway capacity needed to serve planned growth, thereby increasing congestion over time.
Transportation 2040	**Inconsistent**—This alternative would not add north-south capacity to serve anticipated growth in population and employment within the region.
Wenatchee Area Bicycle Master Plan	**Inconsistent**—This alternative does not include the development of additional bicycle infrastructure.

9.4 Potential Mitigation

Both action alternatives would require land acquisition and possible displacements. Property owners would be compensated for acquired property at fair market value, and if displacements are involved, relocation assistance will be provided in accordance with Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) and Washington's relocation and property acquisition law and regulations. Mitigation for impacts specific to each alternative is described below.

9.4.1 Confluence Parkway Alternative

Coordination with the Chelan County PUD on the reconfiguration of the maintenance and operations yard adjacent to the Horan Natural Area could minimize or eliminate impacts to the buildings and uses of the site from construction of the roadway and trail realignment. Mitigation for impacts to park lands in Confluence State Park would be determined under the provisions of Section 4(f), as described in detail in Chapter 8.

Potential mitigation for the loss of on-street parking on Isenhart Avenue could include providing alternative parking and/or transportation opportunities to those working for companies along Olds Station Road. The Port of Chelan County owns vacant land on the west side of Olds Station Road; it may be possible for the project proponents to negotiate with the Port for additional parking opportunities.

Link Transit runs several major inter-city routes along Olds Station Road, which would provide a viable alternative to driving private vehicles.

9.4.2 North Wenatchee Avenue Alternative

Relocation of commercial properties acquired would be conducted in accordance with the regulations described in Section 9.1. However, the commercial area of Wenatchee, particularly along North Wenatchee Avenue, is heavily built out, with little opportunity for additional business locations. Displaced businesses on North Wenatchee Avenue would need to find comparable facilities that offer similar visibility and access to potential customers. While this may not be as critical for a bank or a real estate office, it is an important issue for automobile-oriented businesses such as drive-through restaurants and gas stations. The recent annexation of the Olds Station/Sunnyslope area to the north of the Wenatchee River provided additional commercial industrial opportunities that are now within the city limits, but properties in this area are less likely to be successful locations for automobile-oriented businesses because of their lower traffic volumes. As a result, relocation options for some of the businesses affected by this alternative could be extremely difficult to provide.

Mitigation for parking and ingress/egress impacts to existing businesses along North Wenatchee Avenue would also be difficult. Although property owners would be compensated for land required for roadway right-of-way, changes to access management and parking as a result of the acquisition may be challenging. The narrow, constrained space of the corridor, combined with the irregular sizes and shapes of many lots, may limit opportunities for reconfiguration of parking areas or drive-through facilities. Even if operation of the facilities remains feasible, future expansion may be precluded by the right-of-way acquisition. Safety concerns related to visibility may preclude the development of on-street parking along some portions of the corridor. Coordination between the City and property owners will be required to ensure that use and access are maintained to the greatest extent feasible and that property owners are properly compensated for loss of existing and future use of their land.

To mitigate for inconsistencies between this alternative and local land use plans, the City of Wenatchee, CDTC, and other regional partners may have to reinitiate land use, economic, and transportation planning processes. Specifically, updates to the Wenatchee Comprehensive Plan and regional transportation plans may be warranted to determine how best to plan for and manage land use along a wider North Wenatchee Avenue corridor.

9.4.3 No Action Alternative

The No Action Alternative would result in no land acquisitions or displacements. However, it would be inconsistent with almost all local plans and policies. To mitigate for this inconsistency, the City of Wenatchee, CDTC, and other regional partners may have to reinitiate land use, economic, and transportation planning processes. In particular, it may be necessary either to adjust population and employment growth targets or to revisit previous alternative analyses to identify other potential ways of adding new traffic capacity.

9.5 Summary of Risks

Project risks include those associated with right-of-way acquisition, displacements, and consistency with land use plans.

9.5.1 Confluence Parkway Alternative

This alternative is consistent with local plans and planned land uses, and therefore is at low risk for denial of land use permits or approvals. Full or partial acquisition of properties other than Confluence State Park would pose a low to moderate risk. Although acquisition and relocation would take time, and extensive coordination may be required, the process is straightforward and the cost is unlikely to make the project financially infeasible.

The highest risk related to land use is that fee or easement acquisition of PUD-owned land within Confluence State Park might not be approved through the FERC relicensing process. Regulatory implications and associated risk related to this conversion are discussed in Chapter 8.

9.5.2 North Wenatchee Avenue Alternative

Risks associated with the North Wenatchee Avenue Alternative include the need to coordinate with 49 unique property owners to establish fair market value and to provide relocation assistance for eight businesses (or potentially more, depending on access configurations determined during detailed design). The potential exists for some property owners to be unwilling sellers, which would necessitate condemnation of the property, a time-consuming and potentially expensive legal process. Overall, the level of risk associated with land acquisition would be moderate.

Because this alternative is only partially consistent with existing plans and policies, there may need to be additional work to identify how this alternative could be made more consistent with local planning efforts, or how planning goals might change to account for the project. This is a low to moderate risk, but may require additional stakeholder engagement and public involvement. Without changes to either the project or the plans in order to increase consistency, there would be a moderate risk of denials or appeals to the NEPA process and/or land use permits issued for the transportation improvements.

9.5.3 No Action Alternative

The No Action Alternative would not require any permits or approvals, and therefore would not carry a risk of permit denials or appeals. However, growing congestion as a result of insufficient transportation capacity could pose an economic risk if it affected business performance or reduced the likelihood of new development locating in Wenatchee.

10. RISK ANALYSIS

This chapter summarizes the potential risks assessed by the project team for each transportation alternative. The types of risks evaluated include denials of environmental permits and approvals, risk of successful NEPA appeal, and cost and/or schedule risk related to likely mitigation measures. Because the project Purpose and Need is a foundational aspect of alternatives evaluation under NEPA, the chapter also includes an evaluation of how well each alternative meets the draft Purpose and Need set forth in Chapter 3 of this report.

10.1 Environmental Permits/Approvals and NEPA Appeal

Planned transportation improvements may not be implementable if their expected level of impacts is great enough to result in the denial of environmental permits or approvals. (The risk of NEPA appeal is included in this category.) Table 8 summarizes this risk for each resource for the Confluence Parkway and North Wenatchee Avenue alternatives. The No Action Alternative is not included because no permits or approvals would be required.

Table 8. Risk Related to Environmental Permits and Approvals

Resource	Confluence Parkway	North Wenatchee Avenue
Cultural	***Moderate Risk:*** Based on meetings with Colville Tribes and Yakama Nation, impacts to the NRHP-eligible Wenatchee Flat site do not currently appear to pose a high risk to project implementation. Even if artifacts are discovered during site investigation and construction, most impacts are mitigable. However, discovery of burials could necessitate project redesign as an avoidance measure. An archaeological survey is strongly recommended prior to or during the preliminary design process. Risks related to other NRHP sites are low.	***Low to Moderate Risk:*** Although no known archaeological resources are associated with this alternative, banks of the Wenatchee River may contain resources and should be surveyed prior to or during design. Risks related to demolition of existing SR 285 bridges and other NRHP sites are low.
Wetlands	***Low to Moderate Risk:*** A small amount of wetland fill is required for the Confluence Parkway Alternative unless the project can be designed to avoid wetland impacts. This is likely to be covered by the Nationwide Permit process. Risk of permit denial is low.	***Low Risk:*** No wetland fill would be required for the North Wenatchee Avenue Alternative. Temporary impacts on vegetation would not result in permit denial.
Fisheries	***Low Risk:*** Overwater coverage is not expected to be a major obstacle to this project as long as the purpose and need for the crossing is well-established. There is low risk of denial of permits or approvals.	***Low Risk:*** Same considerations as for Confluence Parkway.

Table 8. Risk Related to Environmental Permits and Approvals (continued)

Resource	Confluence Parkway	North Wenatchee Avenue
Parks and Section 4(f)	***Moderate to High Risk:*** Impacts to Section 4(f) resources (Confluence State Park and Apple Capital Loop Trail) would include direct use of park property and potential indirect effects on noise and visual quality. While these impacts may be mitigable to a *de minimis* level, they have the potential for high mitigation costs. Public input will be required to assess the significance of the impacts and identify potential mitigation measures.	***Low Risk:*** Because mitigation for removal of historic bridges is a straightforward process under the Section 4(f) programmatic agreement, risks associated with obtaining permits/approvals for this alternative are low.
Land Use	***Low Risk:*** The alternative supports local plans and planned land uses, and therefore is unlikely to result in denial of environmental permits or approvals.	***Low to Moderate Risk:*** The alternative is partially inconsistent with local plans and planned land uses. As a result, there may need to be additional planning efforts to address the inconsistency; however, implementation is unlikely to result in denials of permits or approvals.
Color Key:		
Low Risk		**Moderate Risk**		**High Risk**

10.2 Mitigation

Mitigation commitments can pose an additional element of risk if their cost is sufficiently high to make an alternative financially infeasible. Table 9 summarizes potential mitigation considerations for each resource. Because of the conceptual level of design for the action alternatives and the high-level analysis of impacts performed for this report, mitigation costs are difficult to quantify; therefore, for purposes of this report, costs are assigned values of "low," "moderate," or "high." Low costs are those that would pose little to no risk to project financial feasibility. Moderate costs, while higher, are not anticipated to make the alternative financially infeasible as long as it continues to deliver the assumed level of transportation benefit. High costs are defined as those that present a significant risk of rendering the alternative financially infeasible. Where a high level of uncertainly is present, a range may be indicated.

Table 9. Relative Mitigation Cost and Complexity

Resource	Confluence Parkway	North Wenatchee Avenue
Cultural Resources	**Cost: Moderate to High**	**Cost: Low to Moderate**
	Disturbance of Archaeological Resources: Prior to construction (and preferably prior to design), archaeological investigation should be conducted on areas to be disturbed. Design may need to be altered based on findings. Depending on impacts, mitigation measures may include:	**Disturbance of Archaeological Resources:** Although no archaeological resources are known to be present, a survey along the banks of the Wenatchee River is recommended given the sensitivity of downstream areas. **Disturbance of Aboveground Resources:**

Table 9. Relative Mitigation Cost and Complexity (continued)

Resource	Confluence Parkway	North Wenatchee Avenue
	• Conduct systematic investigations of the full archaeological site • Analyze and document artifacts or specimens, if present • Analyze or reanalyze previously excavated collections from the Wenatchee Flat site • Conduct TCP study/oral history study Incorporate interpretive signage and design elements	Mitigation is likely to include extensive historic and photographic documentation of SR 285 bridges prior to alteration or demolition, as well as potentially public education or interpretive measures.
Wetlands	**Cost: Low-Moderate**	**Cost: Low**
	Wetland Fill: Compensatory mitigation would be required for wetland fill at ratios ranging from 6:1 to 16:1. Space constraints in the Horan Natural Area may necessitate mitigation to be provided off site, potentially in the lower reaches of the Wenatchee River. Costs would include property acquisition, plant materials, design, and labor.	**Wetland Fill:** No wetland fill is required for the North Wenatchee Avenue Alternative; therefore, no mitigation for permanent impacts is required, but temporary impacts to wetlands may require mitigation such as riparian plantings.
Fisheries	**Cost: Low**	**Cost: Low**
	Overwater Coverage/Shading: Mitigation would likely involve planting riparian areas proportional to the new overwater coverage area (less than 0.5 acre) and could also include existing aquatic habitat enhancement. **Water Quality**: Standard best management practices to prevent stormwater runoff from directly entering the river would be installed. **Riparian Vegetation:** Mitigation would likely include planting riparian areas equal to those impacted. Typical ratios are 1:1 for grass/forb and non-native tree/shrub vegetation, and 2:1 ratio for native riparian tree/shrub vegetation.	Similar to Confluence Parkway; area required for overwater coverage would be slightly less.
Parks and Section 4(f)	**Cost: Moderate to High**	**Cost: Low**
	Wenatchee Confluence State Park and Apple Capital Loop Trail Measures to minimize harm (subject to agreement by agencies with jurisdiction) may include: • Roadway design features including landscaping and vegetation, noise buffers, relocation of trail away from Hawley Street, and improvements to wetland hydrology in Horan Natural Area • In-kind replacement of land acquired for right-of-way; relocation of displaced park maintenance buildings, trail access road, and parking lot	**SR 285 Bridges** As noted above under Cultural Resources

Table 9. Relative Mitigation Cost and Complexity (continued)

Resource	Confluence Parkway	North Wenatchee Avenue
	• Potential enhancements to park, including acquisition of 7-acre parcel adjacent to Horan Natural Area; improved connections to Apple Capital Loop Trail and new loop trail access points outside of park; interpretative signage and features; and improvements for birders	
	Wenatchee Flat Site • As noted above under Cultural Resources	
Land Use	**Cost: Moderate**	**Cost: Moderate to High**
	Property Acquisition: Property owners will be compensated for acquired property at fair market value; if displacements are involved, relocation assistance will be provided in accordance with Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) and Washington's relocation and property acquisition law and regulations.	Property Acquisition: Same as for Confluence Parkway; costs of land acquisition are expected to be higher because of number of business displacements and commercial use of affected properties
	Access Management: No mitigation anticipated	**Access Management:** Costs of revising access to affected properties on North Wenatchee Avenue may be high.
Color Key:		

Low Cost/Complexity		**Moderate Cost/Complexity**		**High Cost/Complexity**

10.3 Support for Project Purpose and Need

As discussed in Chapter 3, the project Purpose and Need is critical for establishing the range of reasonable alternatives to consider in a formal NEPA process document and assists in the selection of a preferred alternative. FHWA approval of the Purpose and Need statement is a first step in NEPA project development and defines what can be considered reasonable, prudent, and practicable alternatives. Decision-making under NEPA considers how each alternative meets the project Purpose and Need. This affects the assessment of risk because alternatives that fail to meet the purpose and need are by definition not viable, regardless of whether they have fewer impacts. Table 10 summarizes the extent to which each alternative supports the key elements of the purpose and need described in Chapter 3.

Table 10. Summary of Alternatives' Support for Purpose and Need

Project Need	Confluence Parkway	North Wenatchee Avenue	No Action
Transportation Capacity/Congestion Relief	Greatest improvement in congestion	Improves congestion	No added capacity; increased congestion
Connectivity to Regional System	Improves with new river crossing	No change	No change
Support for Transit/Reduced Bus Travel Times	Substantial improvement for transit	Limited benefit for transit	Transit service impaired by congestion
Community and Economic Development	Strongly supports current planning	Improves traffic flow but removes businesses; limits accessibility to Waterfront District and reduces connectivity to/from Olds Station	Congestion would hinder planned growth and development
Safety and Emergency Response	Improved by better traffic flow and new access across river in case of emergencies or evacuations	Somewhat improved for vehicles but potentially less safe for pedestrians; no new access across river	Congestion would increase accidents and impair emergency response
Color Key:			
Strongly Supports	**Supports**	**Neutral**	**Does Not Support**	**Strongly Does Not Support**

10.4 Summary of Findings

10.4.1 Confluence Parkway Alternative

The Confluence Parkway Alternative presents a moderate-to-high degree of risk. This risk stems primarily from the use of a portion of Wenatchee Confluence State Park to construct the proposed roadway. Chelan County PUD, which owns the park property, has expressed significant concerns about potential park impacts. However, the PUD has also expressed openness to exploring mitigation to address these concerns through the NEPA process, and has acknowledged the possibility that park impacts could be satisfactorily mitigated. The nature and cost of mitigation have yet to be determined and could significantly affect project costs.

If the concerns related to use of the park can be resolved and there is agreement that the project is acceptable with appropriate mitigation, the cost of mitigation measures would be an important consideration. While both the Colville Tribes and Yakama Nation have indicated that impacts to the Wenatchee Flat site are likely mitigable, the site will require archaeological survey work during the design process to ensure that significant cultural resource deposits can be avoided or appropriately collected and documented. Mitigation for disturbance of cultural deposits may entail a full survey of the

site (currently mapped as contiguous with the Confluence State Park boundaries north and south of the river), as well as TCP documentation, ethnographic and oral history surveys, and interpretive design elements. The costs of this mitigation are not expected to make the project infeasible, but are likely to be substantial.

Despite the potential risks and costs of the Confluence Parkway Alternative, it would be the most effective of the alternatives studied in meeting the project Purpose and Need. In addition to providing needed new capacity to support population and employment growth, Confluence Parkway would improve connectivity to the regional transportation system and within Wenatchee, and would enhance safety and emergency response by relieving congestion and providing alternative north-south access across the Wenatchee River. Confluence Parkway would support economic development through its consistency with current planning processes, and by avoiding impacts to existing business districts while improving access to growing areas. It is fully consistent with the local and regional plans evaluated for this study.

10.4.2 North Wenatchee Avenue Alternative

The North Wenatchee Avenue Alternative was assessed as having moderate risk. The greatest area of potential risk and cost would be the displacement of businesses and acquisition of property along North Wenatchee Avenue. The value of the eight businesses displaced would be substantial, and would come with an as-yet-unknown expenditure for access revisions, signage replacement, and potential acquisition of additional businesses that were unable to remain viable on the portion of the parcel not needed for the right-of-way. Unwilling sellers could add to the risk level by necessitating a lengthy and expensive condemnation process.

Beyond the cost risk, however, perhaps the greatest concern related to the North Wenatchee Avenue Alternative is its inconsistency with local planning and policy priorities, which is reflected in to the fact that it would not completely meet the project purpose and need. While widening North Wenatchee Avenue would add capacity and improve congestion, these benefits would come at the cost of impacts to existing businesses and a reduced ability to support future economic development. A wider arterial carrying substantial through traffic would not support the development of mixed-use destination areas to the east, as proposed in the North Wenatchee Master Plan, and connections between Olds Station and areas south of the river would continue to be limited. The City would continue to rely on a single crossing of the Wenatchee River for access to and from the north, creating a potentially high-risk situation if evacuation is required. In addition, safety and accessibility for pedestrians and bicyclists would be compromised by the wider cross-section and increased traffic flow.

10.4.3 No Action Alternative

The No Action Alternative would not result in risks or capital costs related to new infrastructure. However, it would fail to meet all aspects of the project Purpose and Need. It would not provide new transportation capacity, which over time would result in steadily increasing congestion along North Wenatchee Avenue and elsewhere in the city. Ultimately, this congestion would undermine community and economic development goals, discouraging new development in the corridor and potentially affecting business revenues. Congestion would also increase transit travel times, slow emergency response, and reduce the safety and desirability of walking and bicycling in the corridor. For all these reasons, No Action would be inconsistent with the City's and region's planning and policy direction and is not considered a viable alternative.

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Appendix A

Previous Alternatives Considered

Appendix A
Previous Alternatives Considered
October 2017

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ACRONYMS AND ABBREVIATIONS

CDTC	Chelan-Douglas Transportation Council
NEPA	National Environmental Policy Act
WVTC	Wenatchee Valley Transportation Council

A. PREVIOUS ALTERNATIVES CONSIDERED

A-1 Introduction

This appendix describes a variety of concepts and alternatives that have been considered in previous planning documents to improve transportation in North Wenatchee. The intent of the discussion is to compile the full range of options that have been evaluated for the area over time and determine which alternatives may be appropriate to carry forward into a future National Environmental Policy Act (NEPA) analysis.

Previous study concepts include those considered in the *Confluence 2030*, *North Wenatchee Transportation Master Plan*, and *Transportation 2040* plans to add capacity and/or improve traffic flow and safety in the North Wenatchee area. While these concepts were not part of a formal NEPA alternatives analysis, they were developed within the context of regional transportation planning efforts that were conducted with stakeholder input and the involvement of local and state agencies. Therefore, it is appropriate to assume that they would be considered as part of a future NEPA alternatives analysis.

A-2 Confluence 2030

Confluence 2030 was adopted in 2010 as the long-range metropolitan transportation plan for the urban areas of Wenatchee, East Wenatchee, and Rock Island. The plan identified regional transportation improvement projects that would support community and economic development goals.

To develop projects for the metropolitan transportation plan, the Wenatchee Valley Transportation Council (WVTC) used "strategic scenarios" that allowed the evaluation of various project options. Each scenario represented a package of specific improvements designed to maximize travel time reduction on the region's congested corridors in 2030. The improvements considered included new crossings of the Columbia River and Wenatchee River, along with new interchanges and improvements to major arterial corridors. All scenarios were evaluated and compared using the following criteria:

- Multimodal travel (transit and nonmotorized)
- Corridor travel time
- System travel time, cost, and net benefit over 20 years (measured in dollars)

Potential environmental impacts were not addressed at this early stage. A summary of the scenarios and analysis results is provided in Table A-1.

All of the scenarios were found to improve regional traffic flow, providing travel time savings, improved transit service, and reduced congestion. The scenarios that included a new Columbia River and/or Wenatchee River bridge shifted overall regional travel patterns, resulting in generally greater congestion reduction than the scenarios without new bridges. However, the costs of the scenarios with new bridges were considerably higher. Overall, the "One New Bridge" scenarios rated the highest in terms of performance.

Table A-1. Concepts Considered in *Confluence 2030*

Concept	Description	Cost/Net Benefit	Analysis
Two New Bridges Scenario	• New Columbia River Bridge north of the Sellar Bridge • New Wenatchee River Bridge west of the existing bridge	$275 million/$246 million	This scenario would create new corridors that cause a major shift in regional travel patterns, reducing congestion regionwide. Overall systemwide travel time savings was estimated to be 2,300 hours per day.
One New Bridge Scenario A	• New Columbia River Bridge north of the Sellar Bridge • New interchange at US 2 and NW Cascade Avenue • New interchange at Maiden Lane and North Wenatchee Avenue • Roadway improvements on the Sunset corridor to SR 28	$268 million/$352 million	This scenario would create a new corridor that shifts some regional travel patterns, reducing congestion regionwide. Overall systemwide travel time savings was estimated to be 2,700 hours per day.
One New Bridge Scenario B	• New Columbia River Bridge north of the Sellar Bridge • New west approach to the Sellar Bridge • New interchange at US 2 and NW Cascade Avenue • New interchange at Maiden Lane and North Wenatchee Avenue • Eastmont Avenue extension • Roadway improvements on the North Wenatchee Avenue corridor	$298 million/$362 million	This scenario would create a new corridor that shifts some regional travel patterns, reducing congestion regionwide. Overall systemwide travel time savings was estimated to be 2,900 hours per day.
No New Bridge Scenario A	• New west approach to the Sellar Bridge • New interchange at US 2 and NW Cascade Avenue • New interchange at Maiden Lane and North Wenatchee Avenue • Roadway improvements on the Sunset corridor to SR 28	$168 million/$354 million	This scenario would not shift regional travel patterns. It would reduce congestion regionwide, but not as well as the bridge scenarios. Overall systemwide travel time savings was estimated to be 2,300 hours per day.
No New Bridge Scenario B	• New west approach to the Sellar Bridge • New interchange at US 2 and NW Cascade Avenue • New interchange at Maiden Lane and North Wenatchee Avenue • Eastmont Avenue extension • Roadway improvements on the North Wenatchee Avenue corridor	$128 million/$393 million	This scenario would not shift regional travel patterns. It would reduce congestion regionwide, but not as well as bridge scenarios. Overall systemwide travel time savings was estimated to be 2,300 hours per day.

A-2.1 Plan Recommendation

Based on the analysis of scenarios, *Confluence 2030* recommended a number of major regional mobility improvements. These improvements were not included on the plan's list of financially constrained transportation project priorities because, as the plan states, they "all require an approach to financing that exceeds in magnitude the scale of a typical locally-administered transportation improvement." The major improvements include:

- Cascade Interchange (US 2 and NW Cascade Avenue)
- North Wenatchee Avenue corridor improvements
- New Columbia River bridge
- Sunset Corridor improvements to SR 28
- New Wenatchee River bridge connecting Western Avenue to US 2

Because North Wenatchee Avenue was identified as a focal point of regional travel demand and congestion, *Confluence 2030* also identified the need for a separate corridor study to provide more specific recommendations for improvement and investment. This study, the *North Wenatchee Transportation Master Plan,* is discussed in detail below.

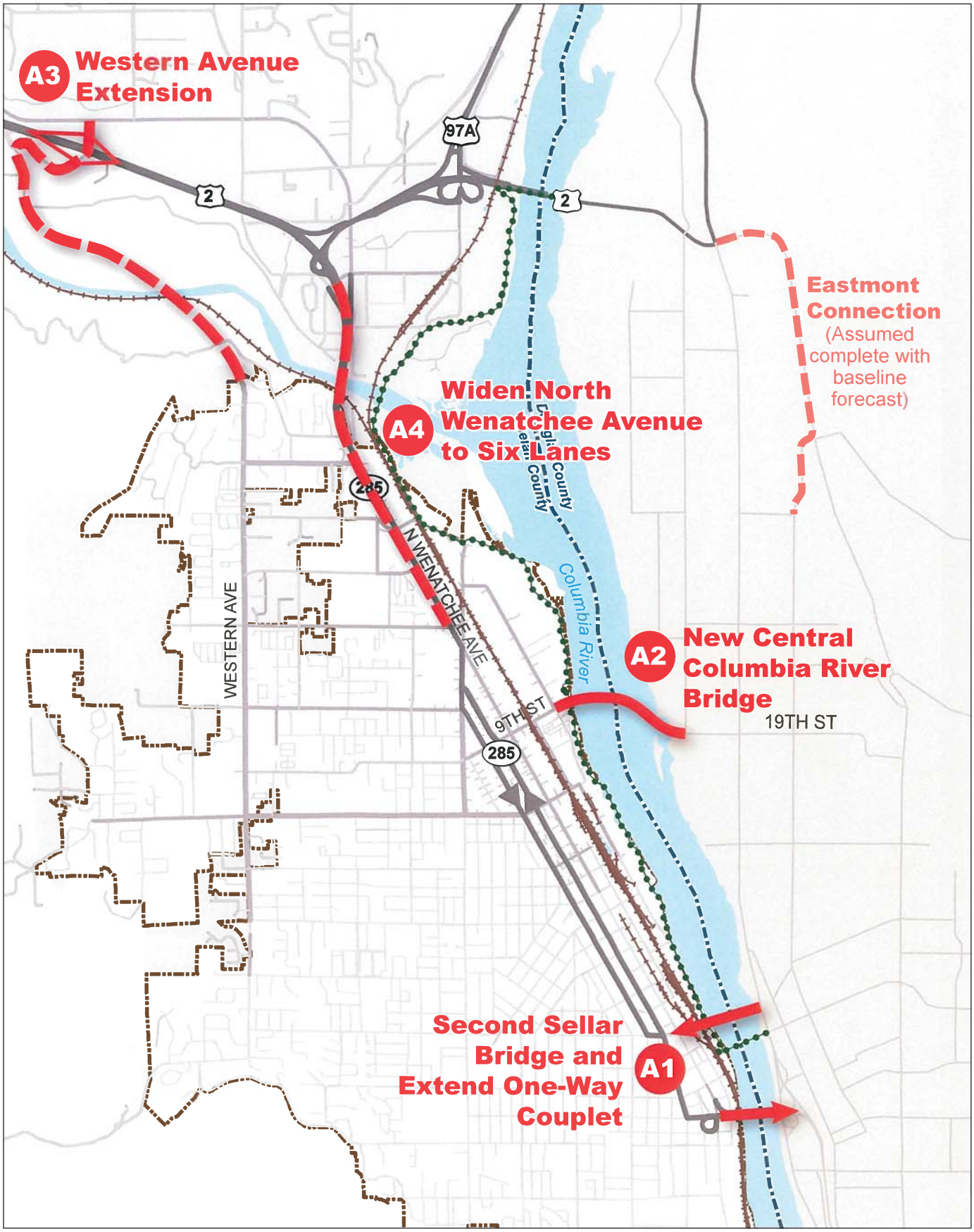
A-3 North Wenatchee Transportation Master Plan

The *North Wenatchee Transportation Master Plan* was developed to establish a blueprint for improving safety and traffic flow that would support economic growth in the SR 285/North Wenatchee Avenue corridor and the Wenatchee Valley as a whole. The plan evaluated a range of potential improvement strategies that considered both multimodal transportation issues and economic factors. As noted above, the impetus for this planning process grew from the analysis done for *Confluence 2030,* which identified the corridor as an area of specific focus.

The planning process began with an evaluation of land use and planned economic growth in North Wenatchee, including a market assessment to understand the types and densities of future land uses that might locate in the area. This work informed the development of future travel demand forecasts that were used to predict what transportation improvements would be needed in 2030 to accommodate the anticipated demand. Three sets of improvement concepts were explored during this iterative planning process. An initial group of concepts was developed and evaluated based on the regional mobility projects identified in *Confluence 2030.* The results of this analysis were used, in combination with a set of corridor-specific strategies, to develop a group of more refined concepts. The refined concepts were then further revised, resulting in a final group of concepts that were based on additional analysis and public input. Those concepts informed the final plan recommendation.

A-3.1 Initial Concepts

The initial concepts considered were based on several of the major regional mobility improvement projects identified in *Confluence 2030.* While that plan evaluated those projects from the standpoint of their potential regional benefits, the *North Wenatchee Transportation Master Plan* considered them from the standpoint of the specific benefit they could provide in terms of congestion relief in the SR 285 corridor. The initial concepts included three of the "new bridge" concepts from the earlier plan, along with an additional concept that would widen North Wenatchee Avenue to six lanes. The evaluation of the four concepts, summarized in Table A-2 and depicted in Figure A-1, is described in "Forecast Conditions and Assessment of Regional Transportation Improvement Strategies," which was prepared in 2010 as part of the *North Wenatchee Transportation Master Plan* development.



Source:
Transpo, North Wenatchee Transportation Master Plan (2010)

Figure A-1
Initial Concepts Considered in North Wenatchee Transportation Master Plan

Table A-2. Initial Concepts Considered in North Wenatchee Transportation Master Plan

Concept	Description	Analysis	Recommendations
Second Sellar Bridge and Extend One-Way Couplet	Construct a new 3-lane bridge approximately one-half mile north of the existing Sellar Bridge to serve only westbound traffic. The existing Sellar Bridge would be converted to a 3-lane bridge serving only eastbound traffic.	• Would not provide significant improvements to North Wenatchee Avenue or along Western Avenue	Not recommended for further analysis because it would not meet the plan's objectives.
New Central Columbia River Bridge	Construct a new 4-lane bridge (two lanes each direction) between Wenatchee (east end of 9th Street) and East Wenatchee (west end of 19th Street).	• Would provide alternative route to North Wenatchee Avenue • Would help reduce traffic volumes in the vicinity of Maiden Lane and Horse Lake Road • Would not fully resolve key issues of throughput, travel speeds, or safety in the corridor due to changes in travel patterns and "induced" traffic	Not recommended for further analysis because it would not meet the plan's objectives.
New Wenatchee River Bridge and Western Avenue Extension	Construct a new 2-lane bridge over the Wenatchee River beginning at the north end of the Western Avenue corridor, winding down to the river, and climbing back up to a new interchange with US 2.	• Improvements would slightly reduce volumes and delays in North Wenatchee Avenue corridor, but would not resolve key mobility and accessibility issues, and would not serve planned growth in Olds Station and Sunnyslope areas. • Traffic destined for bridge would create impacts along Western Avenue. • Steep terrain between Western Avenue, the Wenatchee River, and US 2 would make this concept technically challenging and expensive.	Not recommended at this location because of limited benefits and high cost; however, a bypass farther east may warrant exploration.
Widen North Wenatchee Avenue to six lanes	Widen North Wenatchee Avenue and the existing bridges to six lanes from Miller Street to north of the Wenatchee River. Medians would restrict left turns to/from driveways. Left turns and U-turns would be allowed at major intersections.	• Widening would increase capacity but would displace businesses and parking along North Wenatchee Avenue, significantly affecting existing and future development in the corridor. • Wider roadway cross-section and higher traffic volumes would increase safety risks for pedestrians and bicyclists. • Extensive access management and traffic control would be required to fully utilize the new capacity and to improve safety.	Not recommended for further analysis due to displacement, economic development, and safety concerns; however, improvements to maximize the existing capacity could be considered.

While the "new bridge" concepts would provide some improvement in the SR 285 corridor, they would afford only limited relief for the capacity, safety, and traffic flow concerns anticipated in the North Wenatchee Avenue corridor by 2030. Widening North Wenatchee Avenue to six lanes was found to provide the needed capacity, but at a very high impact to existing and future economic development in the corridor. As a result, none of the initial concepts was carried forward for further analysis. However, the results suggested additional strategies that were used to build a more refined set of concepts, described in the following section.

A-3.2 Refined Concepts

To address the corridor's unique transportation issues and economic factors, a wider range of multimodal strategies was considered in the next round of evaluation. These improvement types included over 100 projects or programs, including new corridors, roadway widening, roadway upgrades, traffic flow improvements, street connections, public transit enhancements, bicycle and pedestrian facilities, interchange modifications, streetscape improvements, and access driveway modifications.

A screening process was used to evaluate how well individual projects and groups of projects would help meet the goals of the plan. The criteria used to evaluate improvement strategies included safety, highway mobility, urban accessibility, and economic impacts and benefits. In addition, order-of-magnitude cost estimates were taken into consideration. Projects that passed the screening were combined into "packages" of compatible strategies, including two strategies for the area north of the Wenatchee River and four strategies for the area south of the river. Each package included improvements for roadways and intersections, pedestrians and bicycles, and transit service and facilities. Travel forecasting and analysis for these packages resulted in four refined concepts for improvements in the northern and southern portions of the corridor, which were presented at an open house and workshop held in February 2010:

- Concept 1 (North)—Realign US 2. This concept would result in the US 2 highway corridor serving as a continuous east-west highway connecting to/from Douglas County instead of connecting to SR 285 and the city of Wenatchee. Travel to and from Wenatchee would be via a new interchange of US 2 at Easy Street. North Wenatchee Avenue would connect into Easy Street north of the Wenatchee River. Circulation in the Olds Station area would be enhanced with new or upgraded collector roads and arterials. A new multiuse trail would be developed just south of US 2, and bicycle and pedestrian connections to the regional trail and parks would also be developed.
- Concept 2 (North)—Modify US 2/Easy Street Access. In this concept, Easy Street becomes an extension of North Wenatchee Avenue to connect the city of Wenatchee with US 2, Olds Station, and Sunnyslope. The concept maintains primary connections between US 2 and SR 285/North Wenatchee Avenue. Easy Street would cross over US 2, with a new ramp to serve the Sunnyslope and Olds Station area. Access to/from the Sunnyslope area north of US 2 would be provided at the Penny Road interchange. Easy Street and other arterials and collectors in the Olds Station area would be upgraded, as would the US 2/Euclid Avenue interchange. A new multipurpose trail would be developed on the north side of the Wenatchee River and connect to the Apple Capital Loop Trail. New trail, sidewalks, and bicycle routes would be developed to provide area connections.
- Concept 3 (South)—Reconfigure North Wenatchee Avenue Access and Circulation Roads. In this concept, access is modified on North Wenatchee Avenue, with additional circulation routes to facilitate through traffic and provide access and circulation to businesses. The concept includes removing the signal and closing the west leg of the intersection at Horse Lake Road and

increasing capacity at the intersection at Maiden Lane. Other intersections along North Wenatchee Avenue would also be modified and new arterial and collector roads would be developed. Access management, including use of medians, U-turn routes, and turn restrictions would be incorporated in the corridor. Pedestrian and bicycle crossings of the corridor would be greatly enhanced.

- Concept 4 (South)—Traffic Bypass. The concept focuses on separating travel with destinations within the North Wenatchee Avenue corridor from through travel to destinations in downtown Wenatchee. A bypass would be constructed adjacent to the existing railroad tracks east of the corridor, and additional capacity (one lane in each direction) would be added across the Wenatchee River. A new north-south collector road would be constructed between Walnut Street/Pine Street and Princeton/Springwater Avenue. Nonmotorized improvements would include an overpass crossing of North Wenatchee Avenue and the railroad tracks between the North Valley Mall and the Waterfront; in addition, an undercrossing of the bypass road and railroad tracks would be provided at Hawley Street.

A-3.3 Final Concepts

The comments and discussion from the open house led to the development of a final set of three concepts, including a "minimal improvements" concept, a "North Wenatchee Avenue corridor improvement" concept, and a new "bypass" concept called Confluence Parkway. These concepts, intended to provide a broad range of relative transportation benefits and levels of investment, were then analyzed and presented in the *North Wenatchee Transportation Master Plan*. The three concepts are summarized in Table A-3.

Table A-3. Final Concepts Considered in North Wenatchee Transportation Master Plan (February 2011)

Concept	Description	Analysis	Recommendation
Minimal Improvements	This concept would improve signing and markings and make targeted improvements to traffic operations and safety on North Wenatchee Avenue and adjacent streets south of the Wenatchee River.	No major highway or roadway improvements would be developed north of the Wenatchee River. No improvements would be made to address safety and mobility issues at the US 2/Easy Street signalized intersection.	Carry these minimal improvements forward. These improvements could be incorporated into a larger project or pursued on their own for operation and safety if funding is not available for major improvements.
North Wenatchee Avenue Corridor Improvements	This concept would maximize the 4-lane capacity of North Wenatchee Avenue by developing additional circulation roads, adding capacity at intersections, reconfiguring access to driveways with medians, adding U-turn routes, and restricting turns. New on- and off-ramps would be built over US 2 to access the Sunnyslope and Olds Station areas.	Would improve circulation and maintain the existing connection between US 2 and SR 285/North Wenatchee Avenue, but would not improve highway mobility.	Pursue this concept either independently of or in conjunction with Confluence Parkway.
Confluence Parkway	This concept would increase capacity and connectivity by constructing a new 2-lane arterial corridor parallel to North Wenatchee Avenue that would connect Miller Street to the Euclid Avenue interchange with US 2, and reconstructing the US 2/SR 285 interchange.	The concept would directly benefit regional traffic, freight, and intercity transit service by providing new capacity and reducing the bottleneck on the existing bridge.	Undertake further design studies and environmental review for this concept.

A-3.4 Plan Recommendation

Based on analysis of the final concepts, the *North Wenatchee Transportation Master Plan* recommendation consisted of three major components:

- **Confluence Parkway Corridor:** The plan recommended constructing a new two-lane arterial corridor by extending Miller Street to connect across the Wenatchee River to Euclid Avenue and US 2. The Miller Street intersection with the North Wenatchee Avenue would be modified to add capacity to provide for southbound traffic and provide a grade-separated crossing of the BNSF railroad mainline. The new arterial would directly benefit regional traffic, freight, and intercity transit service. A new bridge would be constructed over the Wenatchee River reducing the bottleneck on the existing bridge. North of the Wenatchee River, the new roadway would connect to an improved Euclid Avenue to provide regional access to US 2. North of the Wenatchee River, east-west connections would be enhanced to improve connectivity and accessibility for trucks, general-purpose traffic, transit, pedestrians, and bicyclists.
- **North Wenatchee Avenue Corridor:** Because construction of Confluence Parkway would substantially reduce forecasted traffic volumes along North Wenatchee Avenue, improvements in the North Wenatchee Avenue corridor would focus on improving safety, enhancing circulation and accessibility to businesses, and upgrading the look and feel of transportation facilities serving the business district. The proposed improvements would be similar to those described for the North Wenatchee Avenue Corridor Improvements under "Refined Concepts" above.
- **US 2 Corridor:** The plan identified revisions to US 2 and the freeway section of SR 285 to improve safety and traffic flow and maintain and enhance accessibility to Wenatchee and the Olds Station and Sunnyslope subareas. Proposed improvements include modifications to the US 2/SR 285/Easy Street interchange, the US 2/Euclid Avenue interchange, and the US 2 corridor connection to North Wenatchee.

A-4 Transportation 2040

Transportation 2040 was adopted in 2015 by the Chelan-Douglas Transportation Council (CDTC) as the Regional Transportation Plan for the urban, rural, and small city areas in Chelan and Douglas counties. *Transportation 2040* replaced *Confluence 2030* as the guiding metropolitan/regional transportation plan. The plan measures the performance and effectiveness of the regional transportation system against six regional policy goals related to public involvement, intergovernmental coordination, transportation safety, access and mobility, financial stewardship, and environmental stewardship. These goals were the basis for evaluating the performance and effectiveness of the transportation system.

Performance categories and associated performance measures were established to link transportation performance to the regional goals. The performance categories used were roadway condition, safety, driving, walking, cycling, transit, and air quality. Projects were assessed based on the performance measures established within each category.

Transportation 2040 confirmed the previous plans' growth forecasts and emphasized the importance of added north-south capacity. Confluence Parkway is identified as a "Phase 2" project for implementation between 2028 and 2040. Other North Wenatchee area corridor improvements are listed for Phase 1 implementation between 2016 and 2027.

Appendix B

Traffic Analysis Memorandum

transpogroup
WHAT TRANSPORTATION CAN BE.

MEMORANDUM

Date:	May 1, 2017	**TG:**	15341.00
To:	Jenifer Young, Parametrix		
From:	Brent Turley, Transpo Group		
cc:			
Subject:	North Wenatchee Capacity Improvements Study – Traffic Analysis		

This memorandum summarizes the traffic analysis associated with the North Wenatchee Capacity Improvements Study in Wenatchee, Washington. This analysis updates the analysis conducted for the *North Wenatchee Transportation Master Plan* (Transpo Group, 2011). The updated analysis takes into account the latest Chelan-Douglas Transportation Council (CDTC) travel demand model, updated analysis horizon years, and updated planned improvements in the area. Alternatives evaluated, volume forecast methodology, volume forecasts, and findings are discussed below.

Alternatives Evaluated

Three alternatives were evaluated in this traffic analysis:

- Confluence Parkway
- North Wenatchee Avenue
- No Action

The Confluence Parkway Alternative would be a new arterial street serving as a bypass of North Wenatchee Avenue (State Route [SR] 285) between US 2 and McKittrick Street. The North Wenatchee Avenue Alternative would involve widening the existing North Wenatchee Avenue to add two new through lanes (one in each direction) from just north of the Wenatchee River crossing to Miller Street. The No Action Alternative would not make any traffic improvements to the current roadway and bridge structure.

The following terms are used for modeling purposes:

- **2040 Baseline**: Represents “No Action” with respect to the Confluence Parkway project. Most of the land use for the *North Wenatchee Master Plan* (Crandall Arambula, 2016) is assumed as well as funded roadway improvement projects in the area.
- **2040 Confluence Parkway**: This alternative adds the Confluence Parkway to conditions assumed for 2040 Baseline.
- **2040 North Wenatchee Avenue**: This alternative adds one additional lane in each direction to SR 285 (North Wenatchee Avenue) to conditions assumed for 2040 Baseline.

Volume Forecast Methodology

The traffic volume forecasts for each alternative are based on the traffic volume growth shown in the CDTC travel demand models combined with existing 2016 counts. The latest travel demand model files were provided by CDTC in November 2016. CDTC provided models for the years 2014 and 2040.

Land Use Growth

The CDTC travel demand models rely on estimates of dwelling units and employment to forecast traffic growth. Between 2014 and 2040, the CDTC model assumes an annual growth rate of 0.7 percent for dwelling units, and 1.6 percent for employment. In the *North Wenatchee Area Master Plan* area and nearby land uses (TAZs 16, 17, 19, 20, and 29), the model assumes about 600 new dwelling units and about 900 new employees.

Planned Improvements

The planned network improvements assumptions for the 2040 Baseline model were coordinated with CDTC staff to account for funded and/or likely improvements by 2040. The following discussion highlights the planned network improvements.

The major roadway network assumed in the *North Wenatchee Area Master Plan* was coded into the travel demand model. This includes a **new leg of McKittrick Street** extending from N Wenatchee Avenue, crossing the rail corridor at-grade, and east to Miller Street. **Miller Street** is upgraded between Maple Street and North Wenatchee Avenue to provide two-way traffic (rather than existing one-way northbound traffic). The major streets in this area are assumed to be 30 mph streets, with one lane in each direction and turn lanes at major intersections.

The North Wenatchee Avenue (SR 285) corridor was assumed to have upgrades. **Access management treatments** were assumed the full length of the corridor (Miller Street to Horse Lake Road), which generally includes the removal of the two-way, center-turn lane and replaces it with limited mid-block left-turn pockets. **U-turns** would be provided at the Horse Lake Road intersection (north-to-south only), McKittrick Street intersection (both directions), and Maple Street intersection (south-to-north only).

The *North Wenatchee Transportation Master Plan* outlined **intersection and frontage improvements around the Maiden Lane** intersection to improve safety and corridor traffic operations. These improvements were assumed for the 2040 Baseline model.

In addition, the **US 2/Easy Street intersection** was assumed to be converted to a multilane roundabout.

Besides the planned improvements mentioned above, the model network generally reflects existing network conditions.

Other Considerations

The CDTC model does not account for dynamic shifts in travel modes as the model runs. In other words, the model does not compare travel times for private vehicles, vanpools, or transit trips and shift demand to alternate travel modes with the best travel times. It is anticipated that the Wenatchee area would not have alternative transportation options with enough travel time savings that warrants a travel demand model built to measure that dynamic impact. The model does account for a static (unchanging) travel mode split between automobiles, transit, and non-motorized trips.

As with most travel demand models, including those used in major metropolitan areas such as Seattle, driverless (or autonomous) vehicles have not been explicitly added to the model. Part of the reason is that it is unclear how autonomous vehicles will be adopted (private vehicles or fee-for-service), which greatly changes the trip-making assumptions. For now, many modelers assume that the operational benefits would be offset by additional vehicle trips, such that the autonomous vehicle fleet would function on a macroscopic level, much the same as the existing vehicle fleet.

Traffic Volume Forecasts

The 2040 Baseline, 2040 Confluence Parkway, and 2040 North Wenatchee Avenue alternatives were processed using the CDTC models as explained above to develop traffic growth forecasts. For comparing alternatives, traffic volumes were compiled at a screenline located at the Wenatchee River crossing. This provides a common metric to understand how traffic volumes change for each alternative.

Existing 2016 volumes were based on the WSDOT permanent traffic recorder along SR 285 at the Wenatchee River bridge. Hourly traffic volumes were obtained for the month of October 2016. PM peak hour and daily volumes were compiled for Tuesdays, Wednesdays, and Thursdays to reflect typical weekday traffic patterns. Table 1 shows the 2016 existing volumes and 2040 forecast volumes (PM peak hour and daily) for each alternative at the Wenatchee River crossing. The volumes in Table 1 for 2040 represent post-processed traffic volumes, or traffic volumes checked and adjusted for reasonableness because of imperfections inherent on all travel demand models.

Table 1. Traffic Volumes at Wenatchee River Crossing by Alternatives

	North Wenatchee Avenue (PM Peak Hour)		Confluence Parkway (PM Peak Hour)		Total River Crossing (PM Peak Hour)			Total River Crossing (Daily)
Alternative	**SB[1]**	**NB[1]**	**SB**	**NB**	**SB**	**NB**	**Both[2]**	**Both[2]**
2016 Counts[3]	1,875	1,865	0	0	1,875	1,865	3,740	43,600
2040 Baseline	2,270	2,230	0	0	2,270	2,230	4,500	52,500
2040 Confluence Pkwy	1,650	1,730	930	905	2,580	2,635	5,215	60,800
2040 N. Wenatchee Avenue	2,480	2,480	0	0	2,480	2,480	4,960	57,900

Source: Transpo Group
1. Total PM Peak Hour trips in the southbound direction (SB) or northbound (NB) at the Wenatchee River crossing.
2. Total PM Peak Hour trips or daily trips in both the southbound and northbound directions at the Wenatchee River crossing.
3. Based on October 2016 traffic volumes at WSDOT permanent traffic recorder at the Wenatchee River crossing.

As shown in Table 1, there are about 3,740 vehicles crossing the SR 285 Wenatchee River bridge in 2016, about evenly split between the northbound and southbound direction during the PM peak hour period. During 2040 Baseline conditions, the river crossing volume increases to 4,500 vehicles representing a 20-percent increase.

The 2040 Confluence Parkway adds a lane of capacity in each direction in the separate Confluence Parkway bridge. Under this alternative, river crossing trips increase to about 5,215 vehicles (a 39-percent increase). The 2040 North Wenatchee Avenue adds a lane of capacity in each direction along the North Wenatchee Avenue corridor and would increase existing trips by 33 percent to 4,960.

Based on these results, the 2040 Confluence Parkway has the highest river crossing demand for the same capacity added (compared to 2040 North Wenatchee Avenue). In addition, the Confluence Parkway Alternative doubles the amount of growth trips at the river crossing compared to Baseline. Under the Confluence Parkway Alternative, traffic volumes along SR 285 at the river crossing would return to 2016 levels.

The SR 285 corridor currently handles about 8.6 percent of its daily traffic volumes during the PM peak hour. This indicates that traffic volumes on this corridor do not peak as much during typical commuting periods as average urban or suburban corridors (10-percent factor on average). Assuming this same 8.6 percent for the Confluence Parkway Alternative, the North Wenatchee Avenue corridor would have average daily traffic (ADT) of 39,400 and Confluence Parkway 21,400 ADT. The 21,400 ADT could be considered very high for a two-lane urban corridor, but Confluence Parkway has extra capacity than normal urban streets, given very limited side access along the corridor between Hawley Street and Olds Station Road. Alternatively, if we assume a 10-percent peak factor assumption, then ADT for Confluence Parkway may be in the 18,000 to 19,000 ADT range.

Easy Street/US 2 Roundabout Analysis

The intersection of Easy Street and US 2 is planned to be converted from a traffic signal to a multilane roundabout in the future. The timing and need of this transportation improvement project could change depending on the forecast volumes associated with the scenarios evaluated above (2040 Confluence Parkway and 2040 North Wenatchee Avenue). Turning movement forecasts were developed for this intersection based on the methodology discussed above. Intersection level of service (LOS) was determined for the intersection for each scenario. In addition, the estimated "service life" of the roundabout was calculated.

Intersection LOS at study intersections were evaluated on methodologies presented in the Highway Capacity Manual (TRB, 2000) for roundabouts. Criteria range from LOS A, indicating free-flow conditions, to LOS F, indicating extreme congestion and significant delays. LOS at intersections is measured in average vehicle delay. Roundabout analysis was conducted consistent with WSDOT-recommended practices. Traffic operations summary sheets are included as attachments. Table 2 summarizes the results of the operations analysis.

Table 2. Intersection Level of Service: East Street/US 2

	2040 Conditions		
Scenario	**LOS[1]**	**Delay[2]**	**Estimated Service Life[3]**
Weekday PM Peak Hour			
2040 Baseline	A	8.8	19 years
2040 Confluence Pkwy	A	6.9	36 years
2040 North Wenatchee Avenue	A	9.0	18 years

1. Level of service, based on 2010 Highway Capacity Manual methodology.
2. Average delay in seconds per vehicle.
3. Number of years past 2040 that intersection would operate before one or more approaches reached capacity. Assumes compounded annual traffic growth rate of 1 percent.

As shown in Table 2, the planned roundabout at the Easy Street and US 2 intersection would operate at LOS A for all three scenarios. The best LOS would occur with the 2040 Confluence Parkway scenario.

Estimated Service Life

In addition to 2040 conditions, the estimated service life of the planned roundabout at Easy Street/US 2 was calculated. This was forecasted based on increasing the turning movement volumes until one or more of the intersection approaches reached capacity. The annual increase was based on a 1-percent annual growth rate. The source of the growth rate was the growth in traffic volumes at this intersection between the existing year and 2040 Baseline conditions.

Table 2 shows the estimated service life for each scenario. The 2040 Baseline and 2040 North Wenatchee scenarios had about the same service life at 19 and 18 years, respectively. The 2040 Confluence Parkway scenario would have an estimated service life of 36 years. This shows that the Confluence Parkway scenario shifts traffic away from this area, allowing the roundabout project to have a longer service life.

Findings

The following are the key findings of the Confluence Parkway Alternatives Traffic Analysis:

- The traffic analysis considered three alternatives: 2040 Baseline, 2040 Confluence Parkway, and 2040 North Wenatchee Avenue
- The traffic forecasts are based on the 2040 CDTC travel demand models. Between 2014 and 2040, the CDTC model assumes an annual growth rate of 0.7 percent for dwelling units, and 1.6 percent for employment.

- The 2040 Baseline travel demand model assumed the North Wenatchee Area Master Plan network improvements, access management treatments along SR 285, improvements near the Maiden Lane/North Wenatchee Avenue intersection, and a multilane roundabout at US 2 and Easy Street. The 2040 alternatives were built based off the Baseline model assumptions.
- Traffic volumes were compiled at a screenline representing the Wenatchee River crossings. Existing 2016 counts were collected in October 2016 at the river crossing based on a WSDOT permanent traffic recorder at that location. About 3,740 peak hour vehicles and 43,600 daily vehicles crossed the river in 2016.
- The 2040 Baseline would increase crossing traffic by 20 percent compared to the 2016 existing conditions, to 4,500 PM peak hour trips or 52,500 daily trips.
- The 2040 Confluence Parkway Alternative would increase crossing traffic by 39 percent compared to 2016 existing conditions, to 5,215 PM peak hour trips or 60,800 daily trips. Depending on peak-to-daily factor assumptions, the Confluence Parkway would have 18,000 to 21,000 daily trips at the river crossing. Under the Confluence Parkway Alternative, traffic volumes along SR 285 at the river crossing would return to 2016 levels.
- The 2040 North Wenatchee Avenue Alternative would increase crossing traffic by 33 percent compared to 2016 existing conditions, to 4,960 PM peak hour trips or 57,900 daily trips.
- The 2040 Confluence Parkway Alternative would create more river crossings per added lane of capacity compared to the 2040 North Wenatchee Avenue Alternative.
- The planned roundabout at the Easy Street and US 2 intersection would operate at LOS A for all three scenarios. The best LOS would occur with the 2040 Confluence Parkway scenario.
- The 2040 Baseline and 2040 North Wenatchee scenarios had about the same service life at 19 and 18 years, respectively. The 2040 Confluence Parkway scenario would have an estimated service life of 36 years.

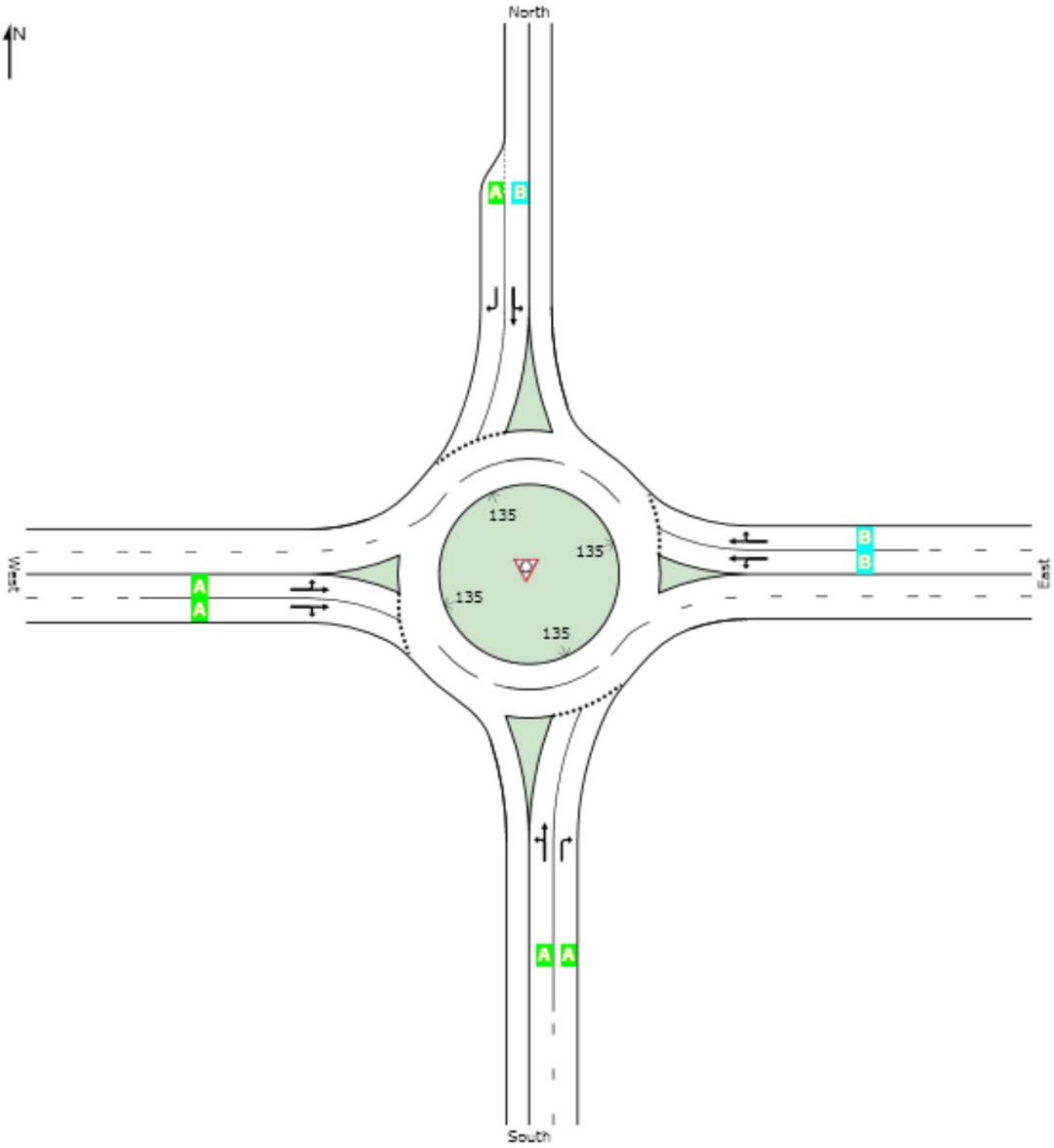
MOVEMENT SUMMARY

Site: US 2 / 97 at Easy - Baseline

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: South											
3	L2	170	1.0	0.446	10.2	LOS B	2.7	68.4	0.80	0.73	30.7
8	T1	218	1.0	0.446	3.7	LOS A	2.7	68.4	0.80	0.73	28.5
18	R2	245	1.0	0.394	5.8	LOS A	2.0	51.1	0.78	0.87	32.3
Approach		633	1.0	0.446	6.3	LOS A	2.7	68.4	0.79	0.78	30.5
East: East											
1	L2	128	5.0	0.710	19.9	LOS B	8.4	219.0	0.93	1.04	32.1
6	T1	1085	5.0	0.710	11.6	LOS B	9.3	242.1	0.93	0.99	34.2
16	R2	218	5.0	0.710	10.9	LOS B	9.3	242.1	0.92	0.94	31.5
Approach		1431	5.0	0.710	12.3	LOS B	9.3	242.1	0.92	0.98	33.6
North: North											
7	L2	149	4.0	0.602	14.3	LOS B	3.8	98.2	0.88	1.02	30.7
4	T1	154	4.0	0.602	7.9	LOS A	3.8	98.2	0.88	1.02	27.5
14	R2	378	4.0	0.526	6.6	LOS A	3.6	93.8	0.89	0.99	29.7
Approach		681	4.0	0.602	8.6	LOS A	3.8	98.2	0.89	1.00	29.4
West: West											
5	L2	197	8.0	0.528	12.3	LOS B	4.3	114.8	0.76	0.73	31.0
2	T1	931	8.0	0.528	4.7	LOS A	4.4	117.9	0.74	0.57	35.2
12	R2	37	8.0	0.528	5.1	LOS A	4.4	117.9	0.74	0.50	29.9
Approach		1165	8.0	0.528	6.0	LOS A	4.4	117.9	0.75	0.60	34.2
All Vehicles		3910	5.1	0.710	8.8	LOS A	9.3	242.1	0.84	0.84	32.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: US 2 / 97 at Easy - Conf Pkwy

Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: South											
3	L2	154	1.0	0.413	9.2	LOS A	2.3	58.9	0.71	0.59	31.1
8	T1	271	1.0	0.413	2.8	LOS A	2.3	58.9	0.71	0.59	28.9
18	R2	303	1.0	0.389	4.7	LOS A	2.0	49.8	0.70	0.72	32.6
Approach		729	1.0	0.413	4.9	LOS A	2.3	58.9	0.70	0.64	30.8
East: East											
1	L2	165	5.0	0.513	16.0	LOS B	4.2	108.2	0.81	0.87	33.2
6	T1	660	5.0	0.513	8.1	LOS A	4.4	114.7	0.80	0.78	35.2
16	R2	223	5.0	0.513	7.7	LOS A	4.4	114.7	0.80	0.72	32.1
Approach		1048	5.0	0.513	9.2	LOS A	4.4	114.7	0.80	0.78	34.2
North: North											
7	L2	165	4.0	0.447	9.9	LOS A	2.8	71.2	0.76	0.68	32.3
4	T1	255	4.0	0.447	3.4	LOS A	2.8	71.2	0.76	0.68	28.7
14	R2	282	4.0	0.400	5.3	LOS A	2.1	55.0	0.74	0.82	30.2
Approach		702	4.0	0.447	5.7	LOS A	2.8	71.2	0.75	0.73	30.1
West: West											
5	L2	149	8.0	0.393	12.6	LOS B	2.7	71.6	0.77	0.75	30.8
2	T1	601	8.0	0.393	5.1	LOS A	3.0	80.7	0.76	0.61	35.1
12	R2	16	8.0	0.393	5.7	LOS A	3.0	80.7	0.76	0.55	29.8
Approach		766	8.0	0.393	6.6	LOS A	3.0	80.7	0.77	0.64	34.0
All Vehicles		3245	4.6	0.513	6.9	LOS A	4.4	114.7	0.76	0.71	32.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: US 2 / 97 at Easy - Wen 7ln

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: South											
3	L2	160	1.0	0.444	10.4	LOS B	2.7	68.3	0.82	0.75	30.6
8	T1	213	1.0	0.444	3.9	LOS A	2.7	68.3	0.82	0.75	28.5
18	R2	234	1.0	0.397	6.1	LOS A	2.0	51.5	0.79	0.88	32.2
Approach		606	1.0	0.444	6.5	LOS A	2.7	68.3	0.81	0.80	30.4
East: East											
1	L2	112	5.0	0.732	20.5	LOS C	9.1	237.3	0.94	1.06	32.0
6	T1	1165	5.0	0.732	12.1	LOS B	10.1	262.6	0.94	1.01	34.0
16	R2	207	5.0	0.732	11.4	LOS B	10.1	262.6	0.93	0.96	31.3
Approach		1484	5.0	0.732	12.7	LOS B	10.1	262.6	0.94	1.00	33.4
North: North											
7	L2	144	4.0	0.595	14.6	LOS B	3.7	95.6	0.88	1.02	30.6
4	T1	144	4.0	0.595	8.2	LOS A	3.7	95.6	0.88	1.02	27.4
14	R2	394	4.0	0.568	7.3	LOS A	4.1	104.7	0.91	1.02	29.4
Approach		681	4.0	0.595	9.0	LOS A	4.1	104.7	0.90	1.02	29.2
West: West											
5	L2	207	8.0	0.552	12.2	LOS B	4.7	125.1	0.75	0.72	31.0
2	T1	1021	8.0	0.552	4.6	LOS A	4.8	127.9	0.74	0.57	35.2
12	R2	21	8.0	0.552	5.0	LOS A	4.8	127.9	0.73	0.49	29.9
Approach		1250	8.0	0.552	5.9	LOS A	4.8	127.9	0.74	0.59	34.4
All Vehicles		4021	5.2	0.732	9.0	LOS A	10.1	262.6	0.85	0.85	32.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: US 2 / 97 at Easy - Baseline (Growth)

Roundabout
Design Life Analysis (Capacity): Results for 19 years

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: South											
3	L2	206	1.0	0.677	14.2	LOS B	5.3	134.5	0.95	1.10	29.6
8	T1	263	1.0	0.677	7.8	LOS A	5.3	134.5	0.95	1.10	27.6
18	R2	296	1.0	0.617	9.7	LOS A	3.8	97.0	0.89	1.02	30.6
Approach		765	1.0	0.677	10.3	LOS B	5.3	134.5	0.92	1.07	29.2
East: East											
1	L2	154	5.0	0.986	49.3	LOS D	27.3	710.3	1.00	1.69	22.8
6	T1	1311	5.0	0.986	39.4	LOS D	33.7	876.2	1.00	1.68	24.2
16	R2	263	5.0	0.986	37.5	LOS D	33.7	876.2	1.00	1.67	23.0
Approach		1729	5.0	0.986	40.0	LOS D	33.7	876.2	1.00	1.68	23.9
North: North											
7	L2	180	4.0	0.950	39.3	LOS D	10.5	270.1	0.99	1.51	23.2
4	T1	186	4.0	0.950	32.9	LOS C	10.5	270.1	0.99	1.51	21.3
14	R2	456	4.0	0.788	14.9	LOS B	7.3	189.3	1.00	1.24	26.7
Approach		823	4.0	0.950	24.3	LOS C	10.5	270.1	0.99	1.36	24.4
West: West											
5	L2	238	8.0	0.699	16.3	LOS B	8.2	217.2	0.93	1.02	29.8
2	T1	1125	8.0	0.699	8.2	LOS A	8.9	237.4	0.92	0.95	34.3
12	R2	45	8.0	0.699	8.3	LOS A	8.9	237.4	0.92	0.91	29.4
Approach		1407	8.0	0.699	9.6	LOS A	8.9	237.4	0.92	0.96	33.2
All Vehicles		4723	5.1	0.986	23.4	LOS C	33.7	876.2	0.96	1.31	27.1

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: US 2 / 97 at Easy - Conf Pkwy (Growth)

Roundabout
Design Life Analysis (Capacity): Results for 36 years

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: South											
3	L2	221	1.0	0.791	15.1	LOS B	7.4	185.3	0.96	1.17	29.4
8	T1	388	1.0	0.791	8.7	LOS A	7.4	185.3	0.96	1.17	27.5
18	R2	434	1.0	0.794	12.1	LOS B	6.3	159.1	0.93	1.15	29.6
Approach		1043	1.0	0.794	11.5	LOS B	7.4	185.3	0.95	1.16	28.7
East: East											
1	L2	236	5.0	0.999	58.9	LOS E	27.1	704.8	1.00	1.74	20.7
6	T1	944	5.0	0.999	48.8	LOS D	34.8	906.0	1.00	1.77	21.9
16	R2	320	5.0	0.999	47.0	LOS D	34.8	906.0	1.00	1.79	21.0
Approach		1499	5.0	0.999	50.0	LOS D	34.8	906.0	1.00	1.77	21.5
North: North											
7	L2	236	4.0	0.890	23.1	LOS C	10.9	281.5	1.00	1.40	27.8
4	T1	365	4.0	0.890	16.7	LOS B	10.9	281.5	1.00	1.40	25.1
14	R2	403	4.0	0.847	17.8	LOS B	7.6	196.9	0.97	1.27	25.9
Approach		1005	4.0	0.890	18.6	LOS B	10.9	281.5	0.99	1.35	26.0
West: West											
5	L2	213	8.0	0.789	28.5	LOS C	10.8	286.8	1.00	1.31	25.7
2	T1	860	8.0	0.789	19.1	LOS B	13.2	351.2	1.00	1.28	29.7
12	R2	23	8.0	0.789	18.8	LOS B	13.2	351.2	1.00	1.27	26.1
Approach		1096	8.0	0.789	20.9	LOS C	13.2	351.2	1.00	1.29	28.7
All Vehicles		4642	4.6	0.999	27.7	LOS C	34.8	906.0	0.99	1.43	25.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: US 2 / 97 at Easy - Wen 7ln (Growth)

Roundabout
Design Life Analysis (Capacity): Results for 18 years

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: South											
3	L2	191	1.0	0.685	15.4	LOS B	5.5	138.7	0.96	1.12	29.2
8	T1	254	1.0	0.685	9.0	LOS A	5.5	138.7	0.96	1.12	27.3
18	R2	280	1.0	0.622	10.6	LOS B	3.9	97.6	0.90	1.03	30.2
Approach		725	1.0	0.685	11.3	LOS B	5.5	138.7	0.94	1.09	28.8
East: East											
1	L2	134	5.0	0.996	51.2	LOS D	29.1	755.8	1.00	1.73	22.4
6	T1	1393	5.0	0.996	41.3	LOS D	35.9	932.2	1.00	1.73	23.7
16	R2	248	5.0	0.996	39.3	LOS D	35.9	932.2	1.00	1.72	22.6
Approach		1775	5.0	0.996	41.8	LOS D	35.9	932.2	1.00	1.73	23.5
North: North											
7	L2	172	4.0	0.914	34.5	LOS C	8.8	226.4	0.98	1.40	24.3
4	T1	172	4.0	0.914	28.0	LOS C	8.8	226.4	0.98	1.40	22.2
14	R2	471	4.0	0.839	18.2	LOS B	8.5	219.2	1.00	1.31	25.7
Approach		814	4.0	0.914	23.7	LOS C	8.8	226.4	0.99	1.34	24.6
West: West											
5	L2	248	8.0	0.714	15.9	LOS B	8.6	229.4	0.92	1.00	30.0
2	T1	1222	8.0	0.714	7.8	LOS A	9.3	247.6	0.91	0.92	34.4
12	R2	25	8.0	0.714	8.0	LOS A	9.3	247.6	0.90	0.89	29.5
Approach		1495	8.0	0.714	9.2	LOS A	9.3	247.6	0.91	0.94	33.5
All Vehicles		4810	5.2	0.996	24.0	LOS C	35.9	932.2	0.96	1.32	26.9

Level of Service (LOS) Method: Delay (HCM 2000).
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HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.