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Cumulative Impacts

4.1 Introduction

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the project. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

The Council on Environmental Quality defines a cumulative impact as:

the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative impact analysis followed these steps:

1. Identify the resources to consider in the analysis;
2. Define the study area for each resource;
3. Describe the current status/viability and historical context for each resource;
4. Identify direct and indirect impacts of the project that might contribute to a cumulative impact;
5. Identify other current and reasonably foreseeable actions;
6. Identify and assess cumulative impacts;
7. Document the results; and
8. Assess the need for mitigation.

Sources consulted to identify potential measures to mitigate cumulative impacts included the Jackson County Economic Action Initiative Plan; the Greater Bear Creek Regional Plan, which is described in Section 3.2.2.2; the land development regulations of the City of Medford and Jackson County; and Chapter 7.2, Environmental Considerations, of the 2009-2034 Rogue Valley RTP, which was prepared to comply with Section 6001 of the federal legislation Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users.

4.1.1 Resources Analyzed for Cumulative Impacts

This chapter focuses on cumulative impacts that fall into one or more of three categories. In the first category, there could be substantial cumulative impacts resulting from the project alternatives in combination with other past, present, and reasonably foreseeable actions. In the second category, cumulative impacts could be relatively small, but the aspect of the environment is in poor or declining health or at risk, making it more sensitive to impacts of any kind. In the third category, cumulative impacts could be large due to actions other than the project, even if project impacts are small. Aspects of the environment that fall into at least one of these categories and which are addressed in this chapter are:

- land use
- socioeconomic analysis (economy and local government fiscal conditions; community character)
- parks and recreation areas
- visual resources
- hydrology and floodplains
- water quality and storm water runoff
- natural systems and communities
- wetlands and other waters
- threatened and endangered species
- non-threatened and endangered species
- invasive species
- noise
- energy
- climate change

This chapter does not address cumulative impacts on the following aspects of the environment because they do not fall within one of the three categories described above.

- Transportation facilities, because the cumulative impacts are described in Section 3.1 along with direct and indirect impacts. The traffic model used for the analysis includes the projects listed in Table 2-1 in Chapter 2 and there are no other foreseeable projects or other actions that would affect traffic volumes.
- Right-of-way, because the amount of land acquired for right-of-way, even when combined with the right-of-way acquired for other transportation projects in the region, would be small compared to the inventory of developed land and land available for development.
- Utilities, because impacted utilities are relocated as part of project construction, so there would be no long-term impacts.
- EJ, because the project would not have a disproportionately high adverse impact on EJ populations, as discussed in Section 3.4.
- Displacement of households and businesses, because the real estate market would offer replacement housing and business locations and no other actions that would cause large numbers of displacements are expected to coincide with the build alternatives or JTA phase.
- Public services and community facilities, because the build alternatives and JTA phase would have only small impacts on them, the status of public services and community facilities is satisfactory, and there are no other actions that will substantially impact them.
- Historic resources, because the build alternatives would not directly or indirectly adversely affect any historic resources. Further, for the build alternatives and/or the JTA phase, the project's Section 106 finding is "No Historic Properties Adversely Affected." See Section 3.7 for additional detail.
- Archeological resources, because the project would not impact archaeological resources, as discussed in see Section 3.7.
- Air quality, because air quality in the Medford area complies with NAAQS, air pollution levels are forecasted to decline in the future because of improved motor vehicle emission controls, and project alternatives are included in the air quality conformity determination for the 2009-2034 Rogue Valley RTP.

This means they would not cause or contribute to any new violations of any standard as Section 3.16 describes. In addition, cumulative impacts would be the same as the direct and indirect impacts described in Section 3.16, because the traffic model from which the traffic volume forecasts used for the Section 3.16 includes all funded transportation projects in the RTP.

- Hazardous materials, because, as described in Section 3.20: 1) the project would remediate hazardous materials encountered during construction and avoidance, minimization, and mitigation measures would minimize the release of hazardous materials; 2) improved regulation of hazardous materials is reducing hazardous waste pollution over time; 3) hazardous waste pollution is by nature localized; and, 4) future hazardous waste releases are unpredictable.

4.1.2 Cumulative Impacts Study Areas

For each resource, both a temporal and a geographic study area are defined in the sections below.

The temporal study area is the time period over which the cumulative impacts would occur. The beginning year of the temporal study area for many resources is 1900 because it represents the approximate beginning of urbanization in the Rogue Valley. Although European-American settlement of the Rogue Valley area began in the 1820s, there was major growth in the Rogue Valley's population between 1900 and 1910, shortly after the railroad was built. The ending year is 2035 for all resources except where noted. The year 2035 was selected because the traffic forecasts for the project extend to 2035, the RTP extends to 2034, and city land use plans provide sufficient land for a 20-year period.

The geographic study area varies according to each resource and is defined within each resource section below.

4.1.3 Other Past, Present, and Reasonably Foreseeable Future Actions

Other past, present, and reasonably foreseeable future actions that could result in cumulative impacts include transportation, land use, economic, environmental, and private development actions. The actions that are considered are as follows.

4.1.3.1 Transportation

Transportation actions include construction of road improvement projects listed in the 2009-2034 RTP (RVMPO 2010), included as Table 2-1. These projects include building new roads, widening existing roads, and adding bicycle lanes and sidewalks in key locations. In addition ODOT is planning to evaluate ways to extend OR 140 west to I-5. This project could involve widening existing roads or building new roads between OR 62 and I-5 in the vicinity of Kirtland Road.

4.1.3.2 Land Use

There are a number of land use actions that could result in cumulative impacts. They include Jackson County's adoption of Rural Use zoning (described further in the next paragraph); adoption of the Draft Bear Creek Valley Regional Plan (RVMCOG 2010), as described in Section 3.2.2.2, and Medford and Eagle Point UGB expansion into urban reserve areas identified in the Draft Bear Creek Valley Regional Plan, as referenced in Section 3.2.2.2.

In November 2007, Jackson County amended its Comprehensive Plan and Land Development Ordinance to authorize "Rural Use" plan designations and zoning. As amended, the Comprehensive Plan allows an applicant to demonstrate that land previously designated Agricultural Use or Forestry/Open Space does not qualify as "Agricultural Lands" or "Forest Lands" under state law or the Comprehensive Plan. If fire protection and other "essential public services" are available, a Rural Use plan designation may be applied and a Rural Use zone district established. Rural use zoning allows minimum lots sizes of 20 acres, but larger minimums may be required, depending on the size of surrounding parcels, fire protection, and

water supply. Existing parcels smaller than 20 acres may qualify, which would allow construction of a dwelling, if one is not already on the parcel. Jackson County will designate and zone land Rural Use only in response to applications.

In addition to those land use actions listed above, private development could occur on vacant or underdeveloped lands. Development that is likely to occur and that is considered a reasonably foreseeable action includes:

- Development of the vacant, industrial zoned lands east of the airport, as shown in Figures 3.2-2 and 3.2-4;
- Development of the vacant, industrial-zoned lands inside the White City UUCB, as shown in Figures 3.2-2 and 3.2-4;
- Redevelopment of the Medford Gun Club and Medford Rifle and Pistol Club, as shown on sheet 6 of Figure 2-4;
- Development of residential units on the Fjarli property, as shown on Figures 3.2-10 through 3.2-15; and
- Infill development and build-out of the existing land use plans in the project area, as shown in Figure 3.2-6 and described in Section 3.2.

4.1.3.3 Economic

Actions that could result in cumulative effects to the local economy include federal, state and local actions as well as general economic trends.

Payments to Jackson County from Public Law (PL) 110-343, which included the last extension of federal payments to replace lost revenues from timber harvesting on federal forestlands, drop from approximately \$11.3 million during Jackson County's fiscal year 2010-2011 (ending June 30) to approximately \$7 million in fiscal year 2011-2012. The outlook for continuing payments is uncertain.

The State of Oregon is projecting a multi-billion dollar reduction in revenues for the 2011-2013 biennium. This reduction could impact state funding for Jackson County and the City of Medford.

The Jackson County General Fund currently operates at a deficit of approximately \$5.6 million annually to support libraries, development services, and health and human services (Jackson County 2011a). Transportation is not supported by Jackson County's General Fund.

Property values would be subject to market fluctuations, resulting in unpredictability of property tax receipts locally.

4.1.3.4 Environmental

Actions that could result in cumulative effects to wildlife habitat and water resources include both beneficial and detrimental actions, as follows.

- Continuation of agricultural practices such as livestock grazing rotation intervals and how drainage patterns are altered for irrigation;
- Environmental restoration projects within the geographic resource study area, including the Agate Desert Conservation Area; and
- Forest management practices that modify habitat, such as road building, harvesting methods, and prescribed fires.

4.1.3.5 Recreational

Actions related to recreational facilities include the development of proposed parks and recreational trails as identified in the Public Facilities Element of the Medford Comprehensive Plan, planned extension of and improvements to the Bear Creek Greenway, and ongoing management and habitat restoration in the Denman Wildlife Area.

Projections in the Annual Energy Outlook 2010 (AEO2010) Reference case focus on the factors that shape U.S. energy markets in the long term. Under the assumption that current laws and regulations will remain generally unchanged throughout the projections, the AEO2011 Reference case provides the basis for examination and discussion of energy market trends and the direction they may take in the future.

4.1.3.6 Social

Social trends that are projected to occur include population increases and changes in energy consumption. The Jackson County population is forecasted to increase at a higher rate than the statewide growth rate, as shown in Table 3.5-1. The population increase would contribute to the development allowed by existing comprehensive plans and zoning described in section 3.2, increases in energy consumption, and more public and private services and amenities (e.g., stores, police, hospitals, etc.).

4.1.3.7 Energy Consumption

The rate of growth of energy consumption in the transportation sector is expected to slow down in the future. National transportation-related energy consumption is expected to increase at an average annual rate of 0.6 percent (from 27.9 quadrillion Btu to 32.5 quadrillion Btu) between 2008 and 2035. This is slower than the 1.3 percent average growth rate that occurred from 1980 to 2008 (U.S. Energy Information Administration (EIA) 2010).

According to the Annual Energy Outlook 2010 (AEO 2010) Reference case, in part because of improved motor vehicle fuel efficiency, energy intensity (the ratio of energy consumption to gross domestic product) is projected to decline at an average annual rate of 1.9 percent from 2008 to 2035 (EIA 2010).

4.2 Land Use

4.2.1 Cumulative Impacts Study Area and Resource Status

The temporal resource study area for cumulative impacts on land use begins in 1900 and ends in 2035 for the reasons stated in Section 4.1.2.

The geographic resource study area for cumulative impacts on land use is Jackson County, because: the Jackson County boundary is similar to the boundaries of the regional land market; Jackson County sets land use policies for rural lands in the county; and the entire area covered by the Draft Bear Creek Valley Regional Plan is within Jackson County boundaries.

One cumulative impact addressed below is loss of farmland. The 1987 U.S. Census of Agriculture recorded 298,471 acres of "land in farms" in Jackson County. By the 2007 Census, "land in farms" had declined by 18 percent to 244,055 acres. The other cumulative impacts addressed below would occur within the Primary and Secondary APIs, as defined in Sections 3.2.2.1 and 3.2.2.2.

4.2.2 Other Reasonably Foreseeable Future Actions

Other reasonably foreseeable future actions are those related to land use and transportation as described in Section 4.1.3.

4.2.3 Cumulative Impacts of Project Alternatives

4.2.3.1 No Build Alternative

The roadway projects in the description of the No Build Alternative, adoption of the Draft Bear Creek Valley Regional Plan, and Medford and Eagle Point UGB expansion into urban reserve areas identified in the Draft Bear Creek Valley Regional Plan would primarily affect land within the two existing UGBs and the White City UUCB and land in the proposed urban reserves. Most of the roadway projects would improve traffic flow in areas which now have very good access, so

taken separately, their land use impacts will be limited. However, taken together, they will facilitate development in the Primary API, as defined on Figure 3.2-1.

Projects 219, 812, 821, and 822, from Table 2-1, will increase the capacity of Table Rock Road and will facilitate development in the vicinity of Table Rock Road. If the Medford UGB were expanded into Urban Reserve MD-1, projects 219, 821, and 822 would improve access to Urban Reserve MD-1 and could facilitate plan amendments and zone changes. Urban Reserve MD-1 is one of the urban reserves shown on Figure 3.2-8.

Projects 558, 567, and 569, from Table 2-1, will facilitate industrial development in the area between the Medford Airport and OR 62 south of Vilas Road. Projects 558 and 567 will also improve access to Urban Reserves MD-2 and MD-3. As would be the intended purpose, the adoption of the Bear Creek Valley Regional Plan and the expansion of the Medford and Eagle Point UGBs to include urban reserves in the Primary and Secondary APIs would encourage development of the land within them. Figure 3.2-1 shows the Primary and Secondary APIs. However, Section 660-12-0060 of the TPR places limitations on plan amendments which add more than 400 additional daily trips and reduce highway mobility to below adopted targets. This limitation, combined with the No Build Alternative, could constrain plan amendments and zone changes after UGB expansion, as discussed in Section 3.2.3.2. The No Build Alternative could limit the amount of development that could occur without causing or worsening instances of the failure to meet mobility performance targets applicable to OR 62.

If urban reserves were incorporated into the UGB and that land was developed, there would be a loss of farmland. Of the urban reserves, about 7,000 acres is zoned EFU, including 1,200 acres rated as high-value farmland. This compares to the 249,822 acres of land zoned EFU in Jackson County. Some of the 7,000 acres is likely to be converted to nonfarm uses between now and 2035. The Draft Bear Creek Valley Regional Plan is intended to identify sufficient land for a period of roughly 50 years.

Urban Reserve MD-1 includes about 54 acres of the 93-acre Gutches property listed in Table 3.2-7. The Gutches property is the largest of the EFU-zoned properties in Subarea 2 that the build alternatives would impact. Because the Gutches property is in an urban reserve, it is likely to be incorporated into the Medford UGB sometime in the future. If this occurs, the Gutches property is likely to become developed. When this would occur is unknown, because urban reserves are intended to accommodate growth over a roughly 50-year time frame.

Jackson County's authorization of the Rural Use plan designations and zoning is likely to result in more low density rural residential development than would occur otherwise. However, the extent of any increase in Rural Use zoning is uncertain and may be limited. Only one rezoning to Rural Use has been approved, as of late 2011, and one additional application received since the County authorized the zone in 2009. Both rezones were for locations in parts of Jackson County remote from the project area. Some land zoned Open Space Reserve in the area of White City and east along OR 140 in the Secondary API may be eligible for Rural Use zoning. However, because of the large required lot sizes, rezoning to Rural Use would allow only a few additional dwellings to be built.

4.2.3.2 Build Alternatives

The cumulative land use impacts of the build alternatives, in combination with the land use and transportation projects described in Section 4.1.3, would be greater than impacts of the build alternatives alone. The build alternatives would substantially reduce v/c ratios at OR 62 intersections compared to the No Build Alternative. The added capacity of OR 62 would support plan amendments and zone changes after UGB expansions. This would apply to UGB expansions into Urban Reserves MD-1, MD-2, MD-3, EP-1A, EP-2, EP-3, and EP-4 shown on Figure 3.2-8. This effect would be similar under the two build alternatives. Similarly, the roadway projects listed in Table 2 1 would aid in demonstrating that needed transportation facilities are in place for Urban Reserves MD-1, MD-2, and MD-3. This does not necessarily mean that the build alternatives would provide adequate

capacity to support expansion into the urban reserves. UGB expansion into the urban reserves is expected to occur over a period of 50 or so years.

The build alternatives and other transportation projects described above would result in a small loss of farmland in Jackson County. The build alternatives would convert about 31 to about 33 acres of land zoned Exclusive Farm Use (EFU) to roadway use, as shown in Table 3.2-7. In addition, Design Option A could indirectly cause about 20 acres of EFU land to go out of agricultural production for the reasons described in Section 3.2.3.2. Similarly, Design Option B could indirectly cause about 5 acres of EFU land to go out of production. Proposed Urban Reserve MD-1 includes 54 acres of EFU land. As with the other urban reserves, both the build alternatives and the planned improvements to Table Rock Road would provide additional highway capacity to support UGB expansion into Urban Reserve MD-1.

The build alternatives would likely increase pressure to expand the amount of land zoned Rural Use by reducing commute travel times to rural areas along OR 62 north of White City and rural areas served by OR 140 east of OR 62 in the Secondary API, as defined in Figure 3.2-1. The build alternatives would substantially reduce commute travel times to rural parts of the Secondary API, as Table 3.2-5 shows. However, Rural Use zoning would allow only a few additional dwelling units to be built. Also, the Oregon land use planning system directs urban growth and densities that are within urban growth boundaries and away from lands that are outside the urban growth boundaries. Decisions as to where new urban development will occur are made within the policy framework of local and regional land use planning.

4.2.3.3 JTA Phase

The cumulative impacts of the JTA phase would be similar to the cumulative impacts of the build alternatives. Specifically:

- The JTA phase would provide added highway capacity to support plan amendments and zone changes associated with UGB expansions into Urban Reserves MD-1, MD-2, MD-3, EP-1A, EP-2, EP-3, and EP-4.
- The effect of the JTA phase on the loss of farmland in Jackson County would be similar to that of the build alternatives.
- The JTA phase and the planned improvements to Table Rock Road would reduce possible constraints on plan amendments and zone changes associated with UGB expansion into Urban Reserve MD-1.
- The JTA phase would likely increase pressure to expand the amount of land zoned Rural Use to a small degree. As Table 3.2-5 shows, the travel time savings to rural areas under the JTA phase is small.

4.2.4 Potential Mitigation

The cumulative land use impacts of the build alternatives or JTA phase, in combination with the land use and transportation projects described in Section 4.1.3, would be greater than impacts of the build alternatives or JTA phase alone. These cumulative land use impacts would result from the way the build alternatives and JTA phase would interact with other foreseeable local and regional planning initiatives and actions. The principal ongoing planning activity of the jurisdictions of the Bear Creek Valley is consideration for adoption of the urban reserves in the Bear Creek Valley Regional Plan. Should local and regional decision-making bodies view any of the cumulative impacts as undesirable, the planning initiatives and actions could be modified to avoid or reduce the impacts. The regional plan considered some of those adverse impacts in evaluating urban reserve areas and considers some opportunities for mitigation. For example, wetland mitigation opportunities and their relationship to park land in the urban reserves were considered for their ability to provide a buffer between the urbanizing area and the remaining adjacent agricultural land.

4.3 Socioeconomic Analysis

4.3.1 The Economy and Local Government Fiscal Conditions

4.3.1.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for the economy and local government fiscal condition is Jackson County. The temporal resource study area only extends to 2015 because of uncertainty about longer-term economic conditions.

Economic conditions are influenced by multiple interrelated factors. Currently, the factor generally considered most important is the recession of the global economy in 2008 and the current slow rate of recovery, including slow economic growth and high unemployment in the U.S. Jackson County's economy has been affected by this downturn. As discussed in Section 3.5.2.1 and shown in Table 3.5-3, the number of jobs in Jackson County shrank from approximately 93,100 in 2005 to approximately 89,600 in 2010 and the unemployment rate more than doubled from 6.2 percent to 12.6 percent.

The slow recovery from the economic recession has resulted in a reduction in both income tax and property tax revenues, causing revenues in the Jackson County budget to be lower than projected. The recommended Jackson County budget for fiscal year 2011-2012 is approximately \$347 million. This is only a 3 percent increase over the previous year's budget to include a cost of living increase (Jackson County 2011a). The City of Medford's total budget declined from \$278 million during the 2007-2009 fiscal year to \$252 million during the 2009-2011 fiscal year, due mainly to spending down of savings (City of Medford 2007 and 2009).

4.3.1.2 Other Reasonably Foreseeable Future Actions

During the 2011-2012 fiscal year, the city and county population is likely to continue to grow at its current rate and the economic recovery will probably continue to be slow. Other factors that could affect the Jackson County and City of Medford budgets in the future include the economic and social trends listed in Section 4.1.3.

4.3.1.3 Cumulative Impacts of Project Alternatives

No Build Alternative

Under the No Build Alternative, Jackson County's economy will continue to be affected by the current slow rate of economic recovery. The unemployment rate will likely remain high in the foreseeable future. The budgets of Jackson County and the City of Medford will continue to be affected by reduced property and income tax revenue.

Increasing congestion on existing OR 62 could potentially have an adverse effect on business revenue along OR 62.

Build Alternatives and JTA Phase

The project would combine with the other actions described above to result in cumulative impacts on local transportation facility maintenance costs and property tax revenues. The differences in cumulative impacts described below would be negligible among the build alternatives, design options, and phases.

If either the build alternatives or the JTA phase were built, the new bypass would become OR 62. Ownership of the bypassed segment of the existing OR 62 would be transferred from ODOT to the City of Medford, from approximately Vilas Road

south, and to Jackson County from approximately Vilas Road north. ODOT and the City and County would enter into an agreement regarding the long-term maintenance and jurisdiction of the facilities.

Annual property tax revenues are estimated to decrease between 0.14 and 0.18 percent due to the conversion of private property to public right-of-way to construct the bypass, as discussed in Section 3.5.11. However, by reducing travel times between Medford and other growing urban areas to the north, including White City, Eagle Point, and Shady Cove, the project could accelerate development of land zoned for urban uses in these areas. This could lead to increased property tax revenue for Jackson County and each of these cities.

For Jackson County, the reduction in property tax revenues from conversion of private property to public right-of-way for construction of this project, while minimal, would combine with the reductions in revenues from the State of Oregon and PL 110-343. This reduction in revenue, combined with the increased fiscal burden of maintaining the county's portion of the existing highway, would further increase strain on the county budget. However, increased property tax revenue from accelerated development from construction of the project could offset these impacts.

The City of Medford would see similar cumulative impacts as Jackson County. Reduction in property tax revenues from the conversion of private property to public right-of-way from construction of this project would combine with an already reduced budget, in combination with the increased fiscal burden to maintain the existing OR 62 roadway within the city limits. However, the City of Medford would benefit from accelerated property development that could result from travel time reductions with the construction of the project.

4.3.1.4 Potential Mitigation

Jackson County has created an Economic Action Initiative Plan to assist with local economic development needs (Jackson County 2011b). The Economic Action Initiative includes the following goals:

- Increase outreach to traded sector businesses
- Provide expansion assistance to retail and service sector businesses
- Promote business consortia to develop new market opportunities
- Develop business recruitment categories
- Tradeshow campaigns
- Site consultant outreach
- Plan and conduct business prospect receptions
- Participate in statewide business recruitment

There are many economic development tools available at the state level, geared toward helping small businesses grow. These include several assistance and financing programs. At the national level, job creation is the top domestic priority of the U.S. Government.

4.3.2 Community Character

4.3.2.1 Cumulative Impacts Study Area and Resource Status

The build alternatives and JTA phase would be constructed through an area that, until the 2008 economic recession, was rapidly urbanizing. Between now and 2035, the area between Medford and White City is likely to become more urbanized. The area from approximately Coker Butte Road north to the vicinity of Justice Road is currently a mix of commercial, industrial, and residential land uses. This area is within the Medford UGB and, therefore, is planned for urban development within the next 20 years.

The geographic resource study area for community character is a neighborhood of approximately 75 homes in the vicinity of Peace Lane and Justice Road. It is the area the Jackson County Comprehensive Plan designates “Rural Residential” just north of the Medford UGB, as shown on Figure 3.2-6. Unlike other areas impacted by the build alternatives and JTA phase, the character of this neighborhood is likely to change between now and 2035. The neighborhood is currently rural residential, with large lot sizes and no sidewalks. Much of the area around Justice Road and Peace Lane is planned for future expansion of the Medford UGB because it is within Urban Reserve MD-1 as described in Section 3.2.2.2. Once it is included in the UGB, Urban Reserve MD-1 is planned to be 69 percent for employment use and 25 percent for residential use.

4.3.2.2 Other Reasonably Foreseeable Future Actions

Other reasonably foreseeable future actions that would affect the character of this neighborhood include the land use actions and economic trends described in Section 4.1.3.

4.3.2.3 Cumulative Impacts of Project Alternatives

No Build Alternative

Under the No Build Alternative, the widening of Table Rock Road would improve access to the rural residential neighborhood in the vicinity of Peace Lane and Justice Road. In addition, future expansion of the Medford UGB would alter the character of this area from rural residential to a mix of employment and residential uses at urban densities.

Build Alternatives and JTA Phase

Cumulative impacts on community character would be relatively similar regardless of which build alternative, design option, or phase is chosen. The project, in combination with the widening of Table Rock Road, would improve access to the rural residential neighborhood north of the Medford UGB in the vicinity of Peace Lane and Justice Road. This, combined with the future UGB expansion described in Section 4.1.3, would substantially alter the character of the area. The draft Greater Bear Creek Valley Regional Plan envisions a mix of employment and residential uses at urban densities. In evaluating potential urban reserve areas, the plan assesses the potential for wetland mitigation areas in relationship to park land and the ability of enhanced park lands to provide a buffer between the developed land and remaining rural and agricultural land. A buffer would help to mitigate the adverse social impact of development adjacent to the urban reserve areas.

In all, the build alternatives and JTA phase would work together with future planned development, consistent with adopted land use plans, to support urban uses within urban project areas and they would tend to avoid development and development-related impacts in rural areas. However, given the scale of regional development compared to the proposed project, the build alternatives and JTA phase would have the potential to have only a very minor cumulative effect on community character within the project area.

4.3.2.4 Potential Mitigation

These cumulative changes to the community character as described in Section 4.3.2.3 would occur as a result of population growth in the Rogue Valley and planned infrastructure improvements to accommodate that growth, including the Build Alternatives and the JTA phase. The primary cause of the change in community character will be due to the results of the local planning process. The proposal to designate as an urban reserve the area north of the Medford UGB came out of a long-range planning process to direct future growth and development. Adverse changes to the area’s community character resulting from the planning decisions could be mitigated through additional regulatory efforts

within the local planning process, which would be outside of the jurisdiction of ODOT or FHWA. These local planning efforts could include such measures as establishing design standards or review process for future development within the areas to be urbanized, including seeking advice from existing local residents. Further, the local jurisdictions could establish design standards for local streets and other infrastructure within the areas to be developed, helping to ensure that facilities help maintain at least some characteristics of the area's existing community character.

4.4 Parks and Recreational Facilities

4.4.1 Cumulative Impacts Study Area and Resource Status

Cumulative impacts on parks and recreational facilities are those that would result from a combination of the proposed project, planned roadway improvements, planned park improvement projects, and private urban development as described in Section 4.1.3.

The temporal resource study area for the Bear Creek Greenway begins in 1973, when the first segment was built. For the Denman Wildlife Area, the temporal resource study area begins in 1954, when the Denman Wildlife Area was first created. The temporal resource study area for the Proposed Medco Haul/Cedar Links Road Path (T-3) begins in 1996 when the Medco Haul Road alignment was purchased by ODOT. All three temporal resource study areas extend to 2035.

The geographic resource study area for cumulative impacts on parks and recreational areas is limited to the Bear Creek Greenway, the Denman Wildlife Area, and the proposed Medco Haul/Cedar Links Road Path (T-3). Those are the only existing or proposed parks where there would be direct and indirect impacts resulting from one or both of the proposed build alternatives or from the JTA phase (T-3 only).

4.4.1.1 Bear Creek Greenway

The Bear Creek Greenway multi-use path is a well-used recreational path that was constructed in segments between 1973 and 2010. In 2010, the last gap in the Greenway's 21-mile multi-use path was constructed with the new bridge over Barnett Road, so the path is now continuous between Ashland and Central Point. Other Greenway improvements that have been added since 1973 include new access points, benches, and signs. New parks, such as the Medford Sports Park, have been developed around or near the Greenway, enhancing the recreational opportunities for people using the Greenway path. The Greenway also provides a good route to those adjacent parks for pedestrians and bicyclists.

The Bear Creek Greenway Management Plan, a collaborative effort of the cities of Ashland, Medford, Phoenix, Talent, and Central Point, Jackson County, ODOT, the Greenway Foundation, and representatives from other organizations in the Rogue Valley, was adopted in August 2005. The plan provides guidelines for the Greenway's operations, maintenance and management activities, as well as plans for completion of and enhancements to the Greenway between Ashland and Central Point.

Although the Bear Creek Greenway has increased in size since 1973, there have also been some minor decreases in size; however, the overall effect has been that the Greenway has increased in size. Because the Greenway is adjacent to I-5, various interchange improvement projects have impacted the Greenway with short term construction impacts. These temporary impacts resulted from adjacent roadway construction and the need to realign short sections of the path. The net effect of these transportation related activities have not decreased the function of the Greenway.

4.4.1.2 Denman Wildlife Area

The Denman Wildlife Area currently covers 1,858 acres in three separate tracts. It includes a diversity of habitat types, from vernal pool complexes to oak woodlands. The Denman Wildlife Area was first created in 1954 when 1,760 acres of Camp White, the WWII-era training camp, were conveyed to the Oregon Game Commission. Additional, noncontiguous tracts have since been added to the Denman Wildlife Area. Most of the lands that now make up the Denman Wildlife Area were severely overgrazed before they were turned over to the Oregon Game Commission. Although native species still exist, they are not as abundant as they were historically. Despite Oregon Department of Fish and Wildlife's efforts since 1954 to reduce invasive species, restore native vegetation, and enhance wildlife habitat, many invasive and non-native species are still present in the Denman Wildlife Area.

Since 1954, the habitat quality and landscape within the Denman Wildlife Area has improved. At the same time, the lands surrounding the Denman Wildlife Area have been increasingly developed and used more intensively than before. Roads near the Denman Wildlife Area have been added or paved; houses and commercial areas have been built, and the White City Industrial Area has been developed. The Ken Denman Wildlife Area Long Range Management Plan acknowledges that the habitat provided at the Denman Wildlife Area has become increasingly important as the surrounding lands are developed and wildlife habitat is lost. Increases in the Jackson County population continue to result in increased usage of the Denman Wildlife Area.

4.4.1.3 Proposed Medco Haul/Cedar Links Road Path (project T-3)

The proposed Medco Haul/Cedar Links Road Path is identified as project T-3 in the Public Facilities Element of the Medford Comprehensive Plan, updated in November 2010. The proposed path is shown in the Comprehensive Plan as roughly following the Medco Haul Road alignment from Vilas Road south to OR 62, then heading southeast through the neighborhoods. The Public Facilities Element provides generalized information about the vicinity of proposed bicycle/pedestrian paths, but it does not specify a precise location or alignment for this or any other proposed path. The City of Medford has not yet acquired right-of-way for the proposed path. The report does state that recreation path site selection may include siting those paths on a street when necessary, but that off-street paths are preferred to bicycle lanes and sidewalks. See Section 3.6.2.3 and Figure 3.6-5 for additional detail.

4.4.2 Other Reasonably Foreseeable Future Actions

Other reasonably foreseeable future actions that could combine with the project to result in cumulative impacts on parks include the transportation, land use, recreational, and social actions that are described in Section 4.1.3.

4.4.3 Cumulative Impacts of Project Alternatives

4.4.3.1 Bear Creek Greenway

The cumulative impacts of the SD Alternative combined with the other reasonably foreseeable actions described in Section 4.1.3 would be likely to result in larger numbers of people using the Greenway. The increase in use would result from improved access to the Greenway that would be provided by the build alternatives. Also, implementation of the Bear Creek Greenway Management Plan, partially or fully, would improve conditions of the Greenway itself. Finally, new or improved parks near the Greenway would tend to increase use of the Greenway itself. The increased usage of the Greenway may require additional improvements to the

multi-use path to reduce conflicts between users, but would be a generally positive impact. Proposed or planned projects that would use small amounts of Greenway land or that would realign the multi-use path would have a negligible effect on the overall recreational experience. The Greenway is located in urban and suburban areas, and there have been numerous changes to the Greenway itself as well as to the area surrounding the Greenway. Additional future changes to the Greenway and its environs are expected, but are not likely to result in adverse cumulative effects. In conclusion, the cumulative impacts on the Bear Creek Greenway resulting from the SD Alternative and all other recently constructed or planned projects called for in the Greenway Management are considered beneficial.

4.4.3.2 Denman Wildlife Area

The cumulative impacts from the proposed project combined with other reasonably foreseeable actions are likely to be a continuation of existing trends. The quality of the Denman Wildlife Area is likely to continue to improve with ongoing ODFW management. Because of potential habitat loss in the area outside the Denman Wildlife Area, the Denman Wildlife Area will become increasingly more important to resident and migratory species. Likewise, with the increase in human populations in and near White City, the Denman Wildlife Area will become increasingly more important for recreational activities such as dog training, bird watching, and hunting. This increase in usage could create a need for new management strategies to ensure that wildlife habitat is preserved. Relocating the parking lot to 11th Street would change usage patterns in the western portion of the Hall Tract Unit of the Denman Wildlife Area: the area near the new parking lot would become more heavily used, while the area near the existing parking lot would be used much less, but overall, this would be a very minor impact.

4.4.3.3 Proposed Medco Haul/Cedar Links Road Trail (T-3)

As noted in Section 3.6.3.1, ODOT consulted with the Medford Parks department to discuss the state of planning associated with this proposed Medco Haul/Cedar Links Road Trail. Medford Park's planners confirmed that construction of the SD Alternative would not necessarily preclude construction of the proposed path, but it could make siting the path more challenging. While the bypass itself would provide a north-south transportation connection for pedestrians and bicyclists, it would not fulfill the role of a recreational trail. Ongoing development in the vicinity of the proposed T-3 Path is also reducing the amount of vacant land that could be used for the proposed T-3 Path.

4.4.3.4 Summary of Cumulative Impacts

In all, the build alternatives and JTA phase would contribute to the overall health of parks within the project area, combining improved access to parks with the planned increases in park land and betterment of park facilities. Wetland mitigation measures that could be directed to park property, either for this or other projects, would tend to improve park and recreational lands.

4.4.4 Potential Mitigation

4.4.4.1 Bear Creek Greenway

The principal ongoing planning activity of the jurisdictions of the Bear Creek Valley is consideration for adoption the urban reserves in the Bear Creek Valley Regional Plan. In evaluating potential urban reserve areas, the plan assesses the potential for wetland mitigation areas in relationship to park land and the ability of enhanced park lands to provide a buffer between the developed land and remaining rural and agricultural land. A buffer would help to mitigate the adverse social impact of development adjacent to the urban reserve areas and would provide enhancement to the park land in the form of increased and/or improved wetland areas within park boundaries.

Potential mitigation strategies by ODOT or other jurisdictions to reduce adverse cumulative effects on the Bear Creek Greenway include the following:

- Improve navigational signage on the local street network to help bicyclists and pedestrians find a safe route to the Greenway.
- In places where the multi-use path would be realigned, ensure that the new segments preserve the recreational experience: sharp turns should be avoided but the path should include gentle curves in harmony with the existing topography and landscape.
- In places where the multi-use path would be realigned, construct the new segments using techniques and materials that will avoid future upheavals or potholes created by tree roots or soil movement.
- In places where there would be new construction or ground disturbance, install landscaping that is native to Bear Creek to screen the new construction and cover the disturbed ground.
- Design all new bridges over Bear Creek to be visually compatible with the surroundings: use pigments to darken concrete, add texture to large expanses of concrete, and avoid using bare galvanized metal on railings, sign posts, or light posts that are visible from the Greenway.

4.4.4.2 Denman Wildlife Area

Potential mitigation strategies by ODOT or other jurisdictions to reduce adverse cumulative effects on the Denman Wildlife Area include the following:

- Prior to project construction, post notices at the parking lot off of Agate Road to alert visitors that the parking lot will be moved to 11th Street.
- Provide directional signage to guide visitors to the proposed new parking lot location.
- Restore the existing parking lot site with native vegetation.
- Build curbs or other barriers around the new parking lot to keep vehicles from enlarging the parking lot.
- Increase efforts to restore native habitat and eliminate invasive species.
- Monitor usage patterns and adjust management plans and restoration strategies to ensure that recreational needs are met while still ensuring habitat and wildlife protection.

4.4.4.3 Proposed Medco Haul Road/Cedar Links Road Trail (T-3)

Bicycles and pedestrians would be permitted to use the shoulders of the proposed bypass. Because the build alternatives and the JTA phase would not adversely affect the design or implementation of the proposed Medco Haul Road/Cedar Links Road Trail, no mitigation measures for that proposed resource are identified.

4.5 Visual Resources

4.5.1 Cumulative Impacts Study Area and Resource Status

Cumulative impacts on visual resources are those that would result from a combination of the proposed project, planned roadway improvements, and private urban development described in Section 4.1.3.

The temporal resource study area is 1900-2035 for reasons described in Section 4.1.2.

The geographic resource study area only consists of two areas where potential new development would substantially change the visual character of an area. The first is Landscape Unit 8: Rural Residential (Justice Road and Peace Lane), in which the Urban Reserve MD-1 is located. This is the rural residential neighborhood

described in Section 4.3.2. The second is Landscape Unit 11: Industrial (White City Industrial Area), which includes a large area of vacant land zoned for industrial uses. Figure 3.8-1 is a map that depicts these landscape units.

As described in Chapter 3, Landscape Unit 8: Rural Residential (Justice Road and Peace Lane) is characterized by one- and two-story single-family houses in a rural setting. It has a moderately high degree of vividness and unity, and an average degree of intactness, leading to a moderately high degree of visual quality. Landscape Unit 11: Industrial (White City Industrial Area) is characterized by large factories, mills, and processing plants for the wood products industry, and is crisscrossed by railroad spur lines. It has low degrees of vividness, intactness, and unity, leading to a low visual quality.

4.5.2 Other Reasonably Foreseeable Future Actions

Other reasonably foreseeable future actions include the transportation and land use actions described in Section 4.1.3.

4.5.3 Cumulative Impacts of Project Alternatives

4.5.3.1 Landscape Unit 8: Rural Residential (Justice Road and Peace Lane)

No Build Alternative

The incremental impact of the No Build Alternative in combination with the other reasonably foreseeable future actions would include:

- Increased urbanization of the lands within Urban Reserve MD-1, transforming existing rural views into more urban views. Landscape Unit 7: Transitional Rural/Industrial (Vilas Road Area) provides an example of the scale and type of development that could occur. This would represent a moderately high degree of visual change. Depending on the type and scale of development, the area may or may not retain a high degree of visual quality, but the views would be different from what they are now.
- Increasing light coming from increased traffic on Table Rock Road to the west, as motorists use it to avoid congestion on OR 62.
- Replacement of existing vegetation – now dominated by grasses and native oaks – with “street trees,” typically non-native trees that have the type of growth habit that works well in an urban setting.
- Obstruction of existing long-range views by new buildings.

SD Alternative, DI Alternative, and JTA Phase

The incremental impact of either the build alternatives or JTA phase in combination with the other reasonably foreseeable future actions on Landscape Unit 8 would include:

- Increased urbanization of the lands within Urban Reserve MD-1 and transformation of existing rural views into more urban views. Landscape Unit 7: Transitional Rural/Industrial (Vilas Road Area) provides an example of the scale and type of development that could occur. This would represent a moderately high degree of visual change. Depending on the type and scale of development, the area could retain a high degree of visual quality (or it could not), but the views would be different from what they are now. Landscape Unit 8 would appear more urbanized with the build alternatives than with the No Build Alternative because the bypass itself would be an urban-style feature.
- Replacement of existing vegetation – now dominated by grasses and native oaks – with “street trees,” typically non-native trees that have the type of growth habit that works well in an urban setting.
- Obstruction of existing long-range views by new buildings.

-
- Increases in traffic on new surface streets associated with the build alternatives. As the area urbanizes, the Justice/Gregory connector road would be likely to see increases in traffic volumes, so viewers would see more cars during the day and more headlights at night.
 - In summary, the proposed project would add to the trend of development of the built environment that has been ongoing and that is planned for the project area. Mitigation measures and visually pleasing design details would moderate the project's contribution to cumulative impacts to visual resources.

4.5.3.2 Landscape Unit 11: Industrial (White City Industrial Area)

No Build Alternative

The incremental impact of the No Build Alternative in combination with the other reasonably foreseeable future actions would include:

- Increased industrialization in the White City Industrial Area, leading to shortening of existing long-range views across undeveloped lands. Foreground views would be of new industrial buildings rather than undeveloped land.
- Changes in traffic patterns resulting from the potential extension of OR 140 to I-5; viewers would see more truck traffic during the day, and would see more headlights at night.
- Increasing light coming from increased traffic on Table Rock Road to the west, as motorists use it to avoid congestion on OR 62.

SD Alternative and DI Alternative

- Increased industrialization in the White City Industrial Area, leading to shortening of existing long-range views across undeveloped lands. Foreground views would be of new industrial buildings and the proposed bypass rather than undeveloped land.
- If OR 140 were extended to I-5, there likely would be changes in traffic patterns that would cause viewers to see more truck traffic during the day and more headlights at night.

JTA Phase

The JTA phase would terminate south of White City, so cumulative impacts on Landscape Unit 11: Industrial (White City Industrial Area) would be the same as for the No Build Alternative.

4.5.4 Potential Mitigation

The principal ongoing planning activity of the jurisdictions of the Bear Creek Valley is consideration for adoption the urban reserves in the Bear Creek Valley Regional Plan. In evaluating potential urban reserve areas, the plan assesses the potential for wetland mitigation areas in relationship to park land and the ability of enhanced park lands to provide a buffer between the developed land and remaining rural and agricultural land. A buffer would help to mitigate the adverse social impact of development adjacent to the urban reserve areas. By implementing urban expansion into the reserves, the plan anticipates that jurisdictions can and will ensure proper mitigation through development standards and approval processes.

Further, the plan notes that prior to the approval of any Urban Growth Boundary Amendment, Jackson County shall appoint an Agricultural Task Force made up of persons with expertise in appropriate fields, including but not limited to farmers, ranchers, foresters and soils scientists, representatives of the State Department of Agriculture, the State Forestry Department, the State Department of Land Conservation and Development, Jackson County, and a RPS participating city. The Agricultural Task Force will develop a program to assess the impacts on the agricultural economy of Jackson County arising from the loss of agricultural

land and/or the ability to irrigate agricultural land, which may result from UGB amendments. The Agricultural Task Force will also identify potential mitigation measures to offset those impacts, which will be applied to UGB amendment proposals.

As a potential measure to mitigate adverse cumulative visual impacts, the current Land Development Ordinance could be amended by Jackson County to include design standards that would address visual impacts of subdivisions and other development projects.

Additional mitigation measures for adverse visual impacts could be pursued by other jurisdictions, with potential support from ODOT include:

- Identification and protection of significant view corridors to those visual resources beyond the immediate project area, such as the Table Rocks; and
- Utilization of native flora for landscaping to help retain the character of the place.

For the proposed Build Alternatives and the JTA phase, ODOT could convene a community aesthetics committee, as described in Section 3.8.4, to develop recommendations for color, texture, and design themes for built components such as bridges, noise barriers, lighting, and landscaping.

4.6 Hydrology and Floodplains

4.6.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for hydrology and floodplain cumulative impacts is the southern portion of the Middle Rogue River watershed, which includes the Bear Creek sub-watershed. This study area is located on the eastern edge of the central Rogue River valley. All of the streams within the geographic resource study area have been diked and channelized to some extent, resulting in much narrower riparian zones along the stream banks. In addition, most streams now have no large woody debris, side channels, or mature woody riparian vegetation, as they would have had in the past. Modification of the hydrology and increases in impervious surfaces have changed how and when flooding occurs in the geographic resource study area.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. The settlement and development during this period have contributed to changes in hydrology and floodplains.

4.6.2 Other Reasonably Foreseeable Future Actions

Future projects affecting hydrology and floodplain dynamics are the transportation, land use, and environmental actions described in Section 4.1.3 that will increase impervious surface areas and modify stream crossings.

4.6.3 Cumulative Impacts of Project Alternatives

4.6.3.1 No Build Alternative

The No Build Alternative would not contribute to the cumulative impacts for hydrology and floodplains. Past, present and future foreseeable actions within the project area that have and would contribute to cumulative impacts are still expected but to a lesser degree if the No Build Alternative is selected.

4.6.3.2 Build Alternatives and JTA Phase

Past, present, and future foreseeable actions would affect hydrology within the geographic resource study area and would have small and local effects. Localized flooding patterns may change as a result of implementation of the build alternatives and JTA phase, but, when assessed with other actions, the resulting cumulative impacts would be negligible. Because ODOT, Medford, and RVSS have flow control requirements in place, peak runoff flows are likely to be managed to prevent further flooding problems. Furthermore, storm water detention facilities are required for all new construction projects. The implementation of this project could create impacts to floodplains from the net new fill associated with the new and replacement culverts, however, as described in Section 3.9.3.1, these impacts are not expected to be noticeable. Additionally, the project would not include any longitudinal encroachments on floodplains or impair the natural, beneficial functions of the floodplains by adding fill. Therefore, none of the alternatives would result in a significant contribution to cumulative impacts on the regulatory floodplains. It is possible that indirect impacts on hydrology and floodplains, potentially caused by large-scale development in Eagle Point, if it occurred, could contribute to cumulative impacts, as described in Section 3.2.

4.6.4 Potential Mitigation

A potential mitigation measure for adverse cumulative impacts to hydrology and floodplains would be for ODOT and local jurisdictions to incorporate additional storm water detention facilities in watersheds that are most vulnerable to flooding impacts. These additional facilities could be incorporated into existing or future facilities, depending on funding and right-of-way availability. ODOT could use its project programming process to place a higher priority for stormwater retrofit programs in these areas for use of area-wide maintenance funds.

4.7 Water Quality and Storm Water Runoff

4.7.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for water quality and storm water runoff is the southern portion of the Middle Rogue River watershed, which includes the Bear Creek sub-watershed. The northern portion of the watershed includes portions of the Umpqua and Rogue River National Forests where water quality is not affected to a great degree by development.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Past and present actions related to urbanization during this time period have contributed to the change in water quality.

The streams in the geographic resource study area that cross through the project area include Bear Creek, Lone Pine Creek, Upton Creek, Swanson Creek, Whetstone Creek, Jacks Creek, Little Butte Creek plus two unnamed tributaries to the Rogue River. Water quality in these streams is low due to the loss of riparian habitat that historically helped to keep streams cooler and due to pollution coming from roadways, farming and ranching, and urban development. Streams in the geographic resource study area now have no large woody debris or side channels as they would have had in the past. Diking and stream channelization have also changed hydrology. These conditions, combined with the widespread sedimentation in the area, contribute to elevated temperatures, bacteria, and sedimentation that contribute to a low water quality in this portion of the Middle Rogue river watershed. Elevated bacteria levels in Whetstone Creek are largely attributed to animal excrement from grazing practices. Section 303(d) listed streams in the geographic resource study area include Bear Creek for sediment, Whetstone Creek for bacteria and Little Butte Creek for dissolved oxygen and sediment.

The poor riparian conditions of the streams in the geographic resource study area have contributed to the decline in water quality. A TMDL has been established for the Bear Creek sub-watershed. Federal, state, local, and private entities have an ongoing restoration project within the Middle Rogue River watershed working toward meeting the standards established by the DEQ for the Middle Rogue River watershed and the Rogue River basin. Currently, storm water treatment facilities in the geographic study area are limited.

4.7.2 Other Reasonably Foreseeable Future Actions

Future projects affecting water quality and storm water runoff are the transportation, land use, agricultural, and environmental projects described in Section 4.1.3 that would increase impervious surface area and modify stream crossings in the Middle Rogue River watershed. Those actions have and will continue to increase impervious surface area, increase the use of pesticides and herbicides, and modify stream channels and hydrology in the geographic resource study area.

4.7.3 Cumulative Impacts of Project Alternatives

The No Build Alternative, in combination with other actions, would have minor cumulative impacts on water quality. Cumulative effects of the No Build Alternative are continued pollutant loading on roadways from increasing traffic congestion. Planned transportation projects described in Section 4.1.3 could relieve some of the congestion and, for projects within the City of Medford, would adhere to Medford's storm water detention requirements for new development, which could reduce water quality impacts and storm water impacts.

The SD and DI Alternatives, in combination with past, present, and foreseeable future actions, would have a minor long-term cumulative impact on water quality: while they would increase the amount of impervious surface and increase the potential for pollutants to reach streams, they would also meet ODOT's and local jurisdictions design and performance standards for stormwater management. Changes in agricultural practices could reduce some streams' ability to meet established TMDL standards. Cumulative impacts resulting from either of the two build alternatives and any of the three design options would be similar because they would create approximately the same amount of total and net new impervious surface area. The JTA phase would create the same type of cumulative impact as the full build alternatives, except the redeveloped and net new impervious surface area would be less. Changes to water quality would be measurable and apparent, with sufficient consequences to cause concern, although effects would be relatively localized. With required mitigation and/or water quality facilities, cumulative impacts could be reduced. The build alternatives would include BMPs to reduce pollutant discharge to storm sewers and would detain storm water from a 10-year storm event. Restoration projects in the Middle Rogue River watershed would help to minimize these effects.

4.7.4 Potential Mitigation

Water quality and storm water is regulated by the state and local communities to improve water quality. Potential measures to reduce cumulative impacts to water quality and storm water runoff include:

- Medford and RVSS have guidelines for construction erosion control and post-construction storm water management to protect receiving water bodies. Those jurisdictions could amend those guidelines to increase their effectiveness, especially for areas with existing or anticipated water quality and storm water deficiencies.

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- Jackson County regulates development within riparian areas. It requires that structures and grading be kept at least 50 feet away from streams that provide habitat, such as Bear Creek. As potential mitigation to cumulative impacts to water quality, the county could consider changes to their development standards within riparian areas targeted to improve water quality.
 - Ongoing restoration activities within the Middle Rogue River watershed would provide additional water quality improvements. The state and local jurisdictions could prioritize providing additional funding for those improvements through their budgeting and programming activities.
 - Monitoring of agricultural practices and services to provide education for protection of water quality on private lands would help to mitigate future declines in water quality.

4.8 Natural Systems and Communities

4.8.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area includes the North Medford Conservation Opportunity Area (COA) and Antelope Creek COA, because the COAs are priority areas where fish and wildlife conservation goals have been established at the ecosystem scale, through ODF&W's Oregon Conservation Strategy.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Past and present actions such as land use and development, changes in water quality and quantity, and invasive species introduction have contributed to the existing conditions in the conservation areas.

Land use changes, water quality and quantity, and invasive species are considered the biggest conservation issues within the two COAs that make up the geographic resource study area.

Strategy habitats within the North Medford COA include grasslands and oak savannah, riparian, and wetlands, as shown in Table 3.11-1. The Antelope Creek COA is comprised of grasslands and oak savannah, pine-oak woodlands, riparian, and wetlands strategy habitats. Focused conservation efforts in these areas would increase the potential for long-term success of maintaining or enhancing priority habitats and minimizing habitat fragmentation over large landscapes.

4.8.2 Other Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions and trends affecting natural systems and communities include transportation and land use actions described in Section 4.1.3. These past, current, and future actions have and will continue to decrease acreages in the COAs and contribute to habitat fragmentation in the geographic resources study area.

4.8.3 Cumulative Impacts of Project Alternatives

4.8.3.1 No Build Alternative

The No Build Alternative would not contribute to the cumulative impacts on natural systems and communities. Past, present and future foreseeable actions within the project area that have and would contribute to cumulative impacts are still expected, but to a lesser degree if the No Build Alternative is selected.

4.8.3.2 Build Alternatives and JTA Phase

Cumulative impacts on natural systems and communities resulting from the build alternatives or JTA phase in conjunction with other actions would be very minor.

Direct impacts on natural systems and communities from the build alternatives or JTA phase could occur from habitat loss or fragmentation. Changes to natural systems, including habitat fragmentation within the geographic resource study area, would be either non-detectable, or, if detected, would have effects that would be considered small and local. Strategy habitats close to roads provide minimal habitat value and are on the edge of the COAs. At COA scale, removal of these small areas of habitat would not substantially contribute to cumulative impacts on natural systems and communities.

4.8.4 Potential Mitigation

As a cooperator on the Oregon Conservation Strategy, ODOT is committed to minimizing impacts on sensitive natural communities, particularly strategy habitats.

If wildlife-vehicle collision hot-spots are present in the geographic resource study area, and if suitable habitat exists to provide suitable long-term connectivity, feasible opportunities to remove barriers and minimize risk of wildlife-vehicle collisions could be included as mitigation.

4.9 Wetlands and Other Waters

4.9.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for wetlands and other waters includes Little Butte Creek, Whetstone Creek, Upton Creek, and Bear Creek watershed sub-basins because loss of wetlands and wetland function from the proposed project would have the greatest impacts on these streams and associated water bodies. Figure 3.9-1 shows these streams. Those impacts, when added to other past, present, and future projects within these watershed sub-basins could result in cumulative impacts.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Past and present actions during this time period have contributed to existing conditions for wetlands and water bodies through the physical and functional loss of wetlands, the modification of stream channels, and the disturbance of hydrology in the geographic resource study area.

Many wetlands, water bodies, and vernal pools exist in the geographic resource study area. Most of the wetlands within the study area are degraded from past agricultural practices and development for residential, commercial, and industrial purposes. Wetlands in the study area generally received low-to-moderate ratings for most functions evaluated.

Vernal Pool Complexes (VPCs) observed within the study area have been severely impacted by soil and water flow disturbance due to development, grazing, farming, illegal trash dumping, and introduction and spread of noxious weeds. Most of the VPCs evaluated within the API received low to moderate ratings for hydrologic and water quality functions.

4.9.2 Other Reasonably Foreseeable Future Actions

Future projects affecting wetlands, vernal pools, and other waters are those transportation, land use, agricultural, and environmental projects described in Section 4.1.3 that contribute to increases in impervious surface area, wetland fill, and modification of stream crossings. Those actions have and will continue to increase physical and functional loss of wetlands and vernal pools and modification of stream channels and hydrology in the geographic resource study area.

4.9.3 Cumulative Impacts of Project Alternatives

4.9.3.1 No Build Alternative

The No Build Alternative would not contribute to the cumulative impacts on wetlands. Past, present and future foreseeable actions within the project area that have and would contribute to cumulative impacts are still expected but to a lesser degree if the No Build Alternative is selected.

4.9.3.2 Build Alternatives and JTA Phase

The cumulative impacts on wetlands and other waters resulting from the build alternatives or JTA phase, in conjunction with other actions, would be moderate. Cumulative impacts include possible long-term impacts (more than 5 years) on wetlands, vernal pools and streams through loss of function and loss of habitat. Temporary or permanent loss of wetlands, including loss of wetland function, resulting from the project or other actions, would contribute to the cumulative impacts. Without mitigation and restoration activities, the project and future actions could result in long-term cumulative impacts on wetland and other water functions. The build alternatives would span or displace up to 23.3 acres of wetlands and other waters, including a loss of up to 2.9 acres of high quality wetlands. Both build alternatives and JTA phase would span or displace several wetlands designated as locally significant by the Medford Local Wetland Inventory, including high quality vernal pools that support rare plant species, as described in Sections 3.12 and 3.13.

Indirect impacts on wetlands and other waters would be similar with either build alternative or JTA phase. Vernal pools would be especially sensitive to these indirect impacts from future proposed projects. The cumulative impacts described above include the indirect effects of each alternative. The project's contribution to cumulative impacts on wetlands and other waters is considered moderate when compared to planned development in and population forecasts for the Medford and Eagle Point UGBs and White City UUCB.

4.9.4 Potential Mitigation

For the Build Alternative and JTA phase, ODOT has worked to avoid or minimize direct, indirect and cumulative impacts on wetlands by complying with current ODOT design standards and through compensatory wetland mitigation to replace functions lost as a result of permanently displacing or spanning wetlands. Specifically, the projects would follow ODOT standard specifications and BMPs for erosion and sediment control, wetland protection, site restoration and planting. Additionally, where appropriate and feasible, the project would be designed to maintain local surface hydrology patterns supporting wetlands and waters. All storm water management facilities would be designed and built in accordance with current state and federal water quality standards.

As described in Section 3.12.4.1, ODOT is in the process of designing and implementing a vernal pool mitigation site in White City. This site is being designed to mitigate all of the project's wetland impacts, including the cumulative impacts from the project identified in this section. Specifically, the site will help address cumulative impacts on wetlands within the Bear Creek sub-watershed, Little Butte Creek sub-watershed, and Middle Rogue River watershed by providing wetland functions and values before future wetland impacts occur.

The principal ongoing planning activity of the jurisdictions of the Bear Creek Valley is consideration for adoption the urban reserves in the Bear Creek Valley Regional Plan. By implementing urban expansion into the reserves, the plan anticipates that jurisdictions can and will ensure proper mitigation through development standards and approval processes. In evaluating potential urban reserve areas, the plan assesses the potential for wetland mitigation to occur as a result of

development projects within the reserve areas, noting that wetland mitigation areas are generally twice the size of the area of displaced wetland, thereby resulting in a net increase in wetlands within the reserved land.

The 2009-2034 Rogue Valley RTP identifies the following methods for mitigating impacts on wetlands:

- Avoidance and minimization of impacts to wetlands or natural habitats through realignment and special design, construction features, or other measures.
- Compensatory mitigation alternatives, either inside or outside of the right-of-way. This includes, but is not limited to, such measures as on-site mitigation, when that alternative is determined to be the preferred approach by the appropriate regulatory agency.
- Improvement of existing degraded or historic wetlands or natural habitats through restoration or enhancement on or off site; creation of new wetlands; and under certain circumstances, preservation of existing wetlands or natural habitats on or off site.
- Improvements to existing wetlands or natural habitats. Such activities may include, but are not limited to, construction or modification of water level control structures or ditches, establishment of natural vegetation, re-contouring of a site, installation or removal of irrigation, drainage, or other water distribution systems, integrated pest management, installation of fencing, monitoring, and other measures to protect, enhance, or restore the wetland or natural habitat character of a site.
- Mitigation banks (such as the vernal pool mitigation site in White City described above). (RVMPO 2010, Chapter 7.2, p. 8).

Local jurisdictions could consider potential mitigation measures for cumulative impacts to wetlands through changes in their development code and design standards, which would be designed to avoid the displacement or spanning of important wetland features. Further, local jurisdictions and ODOT could consider the creation of additional wetland mitigation banks to target specifically high-value wetland types and functions – these banks could be made available to public and private developers as ways to mitigate the unavoidable displacement or spanning of wetlands. Local and state funding criteria could be re-prioritized to place a greater emphasis on support of these targeted wetland mitigation banks.

4.10 Threatened and Endangered Species

The cumulative impact assessment for ESA species in this section is based on the NEPA definition as defined by NEPA [40 C.F.R. §1508.7]. Cumulative impacts are distinct from “cumulative effects,” as defined by the ESA [50 C.F.R. § 402.02], which are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area.

This threatened and endangered species analysis is not intended for cumulative impact analyses for biological assessments prepared to comply with Section 7 of the federal Endangered Species Act (ESA). For ESA cumulative effects, only non-federal actions are included in the specific consultation analysis. Effects of these actions on species are analyzed within the action area; the area subject to consultation.

4.10.1 Cumulative Impacts Study Area and Resource Status

There are two geographic resource study areas for ESA species: one for aquatic species and one for terrestrial species. For aquatic species, which includes Coho salmon and designated critical habitat for the southern Oregon and northern California ESU, the geographic resource study area is the Middle and Upper Rogue River watersheds. Actions affecting streams in these watersheds are currently contributing to the overall declining health of the Rogue River, which affects species survival.

The geographic resource study area for terrestrial ESA species is the Agate Desert. Vernal pool fairy shrimp, Cook's lomatium, and large-flowered woolly meadowfoam and associated designated critical habitat for these species occur within the Agate Desert. Additionally, the Agate Desert Conservation area for vernal pool fairy shrimp, vernal pool habitat and wetlands is within this study area. Southern Oregon buttercup and coral-seeded allocarya have suitable habitat within the Agate Desert geographic resources study area as well. Section 3.13 provides more detail on these species and their occurrence within the geographic resource study area; Figure 3.13-1 is a map of designated critical habitat of these species.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Past and present actions during this time period have contributed to the habitat quality and species diversity.

The geographic resource study area for aquatic species, which is the Middle and Upper Rogue River watersheds, includes a variety of habitats with varying degrees of quality. Many different species can be found within the watersheds. The geographic resource study area for aquatic species also includes several national forests that provide habitat and species diversity at the higher elevations. Water diversions, including dams and canals, in the Upper Rogue River watershed have affected water quality in both the Middle and Upper Rogue River watersheds. These diversions caused water temperatures to rise and have increased sedimentation, which affect aquatic species. Currently, the mainstem of the Rogue River has a TMDL in place to address temperature-related water quality issues. The Middle Rogue River watershed contains most of the developed lands within the larger Rogue River Basin. Land development in both the aquatic and terrestrial geographic resource study areas has contributed to a decline in species diversity as well as habitat quality and quantity. Vernal pool fairy shrimp, ESA-listed plants, and designated critical habitat are most common in the low-lying areas and river valleys of both of the geographic resource study areas. Past actions that modified the area and affected species diversity include agricultural practices, development, grazing practices, water diversions, and encroachment from noxious weeds. Water diversion in the upper elevations and development along the river corridors in the low elevations have affected water quality, the abundance of habitat and habitat diversity, which in turn affects species survival at multiple scales. The geographic resource study areas are currently being monitored. Mitigation, conservation, and restoration measures have more recently resulted in improvements to species survival.

4.10.2 Other Reasonably Foreseeable Future Actions

Future projects that will impact habitat diversity and species abundance are the transportation, land use, agricultural, and environmental projects described in Section 4.1.3 that contribute to increases in development of natural areas, fragmentation of existing habitat, modifications of stream corridors, or reduction in riparian habitat. These past, current, and future actions have and will continue to affect habitat quality and diversity, which will impact species survival in the geographic resource study area.

4.10.3 Cumulative Impacts of Project Alternatives

4.10.3.1 No Build Alternative

The No Build Alternative would not contribute to the cumulative impacts on ESA species. Past, present and future foreseeable actions within the project area that have and would contribute to cumulative impacts are still expected but to a lesser degree if the No Build Alternative is selected.

4.10.3.2 Build Alternatives and JTA Phase

There would be varying degrees of cumulative impacts on ESA species resulting from the build alternatives or JTA phase combined with other actions. There would be moderate cumulative impacts on vernal pool fairy shrimp and designated critical habitat in the terrestrial species geographic resource study area. A moderate cumulative impact on Cook's lomatium and large-flowered woolly meadowfoam is also expected, depending on proposed mitigation success. These moderate cumulative impacts would include loss of habitat or decline in quality of habitat, and could have long-term consequences. No cumulative impacts for Southern Oregon buttercup and coral-seeded allocarya are expected because these species are not known to occur within the project area.

There would be minor to moderate cumulative impacts on ESA aquatic species and designated critical habitat. Impacts would mainly be a result of construction work; increases in impervious surface area and additional development within the study area would not contribute much to cumulative impacts. A minor to moderate impact means that an individual or multiple individuals of a listed species or its critical habitat may be affected, but the change would be small and short-term.

As described in Section 3.2, the build alternatives and JTA phase could accelerate land development allowed by the Medford, Eagle Point, and Jackson County comprehensive plans, including within the White City UUCB, and reduce constraints on plan amendments and zone changes to allow larger-scale development within the Medford and Eagle Point UGBs. However, as described in Section 3.13.3.1, such larger-scale development would not necessarily result in more species displacement or loss of habitat for ESA-listed plant and wildlife species, and could result in less. This is one reason the overall cumulative impact on ESA species within the geographic resource study areas would be minor to moderate.

Development and transportation projects that are constructed in the future will conform to applicable design standards, many of which work to avoid or minimize adverse impacts on habitat and species – and some work to improve the condition of habitat or species (such as stormwater treatment standards). Taken together, the sensitivity of cumulative impacts to ESA-listed species as a result of the build alternatives and JTA phase would tend to be minor and could be either slightly positive or slightly adverse.

4.10.4 Potential Mitigation

As part of its effort to avoid or minimize direct, indirect and cumulative adverse impacts to ESA species, the proposed Build Alternatives and JTA phase would upgrade up to 10 existing stream crossings with fish-passable culverts to avoid fish passage impacts. These crossings could be designed to provide safe passage for other small animals. The project would also comply with the Migratory Bird Treaty Act and avoid impacts on migratory birds. Other projects within the geographic study area would be required to meet environmental performance standards specified in the Forest Practices Act and National Forest Management Act. These performance standards would mitigate their contribution to the cumulative impacts for the Middle and Upper Rogue River watersheds.

This project and future projects will be required to provide mitigation for any loss of species or habitat for ESA species. Additional conservation measures, including ongoing habitat restoration projects in a variety of locations, would provide additional protection for ESA-listed species in the geographic resource study areas.

For wetland dependent ESA species, local jurisdictions could consider potential mitigation measures for cumulative impacts to wetlands through changes in their development code and design standards, which would be designed to avoid the displacement or spanning of important wetland features, as noted in Section 4.9.4. Further, local jurisdictions and ODOT could consider the creation of additional wetland mitigation banks to target specifically high-value wetland types and functions – these banks could be made available to public and private developers

as ways to mitigate the unavoidable displacement or spanning of wetlands. Local and state funding criteria could be re-prioritized to place a greater emphasis on support of these targeted wetland mitigation banks.

Local jurisdictions could also consider changes to their comprehensive plan, zoning and development standards that would work to identify and preserve additional high-quality habitat for ESA species. Further, local jurisdictions could partner with non-profit to target future funding into the acquisition of property or development rights that could preserve or restore high-quality habitat for ESA species.

4.11 Non-Threatened and Endangered Species

4.11.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for non-ESA species is the Middle Rogue River watershed, which includes the Bear Creek sub-watershed. Section 3.14 and Figure 3.14-1 provide background on the study area for non-ESA species. This area has a high degree of habitat diversity and provides a large enough scale to determine how past, present, and future change conditions could affect biological integrity, which includes species' migratory patterns, habitat requirements, and their ability to thrive.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Past and present actions during this time period have contributed to the habitat quality and species diversity in the geographic resource study area.

The Middle Rogue River watershed has a variety of habitats with varying degrees of quality. Many different species can be found within the watershed. At the higher elevations of the geographic resource study area there are several national forests with good habitat and species diversity. The Middle Rogue River watershed contains most of the developed lands within the Rogue River Basin. Land development, farming, livestock grazing, and encroachment from noxious weeds have contributed to impacts on wildlife and native plant species, migratory patterns, and species diversity, particularly in the low-lying areas and river valleys. In the past, river valleys were used for winter range, migratory routes, and transitional habitat for migratory birds. Development along streams and rivers has affected the biological integrity in grasslands, wetlands, vernal pools, and aquatic habitats. Species that live in these habitats have also been affected by development. Past logging, mining, and grazing in the higher elevations has affected the biological integrity of the forested areas, but improved management practices have reduced those types of impacts on the geographic resource study area.

4.11.2 Other Reasonably Foreseeable Future Actions

Future projects affecting habitat diversity and species abundance are the transportation, land use, agricultural, and environmental projects described in Section 4.1.3 that affect streams and habitat. Those past, current, and future actions have and will continue to affect the biological integrity in the geographic resource study area.

4.11.3 Cumulative Impacts of Project Alternatives

4.11.3.1 No Build Alternative

The No Build Alternative would not contribute to the cumulative impacts on non-ESA species. Past, present and future foreseeable actions within the project area that have and would contribute to cumulative impacts are still expected but to a lesser degree if the No Build Alternative is selected.

4.11.3.2 Build Alternatives and JTA Phase

The reasonably foreseeable future actions described above, in combination with past and present projects and the proposed project including the JTA phase would have a minor cumulative impact on non-ESA species because of changes to biological integrity within the geographic resource study area. The project's impacts would be localized, but would still have a minor cumulative contribution to a decrease in biological integrity through loss of key habitat components that support species in the geographic resource study area. The build alternatives and JTA phase would contribute to habitat fragmentation and loss of migration corridors, as other past, present, and future projects have done or would be expected to do. Both build alternatives would contribute the same types of impacts on species displacement, habitat loss and fragmentation, and migration path disruption, although the number of acres affected could be slightly different.

As described in Section 3.2, the build alternatives and JTA phase could accelerate land development allowed by the Medford, Eagle Point, and Jackson County comprehensive plans, including within the White City UUCB, and reduce constraints on plan amendments and zone changes to allow larger-scale development within the Medford and Eagle Point UGBs. However such larger-scale development would not necessarily result in more species displacement or loss of habitat for plant and wildlife species, and could result in less.

Development and transportation projects that are constructed in the future will conform to applicable design standards, many of which work to avoid or minimize adverse impacts on habitat and species – and some work to improve the condition of habitat or species (such as stormwater treatment standards). Taken together, the sensitivity of cumulative impacts to non-listed species as a result of the build alternatives and JTA phase would tend to be minor and could be either slightly positive or slightly adverse.

4.11.4 Potential Mitigation

The project would be designed with fish passable culverts to avoid fish passage impacts. These crossings could also provide safe passage for other small animals. Migratory Bird Treaty Act compliance would avoid impacts on migratory birds. Other projects within the geographic study area would be required to meet environmental performance standards through Forest Practices Act and National Forest Management Act which would lessen or mitigate cumulative impacts.

The measures identified by the 2009-2034 Rogue Valley RTP as potential mitigation for habitat loss as are listed in 4.9.4, above. (RVMPO 2010, Chapter 7.2, p. 8) It also states that, "The effects of roads on wildlife can be mitigated through the design and construction of underpasses and overcrossings. RVMPO 2010, Chapter 7.2, p. 13)

Other potential mitigation measures for adverse cumulative impacts to non-ESA species could include those potential mitigation measures for ESA species, as identified in Section 4.10.4.

4.12 Invasive Species

4.12.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for invasive species is the southern portion of the Middle Rogue River watershed, which includes the Bear Creek sub-watershed. This area was chosen because actions that would result from disturbing existing invasive species populations are within this study area.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Past and present actions that have contributed to the change in the spread of noxious weeds and invasive species include agriculture, grazing activities, and land development. These activities promoted the spread of noxious weeds.

Past and current land development practices and agricultural activities contributed to the widespread presence of noxious weeds within the geographic resource study area. Currently noxious weeds cover 40 percent of the developed lands that contain herbaceous groundcover. Noxious weeds have increased in undeveloped areas within the geographic resource study area as well.

4.12.2 Other Reasonably Foreseeable Future Actions

Future projects affecting noxious weeds are those transportation, land use, agricultural, and environmental projects described in Section 4.1.3 that would create ground disturbance from road construction, development, agriculture, grazing, and/or irrigation practices. These past, current, and future actions have and will continue to increase the potential for noxious weeds to increase in the geographic resource study area.

4.12.3 Cumulative Impacts of Project Alternatives

The No Build Alternative would not change or modify existing landscaping or populations of noxious weed species within the geographic resource study area. Other road and land development projects in the Medford and White City areas would be required to include control of noxious weeds. This potential for noxious weed control would be the direct result of implementing currently planned and future land use decisions.

Direct impacts on noxious weed introduction and proliferation from the build alternatives and JTA phase and other current and reasonably foreseeable actions would result from disturbing existing noxious weed populations. At the geographic resource study area scale, these disturbances would have a minor cumulative contribution to the spread of invasive species after mitigation measures are applied.

Impacts from noxious weeds would be the same for each build alternative, design option, and JTA phase. Both build alternatives and the JTA phase would create disturbed ground along the new roads. Construction could spread noxious weed seed sources, and construction equipment brought to the project site could carry new invasive seed sources from other locations.

4.12.4 Potential Mitigation

Mitigation measures for the control of noxious weeds are mandated by federal and state agencies. Required mitigation or environmental performance standards are incorporated into projects to support this effort. Additional mitigation that could be applied in the geographic study area includes restoration of habitat in areas known to have infestation of noxious weeds through planting and monitoring native species and working collaboratively with federal and state agencies to

control and reduce the introduction and spread of noxious weeds. ODOT and local jurisdictions could change maintenance funding priorities to target weed control within areas of known infestation or areas that are known to be susceptible to infestation. Further, ODOT and local jurisdictions could undertake a public awareness campaign to educate the public on noxious weeds within the area and to enlist public help in controlling those weeds (e.g., through focused articles in newsletters, inserts in utility bills, billboards, booths at farmers markets or similar events, etc.)

4.13 Noise

4.13.1 Cumulative Impacts Study Area and Resource Status

The geographic resource study area for cumulative impacts on noise is the same area used for the API in the direct and indirect impacts analysis in Section 3.17. This area, which is defined as the project footprint with a 500 foot buffer on all sides, was used for the cumulative impacts analysis because receivers which could be impacted by the project are not likely to perceive a noise impact if they are further than 500 feet from the project.

The temporal resource study area is 1900 to 2035 for reasons described in Section 4.1.2. Urbanization of the geographic resource study area during this time period contributed to the increasing noise levels over the years.

Past actions have already created noise impacts in the geographic resource study area. Noise levels differ depending on the type of activities occurring in the area, which is also dependent upon the land use and zoning in the area. As development in the geographic resource study area has occurred and land use has changed from open space to farming, residential, commercial, and industrial, and as roads and highways have been built, noise levels have increased. Approximately four of the 19 NSAs within the API, as analyzed in Section 3.17, exceed or may exceed the ODOT NAAC.

4.13.2 Other Reasonably Foreseeable Future Actions

In the geographic resource study area, reasonably foreseeable future actions that could affect noise include transportation and land use actions described in Section 4.1.3.

4.13.3 Cumulative Impacts of Project Alternatives

No Build Alternative

The transportation projects referred to in Section 4.1.3.1 and the land use changes referred to in Section 4.1.3.2 will have noise impacts. However, the number and location of these impacts cannot be determined because not enough is known about noise impacts associated with the other reasonably foreseeable future actions.

Build Alternatives and JTA Phase

The cumulative noise impacts of the build alternatives and JTA phase and other reasonably foreseeable actions described above are likely to be greater than the noise impacts resulting from the build alternatives and JTA phase alone. However, the number and location of these impacts cannot be determined because not enough is known about noise impacts associated with the other reasonably foreseeable future actions, whether or not noise abatement measures would be applicable to those projects, or whether any noise abatement measures, if needed, would be both reasonable and feasible. Overall, traffic-generated noise impacts

will tend to increase in the project area with or without construction of the build alternatives or JTA phase, due to anticipated increases in traffic volumes over time; and noise levels would increase and decrease at specific locations within the project area, depending on factors such as localized traffic volumes, speeds and the proximity of travel lanes to noise-sensitive land uses.

4.13.4 Potential Mitigation

As shown in Table 3.17-7, no noise abatement measures are likely under the build alternatives or JTA phase, because, based on the current level of design and noise analysis, noise abatement was not found to be reasonable and feasible for any of the identified noise impacted land uses. While other transportation projects in the study area could include mitigation measures (depending on the applicability of FHWA or ODOT requirements and project specifics), not enough is known about the other reasonably foreseeable future actions to predict their contributions to noise levels.

4.14 Energy Consumption

4.14.1 Cumulative Impacts of Project Alternatives

Cumulative impacts are the impacts on the environment which result from the incremental outcome of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts related to energy use, including under the No Build Alternative and including indirect land use impacts, are integrated into the long-term impacts analysis. This is because the energy estimates are based on travel demand forecasts and their associated operational efficiency and the travel demand forecasts reflect planned land use.

Because of the scale of vehicle travel within the project area compared to national and global energy use, the build alternatives and JTA phase would only marginally contribute to a cumulative effect on energy supply or consumption at a regional or local level. Construction and operation of any project alternative are not expected to affect local or regional fuel availability, or require the development of new energy sources.

4.14.2 Potential Mitigation

No notable cumulative energy impacts are expected to result from this project. Consequently, no conservation for cumulative energy impacts is proposed. Furthermore, no notable direct or indirect energy impacts are expected to result from this project. Consequently, no conservation for direct or indirect energy impacts is proposed.

No additional mitigation measures are proposed as part of the build alternatives or JTA phase. However, there are state and federal actions to reduce energy consumption. The U.S. Department of Energy (US DOE) is considering stricter fuel efficiency standards for light- and heavy-duty vehicles (US DOE 2011). The State of Oregon has created the Oregon Sustainable Transportation Initiative (OSTI) to reduce transportation-related greenhouse gas (GHG) emissions; one aspect of this initiative is to reduce fuel consumption.

4.15 Climate Change

4.15.1 Cumulative Impacts Study Area and Resource Status

Overall, the geographic study area for the analysis of cumulative impacts affecting climate change is the entire planet because greenhouse gas emissions and climate change are a global phenomenon. However, an important context

for understanding this project's alternatives and their relationship to climate change are the federal, state and local levels. For example, many federal programs and policies affect energy use and conservation measures, such as federal fuel economy standards. Further, ODOT plays an important role in allocating federal and state transportation funds throughout the state, including within the project area. Finally, this proposed project is an important component in the planned local transportation infrastructure over the next twenty or more years. Table 4-1 illustrates the relationship of Oregon highway CO₂ emissions to current global emissions and project area VMT to statewide VMT. In summary, the project area VMT accounts for approximately 0.001 percent of statewide VMT, while Oregon statewide VMT accounts for approximately 0.07 percent of global greenhouse gas emissions.

The temporal resource study area for the cumulative impact analysis for climate change begins in 1900, because it was the approximate time when automobiles started to appear in the U.S and because average global temperatures have risen approximately 1.5 degrees since 1900.

Table 4-1: Estimated Greenhouse Gas (CO₂) Emissions (annual in millions of metric tons)

Global 2010 ¹	Oregon Highways		OR Highway Emissions as a percent of Global ^{1,2}	Project area VMT as a Percent of OR VMT ^{2,3}
	2010	2030		
30,990	21	15 to 18	0.07%	0.001%

Source: ODOT.

¹ Global emissions are from all sources.

² 2010.

³ In 2005, annual statewide VMT was 35.3 billion. The Oregon Transportation Plan growth rate for VMT is 1.35 percent. As a result, annual statewide VMT for 2007 is forecast to have been approximately 36.3 billion. Annual VMT in the project area in 2007 was approximately 156.0 million.

4.15.2 Other Reasonably Foreseeable Future Actions

Science has shown that the introduction of additional greenhouse gases into the atmosphere has contributed to the current climate change. The release of additional greenhouse gases is the cumulative result global activities humankind, but studies have shown that they primarily involve the combustion of fossil fuels, such as the use of automobiles and aircraft and the production of electricity. Those activities are occurring, at varying levels and rates, at the federal, state and local level. And at all levels, those cumulative activities, which result in the emission of additional greenhouse gases, will continue to occur into the foreseeable future. However, the rate of the emissions may change over time as the result of a wide variety of factors, including demographics, technological advances, legal and procedural changes and budgetary priorities.

The Federal government is addressing the issue of global climate change as an important national and global concern in several ways. The transportation sector is the second largest source of total greenhouse gases in the United States and the greatest source of carbon dioxide (CO₂) emissions – the predominant greenhouse gas. In 2004, the transportation sector was responsible for 31 percent of all U.S. CO₂ emissions. The principal anthropogenic (i.e., human-made) source of carbon emissions is the combustion of fossil fuels, which account for about 80 percent of anthropogenic emissions of carbon worldwide. Almost all (98 percent) of transportation-sector emissions result from the consumption of petroleum products, such as: gasoline, diesel fuel and aviation fuel.

Recognizing this concern, the FHWA is working nationally with other modal administrations through the U.S. Department of Transportation's Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases, particularly CO₂ emissions, and to assess the risks to transportation systems and services from climate changes.

The State of Oregon also has policies and programs to address greenhouse gas emissions and climate change, including: Oregon House Bill 3543, the Climate Change Integration Act; House Bill 2001, the Oregon Jobs and Transportation Act; House Bill 2186, which initiated the Oregon Sustainable Transportation Initiative; SB 1059, which requires various state agencies to work together to examine ways to reduce greenhouse gas emissions from vehicles; and Oregon Revised Statute 366.514, which requires the construction of foot and bike paths whenever roadway roadways are constructed or reconstructed.

At the local level, in March 2011, the Rogue Valley Council of Governments published the Southern Oregon Regional Greenhouse Gas Inventory, which summarizes a greenhouse gas inventory for the county and is a first step in identifying ways to reduce local greenhouse gas emissions and to implement mitigation measures at the local level. The Rogue Valley Clean Cities Coalition was one of the first 10 coalitions formed under the U.S. Department of Energy through the Energy Policy Act of 1992 and it is supported by the Rogue Valley Transportation District, Jackson County and AVISTA Utilities. See <http://www.roguevalleycleancities.org> for additional information on the coalition and its efforts to reduce greenhouse gas emissions at the local level.

At the local level, the project accounts for reasonably-foreseeable future actions that affect greenhouse gas emissions by basing its transportation, air quality and energy analyses on adopted state, regional and local land use plans and policies, which help form the basis of the adopted population and employment projections and travel demand forecasts. Further, projections of travel patterns are based model networks that account for both existing and planned/programmed transportation facilities at the local level.

4.15.3 Cumulative Impacts of Project Alternatives

GHG emissions analyses are most informative at regional, state, or national levels. At this level, they can be conducted during local and regional land use planning processes or as a part of federal policy analyses. ODOT's recent land use and transportation modeling studies have shown that land use patterns have a much greater impact on roadway-generated emissions than do highway expansions. Further, most highway projects that expand roadway capacities are needed because of land use changes, development, economic growth, and other regional, state and national trends.

Models used to quantify greenhouse gas emissions associated with a proposed transportation project are currently in a state of development. As a result, there is a wide range in methods used by project sponsors as they work with FHWA to assess the effects of a proposed project on greenhouse gases. While EPA has been working on its MOVES model, which is replacing the MOBILE6.2 model, the EPA has plans for future enhancements to the model. Pending finalization of a dependable and standardized greenhouse gas model that can be used for all federal transportation projects, this and many other projects instead use VMT as a surrogate for energy consumption and greenhouse gas emissions. As VMT changes due to a proposed project and its alternatives, so would energy use and greenhouse gas production. The SD and DI Alternatives would increase annual project area VMT by 28 and 23 percent, respectively, compared to approximately 2 percent under the JTA phase.¹ Beyond the change in VMT and its relationship to greenhouse gas emissions, the proposed build alternatives and the JTA phase would tend to reduce congestion and improve traffic flow, compared to the No Build Alternative, which would tend to reduce greenhouse gas emissions.

¹ Annual VMT in the project area would be approximately 199 million, compared to approximately 255 million and 244 million under the SD and DI Alternatives, respectively, and approximately 203 million under the JTA phase.

4.15.4 Potential Mitigation

No federal laws currently exist that explicitly require greenhouse gas emissions analyses per se in project-level NEPA documents. In the absence of federal regulations and a regional or national framework for considering the implications of project-level greenhouse gas analyses, U.S. DOT concludes that greenhouse gas emissions calculated for project alternatives cannot be usefully evaluated in the same way that vehicle emissions are evaluated within a local project-level context and that such an attempted analysis would not inform project decision-making in any meaningful way.

GHG emissions are currently not regulated in the State of Oregon, but the State has developed some GHG emissions goals. On August 7, 2007 Oregon House Bill 3543 was passed, creating the Climate Change Integration Act. This Act includes goals to reduce GHG emissions 10 percent below 1990 levels by 2020 and to further reduce greenhouse gas emissions 75 percent below the 1990 levels by 2050. Oregon House Bill 3543 also created the Oregon Global Warming Commission that is responsible for recommending policies to state and local governments to reduce greenhouse gas emissions.

Intelligent transportation systems and land use planning policies will be among several strategies necessary to meet the state's goal of reducing greenhouse gas emissions. To accomplish this, the Commission has formed a Land Use and Transportation Committee. The Committee will work with state agencies to integrate greenhouse gas emission goals into transportation and land use planning. Transportation and land use policies will be designated to stop the growth of greenhouse gas emissions, and then reduce over time, according to the specific goals set out the Oregon Legislature.

Research is also underway to develop better models for measuring, analyzing, evaluating, and reporting greenhouse gas emissions. ODOT is coordinating with other state and federal agencies to determine appropriate contexts for measuring impacts from transportation and land use changes. FHWA and ODOT strategies regarding climate change efforts are summarized in Appendix K.