# CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

## Traffic, Transportation and Safety

This section of the DEIS uses computerized traffic modeling as a tool for assessing traffic, transportation and safety impacts. The model considers the existing street system, the future transportation network, trip origin and destination patterns, transit, and other variables. The model measures traffic performance. Traffic models were run for the anticipated first year of operation (2010), at a 20-year horizon (2030) and also at an interim year (2020).

The City of Medford and ODOT use different standards to measure traffic performance. Hence, this study applies different measures for areas of the project in the City's jurisdiction versus areas under State jurisdiction. The City uses Level of service (LOS) analysis to measure performance of road segments and intersections. Levels of service range from "A" to "F" with "A" being the best and "F" being the worst (Table 4-1). The State uses volume-to-capacity ratios (v/c) to measure traffic performance with a measurement of 0.75 indicating ¾ of the road capacity is used and a measurement of 1.0 indicating that all the available capacity is used.

### *No-Build Alternative*

Transportation modeling of the No-Build Alternative used the existing road network, projects already under development, and also "committed projects." Committed projects are those that have been identified in the *RTP* as funded.

The No-Build Alternative would lead to general system failure. This would mean substantial delays as traffic waits to move through the study area. During peak use, queues in the interchange area would often extend through more than one traffic signal. Travelers would often experience stopped cars on the freeway caused by congestion at the interchange. The model shows that traffic performance in many areas deteriorates to a LOS of F and a v/c of greater than 1.0 (over capacity) by the year 2030 (see Table 4-1).

Because congestion would increase on Barnett Road across I-5, travelers would increasingly seek alternative routes through the neighborhoods to travel from southeast Medford to the downtown area. As an example, traffic levels would increase on Highland Drive, Ellendale Drive, Greenwood Street, and other connecting residential streets north of Barnett Road. Out-of-direction traffic would result in higher vehicle miles traveled than the Build Alternatives (VMT of 3,105,238).

LOS at two intersections, Center Drive and Stewart Avenue and Barnett Road and WinCo, would improve from C to B under the No Build Alternative. This would result from the construction of other planned improvements in the area that are funded and assumed to occur under the No Build Alternative and from refinements in signal timing.

### *Consequences Common to Both Build Alternatives*

The Highland and Ellendale alternatives both solve the basic transportation problem at the South Medford Interchange by providing a safe, efficient, long-term solution. While not all transportation issues would be solved in the surrounding street network, both alternatives would reduce congestion so that conditions would be as good or better than the No-Build Alternative would provide.

**Table 4-1**
**COMPARISON OF EXISTING CONDITIONS TO 2030 NO-BUILD ALTERNATIVE**

| | Existing Conditions | | 2030 No-Build | |
|---|---|---|---|---|
| **Intersection** | **LOS** | **V/C** | **LOS** | **V/C** |
| Stewart Avenue & Riverside Avenue (Highway 99) | NA | 0.81 | NA | 1.52 |
| Barnett Road & Stewart Avenue (I-5 Southbound off-ramp) | NA | 0.89 | NA | 1.38 |
| Barnett Road & Riverside Avenue (Highway 99) | D | 0.91 | F | NA |
| Barnett Road & Highland Drive | C | NA | F | NA |
| Barnett Road & Black Oak Drive | D | NA | F | NA |
| Barnett Road & Alba Drive | NA | 0.81 | NA | 1.31 |
| Center Drive & Stewart Avenue | C | NA | B | NA |
| Belknap Rd. & Center Drive | NA | NA | NA | 0.61 |
| Barnett Road & Ellendale Drive | B | NA | B | NA |
| Belknap Rd. and Highway 99 | NA | 0.44 | NA | 1.08 |
| Barnett Road & WinCo | C | NA | B | NA |

Through the construction of a single-point urban interchange, both Build Alternatives offer good access to Interstate 5 over the long term. Traffic modeling of Year 2030 shows the new interchange operating efficiently at a v/c of 0.62 (Table 4-2).

Both Build Alternatives would provide relatively equivalent reductions in vehicle-miles traveled (VMT) over the No-Build Alternative. Based on a regional analysis for the area for the year 2030, vehicle-miles traveled for the Highland Alternative would be 3,077,968 miles. The Ellendale Alternative VMT would be 3,078,319.

Some residential streets would experience minor changes in traffic volumes compared to the No-Build Alternative. With the exception of the link between Highland Drive at Barnett Road and Highland Drive at Siskiyou Boulevard, none of these differences, whether increasing or decreasing, cause the daily volumes to approach thresholds for a different functional classification. For example, although Siskiyou Boulevard is classified as a collector for No-Build volumes, it may experience increased traffic after building the Ellendale or Highland alternatives. However, year 2030 Ellendale and Highland alternatives predicted daily traffic volumes do not change the functional classification. This is also true for residential streets that are predicted to experience changes in daily traffic volumes.

Traffic Accident Patterns

The Build Alternatives add capacity and improve sight distance at intersections, which should reduce accidents. Several measures would be implemented to minimize accident potentials, such as:

- Limiting traffic movements to and from properties to "right-in/right-out" turns (e.g., not allowing motorists to turn left and cross traffic lanes as they leave a property). Under both Build Alternatives the access to and from the Pacific Power and Light power substation on the

**Table 4-2**
**YEAR 2030 INTERSECTION LEVELS OF SERVICE (LOS) & VOLUME TO CAPACITY RATIOS (V/C)**

| Intersection | Alternative | Jurisdiction | LOS | V/C |
|---|---|---|---|---|
| Stewart Avenue & Riverside Avenue (Hwy 99) | No-Build | ODOT | NA | 1.52 |
| | Ellendale | ODOT | NA | 1.18 |
| | Highland | ODOT | NA | 1.19 |
| Barnett Road & Stewart Avenue (I-5 Southbound off-ramp) | No-Build | ODOT | A | 1.38 |
| | Ellendale | City | C | NA |
| | Highland | City | D | NA |
| Barnett Road & Riverside Avenue (Hwy 99) | No-Build | City | F | NA |
| | Ellendale | City | F | NA |
| | Highland | City | F | NA |
| Barnett Road & Highland Drive | No-Build | City | F | NA |
| | Ellendale | City | C | NA |
| | Highland | City | D | NA |
| Barnett Road & Black Oak Drive | No-Build | City | F | NA |
| | Ellendale | City | E | NA |
| | Highland | City | E | NA |
| Barnett Road & Alba Drive | No-Build | ODOT | NA | 1.31 |
| | Ellendale | City | A | NA |
| Center Drive & Stewart Avenue | Ellendale | City | B | NA |
| | Highland | City | B | NA |
| Hwy 99 Connector & Center Drive | Ellendale | ODOT | NA | 0.61 |
| | Highland | ODOT | NA | 0.69 |
| Barnett Road & Ellendale Drive | No-Build | City | B | NA |
| | Ellendale | City | B | NA |
| | Highland | City | B | NA |
| Hwy 99 Connector & Highway 99 | No-Build | ODOT | NA | 1.08 |
| | Ellendale | ODOT | NA | 0.97 |
| | Highland | ODOT | NA | 1.00 |
| Barnett Road & WinCo | No-Build | City | B | NA |
| | Ellendale | City | B | NA |
| | Highland | City | B | NA |
| I-5 Southbound off-ramp & Hwy 99 Connector | Ellendale | ODOT | NA | 0.62 |
| | Highland | ODOT | NA | 0.62 |

Highway 99 Connector would be limited to a right-in/right-out movement.

- Including raised medians in the roadways to limit left-turns that cross oncoming traffic, except where breaks in the medians are provided to allow left-turns. Raised medians would be provided along the proposed Connectors and Barnett Road, except at roadway intersections, and at other locations specifically addressed below for each of the alternatives.

Consolidating access points where multiple driveways exist in near proximity to each other and opportunities exist to combine them via shared driveways/entries.

Bicycle and Pedestrian Facilities

Both Build Alternatives improve bike and pedestrian connectivity across the interstate by creating a new crossing of I-5, and also by converting the existing Barnett Road crossing to serve local transportation. The proposed sidewalks would be 1.8 meters (six feet) wide and bike lanes 2.4-meters (eight feet) wide on both sides of each new/relocated street. On the interchange itself, the bike lanes would cross the facility parallel to the through lanes. The single point urban interchange design concentrates all interchange vehicle-turning movements into one location above the freeway. It is designed to accommodate connectivity over the freeway for vehicles, bicycles, and pedestrians. For bicyclists and pedestrians, the common impact for all Build scenarios is improved connectivity across the interstate. However, no provision is made for north-south movements for bicyclists and pedestrians across the interchange. Pedestrians walking over the interchange are intended to cross on one side or the other of the interchange. Pedestrians walking through the project area can safely cross the roadway at signalized intersections at Barnett Road or Center Drive.

Both Build Alternatives would increase the width of Barnett Road. Although the roadway would be enhanced by signals at intersections, the increased width is likely to increase the difficulty of pedestrian crossing.

The project proposes a shared pedestrian/bike way along Barnett Road east of I-5 (see Figure 2-1). This space may not be adequate to safely accommodate bicyclists and pedestrians. Also, inadequate sidewalks and bike paths on Highland Drive and on Highway 99 could create safety issues (see Figs. 2-1 and 2-2).

Part of this project would be the construction or reconstruction of a small bridge serving a multipurpose path that connects the Bear Creek Greenway Trail (multipurpose path) to development west of Bear Creek. Alternatives to the planned location need to be explored. At this location, the bridge cannot both be protected from flooding and meet American Disabilities Act design requirements. The path, which travels under the I-5 bridges, would have too steep a climb before going over Bear Creek at the planned bridge location.

Freight

The Build Alternatives would improve the geometrics of the interchange and connecting streets, thereby enhancing flow of freight. Minor variations in truck routing would result from the relocated interchange.

Transit Facilities

The Build Alternatives are nearly identical from a transit viewpoint. Impacts to transit facilities and systems serving the transportation-disadvantaged are minimal. Existing transit routes do not use the interchange to access the interstate or to access either side of the interstate. Two routes from the *RTP* preferred service transit plan identify using the interchange to provide access across the interstate.

Transportation Safety

The Build Alternatives would alleviate congestion and make design and operational improvements that are likely to reduce accident rates. Examples include:

- Elimination of back-ups at on-ramps onto I-5 reduce the likelihood of rear end collisions.
- Elimination of the short weave distance between Stewart Avenue and the southbound I-5 on-ramp.
- Reduction in the number of conflict points in the high traffic areas through access control.
- Elimination of local intersections and driveways that would conflict with interchange ramp function.

Construction Impacts

Construction impacts to transportation would be relatively low for both Build Alternatives since the existing interchange could continue to function until the new interchange is built. A final design would include measures to maintain reasonable access to and from the interstate with detours and temporary paved surfaces until construction is complete. The construction traffic access plan would comply with uniform work zone traffic control standards and guidelines as set forth in Part VI of the *Manual on Uniform Traffic Control Devices.*

### *Highland (Preferred) Alternative*

The existing interchange would be replaced by the single-point urban interchange and streets that would connect the new interchange with the Highland Drive/Barnett Road intersection (the Highland Connector) and with the existing Highway 99/Belknap Road intersection (the Highway 99 Connector). Highland Drive at Barnett Road would become a four-leg intersection by adding the approach for the interchange.

Adding a fourth leg to the intersection at Barnett Road and Highland Drive would increase traveling options for vehicles with destinations from the interstate to Siskiyou Boulevard via Highland Drive. Year 2030 No-Build traffic on the north leg traveling north from Barnett Road is projected to be 577 vehicles during the peak hour. The year 2030 Highland Alternative traffic model predicts that about 400 additional vehicles would travel northbound on this link during the peak hour. Most of this is local traffic. Interchange-related traffic would travel through the neighborhood for the No-Build scenario, but with a more direct link provided by the Highland Drive connector to the interchange, traffic would use Siskiyou Boulevard east of Highland Drive rather than Barnett Road east of Highland Drive.

Effects on Traffic Operations

The efficiency of intersections under the Highland Alternative is shown in Table 4-2. The table shows the Highland Alternative would meet needed performance standards and solve the congestion problems associated with the No-Build Alternative. Compared to the Ellendale Alternative, the model shows that the Highland Alternative

would have slightly lower reductions in congestion at the following intersections:

- Barnett Road/Stewart Avenue
- Barnett Road/Highland Drive
- Highway 99 Connector(existing Belknap)/Center Drive

Effects on Transit Facilities

The *RTP* lists two plans for transit in South Medford. Neither plan features access to the interstate. The new connectors proposed for the Highland Alternative would provide an opportunity for bus routes to be located from Highway 99 south of Stewart Avenue to Barnett Road east of Alba Drive.

Effects on Bicycle and Pedestrian Safety

Pedestrians may find it more difficult to cross Highland Drive between the signalized intersections at Barnett Road and Siskiyou Boulevard because of increased traffic. Peak hour traffic volume on this section of Highland Drive could increase as much as 70 percent by 2030 compared to the No-Build Alternative.

### *Ellendale Alternative*

The Ellendale Alternative would replace the current interchange with a new interchange to the south connecting to the existing Belknap Road/Highway 99 intersection west of I-5 (the Highway 99 Connector), and to Ellendale Drive east of I-5 (the Ellendale Connector).

Ellendale Drive at Barnett Road is currently a four-leg intersection. The south leg, where the new interchange would be connected to Highway 99 at Garfield Street, is currently serving the Rogue Valley Manor and terminates a short distance south of the existing Manor entrance. The access to the Manor would be moved to the relocated Rogue Valley Manor Drive shown on Figure 4 in the DEIS Summary. The new entrance at Ellendale Drive would not have a signal and it would only allow right turns in and out.

Effects on Traffic Operations

The efficiency of intersections under the Ellendale Alternative is shown in Table 4-2.

Due to access management requirements, the current connections between Ellendale Drive and Hobert and Halsey streets and Rogue Valley Manor Drive would be closed. Access to Ellendale Drive would be achieved via a relocation of Rogue Valley Manor Drive. This would result in out-of-direction travel for residents along Hobert and Halsey Streets. The rest of the street system would remain unchanged. Ellendale Drive north of Barnett Road may include additional interchange traffic, despite the lack of direct connectivity to other streets.

North of Barnett Road, Ellendale Drive enters a residential neighborhood with relatively low-volume traffic. Traffic volumes on Ellendale Drive north of Barnett Road could increase since vehicles going to or coming from the new interchange might use this network of residential streets rather than streets such as Barnett Road, Highland Drive or Black Oak Drive.

Transit Facilities

The *RTP* lists two plans for transit in South Medford. Neither plan features access to the interstate. The new connector proposed for the Ellendale Alternative would provide an opportunity for bus routes from Highway 99 south of Stewart Avenue to Barnett Road east of Highland Drive.

Effects on Bicycle and Pedestrian Safety

Pedestrians would be unable to cross Ellendale Drive between the interchange and Barnett Road because there would be no intervening crosswalks. Peak hour traffic volume on this section of Ellendale Drive are projected to be nearly five times volumes under the No-Build Alternative by 2030, about 2,200 vehicles versus 450 vehicles.

## Land Use

### *No-Build Alternative*

The impacts of the No-Build Alternative were altered following a recent decision by the Oregon Transportation Commission to relax mobility standards at the I-5/Barnett Road interchange and the intersection at Stewart Avenue and Highway 99. The alternative mobility standard allows congestion to exceed the statewide mobility standard at these locations. Without this change, development in South Medford would have been limited to those having very limited or no adverse impact on these intersections. As a consequence, little new development would have been expected in South Medford, continuing a trend that has persisted for the past several years.

With the relaxation of mobility standards, the *Southeast Medford Plan*, which could have as much as a 10-year build-out, would be as likely to develop under the No-Build Alternative as with the Build Alternatives.

The alternative mobility standards are scheduled to expire if the project is built, or in 2020, whichever comes first. If the interchange is not constructed, the I-5/ Barnett Road Interchange and the Highway 99/Stewart Avenue intersection would exceed the original *Oregon Highway Plan* mobility standards. At that time, unless the South Medford Interchange project has been constructed, development having an impact on the interchange and development subject to the *RTP* would no longer be permitted.

### *Consequences Common to Both Build Alternatives*

Consistency with Land Use Plans

The project is consistent with all relevant land use plans, with the following exceptions.

The project area is within Medford's Urban Growth Boundary. Medford's *Comprehensive Plan* is the controlling land use document for the project. Both Build Alternatives would complement the *Comprehensive Plan*'s long-range land uses. The designs for this project meet land use and transportation demands forecast for 2030, based on the *Comprehensive Plan* designations. The only exception is that the Build Alternatives would convert existing public park land to street functions.

Both the Highland and Ellendale alternatives may require amendments to Medford's Street Classification Map.

A conditional use permit for a street improvement within a riparian area would be required for either Build Alternative.

Because several of the properties lying west of Interstate-5 in the project area are unincorporated, they would be subject to city and county urbanization policies regarding division of the property.

The project would create new parcels and add new travel lanes. Consequently, under Jackson County's Land Development Code, a partition or subdivision and a conditional

use permit would be required in advance of land purchases.

The *RTP* includes a project that would widen the Barnett Bridge over I-5 and modify the interchange. The *RTP* project would not reconstruct the Barnett Interchange, but would move the interchange south. To determine whether the current project is consistent with the *RTP*, traffic and air quality modeling would need to be updated. The Record of Decision (ROD) for the FEIS would be approved by the Federal Highway Administration (FHWA) after the Regional Plan's project list was amended to accommodate the selected Build Alternative.

Direct Impacts

The Build Alternatives would have the effect of splitting existing parcels under a single ownership into non-contiguous properties and potentially adversely affecting their potential for a large, single-use development. The specific impact of each alternative varies.

Both Build Alternatives would require construction of proposed roadway facilities over a sanitary sewer main trunk line that generally parallels and is in close proximity to Bear Creek in the project area. Relocation of power lines or other impacts to utilities are probable and would need to be coordinated with utility companies as design proceeds.

Indirect Impacts

The project's access management would limit access to new businesses along the length of the connectors. The limited type and level of access available could influence the type of businesses that might locate in this area, but businesses developing in this area would be able to take full advantage of the exposure afforded by their location near an interchange. Signage, building design and exterior color, and lighting all contribute to business visibility and exposure. Businesses that currently enjoy that exposure at the existing interchange would lose that advantage. The larger the building and thereby the more signage permitted under the City code, the less impact the interchange relocation would have.

The expectation that commercial development would likely occur in the future along the connecting roadway is corroborated in a document entitled *South Medford Interchange Project Alternatives & Solutions, Land Use Charrette Summary Report*, July 2000. The "Regional Center" and "Mixed Use" land use scenarios described in the report include additional commercial development adjacent to the new connecting street west of I-5. Only the "Protection" scenario excluded commercial development from this area, but, nonetheless, included a large mixed-use area (both commercial and residential uses) in the same vicinity. The "Consolidated Scenario" developed by the South Medford Interchange Solution Team's Land Use sub-team included additional commercial development adjacent to the new connecting street west of I-5, as well as mixed use areas on both sides of the freeway. Because of the access control expected on the connector streets, access to this potential commercial development would have to be obtained from local street systems.

Both Build Alternatives would maintain the continuity of the Bear Creek Greenway trail/multipurpose path and provide connections to the local street network in the project vicinity. Adverse impacts associated with both Build Alternatives would be primarily related to highway noise and

visual impacts to land uses. These impacts currently occur along much of the path's length in the Medford / Central Point area. The opportunity for relatively higher business exposure afforded at the new interchange would create pressure for commercial development along the length of the new connector. The majority of this area is planned for urban residential uses. *Comprehensive Plan* and zone changes to permit commercial uses would be expected. This is especially true on lands south of the existing South Gateway Center, east of Highway 99 and west of I-5.

Low intensity commercial, service, or office uses near the project's intersections with Highway 99 and Barnett Road would likely undergo redevelopment to more intensive commercial uses. An intensification of commercial uses could increase travel demands and lead to higher levels of congestion within the interchange area.

### *Highland (Preferred) Alternative*

Consistency with Land Use Plans

The Highland Alternative could affect the classification of that portion of Highland Drive north from Barnett Road to Siskiyou Boulevard. It is currently classified as a collector street. Year 2030 forecast traffic volumes on this street segment are forecast to exceed the typical thresholds for collector streets.

Direct Impacts

Table 4-3 itemizes the direct impacts of the project's primary and buffered footprints (i.e., including the 3-meter [10-foot] buffer) by Medford and Jackson County *Comprehensive Plan* and land use zone designations. The largest impact would occur on lands plan-designated for urban residential uses. The approximately 2.7 hectares (6.6 acres) of directly impacted urban residential plan-designated lands is predominately zoned for "Rural Residential – 5." Two-thirds of the directly impacted commercial lands are zoned "Regional Commercial."

The Highland Alternative would occupy small sections of four existing streets' rights-of-way: Barnett Road, Highland Drive, Belknap Road, and Center Drive. Included in this footprint are buildings in two apartment complexes that would be affected by the project under the worst case scenario. Under the worst case scenario, if the buildings need to be removed, they would likely be replaced with commercial development. Medford's long-range planning includes commercial uses to the east of the property along Barnett Road and immediately across it to the south.

The Highland Alternative would infringe upon park lands on the east and south sides of Bear Creek. Impacts to the park land are discussed in the *Draft Section 4(f) Evaluation* included in this report.

After crossing Bear Creek and I-5, the Highland 99 connector would pass through largely undeveloped lands until reaching Highway 99. In the process, the project would create an approximately 1.8-hectare (4.42-acre) parcel, located to the north of the project, and south and east of the RRRink, that would be without access to a public street. Without access the property would probably be developable only in conjunction with adjoining property within the South Gateway Center.

The Medford Urban Renewal site fronting on Center Drive would be divided into four parcels.

**Table 4-3**
**HIGHLAND DIRECT IMPACTS**

| City of Medford Plan Designation | Jackson County and Medford Zoning Designation | Primary Footprint Impact Area Hectares (Acres) * | Buffered Footprint Impact Area (includes 3-meter buffer) Hectares (Acres) * |
|---|---|---|---|
| Commercial | | 1.3 (3.1) | 1.9 (4.6) |
| | Service/Professional | 0.0 (0.0) | 0.0 (0.0) |
| | Neighborhood Comm. | 0.0 (0.0) | 0.2 (0.1) |
| | Regional Comm. | 1.2 (3.1) | 1.7 (4.3) |
| | General Comm (JC) | 0.0 (0.0) | 0.1 (0.1) |
| | Rural Residential – 5 | 0.0 (0.0) | 0.0 (0.0) |
| | General Industrial | 0.0 (0.0) | 0.0 (0.0) |
| Service Commercial | | 0.6 (1.5) | 0.7 (1.8) |
| | Service/Professional | 0.6 (1.4) | 0.7 (1.7) |
| | Neighborhood Comm. | 0.0 (0.0) | 0.0 (0.0) |
| | Multi-Family – 30 | 0.0 (0.0) | 0.0 (0.0) |
| Urban High Density Residential | | 0.1 (0.3) | 0.2 (0.5) |
| | Community Comm. | 0.0 (0.0) | 0.0 (0.0) |
| | Service/Professional | 0.1 (0.2) | 0.1 (0.3) |
| | Multi-Family – 30 | 0.0 (0.0) | 0.1 (0.2) |
| Urban Residential | | 2.7 (6.6) | 3.0 (7.4) |
| | Service/Professional | 0.1 (0.2) | 0.1 (0.2) |
| | Regional Comm. | 0.4 (0.9) | 0.4 (1.0) |
| | Single Family – 10 | 0.7 (1.6) | 0.8 (1.9) |
| | Rural Residential – 5 | 1.6 (3.9) | 1.7 (4.3) |
| Parks & Schools | | 0.8 (2.0) | 1.1 (2.7) |
| | Neighborhood Comm. | 0.0 (0.0) | 0.0 (0.0) |
| | Regional Comm. | 0.0 (0.0) | 0.0 (0.0) |
| | Single Family – 4/PD | 0.0 (0.0) | 0.0 (0.0) |
| | Single Family – 6 | 0.0 (0.0) | 0.1 (0.1) |
| | Single Family – 10 | 0.3 (0.9) | 0.4 (1.0) |
| | Multi-Family – 30 | 0.1 (0.3) | 0.1 (0.4) |
| | Rural Residential – 5 | 0.3 (0.8) | 0.4 (1.0) |
| **Total** | | **5.5 (13.5)** | **6.9 (17.0)** |

* Totals may not sum due to rounding.

The alternative would compromise access to lands located south of the Highway 99 Connector that are plan-designated for urban residential uses. The two tracts total approximately 7.5 hectares (18.4 acres) and currently derive access from the unimproved section of Belknap Road. The alternative would provide driveway access to the most westerly property, but would not provide access to the easterly one. At the city's highest urban residential zoning density, approximately 184 dwellings could be developed on these properties in the future.

Indirect Impacts

Land on both sides of Barnett Road and east of the new intersection with the Highland Connector, excluding the apartment located on the northeast corner of the intersection, are currently planned for Service Commercial and zoned Commercial—Service Professional Office. The accessibility and exposure afforded these properties by the relocated interchange would likely lead to increasing pressure for a wider array of commercial uses.

Under the No-Build Alternative, the portion of Highland Drive north of Barnett Road is forecast to experience an 85 percent increase in bi-directional peak-hour traffic between 2000 and 2030 (1,793 vehicles per hour compared to 970). If the Highland Alternative is built, by 2030 this segment would experience an additional 407 more vehicles per hour. This increased volume, when coupled with growth in east-west traffic on Siskiyou Boulevard, could potentially improve the success of businesses located on the northwest corner of Siskiyou Boulevard and Highland Drive and lead to further development on vacant land at this location. Medford's "Neighborhood Commercial" designation would not be expected to change, but the intensity of commercial uses at this location (consistent with city zoning and development standards) would likely increase.

### *Ellendale Alternative*

Consistency with Land Use Plans

Medford's *Transportation System Plan* is scheduled for adoption in advance of the construction of the proposed project. While the general alignment of the Highland Alternative is shown on the city's Street Classification Map, the Ellendale Alternative is not. This alternative would be subject to the application, review and public hearing process for revisions if it is selected.

The Ellendale Alternative may require the amendment of the City's Street Classification Map to designate Ellendale Drive south of Barnett Road as an arterial street. It is currently classified as a collector street from its intersection with Barnett Road to just south of Hobart Street. From that point south it is classified as a standard residential street.

The only area in which the project might conflict with statewide land use planning rules would be under Goal 10-Housing. The Ellendale Alternative, which could displace low-income senior residents, would require mitigation for compliance.

Direct Impacts

Table 4-4 itemizes the potential direct impacts that would occur under the Ellendale Alternative's primary and buffered footprints, by City of Medford and Jackson County *Comprehensive Plan* and land use zone designations. The largest impact of the alternative would occur on lands plan-designated for urban residential uses. The

approximate 5.9 hectares (14.5 acres) of directly impacted urban residential plan-designated lands (included in the project's buffered footprint) is largely within two zoning districts, Jackson County "Rural Residential – 5" and City of Medford "Single Family – 4PD." Two-thirds of the directly impacted commercial lands are zoned "Regional Commercial." The Ellendale Alternative would use all of the existing Ellendale Drive right-of-way south of Barnett Road and short segments of the Barnett Road, Belknap Road and Center Drive rights-of-way. The alternative crosses Larson Creek. Lying to the east are several large apartment buildings and one of these buildings would be removed to provide a connection between Rogue Valley Manor Drive and the Ellendale Connector. West of Ellendale Drive, the Rogue Valley Manor proposes to develop its land. The alternative's footprint and buffer would affect only lands immediately adjacent to the existing Ellendale Drive right-of-way. The greater impact on the proposed development would occur as a result of the projects access control that would limit access to the Ellendale Connector to specific locations.

The proposed connection between Rogue Valley Manor Drive and the Ellendale Connector also would be located along much of the western boundary of the Quail Point Golf Course's first fairway (Photo 7). The new roadway could affect the width of the first fairway and require safety netting in the area.

Further south, the Ellendale Alternative would enter a residential area with single-family dwellings on the east and a mobile/manufactured home park on the west. Seven dwellings (eight within the buffered footprint) would be removed from the mobile/manufactured home park. The Rogue Valley Manor's maintenance structure that lies east of Ellendale Drive also may be removed.

Proceeding further south and before reaching I-5, the Ellendale Alternative would require land at the southern end of the Quail Point Golf Course's driving range. This would displace the range. Redevelopment for residential use could follow and would be consistent with Medford's Plan and Zone designation for this parcel. The city's planned development ordinance, which the Rogue Valley Manor has used elsewhere and proposes to use on lands west of Ellendale Drive, allows uses that would not otherwise be permitted by the underlying zoning district. Forecasting future land uses under these circumstances is difficult.

The alternative's northbound on-ramp at its merger with I-5 would have a slight impact on publicly owned recreation land (See the 4(f) Evaluation for discussion).

On the west side of the Interstate, the project would use largely undeveloped land until reaching the intersection at Highway 99. The Medford Urban Renewal site fronting on Center Drive would be divided into three parcels under the Ellendale Alternative. The resulting parcel would no longer be suitable for a single, large-scale retailer. However, the largest of the three parcels could be linked with an adjacent Medford Urban Renewal property to make a larger property.

Indirect Impacts

There are no unique indirect impacts associated with the Ellendale Alternative.

**Table 4-4**
**ELLENDALE DIRECT IMPACTS**

| City of Medford Plan Designation | Jackson County and Medford Zoning Designation | Primary Impact Area Hectares (Acres) * | Buffered Footprint Impact Area (includes 3-meter buffer) Hectares (Acres) * |
|---|---|---|---|
| Commercial | | 1.1 (2.6) | 1.7 (4.3) |
| | Community Comm. | 0.3 (0.8) | 0.4 (1.1) |
| | Regional Comm. | 0.7 (1.7) | 1.2 (2.9) |
| | General Comm (JC) | 0.0 (0.0) | 0.1 (0.1) |
| | Service/Professional | 0.0 (0.0) | 0.0 (0.0) |
| | General Industrial | 0.0 (0.0) | 0.0 (0.0) |
| | Rural Residential – 5 | 0.0 (0.0) | 0.0 (0.0) |
| Service Commercial | | 0.0 (0.0) | 0.1 (0.2) |
| | Service/Professional | 0.0 (0.0) | 0.1 (0.2) |
| | Community Comm. | 0.0 (0.0) | 0.0 (0.0) |
| Urban High Density Residential | | 0.3 (0.7) | 0.4 (1.0) |
| | Community Comm. | 0.2 (0.5) | 0.3 (0.7) |
| | Service/Professional | 0.1 (0.1) | 0.1 (0.2) |
| | Multi-Family – 20 | 0.0 (0.0) | 0.1 (0.1) |
| | Multi-Family – 30 | 0.0 (0.0) | 0.0 (0.0) |
| Urban Residential | | 4.6 (11.4) | 5.9 (14.5) |
| | Community Comm. | 0.1 (0.1) | 0.1 (0.2) |
| | Regional Comm. | 0.1 (0.3) | 0.1 (0.4) |
| | Single Family – 10 | 0.8 (1.9) | 1.0 (2.4) |
| | Single Family – 6 | 0.0 (0.0) | 0.0 (0.0) |
| | Single Family – 4 | 0.1 (0.3) | 0.2 (0.6) |
| | Single Family – 4/PD | 1.8 (4.5) | 2.4 (6.02) |
| | Rural Residential – 5 | 1.8 (4.4) | 2.0 (5.0) |
| Parks & Schools | | 0.4 (0.9) | 0.4 (1.0) |
| | Regional Comm. | 0.0 (0.0) | 0.0 (0.0) |
| | Single Family – 4/PD | 0.0 (0.0) | 0.0 (0.0) |
| | Rural Residential – 5 | 0.3 (0.9) | 0.4 (1.0) |
| **Total** | | **6.3 (15.6)** | **8.5 (21.1)** |

* Totals may not sum due to rounding.

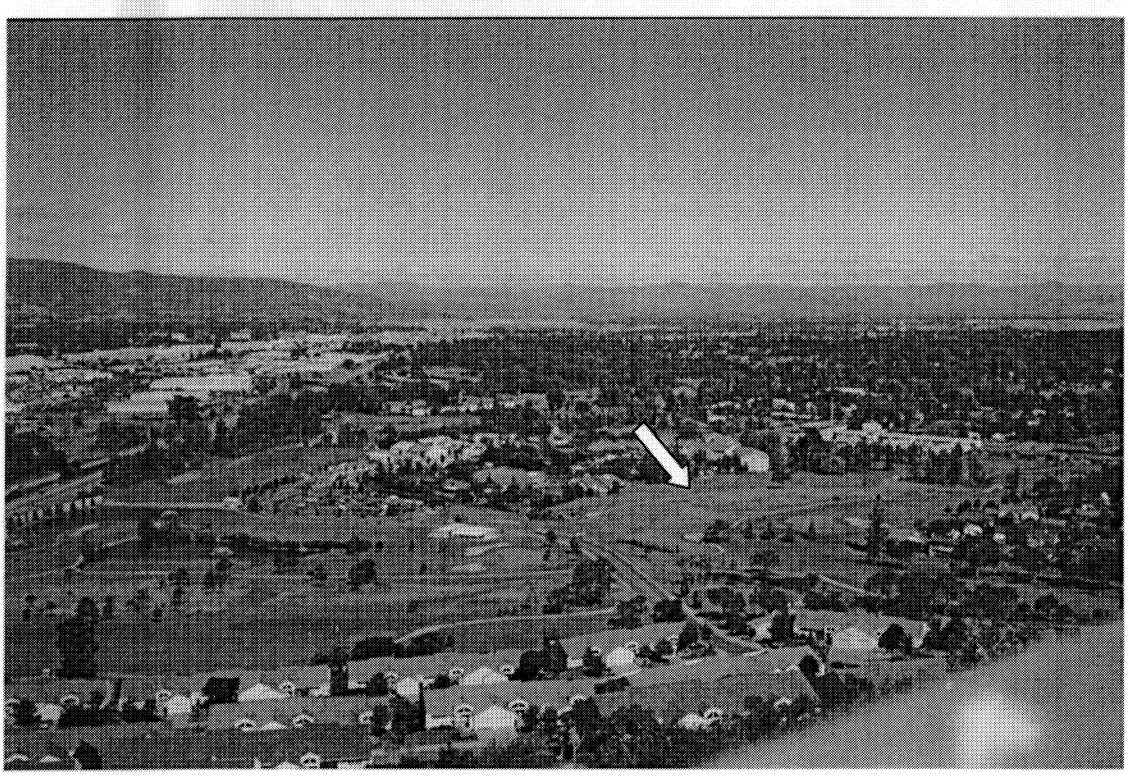


**Photo 7. Quail Point Golf Course: arrow points to first fairway.**

## Rights-of-Way and Relocation

### *No-Build Alternative*

No impacts are indicated, as there would be no change from current conditions.

### *Affected Properties*

Table 4-5 identifies potential impacts of the Build alternatives, which include partial or complete displacements of the affected building. The address information is based on tax lot address, not site address.

### *Highland Alternative*

Residential Displacements

The Highland Alternative would displace one residence under the primary footprint. Under a worst-case scenario (using the buffered footprint), a commercially zoned residence on Barnett would be displaced as well as up to an estimated 20 to 30 units in two apartment complexes located on Highland Drive north of Barnett Road.

The housing market is large enough that those relocated due to the Highland Alternative could be reabsorbed over the two-year acquisition period. The extent of these impacts under the buffered footprint would depend on the amount of area within it that would be required for project improvements as they relate to the layout and construction of the apartment complexes.

## Table 4-5
## RIGHTS-OF-WAY – AFFECTED PROPERTIES

| **Highland Alternative**<br>**Partial or Complete Displacements** | | | | |
|---|---|---|---|---|
| **Name** | **Use** | **Tax Lot Address** | **Primary Footprint** | **Buffered Footprint** |
| Four Seasons | Apartments | 747 Highland Dr. | | X |
| Highlander | Apartments | 851 Highland Dr. | | X |
| Party Place | Retail Store | 1600 E. Barnett Rd. | X | X |
| | Residence | 1510 E. Barnett Rd. | | X |
| State Farm Claims | Office complex | 1408 E. Barnett Rd. | | X |
| | Residence | 1300 E. Barnett Rd. | X | X |
| Harrison Inn | Motel | 1200 E. Barnett Rd. | X | X |
| Shell | Gas station | 1100 E. Barnett Rd. | | X |
| Les Schwab | Tire store | 2121 S. Pacific Hwy. | X | X |
| **Ellendale Alternative**<br>**Partial or Complete Displacements** | | | | |
| Coreen's Flowers & Gifts | Retail store | 1840 E. Barnett Rd. | | X |
| School House<br>Hair Flair<br>Multinet Info Systems | Four (4) businesses | 1804 E. Barnett Rd. | X | X |
| RV Manor Business Office | Office complex | 1085 Ellendale Dr. | X | X |
| Quail Ridge Retirement Community | 60-unit HUD low income elderly housing apartments | 1081 Ellendale Dr. | X | X |
| Woodcreek | Apartments | 800 Ellendale Dr. | | X |
| Christopher Morgan, M.D./Lori Morgan, M.D.<br>RVM Community Service Center | Doctor's Office and Social Hall | 1700 E. Barnett Rd. | X | X |
| Tamara Abbott, Dentist | Office complex | 960 Ellendale Dr. | X | X |
| Party Place | Retail store | 1600 E. Barnett Rd. | X | X |
| | Residence | 1510 E. Barnett Rd. | X | X |
| | Apartment | 1601 E. Barnett Rd. | | X |
| Crest Imperial Estates | Mobile home park | 1090 Ellendale Dr. | X | X |
| Quail Point Golf Course | Golf / Maintenance | 1100 Ellendale Dr. | | X |
| Quail Point Golf Course | Golf course | 1200 Mira Mar Ave. | X | X |
| Les Schwab | Tire store | 2121 S. Pacific Hwy. | | X |

**Table 4-5 (continued)**
**RIGHTS-OF-WAY – AFFECTED PROPERTIES**

| Directly Impacted Properties | | | | |
|---|---|---|---|---|
| Alternative | Areas Acquired | | Right-of-Way Costs | |
| | Primary Footprint | Buffered Footprint | Primary Footprint | Buffered Footprint |
| Highland | 46,339 $m^2$<br>498,801 sq. ft. | 55,625 $m^2$<br>598,653 sq. ft. | $5,232,300 | $9,628,900 |
| Ellendale | 69,614 $m^2$<br>749,342 sq. ft. | 92,679 $m^2$<br>1,008,282 sq. ft. | $10,547,000 | $14,370,000 |

***Ellendale Alternative***

The Ellendale Alternative would result in the largest number of residential and commercial displacements.

Residential Displacements

The Ellendale alternative would displace at least 71 residences, mostly in one senior housing center east of Ellendale Drive. Under the worst-case (buffered footprint) scenario, up to an additional 13 residences would be displaced, for a total of 84.

The Ellendale Alternative would impact mainly residential rental properties, except where the mobile home park would be affected. Typically the mobile home pad sites are rented, and the mobile or manufactured home is owner occupied. However, the mobile or manufactured home can also be rented.

The greatest potential residential displacement impact of the Ellendale Alternative would be to a 60-unit HUD affordable housing complex for the elderly. The complex is relatively new and would be expensive to replace (conservatively over $2 to 3 million). Relocation for the senior adults occupying the complex would be extremely difficult due to the lack of similar replacement facilities within the Medford area.

It is doubtful that the market could absorb additional households in less than a 2-year period. There is generally a waiting list for this type of housing and multiple requests at the same time compounds the placement problem.

The single-wide mobile homes potentially displaced under the Ellendale Alternative would not be difficult to relocate. The housing market should be able to accommodate the mobile home occupants under normal market conditions.

Business Displacements

Construction of the Ellendale Alternative would displace ten businesses as listed on Table 4-5. Under a worst-case scenario (using the buffered footprint) an additional three businesses would be displaced.

## Socioeconomics

### *No-Build Alternative*

Right of Way Acquisition and Relocation Effects

With the No-Build Alternative, no property would be acquired and no right-of-way or relocation efforts would be necessary.

Changes in Neighborhood or Community Cohesion

No changes in roadway configuration or maintenance are anticipated. Therefore, there would be no direct effect expected over the short-term. No specific longer-term indirect effects on neighborhood or community cohesion have been identified.

Effects on Community Facilities

As congestion builds over time on Barnett Road, fire, police, and emergency vehicles could face increasing difficulty in providing service, especially during peak hour traffic.

Effects on the Economy

No direct or immediate effects are expected, as this alternative involves no changes from current conditions. Indirect effects on the local economy are related to increasing congestion along Barnett Road that reduces accessibility to businesses on this street (particularly west of I-5), Stewart Avenue, Riverside Avenue at Stewart Avenue and into downtown, and at Alba Drive and Highland Drive intersections with Barnett Road.

Longer-term indirect effects on the regional economy relate to Medford's ability to continue to function as a regional hub and tourism, recreation, and retail center. To the extent that Medford is perceived as a less desirable place to visit, do business, or shop, these roles could be diminished.

Effects on Businesses

No direct effects are expected as this alternative largely reflects continuation of current conditions. Minor system improvements, such as signalization improvements, lane re-striping, and removal of on-street parking where appropriate may be accomplished as part of the City's routine maintenance and development review processes.

Indirect effects could include decreased accessibility to businesses on Barnett Road (particularly west of I-5), Stewart Avenue, Riverside Avenue at Stewart Avenue into downtown, and Alba Drive and Highland Drive intersections with Barnett Road due to increasing traffic congestion. Businesses could be vulnerable if they are perceived as less convenient or accessible and if they have competition elsewhere in the Medford area.

No direct effects are expected as this alternative largely reflects continuation of current conditions. Indirect long-term effects could include a declining competitive position for businesses on Barnett Road (particularly west of I-5), Stewart Avenue, Riverside Avenue at Stewart Avenue and into downtown, and at Alba Drive and Highland Drive intersections with Barnett Road due to increasing traffic congestion. Businesses there could be vulnerable if they are perceived as less convenient or accessible and if they have competition elsewhere in the Medford area and Jackson County.

Other Employment Effects

No construction expenditures would occur under the No-Build Alternative so no direct

employment effects are expected. Indirect effects could include reduced levels of employment growth if Medford is perceived as less desirable for additional development as roadway congestion increases.

### *Consequences Common to Both Build Alternatives*

Changes in Neighborhood Cohesion

Among possible beneficial effects are reduced congestion, improved overall accessibility, and improvements in safety for local and non-local vehicular traffic. Potential adverse effects include disruption of existing travel and accessibility patterns and increased noise, which would adversely affect neighborhood cohesion.

Effects on Community Facilities

Community facilities located on or near Barnett Road, Highland Drive, and Ellendale Drive are likely to be affected by project alternatives. These include Bear Creek Park and Greenway, a school bus stop on Ellendale Drive, and Rogue Valley Medical Center. Bear Creek Park operates as both a neighborhood and regional facility. Features include a playground, outdoor in-line hockey arena, baseball/softball fields, a BMX track, a large public skateboard park, and an off-leash area for dogs.

Other indirect effects may include:

- Increased ability for fire, police, and emergency vehicles to provide service to the South Medford area compared to the No-Build Alternative (occurs for different traffic directions at different times of day).
- Improved access (safer and less congested) between the interstate and Rogue Valley Medical Center.

Effects on the Economy

Direct economic effects of the Build Alternatives would include beneficial short-term income and employment effects and increased accessibility to business and residential areas around the existing interchange overpass which would be otherwise impacted by congestion.

Short-term income effects from construction of the new roadway would include:

- Direct added income associated with new highway and construction jobs.
- Indirect added income from jobs created in industries supplying goods and services to the highway and construction firms.
- Induced income resulting from additional purchases made by the households receiving the new direct and indirect income benefits.

The estimate of income effects is based on ratios provided by the Minnesota IMPLAN Group, Inc. (MIG), a nationally-recognized input-output model designed to estimate economic impacts. It is estimated that, within Jackson County, approximately $446,500 of new personal income is generated per $1 million of highway construction spending. The estimated cost of construction of the South Medford Interchange project is approximately $42.7 to $47.1 million for the Highland Alternative and $55.7 to $57.2 million for the Ellendale Alternative. Between direct, indirect, and induced effects, a total of $19.6 million of added personal income might be generated from construction spending on the Highland Alternative, or $25.5 million from construction spending on the Ellendale Alternative. Regardless of the alternative selected, these income effects could be expected to dissipate relatively quickly following the end of the construction period.

Indirect effects could include stimulating development in the vicinity of the new roadways. In particular, development could be expected at new major intersections, such as Ellendale Connector/Dyer Road, the Ellendale or Highland connectors at Barnett Road, and the western terminus of the Highway 99 Connector (at current Belknap Road and Highway 99), and in the vicinity of the relocated Center Drive and its potential future extension to the south.

Other effects could include continued/ increased perception of Medford as a desirable place to live and do business, thus attracting additional residential, commercial, and industrial development.
The net cumulative economic effect for the local and regional economies would depend on a variety of influences, including local and regional land use and growth management policies, land availability, and infrastructure capacity.

Effects on Businesses

Table 4-6 lists examples of affected business types. Effects on existing or potential interstate-related businesses associated with the Build Alternatives, beyond displacement through property acquisition (identified in the *Displacements* section), results primarily from changes in travel patterns and access, improved safety, reduced congestion, and segmentation of vacant land parcels.

For both alternatives, direct effects, such as changes in travel patterns for both local and pass-through traffic, improved safety, and reduced congestion, could affect businesses located on Stewart Avenue, Center Drive, Belknap Road, and Barnett Road on both sides of the highway.

The precise economic effects of these changes on businesses can be quite difficult to estimate in advance and may vary widely, depending on the specifics of the individual business situation. The effects may depend (in part) on the reliance of individual firms on pass-through traffic, as opposed to being relatively more destination-oriented, in addition to several other business factors (e.g., proximity of competitors, market demand trends, types of merchandise).

In order to frame the discussion of effects of the proposed Build Alternatives on existing or potential highway-related businesses an overview of examples of businesses, that typically rely on different customer types is provided.

**Table 4-6**
**EXAMPLES OF BUSINESSES BY CUSTOMER TYPES**

| Destination | Pass-Through | Mixed |
|---|---|---|
| • Health services<br>• Building materials & hardware<br>• Furniture stores<br>• Auto dealers<br>• Department/variety/ pharmacy | • Fast food<br>• Gasoline service stations<br>• Mini mart/service stations | • Grocery stores<br>• Specialty shops<br>• Banks<br>• Personal services<br>• Restaurants<br>• Convenience store<br>• Motels/Inns |

Source: E.D. Hovee & Company, September 1995.

National research suggests that businesses, such as health service providers, building materials and hardware, furniture stores, auto dealers, and department/variety stores tend to be destination oriented. Businesses that tend to be mixed with a combination of pass-through and destination traffic include grocery stores, specialty shops, banks, personal services, restaurants, and convenience stores. Examples of businesses typically reliant on pass-through traffic include fast food restaurants, gasoline service stations, and mini marts/service stations.

Changes in visibility, ease of access, level of service of adjacent intersections, and traffic flow affect businesses with different customer bases in different ways. To the extent that each of these elements improves or increases the net effect on a business would be positive. If all these factors were to decline (for instance a business becomes more difficult to reach, less visible, and adjacent traffic flows decline) the net effect would likely be negative. When impacts include a mix of both positive and negative factors, assessing the net affect on a business is difficult. The net result would depend on which of the differing customer bases play a stronger role.

Also, when assessing impacts to businesses, the condition of the regional and local economy and the condition of the individual business itself both play important roles. Factors such as whether the local economy is stable or there is an increasing demand for goods and services; whether there is unmet demand for the firm's product or service; and whether the business is well managed, financially stable, or is reinvesting to remain competitive and has limited competition in the local market area. Potential impacts, such as those mentioned above, would then be less important.
Economic value and marketability of the commercially zoned parcel remainders (or potential for future highway related businesses) created in the South Gateway Center area would depend, in part, upon the resulting size and shape of the new parcels together with their visibility and access.

In addition, adverse effects such as reduced roadway access and increased noise could result from the construction phase of the project. These adverse effects are likely to be greater the longer the duration of construction. However, the effect would dissipate after project completion.

Both the Highland and Ellendale Alternatives include closure of the existing I-5 off-ramps to Barnett Road. Changes in travel patterns include a decline in interchange-related traffic on Barnett Road west of I-5, and a more notable decline for Stewart Avenue between Barnett Road and Riverside Avenue, and on Center Drive.

Businesses located on Stewart Avenue between Barnett Road and Riverside Avenue and Center Drive that are dependent upon on pass-through traffic would likely experience a substantial reduction in the number of available customers. Businesses affected could include one existing fast food restaurant and the market values of remaining vacant pad sites on Center Drive also could be affected.

Businesses on Barnett Road west of I-5 that are dependent upon pass-through traffic may also experience a decline in the number of available customers, but to a lesser degree as total traffic volume appears to be less impacted (the Highland Alternative has the least impact on traffic volume). Affected

business may include two gas stations and a number of fast food restaurants. Destination retail in the South Gateway Center area is likely to benefit, as increased levels of service at the intersections with less congestion make them more accessible to the customer base. A new variety/department retailer, a variety/pharmacy/grocery combination store, furniture store, a nursery, and a destination catalog based retailer are examples of business types that could benefit.

Businesses on Barnett Road, west of I-5, Stewart Avenue between Barnett Road and Riverside Avenue, and businesses on Center Drive that rely on a mix of destination and pass-through traffic would experience varying impacts, depending on the level of reliance on pass-through traffic and general business health. These include over a dozen full service restaurants, personal services, specialty retail stores and a motel (Photo 8).

Highway-related businesses dependent on existing or potential future mixed or pass-through traffic, which would be most easily seen and accessed from the new Highway 99 Connector, would likely have increased numbers of potential customers. Existing businesses at the existing intersection of Belknap Road and Highway 99 would likely rely on a combination of destination and pass-through traffic. These two businesses (a credit union and an automotive part and service business) could benefit from the increased visibility and traffic volume and may witness pressure to convert to intensive uses.

Access Management Issues

As shown in Table 4-7, the construction of raised medians and/or closure and consolidation of existing accesses could have both beneficial and adverse effects.

The two most important factors relating to access management impacts are (a) whether the business relies primarily on destination rather than pass-through traffic; and (b) whether the business is located at an intersection with a break in the median.

Businesses located at median breaks and primarily dependent on pass-through traffic may experience little or no effect or even a positive effect from the raised median. Although a business is dependent on pass-through traffic (ordinarily a negative factor), access to the business is not restricted by the raised median (and may even be enhanced by it) because of the left-turn capability at the median break.

Similarly, businesses that are dependent on destination traffic but located mid-block may experience no effect or a positive effect from a raised median. This might occur because destination traffic is willing to travel out-of-direction in order to reach their intended place of business.

Businesses that are both dependent on pass-through traffic and located mid-block are the most likely to experience adverse effects.

Effects on Established Business Districts

Direct effects of both Build Alternatives on established business districts most likely would be limited to the WinCo and South Gateway Center area, the service commercial areas on Barnett Road in the vicinity of Ellendale Drive and the Rogue Valley Medical Center. They could include:

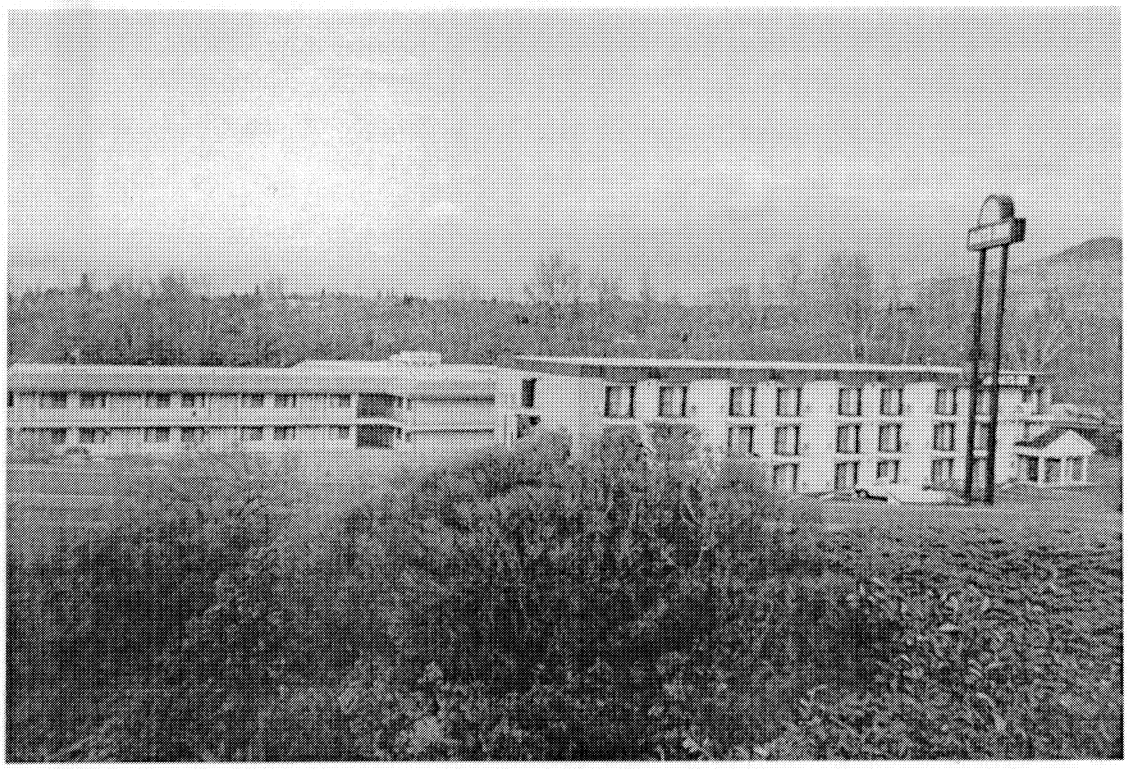


**Photo 8. One of several motels located at the South Medford Interchange.**

- Temporary adverse effects – such as reduced roadway access and construction noise – could impact businesses in the vicinity of existing Belknap Road, Center Drive, and Barnett Road at the eastside connection with the interstate connector as a result of the project's construction phase.

Indirect impacts could include:

- Improved levels of service and roadway capacity benefiting destination businesses such as the health services on Barnett Road east of I-5 and destination retailers in the South Gateway Center area. However, over time these benefits could diminish if other connectivity issues in Medford are not addressed.
- Development of destination retailers on the interior of the South Gateway Center and businesses reliant on pass-through traffic at the north and south ends of the WinCo and South Gateway Center area as a result of changes in travel patterns.

The Build Alternatives would marginally improve access to the Downtown via Riverside Avenue. Otherwise, no appreciable impacts to Downtown are expected.

Other Employment Effects

Employment impacts from construction expenditures include the direct employment effects of immediate construction hiring, as well as indirect effects. Indirect employment effects would include employment by businesses providing goods and services to

**Table 4-7**
**BUSINESS EFFECTS POTENTIALLY ASSOCIATED WITH RAISED MEDIANS**

| Factors Associated with Raised Medians: | |
|---|---|
| **Positive Factors** | **Negative Factors** |
| • Business relies primarily on destination rather than pass-through traffic.<br>• Business is located at intersection with break in median.<br>• Business is profitable prior to placement of median, with resources to weather transition in travel patterns after median.<br>• U-turns are allowed at highway intersections, allowing traffic to cycle back.<br>• Level of service (LOS) and/or traffic volume is increased as a result of raised median project.<br>• Right-in, right-out access is enhanced with highway project.<br>• A majority of customers can be served by right-in, right-out traffic.<br>• Property owners and developers cooperate to upgrade and re-orient commercial developments in tandem with highway construction.<br>• Provision is made for commercial vehicles for business pick-up and deliveries.<br>• Parking remains adequate to serve the business.<br>• Appropriate public agencies are prepared to mitigate adverse business impacts legitimately associated with median.<br>• Safety improvements/benefits | • Business relies primarily on pass-through traffic.<br>• Business is located midway between intersections, where left hand turns and crossing traffic are not allowed.<br>• Business profits are declining or marginal prior to placement of median, or with minimal financial resources to weather the transition period after median.<br>• Level of service (LOS) and/or traffic volume accommodated does not improve or declines.<br>• A majority of customers need to make a left turn to access the business.<br>• Property owners do not cooperate and are unwilling or unable to re-orient development away from strip commercial with multiple individual accesses.<br>• Access for commercial vehicles is significantly impaired.<br>• Parking is lost, and no longer adequate to meet customer and employee needs.<br>• Public agencies provide little or no assistance to mitigate or address negative business effects associated with median. |

the construction firms. It is estimated that, within Jackson County, there are 7.75 construction jobs and 4.40 jobs in other sectors of the local economy created for every $1 million of construction expenditure. Employment stimulated by additional purchases made by households occurs primarily in the retail trade and service sectors.

Effects on the Tax Base and Local Government

The direct effect of the project on the tax base and local government is based on lost revenues because private property acquired by ODOT for right-of-way would be tax exempt.

Additional residential or commercial development that would occur as an indirect impact of the proposed highway project would increase the property tax base of taxing jurisdictions – offsetting the direct losses experienced in whole or in part.

Access changes would affect businesses along Barnett Road:

- Three access driveways for the restaurant and lodging facility at the existing southwest corner of Barnett Road and Highland Drive would be

consolidated into one. Existing accesses to and from other commercial properties on Barnett Road east of I-5 would be right-in/right-out only except at median breaks.

- The existing Belknap Road access to the credit union on the north corner of the intersection of Highway 99/Belknap Road would be closed. Access to the business would be available from the rerouted Center Drive or Highway 99, via Credit Union Drive.

- The automotive parts and service business at the southeast corner of the Highway 99/Belknap Road intersection would be required to consolidate access opportunities and take all of its access off of Highway 99 (eliminating the current accesses to Belknap Road).

### *Highland (Preferred) Alternative*

Right-of-Way Acquisition

An estimated 33 tax lots and four buildings would be impacted. Real property acquisition costs (market value of land only) are estimated at roughly $9.6 million for the buffered and $5.2 million for the primary footprint. ODOT estimates the proposed project would require approximately 46,300 square meters (498,800 square feet) of purchased land for right-of-way and easement. This amount does not include excess property resulting from purchased land not used for the roadway areas.

Under a worst-case scenario (using the buffered footprint) up to 11 additional tax lots and four buildings could be impacted.

Displacements

Residential Displacements: There would be only one residential displacement associated with the primary footprint for the Highland Alternative. As a worst case scenario, the buffered footprint could result in potential displacement of one additional single-family rental residence and two multi-family apartment complexes could be impacted.

Business and Commercial Displacements: The Highland Alternative would displace three businesses, which include a retail store, a motel, and a tire store. Under a worst-case scenario, the Highland Alternative would displace an additional gasoline station business and an insurance company claims office.

Changes in Neighborhood Cohesion

The Highland Alternative could result in reduced neighborhood cohesion due to increased traffic volume on the Highland Drive side of Bear Creek Park, particularly during peak hours (For Bear Creek Park, see Figure 2). This could affect the ability of neighborhood users on the east side of the park to easily access the facility unless they travel first to a signalized intersection, thus potentially reducing accessibility for neighborhood residents to community facilities. Of particular concern would be unsupervised children and teens.

Effects on Community Facilities

The only direct effect on a community facility associated with the Build Alternatives is a small amount of property acquisition at the southeast corner of Bear Creek Park associated with roadway improvements on Barnett Road and its intersection with Highland Drive.
The residents of the one housing unit displaced under the primary footprint of the Highland Alternative were not successfully contacted despite two attempts to survey the residents. The other residential units

potentially impacted under the buffered footprint of this alternative include two apartment complexes and another single-family residence. According to the property managers for the two apartment complexes, households represent a mix of incomes, ethnicities, and ages. However, according to 1990 census data, senior citizens are represented in stronger concentrations in impacted neighborhoods than within the city as a whole.

Effects on Businesses

Based on existing zoning, commercially zoned parcel remainders west of I-5 created as a result of this alternative can be clustered together in marketable shapes/sizes with good visibility from the Garfield connector. Most of the vacant and sparsely developed residentially zoned parcels are located together on the south side of the new connector, creating an opportunity for a viable residential area.

Access would be closed off existing Belknap Road to the single commercial property east of the ice rink. Replacement access is not currently a part of proposed roadway improvements.

The Highland Alternative also results in continuing visibility, access, and traffic volume for the two highway-related business clusters on the east side of I-5 which likely rely to a large degree on pass-through traffic.

Effects of the median on Barnett Road east of I-5 would have the strongest impact on the highway-related business near the inter-state, but these impacts would be minimized by left turn capability at the Alba Drive break in the median.

Effects on the other business to the east, which all appear to rely on either destination or a mix of destination and pass-through traffic, would depend largely on the degree to which they rely on pass-through traffic.

Five property accesses off existing Belknap Road and two on Barnett Road east of I-5 would be eliminated.

Effects on the Workforce of Displaced Businesses

Three business displacements would be associated with the primary footprint for the Highland Alternative. The impacted businesses include a retail store, a probable home occupation, a landscaping business, a motel, and a tire store. Current employment at these locations is estimated to be in excess of 60 full and part-time jobs (not all businesses responded to survey attempts).

However, two of these displacements occur because the project as proposed does not appear to provide for access to the property or building in which they are located. These displacements may occur only if the businesses are unable to adapt to changes in site access. As a result, exact job relocation impacts are difficult to estimate.

Under a worst case scenario, the project could result in displacement of an additional gasoline station business and insurance claims office. For both footprints, there could be some losses in income associated with relocation. Wage rates for businesses impacted under this alternative are estimated to range from minimum wage to $13 per hour. If suitable relocation sites are not found, there is the risk of permanent job loss. However, suitable alternative sites should be available for impacted businesses that choose to relocate.

Effects on the Tax Base and Local Government

The total cost of right-of-way acquisitions (tax assessed value of land) is currently estimated at $5.2 million for the primary footprint and $9.6 million when potential buffer impacts are included. The 1998-99 combined governmental tax rate (which includes the city and county rate, school district, and other local property tax supported activities) was $14.68 per $1,000 of assessed value. Applying this rate to the assessed property value (land and improvements) of right-of-way acquisitions associated with the proposed project results in an estimated annual property tax revenue loss of between $76,000 (primary footprint) and $141,000 (with buffer).

Again, any additional residential or commercial development that occurs as a secondary or cumulative impact of the proposed highway project would increase the property tax base of the taxing jurisdictions noted – offsetting the direct losses experienced in whole or in part.

### *Ellendale Alternative*

Right of Way Acquisition

Approximately 35 tax lots and 16 buildings (including mobile homes) would be impacted. Real property acquisition costs are estimated at roughly $10.5 million.

ODOT estimates the proposed project would require approximately 69,600 square meters (749,300 square feet) of purchased land for right-of-way and easement. This amount does not include surplus property resulting from purchased land not used for the roadway areas.

Under a worst-case scenario (using the buffered footprint), up to 15 additional tax lots and six buildings could be impacted in the unlikely event that all portions of the buffered footprint were needed. Real property acquisition costs would increase by an estimated $3.9 million (to $14.4 million).

The total buffered areas of the proposed project could, in the worst-case scenario, require up to a maximum of approximately 24,100 additional square meters (258,900 square feet) of purchased land for right-of-way and easement. This amount does not include surplus property resulting from purchased land not used for the roadway areas.

Displacements

Residential Displacements: Displacement of approximately 71 residential units is associated with the primary footprint for the Ellendale Alternative as currently designed. These include seven mobile homes, 60 low-income senior apartment units and one single-family rental residence.

The buffered footprint could result in potential displacement of one other mobile home and as many as 12 multi-family rental units in two apartment complexes.

Thus, the "worst case" outcome would be a total of 84 displacements. The exact number cannot be determined until final design. Special relocation consideration may be needed for low-income senior households (Photo 9) and mobile homes displaced under the Ellendale Alternative.

Business and Commercial Displacements: The Ellendale Alternative primary footprint could result in up to ten business displacements. The potentially impacted businesses include retailers, medical,

business, and personal service providers, and possibly an automotive part and service business. One of these displacements may occur only if the business is unable to adapt to changes in site access.

In addition, the Quail Point Golf Course driving range and a building associated with the driving range would also be displaced. As a result of relocation of Rogue Valley Manor Drive, adjustments may be necessary to the first and second fairways of the golf course.

The buffered footprint could result in potential displacement of three additional businesses in the same categories as identified under the primary footprint.

Changes in Neighborhood Cohesion

Currently, the physical barriers of Barnett Road, Interstate 5, the Quail Point Golf Course and the hill beyond geographically separate the residential neighborhood on and around Ellendale Drive from other residential areas in Medford. The Ellendale Alternative would further divide this neighborhood creating two isolated areas.

Ellendale Drive north of Barnett Road may experience some increase in local residential traffic.

Access changes in the Ellendale Drive area would affect the neighborhood in several ways, as described below.

The two current Ellendale Drive driveway accesses to Crest Imperial Estates would be closed and a new access drive would extend north from Crest Imperial Estates to intersect Dyer Road.

The current accesses from Ellendale Drive to the Rogue Valley Manor's retirement community and to the Quail Point Golf Course and Halsey and Hobert Streets would be closed. A replacement street would be provided extending east from the relocated intersection of Ellendale Connector/Dyer Road, past the first green of the golf course, turning and extending south along the western boundary of the course and connecting to the existing Rogue Valley Manor Drive.

Access to and from the Ellendale Connector from the relocated Dyer Road and Rogue Valley Manor Drive would be limited to right-in/right-out access only.

Access to and from the Ellendale Connector from the Larson Creek Retirement Community and commercial office/retail properties near the intersection with Barnett Road would become right-in/right-out access only.

Effects on Community Facilities

A school bus stop originally relocated from Barnett Road to Ellendale Drive to improve safety for local children would likely need to be eliminated. Five buses transporting approximately 40 elementary students and 25 middle and high school students currently service this stop. The bus service company has indicated relocating the stop to Barnett Road is not feasible as many drivers fail to respond to the school bus safety lights.

Social Effects

All of the displaced units lie within the same residential area or neighborhood. At least 41 percent of the households in the neighborhood are low-income, as defined by the Federal Highway Administration. Low-income households are displaced at a higher ratio than they occur in Medford under this alternative. As with the Highland Alternative, senior citizens are represented

**Photo 9. Low-Income Senior Apartment Units.**

in stronger concentrations in impacted neighborhoods than within the city as a whole.

Effects on Businesses

The Ellendale Alternative divides the areas zoned urban residential into one area mixed with commercially zoned land north of the Ellendale Connector and a another area bounded by Charlotte Anne Drive and the new Highway 99 Connector. Commercially zoned parcel remainders created as a result of this alternative appear to be smaller and awkwardly shaped with limited visibility from the interchange connector.

Based on traffic data, the additional distance to the Ellendale Connector appears to result in more substantial traffic volume drops in the vicinity of existing interstate related businesses on Barnett Road on both sides of I-5. As a result, there could be impacts to businesses that rely on pass-through traffic.

The median on the Ellendale Connector would primarily affect future residential and commercial development access. The median on the Ellendale Connector would affect the Larson Creek Retirement Community, Rogue Valley Manor properties, and commercial office/retail properties that have access off existing Ellendale Drive. These accesses would become right-in/right-out only, resulting in out-of-direction travel to and from these locations. The commercial uses are primarily office uses and so are most likely primarily reliant on destination traffic. However, particular concerns have been

identified regarding out of direction travel for Rogue Valley Manor employees moving between administrative offices on existing Ellendale Drive and the operation's main buildings on the hilltop.

Effects of the median on Barnett Road east of I-5 would have the strongest impact on the highway-related business near the interstate, but these impacts would be mitigated by left turn capability at the Alba Drive break in the median. Effects on the other business to the east, which all appear to rely on either destination or a mix of destination and pass-through traffic, would depend largely on the degree to which they benefit from pass-through traffic.

Five property accesses off existing Ellendale Drive, four off current Belknap Road, and two on Barnett Road east of I-5 would be eliminated.

Effects on the Workforce of Displaced Businesses

Six commercial building displacements impacting approximately ten businesses would be associated with the primary footprint for the Ellendale Alternative as currently proposed. The potentially impacted businesses include retailers and medical, business, and personal service providers. In addition, a building associated with the driving range at the Quail Point Golf Course would be displaced.

Current employment at these locations is estimated to be in excess of 120 full and part-time jobs (not all businesses responded to survey attempts). However, one of these displacements could occur only if the business would be unable to adapt to changes in site access. As a result, exact job relocation impacts are difficult to estimate.

The buffered footprint, which is the worst case scenario, could result in potential displacement of three additional businesses in the same categories as identified under the primary footprint. Current employment at these additional locations is estimated to be 18 full and part-time jobs.

As with the Highland Alternative, for both footprints there could be some losses in income associated with relocation. Wage rates for businesses impacted under this alternative are estimated to range from minimum wage to $16 per hour. If suitable relocation sites are not found, there is the risk of permanent job loss. However, suitable alternative sites should be available for impacted businesses that choose to relocate.

Effects on the Tax Base and Local Government

The cost of right-of-way acquisitions, based on assessed land value, is currently estimated at $10.5 million for the primary footprint and $14.4 million when potential buffer impacts are included. The 1998-99 combined governmental tax rate (which includes the city and county rate, school district, and other local property tax supported activities) was $14.68 per $1,000 of assessed value. Applying this rate to the assessed property value (land + improvements) of right-of-way acquisitions associated with the proposed project results in an estimated annual property tax revenue loss of between $154,000 (primary footprint) and $211,000 (with buffer).

Any additional residential or commercial development that occurs as a secondary or cumulative impact of the proposed highway project would increase the property tax base of the taxing jurisdictions noted – offsetting

the direct losses experienced in whole or in part.

### *Assessment of Environmental Justice Issues (Low-Income/Minority Effects)*

The term environmental justice was created by people concerned that everyone within the United States deserves equal protection under the country's laws. Executive Order 12898, issued in 1994, responded to this concern by organizing and explaining in detail the Federal government's commitment to promote environmental justice. Each Federal agency was directed to review its procedures and to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies, and activities on minority populations and low-income populations. The U.S. Department of Transportation (DOT) issued its *DOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations* in 1997. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) have been working with their State and local transportation partners to make sure that the principles of environmental justice are integrated into every aspect of their transportation mission.

Principles of Environmental Justice are to:

- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- Avoid, mitigate, or minimize disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations.
- Prevent the reduction in, significant delay in, or denial of the receipt of benefits by minority and low-income populations.

The environmental justice assessment of the South Medford Interchange project begins with a discussion of public involvement efforts and concludes with assessment of impacts associated with the No-Build and Build Alternatives.

Public Involvement

In the course of outreach activities related to the South Medford Interchange, a variety of efforts have been made to ensure the inclusion of diverse and special populations in project activities and public involvement processes. These efforts may be summarized by focusing on efforts made during different phases of the project, as outlined below.

Project Notification: This phase was dedicated to notifying a large number of persons in the Interchange area and in the broader initial study area about the project, its purpose and goals. As part of this notification process, RVCOG developed a stakeholder mailing list that, in part, specifically identified individuals and agencies that serve, represent or advocate for special populations, including low-income persons, elderly persons, persons with disabilities and Hispanic persons. While this stakeholder list resulted in the notification of special groups, it should also be noted that the blanket mailing resulted in the notification of some ethnic business and property owners in the Interchange area.

Recruitment for and Selection of the Citizens Advisory Committee (CAC): All persons who received the above notification mailing also received a questionnaire form requesting their input/concerns about the project and querying their interest in serving on the CAC. On this form, people were

asked if they represented any special groups or interests. Once all responses were received, the CAC was selected on the basis of having persons on the CAC who could represent diverse groups. The executive director of Centro Hispano, a group that works with Hispanic residents, was invited to join, as were the executive director of a community action program agency, the director of a senior program, a resident of a retirement community, a person working with transportation for the disabled, and a high school principal. All these persons became members of the CAC, with the exception of the director of Centro Hispano. Thus, the CAC that was established was particularly effective with respect to its inclusion of diverse and special populations.

NEPA Scoping Meeting: To ensure that all persons were notified of this meeting, the display ad placed in the *Mail Tribune* was published in both Spanish and English. A bilingual person was on site throughout the entire meeting to accommodate Spanish-speaking visitors' needs for interpretation, although no one requested bilingual assistance. Several representatives of Native American tribes were mailed invitations to this meeting. To our knowledge, no Native Americans attended in an official capacity.

Neighborhood Mailings: The project team has sent informational mailings specifically to lower income residential areas, including manufactured home parks, in order to reach these persons. In addition, the project team has mailed information not only to property owners, but also to residents who are renting such property. Mailings to the Franquette Street area, as well as to the Portland Avenue area and the Garfield Street area, included a high percentage of renters, as well as potentially low-income residential settings. These letters included narrative in Spanish and a bilingual contact person for people wishing additional information in Spanish.

May 6, 2000, Open House: A special effort was made to identify and invite to this open house a set of fifteen persons classified as advocates for Hispanic community members.

Summary: Outreach efforts to include special and diverse populations have been emphasized in the public involvement program for the South Medford Interchange. These concerns were instrumental in identifying project stakeholders and identifying members for the Citizens Advisory Committee; they have shaped neighborhood mailings, meeting logistics, and meeting discussions of the CAC and Solution Team.

No-Build and Build Alternative Impacts Assessment

*Disproportionately high and adverse effects* are defined as effects that would: a) be predominantly borne by a minority or low-income population/community, or b) be greater in magnitude or appreciably more severe for a minority or low-income population/community than those suffered by non-minority or non-low-income populations/communities.

Current guidelines define a *population/ community* as "any readily identifiable group of minority or low-income persons living in geographic proximity to one another, or if warranted, geographically dispersed/transient persons (such as migrant workers or Native Americans) who might be similarly affected by a proposed program, policy, or activity."

No-Build Alternative: No direct effects are indicated, as there would be no change from current conditions.

Highland Alternative: Four business areas would be directly impacted by the Highland Alternative. These include the South Gateway Center, two highway-related business nodes east of I-5 on Barnett Road, and the service commercial cluster at the intersection of Ellendale Drive and Barnett Road.

None of these potentially affected business areas are minority business districts. A minority business owner does own two of the five business properties at one of the highway-related business nodes east of I-5. However, these properties are no more or less impacted than the others in the same area. Minority business ownership appears to occur at a lower rate than minority population representation in Medford for the remaining impacted business areas.

Of the up to five businesses potentially displaced under this alternative, none where identified as under minority ownership. It is noteworthy that a number of those surveyed opted to not answer the question of race/ethnicity of owner(s). Employees of two of the displaced businesses have hourly wages near minimum wage. This suggests potential for some low-income employees, though detail about the lives of individual employees was not requested and so no specific determinations regarding their household incomes can be made.

The residents of the one housing unit displaced under the primary footprint of the Highland Alternative were not successfully contacted despite two attempts to survey the residents. The other residential units potentially impacted under the buffer footprint of this alternative include two apartment complexes and another single-family residence. Property managers for the two apartment complexes were contacted. None of the potentially affected residential areas could be considered a minority or low-income community. Households in the apartment complexes represent a mix of incomes, ethnicities, and ages.

Ellendale Alternative: The Ellendale Alternative would directly impact two business areas. These include the South Gateway Center and the service commercial cluster at the intersection of Ellendale Drive and Barnett Road. None of these potentially affected business areas are minority business districts. Minority business ownership appears to occur at a lower rate than minority population representation in Medford for the impacted business areas.

Of the approximately thirteen businesses potentially displaced under this alternative, only one was identified as under minority ownership. Employees of one of the displaced businesses may have hourly wages near minimum wage (a retail business). This suggests potential for some low-income employees, though detail about the lives of individual employees was not requested and so no specific determinations regarding their household incomes can be made.

Displacement of approximately 71 residential units is associated with the primary footprint of the Ellendale Alternative. All of the displaced units lie within the same residential area or neighborhood. Barnett Road, Interstate 5, the Quail Point Golf Course and the hill beyond geographically separate the neighborhood from other residential areas in Medford.

There are about 270 households within this neighborhood. Surveys of potentially

displaced residents and contacts with two other neighborhood multi-family properties have determined at least 110 (41%) of the households in the neighborhood are low-income as defined by the Federal Highway Administration (households at or below the poverty level as defined by the U.S. Department of Health and Human Services Year 2000 Poverty Guidelines).

As of 1990, the most current year for which a local assessment is available, 13.2% of Medford Metropolitan Statistical Area (MSA) households were at or below poverty level. This and current guidelines suggest the neighborhood constitutes a low-income neighborhood/community.

Displacement of a large number of households within this low-income community (53 of the 71 displacements affect low-income households) appears to constitute *disproportionately high and adverse effect.* The effects noted would be greater in magnitude or appreciably more severe for a low-income community than those suffered by non-low-income populations/communities.

## Cultural Resources

### *No-Build Alternative*

No impacts will occur.

### *Consequences Common to Both Build Alternatives*

Archaeological Resources

Both Build Alternatives would affect an area within which prehistoric artifacts were discovered during archaeological reconnaissance probe excavations. Because little is known archaeologically about the prehistoric use of the Bear Creek basin, further archaeological testing will be conducted on the selected alternative to determine whether or not the resources constitute an archaeological site and whether it is eligible for listing on the National Register of Historic Places.

Historic Resources – Potentially National Register Eligible Properties

Central Oregon Pacific Railroad (COPR). A portion of the eastern side of the COPR rights-of-way that lies between Stewart Avenue and the future extension of Garfield Street would be needed for fill slope associated with widening Highway 99. No effect would occur to the existing railroad tracks and associated raised grades that are required for continued safe and efficient operation of the railroad. The sense of the close historical relationship between the highway and the railroad would be maintained. Opportunities might exist to minimize impacts further by using minimum roadway design standards that nonetheless maintain the highway's safe and efficient operation.

Southern Oregon Sales (SOS) Buildings. No portion of the SOS buildings or the properties on which they rest would be used for proposed project improvements. Other potential indirect effects of the improvement such as increased traffic levels, noise, and air pollution would not result in adverse effects to the buildings or their continued use. Increased traffic levels (and associated noise and vibration levels) along Stewart Avenue under the No-Build Alternative would be worse than under the Build Alternatives. Consequently, the proposed project results in beneficial implications to the overall future context of the property.

Veteran's Park. The proposed project would not require taking of land associated with

the Veteran's Park. However, refer to impacts associated with recommended mitigation measures in Chapter 5 necessary to offset proposed project impacts to bicycle and pedestrian safety. Highway 99 would need to be widened to the east, along the Park's frontage.

### *Highland (Preferred) Alternative*

No important cultural resources impacted only by the Highland Alternative were discovered during the course of the cultural resources investigations.

### *Ellendale Alternative*

In addition to the area affected by both Build Alternatives, the Ellendale Alternative would affect an area within which prehistoric artifacts were discovered during archaeological reconnaissance probe excavations. Given the paucity of recorded archaeological data and information regarding prehistoric use of the Bear Creek basin, further archaeological testing should be conducted to determine whether or not the resources constitute an archaeological site and whether it is eligible for listing on the National Register of Historic Places.

## Visual Resources

Impacts were analyzed based upon magnitude of change or contrast, ability of the area to absorb visual change, and type of viewer affected (mobile or stationary).

### *No-Build Alternative*

The No-Build Alternative would present few visual changes to existing conditions. Over time, the location of future development would not be substantially different from that anticipated under the Build Alternatives.

### *Consequences Common to Both Alternatives*

Both Build Alternatives propose removing the existing interchange ramps at Barnett Road, which would reduce views of pavement in that location. Although the ultimate disposition of this land remains unknown, for this analysis it is assumed it would remain open space.

Much of the new roadway alignment would contain raised, vegetated medians. The unpaved portions of rights-of-way would also be vegetated generally with a combination of shrubs and grasses.

Areas containing fill, such as that which would occur under the roadways at either end of the bridges connecting to the interchange structure, would introduce visual discontinuities by virtue of changes in vegetation, texture, and lines of horizons. The landscape plans for these areas would be developed. The appearance of retaining walls and structures is conceptual at this stage of project development, but they are planned in the area of the Bear Creek Greenway. Retaining walls and structures have the potential to adversely affect the visual environment by introducing features that conflict with the harmony of the surrounding environment in terms of general form, color, and texture.

Both Build Alternatives include stormwater swales that would generally run parallel to segments of new roadway. Being vegetated with grasses, these swales would provide a visual buffer between the new roadway segments and adjacent (typically) commercial and/or residential uses.

For stationary and mobile viewers in the southern part of the South Gateway Center, foreground views to the open field of the undeveloped lot would be replaced by views

to the new roadway pavement and traffic. Looking further east, current views to the field and trees would be replaced by views to the new interchange. The new interchange, which would be elevated over I-5 and would include the bridge structures extending over the Bear Creek floodway, would introduce urban visual elements in foreground and near middle ground views.

For travelers along I-5, the new interchange associated with both build alternatives would produce a new gateway view to the city for northbound travelers. The new elevated interchange structure, which would be substantially larger than the Barnett Road Bridge over I-5, and associated bridging extending from the interchange, would dominate traveling views to a greater extent than the existing interchange. For those exiting and entering at the new interchange along the connectors, the vegetation that would be planted in the median would soften the views and provide a transition between highway and city scenery.

Viewers at the Rogue Valley Manor building atop the hillside to the southeast of the project area would view a new interchange structure and associated bridging within the broad view of the city, highway corridor, and landscape in the background. Although some of the nighttime lighting associated with the existing interchange would be removed, the new interchange, particularly considering its expansive visible surface, would increase potential for nighttime reflection from highway-related lighting.

Bicyclists and other users traveling along the future Bear Creek Greenway multipurpose path would generally experience foreground views of the two proposed interchange ramp bridges as they would cross under the structures which are located adjacent to the existing I-5 bridges. In the middle and backgrounds, those on the Bear Creek Greenway multipurpose path would see more pavement and traffic than they would otherwise without the project.

Views from some of the residences along the proposed streets could be affected by construction of noise walls that might be proposed as mitigation measures to minimize projected noise impacts to residents. Noise walls can result in potentially adverse impacts to residential and mobile views. Noise walls would block views and create shadows for residential yards. Noise walls also potentially block some or all of the views of surrounding community areas and environmental settings from roadways, especially I-5. This can have negative or positive effects, but it generally acts to limit the visual information reaching motorists traveling these roadways.

### *Highland (Preferred) Alternative*

Travelers along Barnett Road near Highland Drive would have middle ground views of new roadway pavement and traffic that would replace the brief view of the undeveloped field east of the motel. Although the new road would be adjacent to the motel, the new road and interchange ramp would not be viewed from the motel as there are no windows on the east side of the building.

Middle ground views from residential units associated with the Rogue Valley Manor (well over 100 residents) and foreground views for golfers would include the interchange structure and associated elevated roadway. The views would be somewhat buffered by trees along the creek just southeast of the structures and by the benefits of landscaping associated with the golf course.

About 20 mobile homes located on the west side of the manufactured home park west of Ellendale Drive would have views of the elevated ramp and bridging, and traffic. The new interchange would be located about 15 to 30 meters (50 to 100 feet) west of the homes. Some of the residences at the eastern end of the park may also be able to view the facility, owing to their topographically elevated position above the lower homes.

For the buildings on the southwest side of I-5, views to adjacent undeveloped fields would be replaced by views to the new connector street, elevated ramp, associated bridging, traffic and pavement of the new interchange. In the middle ground, views to ball fields and equipment storage would be replaced by views to the new interchange as well.

For the stationary viewers and travelers along the Center Drive commercial area, foreground views to the open field of the undeveloped lot would be replaced by views to the new connector roadway pavement and traffic. Looking further east, current views to the field and trees would be replaced by views to the new interchange.

Viewers using the future Bear Creek Greenway multipurpose path would cross under the proposed bridge crossing Bear Creek to the east of the interchange structure. On the west side of I-5, the path would extend south and parallel to the existing highway, southbound on-ramp, and creek. The visual experience would include incrementally more urban landscape, but would not be substantively different from that which would be experienced under the No-Build Alternative.

***Ellendale Alternative***

Residential viewers associated with the Rogue Valley Manor facilities (well over 100 residents) would see the new interchange structure, pavement, and traffic in the middle-ground view in place of portions of the existing view to the golf course below. The interchange would displace the driving range. The interchange structure would be viewed within the broad context of the city, highway corridor, and landscape in the background. Due to the closer proximity of the proposed interchange and the reduced potential for intervening creek-related vegetation and golf course facilities to minimize potential adverse view impacts, the Ellendale Alternative would have noticeably greater potential visual impact to people at the golf course.

Viewers along the Ellendale Connector would have an increased view of the additional pavement and vehicles. In addition, an increase in views to surrounding properties may be afforded by the elevated roadway. They would view the roadway, sidewalks, and plantings.

The view to the current undeveloped area on the west side of Ellendale Drive from the retirement centers would be punctuated with increased road width and moving vehicles. However, this impact would be short-term because the long-term expectation for this area includes development of much of the undeveloped area in accordance with the City of Medford *Comprehensive Plan*, thereby minimizing the long-term visual contrast between roadway and undeveloped land.

From the residences adjacent to the Ellendale Connector, foreground views would be of increased vehicles, pavement, and elevated structures.

The Ellendale Alternative would remove a portion of the existing golf course at the southern portion of existing Ellendale Drive. The new Ellendale Connector would displace the driving range. The relocated Rogue Valley Manor Drive would also cut through a portion of the golf course. Golfers in this general area would therefore have views of vehicles on the ramp, of the elevated roadway structure, and of vehicles and pavement along the relocated Rogue Valley Manor Drive.

Viewers around the Center Drive commercial area would see adjacent, undeveloped lots replaced by roadway, elevated concrete ramp, and vehicles. Residents along Charlotte Anne Drive would view the elevated interchange and bridge structures and roadway/vehicles between homes and the trees and shrubs behind the homes.

Viewers using the future Bear Creek Greenway multipurpose path would experience a substantially modified landscape along approximately 360 meters (1,181 feet) of path along the west side of I-5. The path would be located under bridge structures supporting ramps and the interchange structure. The visual sense of traveling through a naturalistic corridor would be substantially replaced by the intrusion of the bridges. The multipurpose connecting path would generally parallel the bridge east of the interchange and connect with the proposed new roadway west of the bridge.

### *Comparison of Highland and Ellendale Alternatives*

In summary, the Ellendale Alternative would result in greater potential adverse visual impacts to residential development, primarily because the proposed widening of Ellendale Drive would increase street-related development in an area already developed on the east side of Interstate 5. The Ellendale Alternative would place the interchange closer and in a less buffered position to the Rogue Valley Manor residential units than the Highland Alternative. The Ellendale Alternative would also place the new interchange much closer to the residences located on the east end of Charlotte Anne Drive than would the Highland Alternative. The Ellendale Alternative would result in substantially greater impacts to the Bear Creek multipurpose path users. Because the path would extend under a substantial length of bridge structure on the west side of the interstate, the sense of traveling within natural conditions along the path would be impaired substantially more than with the Highland Alternative, where the path would be located adjacent to the highway and not under a structure. For comparison, Photos 10, 11, and 12 show the existing conditions and simulations for the Build Alternatives.

## Noise

Using the STAMINA/SOUND32 (S32) noise modeling and the same noise measurement and modeling locations as for the existing conditions, the unabated noise levels were estimated for the No-Build, Highland and Ellendale alternatives.

Traffic noise impacts are defined by ODOT to occur when a substantial increase in traffic noise would result from the project ("substantial" is defined by ODOT as a ten dBA increase above existing noise levels). Traffic noise is of concern and should be evaluated when predicted noise levels with the project would approach or exceed the Noise Abatement Criteria (NAC). Based upon the noise modeling, traffic noise would not increase substantially as a result of the

project and no noise impact would occur. However, 19 of the 36 modeled representative noise-sensitive receivers would approach or exceed the NAC for Activity Category B land uses in one or both of the future-with-project scenarios. Thus, traffic noise abatement was considered for those noise-sensitive receivers that approach or exceed the NAC. The results of the noise abatement analysis are summarized below. Additionally, a description of the methodology and more detailed information are contained in the Technical Noise Report.

### *No-Build Alternative*

Future No-Build Alternative noise levels are predicted to range from 53 decibels adjusted (dBA $L_{eq}$) to 71 dBA $L_{eq}$. Figure 4-1 shows that in the No-Build Alternative, 12 of the 36 modeled receptors would approach or exceed the NAC for Activity Category B land uses in the design year 2020. This is representative of approximately 61 residences. Traffic noise impacts would occur at noise-sensitive land uses adjacent to both sides of I-5 and along Barnett Road.

### *Highland (Preferred) Alternative*

For the Highland Alternative, Figure 4-2, shows that, without abatement, 12 of the 29 modeled representative noise-sensitive receivers would approach or exceed the NAC for Activity Category B. This is representative of approximately 60 residences or residential equivalents. Traffic noise impacts are predicted to occur at noise-sensitive land uses adjacent to the northbound side of I-5, adjacent to the southbound side of I-5, and along Barnett Road.

Noise abatement was considered for the Highland Alternative, and was found to be either not feasible or not cost-effective. For example, Receptors ST-2 and ST-3 were found to be not feasible to abate under the Highland Alternative, because of their distance and elevation above I-5. Similarly, construction of soundwalls at locations along Barnett Road (Noise Barriers H-3 – H-7 for the Highland Alternative and Noise Barriers E-6 – E-10 for the Ellendale Alternative) is not recommended. In order to achieve at least five decibels of noise reduction, the walls would need to be continuous (i.e., without breaks for driveways). This would reduce access (ingress and egress) to the sites from Barnett Road. The noise barriers considered but not recommended for the Highland Alternative are shown in Figure 4-2.

### *Ellendale Alternative*

For the Ellendale Alternative, Figure 4-3 shows that, without abatement, 18 of the 34 modeled representative noise-sensitive receivers would approach or exceed the NAC for Activity Category B land uses. This is representative of approximately 79 residences or residential equivalents. Traffic noise impacts are predicted to occur at noise-sensitive land uses adjacent to both sides of I-5 and along Barnett Road.

As discussed above for the Highland Alternative, noise barriers were considered and, in general, found to be either not feasible or not cost-effective. Under this alternative, too, receptors ST-2 and ST-3 were found to be unfeasible. The exception is Barrier E-4 (shown in Figure 4-3) which was preliminarily found to be feasible and cost-effective to construct. The noise data results are also shown in Tables 4-8 and 4-9.

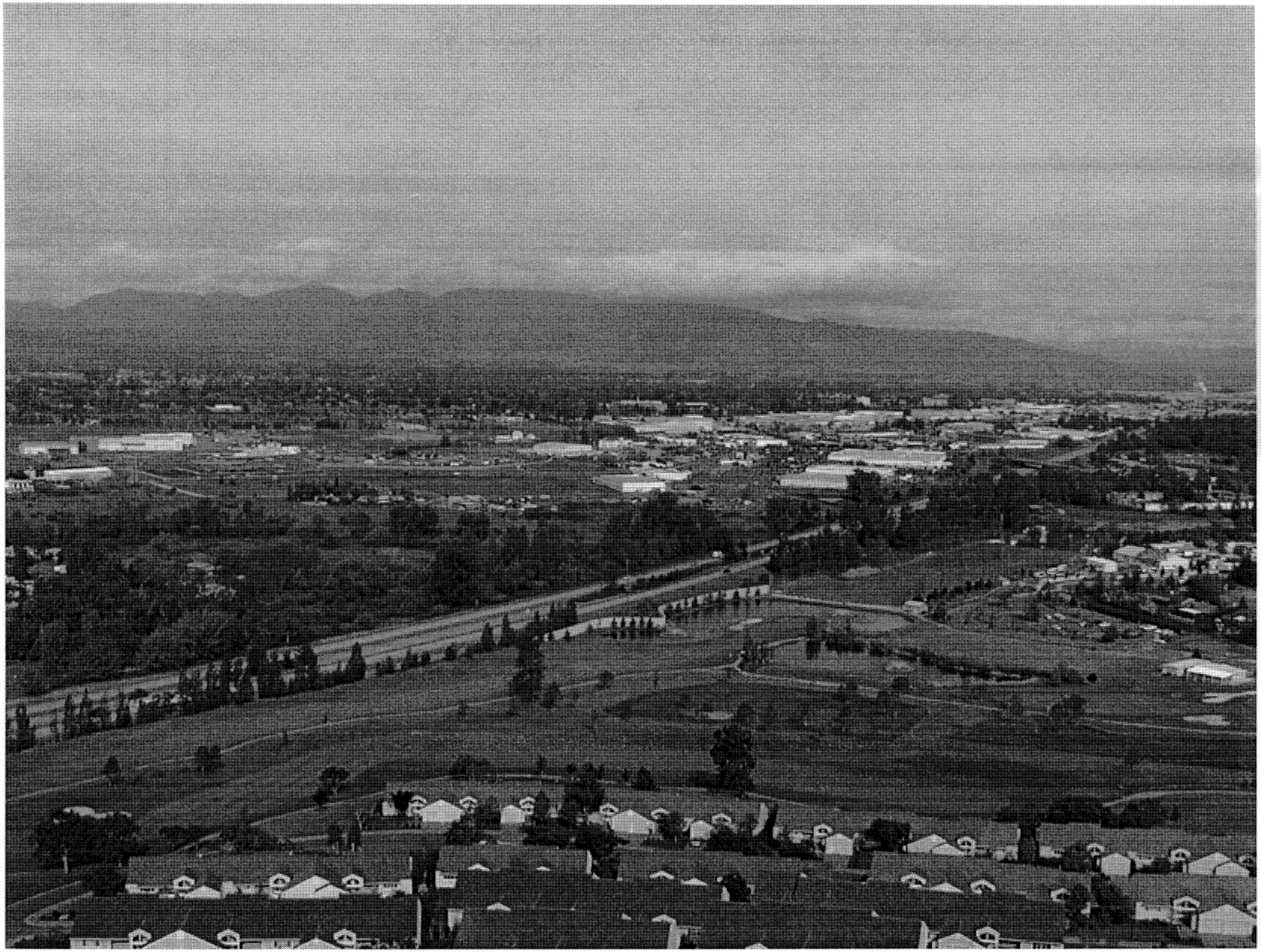


Photo 10 Existing conditions

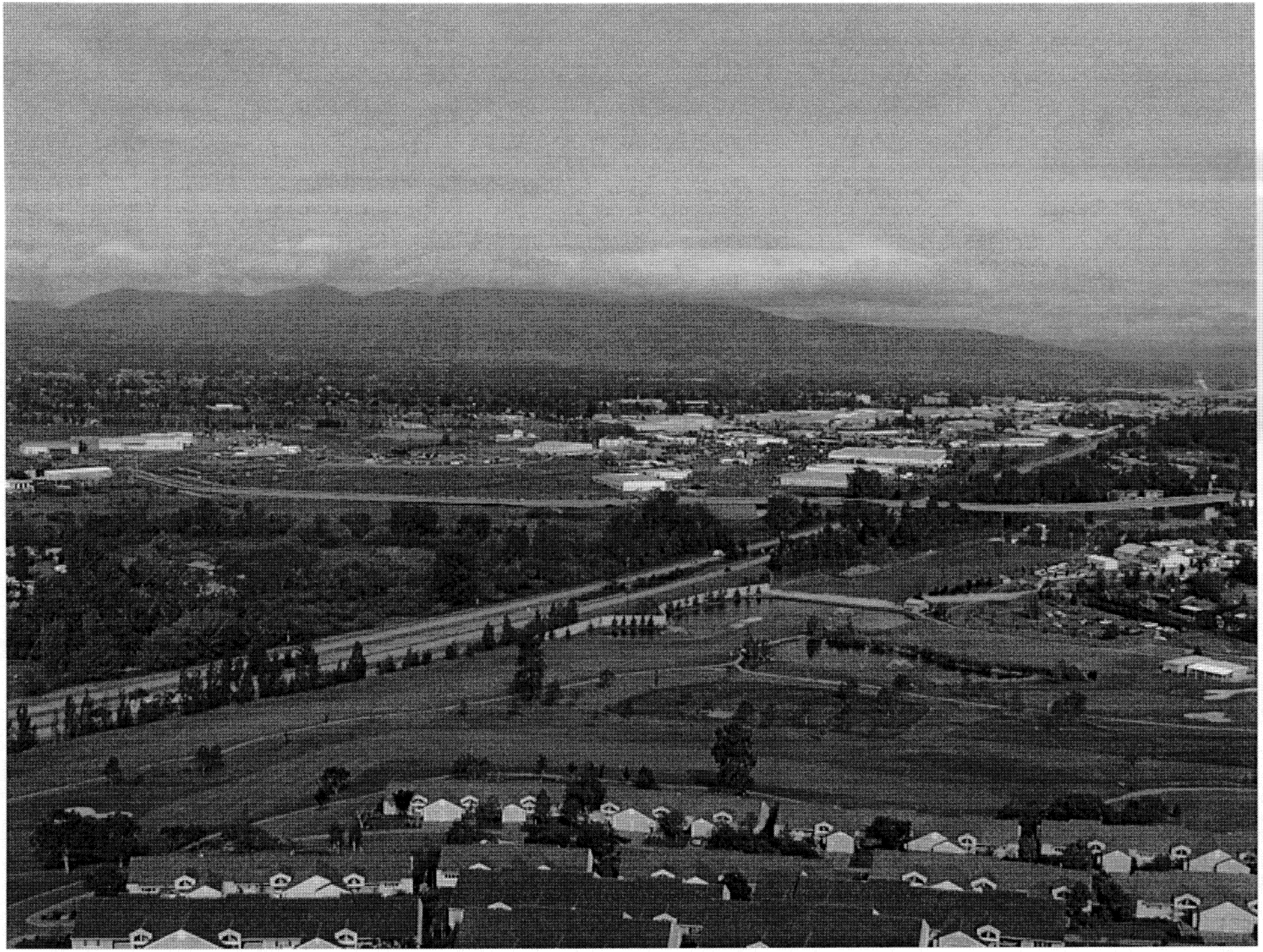


Photo 11 Highland Alternative

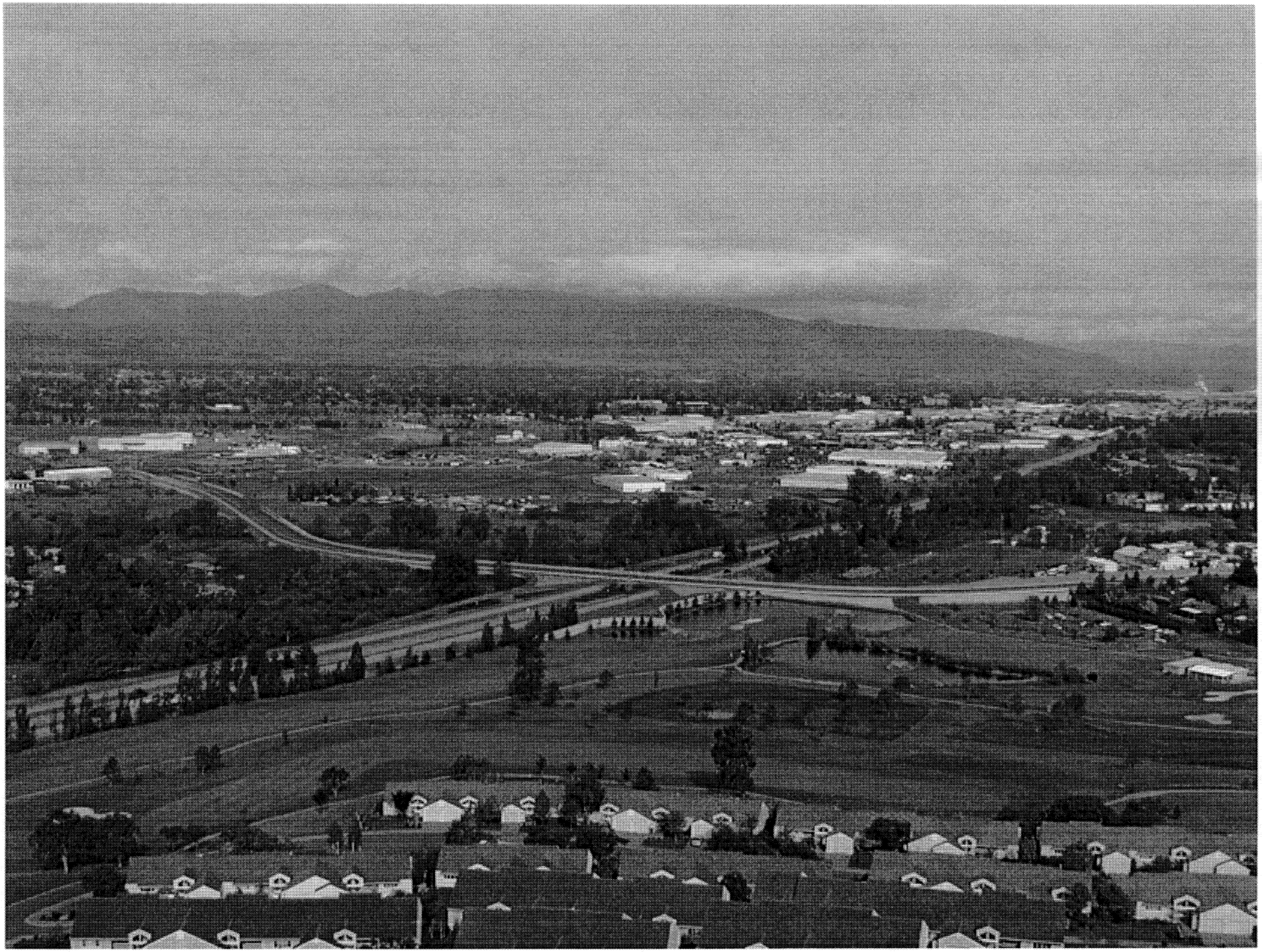
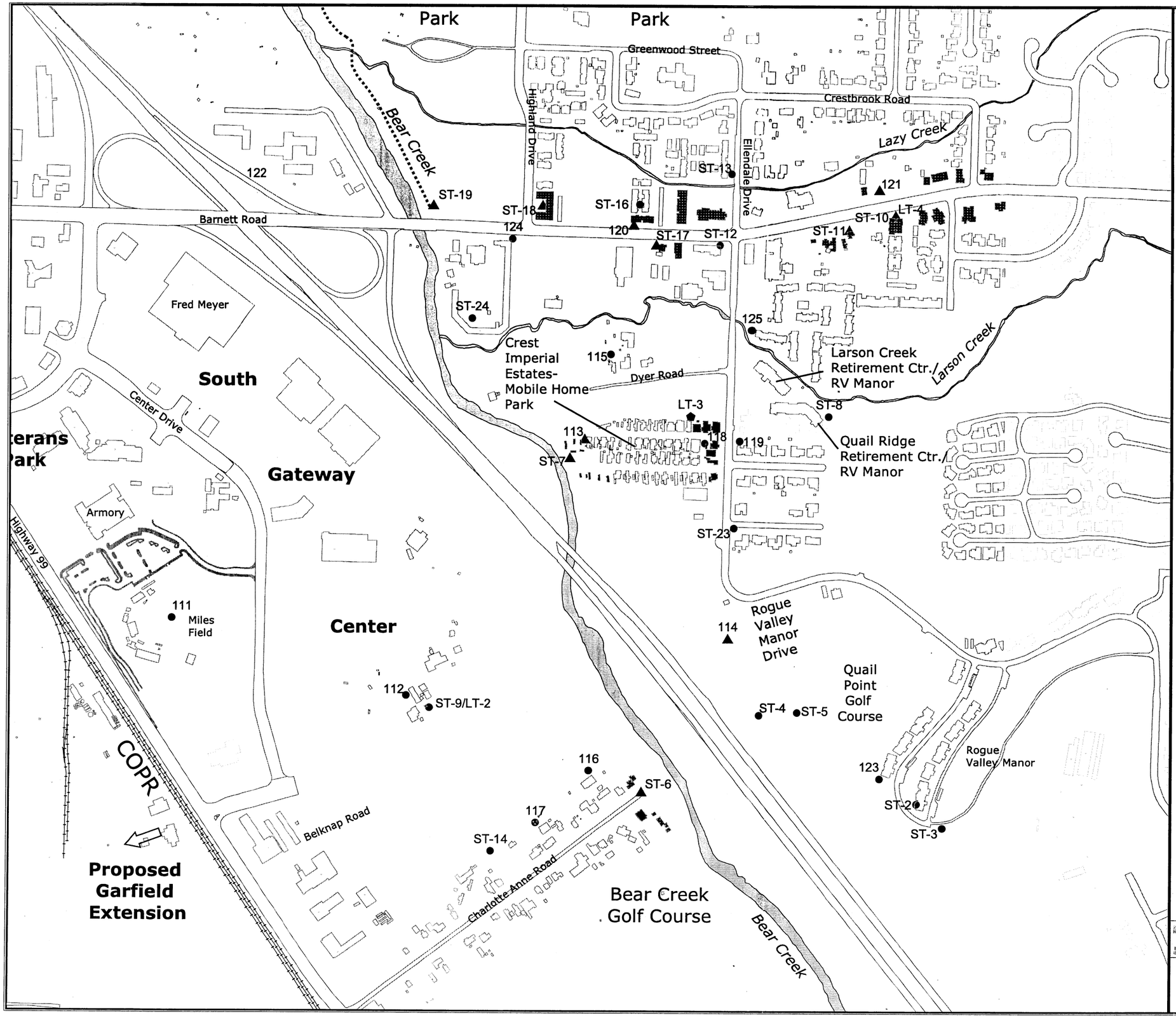


Photo 12 Ellendale Alternative

SOUTH MEDFORD INTERCHANGE PROJECT
ALTERNATIVES & SOLUTIONS




## No Build Alternative

### Noise Analysis

- ● ST-11 — Measured and Modeled Receptors
- ● 115 — Modeled-Only Receptors
- ▲ ST-10 — Both Existing and Future No Build Peak-noise-hour Leq Approaches or Exceeds Noise Abatement Criteria (NAC)
- ⬟ 115 — Future No Build Peak-noise-hour Leq Approaches or Exceeds NAC
- Existing and Future No Build Peak-noise-hour Leq Approaches or Exceeds NAC
- Future No Build Peak-noise-hour Approaches or Exceeds NAC

### Project Features

- Streams
- Buildings
- Existing Roads
- Railroad

N

500 0 500 Feet

200 0 200 Meters

Oregon Department of Transportation

Print Date: Aug 2001 PDX k:\s_medford\deis\apr\deis_figs.apr

**Figure 4 - 1**
**No Build Alternative**

SOUTH MEDFORD INTERCHANGE PROJECT
ALTERNATIVES & SOLUTIONS

## Highland Alternative

### Noise Analysis

- Considered Noise Barriers (H1-H7)
- ST-9/LT-2 Measured and Modeled Receptors
- 115 Modeled-Only Receptors
- ST-10 Peak Noise Hour Leq (dBA) Approaches or Exceeds Noise Abatement Criteria (NAC)
- Peak-noise-hour Approaches or Exceeds NAC

### Project Features

- Proposed Bridge
- Primary Footprint
- Buffered Footprint
- Bikepath
- Streams
- Buildings
- Roads after Construction
- Railroad

N

500 0 500 Feet

200 0 200 Meters

Oregon Department of Transportation

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**Figure 4 - 2**
**Highland Alternative**

SOUTH MEDFORD INTERCHANGE PROJECT
ALTERNATIVES & SOLUTIONS

## Ellendale Alternative

### Noise Analysis

- Considered Noise Barriers (E1 - E12)
- ST-9/LT-2 Measured and Modeled Receptors
- 115 Modeled-Only Receptors
- ST-10 Peak Noise Hour Leq (dBA) Approaches or Exceeds Noise Abatement Criteria (NAC)
- Peak-noise-hour Approaches or Exceeds NAC

### Project Features

- Proposed Bridge
- Primary Footprint
- Buffered Footprint
- Bikepath
- Streams
- Buildings
- Roads after Construction
- Railroad

N

500 0 500 Feet

200 0 200 Meters

Oregon Department of Transportation

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**Figure 4 - 3**
**Ellendale Alternative**

**Table 4-8**
**NOISE LEVELS: EXISTING, FUTURE NO BUILD AND HIGHLAND ALTERNATIVE**

| Site ID | Primary/Closest Traffic Noise Influence | Location | Existing Conditions | | | | | Future Conditions | | | | Soundwall at Edge-of-Shoulder $L_{eq}$ (dBA) | | | | | Soundwall at Top-of-Berm $L_{eq}$ (dBA) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Measured $L_{eq}$ (dBA) | Calibration Run Modeled Noise Level $L_{eq}$ (dBA) | K-Factor (dBA) | Modeled Existing Peak-Noise-Hour $L_{eq}$ (dBA) | Noise Level Exceeds Cat. B NAC? | Future No Build $L_{eq}$ (dBA) | Noise Level Exceeds Cat. B NAC? | Alternative 11: Highland No Abatement $L_{eq}$ (dBA) | Noise Level Exceeds Cat. B NAC? | 8' | 10' | 12' | 14' | 16' | 8' | 10' | 12' | 14' | 16' |
| ST-2 | NB I-5 | On porch of a residence at the Manor | 64 | 62 | 0 | 64 | No | 64 | No | 66 | Yes | 64 | 64 | 64 | **63** | 62 | 65 | 64 | 64 | 64 | 63 |
| ST-3 | NB I-5 | Near residences at the manor | 62 | 63 | 0 | 64 | No | 65 | Yes | 65 | Yes | 65 | 64 | 64 | **64** | 63 | 65 | 65 | 65 | 65 | 65 |
| ST-4 | NB I-5 | Golf course at the Manor | 60 | 62 | 0 | 61 | No | 61 | No | 63 | No | 63 | 63 | 63 | **63** | 63 | 62 | 62 | 62 | 62 | 62 |
| ST-5 | NB I-5 | Edge of proposed housing development at the Manor | 62 | 61 | 0 | 61 | No | 62 | No | 63 | No | 63 | 63 | 63 | **62** | 62 | 63 | 62 | 62 | 62 | 62 |
| ST-7 | NB I-5 | Western edge of trailer park | 63 | 66 | 0 | 65 | Yes | 67 | Yes | 62 | No | | | | | | | | | | |
| 114 | NB I-5 | Putting green near lake, The Manor | NA | NA | 0 | 64 | No | 65 | Yes | 66 | Yes | 66 | 66 | 66 | **65** | 64 | | | | | |
| 115 | NB I-5 | Residence, Dyer Rd. | NA | NA | 0 | 59 | No | 61 | No | 59 | No | | | | | | | | | | |
| 122 | NB I-5 | Economy Inn, Barnett Rd. | NA | NA | 0 | 63 | No | 64 | No | 64 | No | | | | | | | | | | |
| 123 | NB I-5 | Residence, near golf course | NA | NA | 0 | 63 | No | 64 | No | 64 | No | 64 | 64 | 63 | 63 | 62 | 64 | 63 | 63 | 62 | 62 |
| 113 | NB I-5/Future Highland | North side, west end of trailer park | NA | NA | 0 | 63 | No | 65 | Yes | 62 | No | | | | | | | | | | |
| ST-6 | SB I-5 | Front yard of 555 Charlotte Anne Dr | 65 | 64 | 0 | 66 | Yes | 66 | Yes | 67 | Yes | 66 | 65 | 64 | 63 | **61** | | | | | |
| 116 | SB I-5 | Residence, Charlotte Anne Rd. | NA | NA | 0 | 63 | No | 63 | No | 65 | Yes | 64 | 64 | 63 | 62 | **60** | | | | | |
| 117 | SB I-5 | Residence, Charlotte Anne Rd. | NA | NA | 0 | 60 | No | 61 | No | 61 | No | 61 | 61 | 60 | 59 | 58 | | | | | |
| ST-14 | SB I-5/Future Highland | Residence, Charlotte Anne Rd | 51 | 56 | -3 | 56 | No | 53 | No | 57 | No | | | | | | | | | | |
| 112 | SB I-5/Future Highland | Residence, Center Dr (Belknap Rd) | NA | NA | 0 | 60 | No | 61 | No | 64 | No | | | | | | | | | | |
| ST-9 | NB Center Dr. | Residence, Belknap Rd | 50 | 59 | -7 | 53 | No | 54 | No | 55 | No | | | | | | | | | | |
| ST-15 | SB Center Dr. | Center Dr near stadium | 67 | 61 | 0 | 67 | No[1] | 66 | No[1] | 65 | No[1] | | | | | | | | | | |
| 111 | SB Center Dr. | 2nd base inside stadium | NA | NA | 0 | 58 | No | 59 | No | 56 | No | | | | | | | | | | |
| ST-10 | EB Barnett Rd. | Cedar Tree Apts., Barnett Rd. | 69 | 67 | 0 | 68 | Yes | 69 | Yes | 70 | Yes | **63** | **61** | **59** | **58** | **58** | | | | | |
| ST-11 | EB Barnett Rd. | In front of 2100 Barnett Rd | 67 | 65 | 0 | 66 | Yes | 67 | Yes | 66 | Yes | **61** | **59** | **58** | **57** | **57** | | | | | |
| ST-12 | EB Barnett Rd. | Medical practice, 1750 Barnett Rd | 71 | 69 | 0 | 69 | No[2] | 71 | No[2] | 68 | No[2] | | | | | | | | | | |
| ST-17 | EB Barnett Rd. | Residence, 1510 Barnett Rd. | 68 | 68 | 0 | 69 | Yes | 71 | Yes | 70 | Yes | **63** | **62** | **61** | **61** | **61** | | | | | |
| ST-24 | EB Barnett Rd. | Best Western Inn, Barnett Rd. | 55 | 65 | -8 | 56 | No | 57 | No | 58 | No | | | | | | | | | | |
| 124 | EB Barnett Rd./Future Highland | Best Western Inn, Barnett Rd. | NA | NA | 0 | 68 | No[3] | 69 | No[3] | 69 | No[3] | | | | | | | | | | |
| ST-16 | WB Barnett Rd. | Woodcreek Apts., Barnett Rd. | 55 | 60 | -3 | 58 | No | 59 | No | 60 | No | | | | | | | | | | |
| 120 | WB Barnett Rd. | Woodcreek Apts., Barnett Rd. | NA | NA | 0 | 69 | Yes | 70 | Yes | 71 | Yes | **62** | **60** | **59** | **58** | **57** | | | | | |
| 121 | WB Barnett Rd. | Residence, Barnett Rd. | NA | NA | 0 | 65 | Yes | 67 | Yes | 66 | Yes | **60** | **59** | **58** | **57** | **56** | | | | | |
| ST-19 | WB Barnett Rd. | Dog park near bike path, Barnett Rd | 64 | 65 | 0 | 69 | Yes | 70 | Yes | 69 | Yes | 65 | **63** | **62** | **62** | **61** | | | | | |
| ST-18 | WB Barnett / Highland | Highlander Apts., Highland / Barnett | 64 | 65 | 0 | 66 | Yes | 68 | Yes | 69 | Yes | 65 | 65 | 65 | **64** | **64** | | | | | |
| ST-23 | NB Ellendale Dr. | Ellendale Dr. / Hobert St. | 61 | 62 | 0 | 61 | No | 62 | No | 61 | No | | | | | | | | | | |

1 - Site is open space. There is no noise abatement criteria threshold.
2 - Site is a commercial land use. The noise abatement criteria threshold is therefore 72 dBA $L_{eq}$.
3 - Site does not have exterior noise sensitive land uses. Interior noise level of 52 dBA is therefore the NAC. Allowing for 20 dB exterior/interior noise reduction, the noise threshold is therefore 72 dBA $L_{eq}$.

Note: Numbers in **bold** indicate that minimum noise reduction of 5 decibels would be achieved.

**Table 4-9**
**NOISE LEVELS: EXISTING, FUTURE NO BUILD AND ELLENDALE ALTERNATIVE**

| Site ID | Primary/Closest Traffic Noise Influence | Location | Existing Conditions | | | | | Future Conditions | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Soundwall at Edge-of-Shoulder $L_{eq}$ (dBA) | | | | | Soundwall at Top-of-Berm $L_{eq}$ (dBA) | | | | |
| | | | Measured $L_{eq}$ (dBA) | Calibration Run Modeled Noise Level $L_{eq}$ (dBA) | K-Factor (dBA) | Modeled Existing Peak-Noise-Hour $L_{eq}$ (dBA) | Noise Level Exceeds Cat. B NAC? | Future No Build $L_{eq}$ (dBA) | Noise Level Exceeds Cat. B NAC? | Alternative 2: Ellendale No Abatement $L_{eq}$ (dBA) | Noise Level Exceeds Cat. B NAC? | 8' | 10' | 12' | 14' | 16' | 8' | 10' | 12' | 14' | 16' |
| ST-1 | NB I-5 | Pool area on the roof of the Manor | 60 | 65 | -3 | 63 | No | **64** | No | 64 | No | | | | | | | | | | |
| ST-2 | NB I-5 | On porch of a residence at the Manor | 64 | 62 | 0 | 64 | No | **64** | No | 65 | Yes | **64** | 64 | 64 | **63** | 63 | 64 | 64 | 64 | 63 | 63 |
| ST-3 | NB I-5 | Near residences at the manor | 62 | 63 | 0 | 64 | No | **65** | Yes | 65 | Yes | **65** | 65 | 64 | **64** | 63 | 65 | 65 | 65 | 65 | 65 |
| ST-4 | NB I-5 | Golf course at the Manor | 60 | 62 | 0 | 61 | No | 61 | No | 63 | No | 62 | 61 | 61 | 61 | 60 | 63 | 62 | 62 | 62 | 62 |
| ST-5 | NB I-5 | Edge of proposed housing development at the Manor | 62 | 61 | 0 | 61 | No | **62** | No | 63 | No | 62 | 62 | 61 | 61 | 61 | 62 | 62 | 62 | 62 | 62 |
| ST-7 | NB I-5 | Western edge of trailer park | 63 | 66 | 0 | 65 | Yes | 67 | Yes | 69 | Yes | **66** | 65 | **64** | **62** | **61** | | | | | |
| 113 | NB I-5 | North side, west end of trailer park | NA | NA | 0 | 63 | No | 65 | Yes | 67 | Yes | 65 | 64 | **62** | **61** | **60** | | | | | |
| 114 | NB I-5 | Putting green near lake, The Manor | NA | NA | 0 | 65 | Yes | 65 | Yes | 65 | Yes | 62 | 61 | **60** | **60** | **59** | | | | | |
| 115 | NB I-5 | Residence, Dyer Rd. | NA | NA | 0 | 59 | No | 61 | No | 58 | No | | | | | | | | | | |
| 123 | NB I-5 | Residence, near golf course | NA | NA | 0 | 65 | Yes | 64 | No | 64 | No | **64** | 64 | 64 | 63 | 62 | 64 | 63 | 63 | 62 | 62 |
| ST-6 | SB I-5 | Front yard of 555 Charlotte Anne Dr | 65 | 64 | 0 | 66 | Yes | 66 | Yes | 65 | Yes | 63 | 62 | 62 | 61 | **60** | | | | | |
| 116 | SB I-5 | Residence, Charlotte Anne Rd. | NA | NA | 0 | 63 | No | 63 | No | 64 | No | 61 | 60 | 60 | **59** | **58** | | | | | |
| 117 | SB I-5 | Residence, Charlotte Anne Rd. | NA | NA | 0 | 60 | No | 61 | No | 61 | No | 60 | 59 | 59 | 58 | 57 | | | | | |
| ST-14 | SB I-5/Future Ellendale Dr. | Residence, Charlotte Anne Rd | 51 | 56 | -3 | 56 | No | 53 | No | 57 | No | | | | | | | | | | |
| 112 | SB I-5/Future Center Dr. | Residence, Center Dr (Belknap Rd) | NA | NA | 0 | 60 | No | 61 | No | 67 | Yes | **61** | **60** | **60** | **59** | **58** | | | | | |
| ST-9 | NB Center Dr./Future Ellendale Dr. | Residence, Belknap Rd | 50 | 59 | -7 | 53 | No | 54 | No | 56 | No | | | | | | | | | | |
| ST-15 | SB Center Dr. | Center Dr near stadium | 67 | 61 | 0 | 67 | No[1] | 66 | No[1] | 62 | No[1] | | | | | | | | | | |
| 111 | SB Center Dr. | 2nd base inside stadium | NA | NA | 0 | 58 | No | 59 | No | 58 | No | | | | | | | | | | |
| ST-8 | NB Ellendale Dr. | Behind apts. near proposed relocated Rogue Valley Dr. | 51 | NA | 0 | 54 | No | 55 | No | 60 | No | | | | | | | | | | |
| ST-23 | NB Ellendale Dr. | Ellendale Dr. / Hobert St. | 61 | 62 | 0 | 61 | No | 62 | No | 65 | Yes | **58** | **56** | **54** | **52** | **51** | | | | | |
| 119 | NB Ellendale Dr. | Residence off Ellendale Rd. | NA | NA | 0 | 59 | No | 55 | No | 67 | Yes | **61** | **59** | **57** | **55** | **54** | | | | | |
| 125 | NB Ellendale Dr. | Residence off Ellendale Rd. | NA | NA | 0 | 60 | No | 61 | No | 64 | No | | | | | | | | | | |
| ST-13 | SB Ellendale Dr. | Woodcreek Apts, 800 Ellendale | 60 | 61 | 0 | 63 | No | 64 | No | 63 | No | | | | | | | | | | |
| LT-3 | SB Ellendale Dr. | North side of trailer park | NA | NA | 0 | 64 | No | 65 | Yes | 65 | Yes | 61 | **60** | **58** | **57** | **55** | | | | | |
| 118 | SB Ellendale Dr. | East side of trailer park | NA | NA | 0 | 59 | No | 63 | No | 67 | Yes | **62** | **60** | **59** | **57** | **56** | | | | | |
| ST-10 | EB Barnett Rd. | Cedar Tree Apts., Barnett Rd. | 69 | 67 | 0 | 68 | Yes | 69 | Yes | 69 | Yes | **62** | **60** | **57** | **55** | **54** | | | | | |
| ST-11 | EB Barnett Rd. | In front of 2100 Barnett Rd | 67 | 65 | 0 | 66 | Yes | 67 | Yes | 67 | Yes | **60** | **58** | **57** | **55** | **53** | | | | | |
| ST-17 | EB Barnett Rd. | Residence, 1510 Barnett Rd. | 68 | 68 | 0 | 69 | Yes | 71 | Yes | 72 | Yes | **61** | **59** | **58** | **56** | **55** | | | | | |
| ST-24 | EB Barnett Rd. | Best Western Inn, Barnett Rd. | 55 | 65 | -8 | 56 | No | 57 | No | 55 | No | | | | | | | | | | |
| 124 | EB Barnett Rd. | Best Western Inn, Barnett Rd. | NA | NA | 0 | 68 | No[2] | 69 | No[2] | 69 | No[2] | | | | | | | | | | |
| ST-16 | WB Barnett Rd. | Woodcreek Apts., 800 Ellendale Dr | 55 | 60 | -3 | 58 | No | 59 | No | 59 | No | | | | | | | | | | |
| 120 | WB Barnett Rd. | Woodcreek Apts., Barnett Rd. | NA | NA | 0 | 69 | Yes | 70 | Yes | 70 | Yes | **62** | **60** | **57** | **56** | **54** | | | | | |
| 121 | WB Barnett Rd. | Residence, Barnett Rd. | NA | NA | 0 | 65 | Yes | 67 | Yes | 66 | Yes | **60** | **58** | **56** | **55** | **53** | | | | | |
| ST-18 | WB Barnett Rd. | Highlander Apts., Highland / Barnett | 64 | 65 | 0 | 66 | Yes | **68** | Yes | 69 | Yes | **61** | **60** | **58** | **56** | **55** | | | | | |
| ST-19 | WB Barnett Rd. | Dog park near bike path, Barnett Rd | 64 | 65 | 0 | 69 | Yes | 70 | Yes | 69 | Yes | **63** | **62** | **60** | **58** | **57** | | | | | |

1 - Site is open space. There is no noise abatement criteria threshold.
2 - Site does not have exterior noise sensitive land uses. Interior noise level of 52 dBA is therefore the NAC. Allowing for 20 dB exterior/interior noise reduction, the noise threshold is therefore 72 $dBA_{eq}$.

Note: Numbers in **bold** indicate that minimum noise reduction of 5 decibels would be achieved.

## Air Quality

Potential air pollutant emissions from either of the Build Alternatives during construction include the following: emissions from workers' vehicles and delivery truck exhaust, heavy equipment exhaust, and fugitive dust. They are temporary and expected to be minimal. The main construction projects would be the construction of the interchange bridge over Interstate 5 and on- and off-ramps. These are relatively small-scale projects (in acreage); emissions from ground disturbance (fugitive dust) would be generated for several months at a time, but in localized areas, and therefore more easily contained. The use of large-scale construction equipment would also probably occur for several months. Specific construction equipment use is unknown at this time. Equipment emissions are expected to be relatively low, as compared to area-wide vehicular emission. Construction emissions from the project are not included in the analysis because they are expected to be low in comparison to area-wide emissions, and will only be temporary.

Both current and future year predictions of vehicle-miles traveled in the study area were developed in the traffic analysis for this project. For each evaluation year (2010, 20, and 30) the No-Build Alternative is predicted to have higher VMT than the two Build Alternatives. This is most likely due to improvements in travel patterns and flow-throughs, including diversions outside of the project area. Emissions of particulate matter less than 10 microns in diameter ($PM_{10}$) are directly related to VMT. Therefore, they would be expected to decrease for both of the Build Alternatives as compared to the No-Build Alternative. Total project area carbon monoxide (CO) emissions are also expected to follow this trend. Future year pollutant emissions are expected to increase for all three alternatives due to projected increases in traffic. However, on a per-vehicle basis, carbon monoxide emissions are expected to decrease due to projected improvements in emission technology and fuel and testing programs.

The effect of this project on local carbon monoxide "hot spots" was analyzed at four intersections. These intersections represented the worst-case conditions within the study area. All four intersections have predicted maximum impacts that are within the carbon monoxide standards for each Build Alternative for all analysis years.

The *RTP* includes a major project that modifies the I-5 interchange at Barnett Road and additional improvements to some of the on- and off-ramps. An analysis for conformity determination was performed as part of the *RTP*. It is expected that both of the Build Alternatives would also show conformance, as these alternatives exhibit similar traffic configurations and congestion reduction as the associated *RTP* projects. An amendment to the *RTP* would be submitted in the future, to account for this revised South Medford Interchange Project. The regional air quality conformity determination would need to be reevaluated as part of that future amendment. In addition, based on a qualitative assessment presented in this section, construction of this project is not expected to create new or exacerbate existing carbon monoxide hot spots in the project area.

## Hazardous Materials

### *Consequences Common to Both Build Alternatives*

Neither alternative is likely to encounter a substantial hazardous materials problem. Activities at sites within the project area (see

Affected Environment section) could have generated hazardous materials. If the situation occurred where a hazardous material was released at any of these known sites, both Build Alternatives would be affected in very similar ways.

### *Highland (Preferred) Alternative*

The Highland Alternative footprint traverses the Hale property through an area of abandoned automobiles and heavy equipment and adjacent to the north of the shop/storage building on the southern area of the property. Because this alternative would traverse closer to the center of areas containing potential hazardous materials, the potential for impact from hazardous materials would be greater under this alternative than under the Ellendale Alternative.

The Highland Alternative is adjacent to the east of the barn structure located northwest of the Quail Point Golf Course, through the open field that appears to serve as a disposal area for cow manure. It is unknown whether any leaks or spills of pesticides, herbicides, or petroleum product ever occurred in the vicinity of the barn.

The Highland Alternative crosses the western edge of an apparent shop building south of east Barnett Road. It is unknown whether any releases of petroleum product or hazardous substance may have occurred at this site or beneath the project footprint.

### *Ellendale Alternative*

The Ellendale Alternative footprint crosses the Hale property south of the residence building and adjacent to the east of the residence and a small shed, thereby skirting the area with the highest potential for contamination. It would also cross the Quail Point Golf Course and maintenance area to connect to the current southern end of Ellendale Drive. It is unknown whether any releases of petroleum product or hazardous substance may have occurred at this site or beneath the project footprint.

## Energy

The energy requirement analysis includes evaluating both construction energy and operations energy. The construction energy evaluation involves analyzing the total energy required for the physical construction of each Build Alternative. The operations energy evaluation involves an analysis of the energy consumed by the operation of vehicles using the Build and No-Build Alternatives. All energy values are expressed in British Thermal Units (BTUs), which are used to provide a common unit for purposes of calculating and comparing the different forms of energy involved in the project.

### *Construction Energy Determination*

An estimate of the energy required to construct the two Build Alternatives was calculated using appropriate energy factors and material quantities for the different construction activities (e.g., excavation, embankment, structural material, base and surfacing, and guardrails).

The construction of the Ellendale Alternative would require about 547 billion BTUs. The amount of energy required to construct the project under this alternative is equivalent to about 15,140,000 liters (4.0 million gallons) of gasoline.

The construction of the Highland Alternative would require about 477 billion BTUs. The amount of energy required to construct the project under this alternative is

equivalent to about 14,383,000 liters (3.8 million gallons) of gasoline.

### *Operations Energy Determination*

The energy requirements for the operation of vehicles were calculated for the two Build Alternatives and for the No-Build Alternative. The operations energy determination compares a calculation of fuel consumption by traffic in the project area. The calculation uses the number of vehicles, the types of vehicles, an estimated average vehicle speed, and the length of roadway. The annual energy usage for the three alternatives is provided in Table 4-10.

Both Build Alternatives require 20 percent less energy than the No-Build Alternative. The payback period for the Highland Alternative was calculated to be 7 years. The Ellendale Alternative would require a greater investment of energy for construction and is estimated to achieve equal energy savings as the Highland Alternative during the long-term use of the interchange. A payback analysis was performed assuming a linear increase in energy consumption between year 2010 and 2030. The energy saving of operations energy for the Ellendale Alternative over the No-Build Alternative compared to the construction energy of the Ellendale Alternative would be equal in 6 years.

## Geology and Soils

### *No-Build Alternative*

Existing bridge structures over Bear Creek and the Barnett Road overpass are supported by shallow foundations built on conglomerate bedrock. These structures would likely be damaged or destroyed by an earthquake substantially disrupting traffic flow in Medford.

### *Consequences Common to Both Build Alternatives*

Embankment Retaining Walls

Foundation soils along the alignments would provide adequate bearing material for proposed walls provided the walls are built in accordance with recommendations provided by the project geotechnical engineer.

Shrink-Swell Clays

Shrink-swell clays are common in the footprints of both Build Alternatives. Post-construction movements induced by shrink-swell clays could affect the in-service performance of pavement and embankment structures for both Build Alternatives.

**Table 4-10**
**ANNUAL ENERGY USAGE**

| Alternative | Annual Energy Usage (billion BTUs)—Year 2010 | Annual Energy Usage (billion BTUs)—Year 2030 |
|---|---|---|
| No-Build | 455 | 650 |
| Highland | 378 | 542 |
| Ellendale | 378 | 539 |

### *Highland (Preferred) Alternative*

No additional impacts are envisioned with the Highland Alternative.

### *Ellendale Alternative*

No additional impacts are envisioned with the Ellendale Alternative.

## Hydraulics

Scientists conducted a hydrological analysis for this project in collaboration with FEMA.

### *No-Build Alternative*

The effects on the floodplain are assumed to be a continuation of existing conditions, incorporating planned development trends and regulatory stipulations.

### *Consequences Common to Both Build Alternatives*

Based on preliminary hydraulic analysis, both alternatives would alter flood conveyance within the FEMA-designated floodway of Bear Creek, but the cumulative impact of either alternative cannot be quantified until detailed hydraulic modeling is performed. This would be done once detailed design information becomes available.

The preliminary evaluation consisted of conveyance compensation analyses. The analyses were performed on locations within the Bear Creek floodway that were selected as representative of the bridge crossings under each Build Alternative. The three new bridges under each alternative would span Bear Creek, i.e., no piers would be located in the creek, itself, or within its 2-year flood elevation or ordinary high water line. Piers that would be located within Bear Creek's floodway would reduce conveyance. However, trees located beneath a bridge would be removed, and this would reduce the roughness of the channel and at least in part counter-balance the reduction in flood conveyance caused by the addition of piers.

### *Highland (Preferred) Alternative*

Bear Creek

The preliminary evaluation consisted of analysis of seven locations selected as representative of existing channel conditions and possible pier placement. Piers would cause flood conveyance losses at three locations because few trees are present at the proposed pier locations. The other four locations are densely forested, so that removal of the trees would counter-balance the addition of piers and there would not be a loss of flood conveyance.

A small area, approximately 60 square meters (646 square feet) of the retaining wall associated with the northbound on-ramp may be located within the floodway boundary that was used for the hydraulics analysis. On-the-ground surveys between the DEIS and the Final EIS would determine the extent to which this may reflect mapping inaccuracies. Should the encroachment be confirmed, impacts to the floodway would be avoided or minimized by measures that could include (but not necessarily be limited to) relocating the retaining wall and/or bridging the floodway.

Lazy Creek and Larson Creek

There would be no floodway conveyance impacts because the floodways of these streams is contained in their main channels and the proposed bridges over them would span the streams.

### *Ellendale Alternative*

The preliminary evaluation consisted of analysis of 11 representative locations. Piers would cause flood conveyance losses at two of the locations because few trees are present. The remaining nine encroachment cross-sections are predicted to have no conveyance losses because the effect of the new piers would be fully counter-balanced by the removal of the existing trees.

Preliminary evaluation indicates that the likelihood of a net reduction in flood conveyance is higher under the Ellendale Alternative. While piers would total 60 under the Ellendale Alternative versus 28 under the Highland Alternative, piers would reduce flood conveyance at two out of 11 representative locations under the Ellendale Alternative, versus three out of seven locations under the Highland Alternative.

## Water Quality

Construction impacts on water quality often occur as a result of ground disturbance, which exposes soils to erosion; in-water work; and spills of toxic material in or near receiving waters.

After projects of this type have been constructed, water quality impacts often occur as a result of discharges of highway runoff, alterations in hydrology due to increased impervious surface area and filling wetlands, and short-term loss of shading resulting from work in riparian zones.

Highway runoff typically carries a suite of pollutants, most notably suspended sediment, nutrients, oils and grease, and heavy metals. Estimated concentrations of copper were used to determine whether freshwater acute toxicity criteria would be exceeded. Increasing impervious surface area generally has the effect of increasing the total load of pollutants discharged to receiving waters. This in turn can increase in-stream pollutant concentrations.

Increases in impervious surface area contribute to making streams flashier, with faster, higher peak flows and reduced discharge during periods of low flow. This effect can be amplified when a project fills wetlands. Along with increased risk of flooding comes the potential for streambank erosion and the consequent increased turbidity and channel morphology changes. Decreased low flow discharges not only reduce habitat available for aquatic life, but also lead to increased water temperatures during summer months.

### *No-Build Alternative*

There would be no construction-related impacts under the No-Build Alternative, because there would be no ground-disturbing activities.

The No-Build Alternative would perpetuate existing conditions with regard to highway runoff. Most of the runoff from project roads and the existing interchange is discharged untreated into Bear Creek. Nonetheless, the effect of the runoff on water quality is, on its own, small. The three-year pollutant concentration to acute criteria ratio for copper is 0.27. Larson Creek receives only a limited amount of runoff from project area roads, so, despite its small size, the three-year ratio is 0.18, well below the acute toxicity criteria. Because the watershed has experienced considerable development, it is possible that Larson Creek occasionally exceeds the acute toxicity criteria for metals, but the project area roads are a minor contributor.

Increases in traffic resulting from development both in the project area and elsewhere would cause an increase in pollutant loading in runoff from at least some of the project area roads. Because pollutant loads and traffic volumes are only weakly correlated, a prediction of the magnitude of the effect cannot be made.

With no increases in impervious surface area and no filling of wetlands, there should be no impacts to the hydrology of Bear, Larson or Lazy creeks. This does not, however, preclude changes due to ongoing development in the project area or the rest of the Bear Creek watershed.

### *Consequences Common to Both Build Alternatives*

Both Build Alternatives would require bridge construction. Work on stream banks and within the riparian zone could result in a greater risk of erosion causing sediment to get into the streams during construction.

The impact of discharging untreated runoff to Bear Creek from the Highland Alternative is essentially indistinguishable from the impact of the Ellendale Alternative. Neither alternative would, on its own, cause an exceedance of acute toxicity criteria for metals in Bear Creek. Neither alternative would impact Lazy Creek.

Removal of the existing off-ramps and portions of Center Drive would eliminate 2 to 3 hectares (5 to 7 acres) of existing impervious surface area in both alternatives.

### *Highland (Preferred) Alternative*

In addition to the number of new bridges (which both Build Alternatives have in common) the Highland Alternative would place the northbound on-ramp immediately adjacent to Bear Creek, presenting a challenge for erosion control.

The terrain along the Highland Alternative's alignment varies from flat to moderate slopes. The slopes present opportunities for erosion by overland flow.

The Highland Alternative includes somewhat less new impervious surface area in the primary footprint (8.25 hectares (20.39 acres)) than the Ellendale Alternative, and would require less construction on the east side of Bear Creek.

Larson Creek would experience a small increase in pollutant loading due to project highway runoff, but not enough to adversely affect beneficial uses on its own. The 3-year concentration ratio for copper is estimated to be 0.26, an increase over existing conditions, but not high enough to cause, on its own, an exceedance of toxicity criteria in the receiving waters. The hydrologic impacts of the Highland Alternative on Bear Creek would be similar, though slightly less than those of the Ellendale Alternative. While virtually unnoticeable, the increase in flashiness and decrease in low flow discharge would be smaller because there would be less new impervious surface area, and the wetland area impacted (0.04 hectare (0.1 acre)) would be smaller. The impact on Larson Creek would be proportionately larger than on Bear Creek, but would also be smaller than the Ellendale Alternative's impact. However, slightly more riverine wetland along Larson Creek would be impacted.

Impacts to riparian forests have the potential to reduce shading, increasing summertime water temperature and reducing food sources for aquatic life and shelter during high flows.

### *Ellendale Alternative*

In addition to the number of bridges (which both Build Alternatives have in common) the Ellendale Alternative would have a southbound off-ramp immediately adjacent to Bear Creek for a distance of 600 hundred meters (approximately 1,500 feet). This would provide a challenge for erosion control.

East of Bear Creek, a ridge extending from the northwest side of Barneburg Hill divides the flow of Bear Creek. South of the ridge, a relatively steep slope dips toward Bear Creek. North of the ridge the ground slopes at a moderate gradient toward Larson Creek. That portion of the alignment probably presents the most opportunity for extensive erosion.

The Ellendale Alternative has the largest amount of new impervious surface area in the primary footprint, 8.95 hectares (22.11 acres), of the Build Alternatives, but slightly less impact on Larson Creek than the Highland Alternative. The new impervious surface area would be the result of new alignments and widening of existing roads.

Larson Creek would receive a moderate increase in pollutant loading. The 3-year pollutant concentration ratio for copper would be about 0.25 and therefore would not rise above the acute criteria. Even untreated, the runoff would not, on its own, cause Larson Creek to exceed acute criteria. The likelihood of water quality criteria exceedance in Larson Creek would increase.

The increase in impervious surface area would only marginally affect the hydrology of Bear Creek. The project area is very small (0.005 percent) in relation to Bear Creek's watershed, so the impact would be essentially imperceptible. Flashiness would be slightly enhanced.

Because the proportion of project new impervious surface area to watershed area for Larson Creek (about 0.02 percent) is greater than for Bear Creek, the impact would be greater, though on its own still very small.

## Biological Resources

In general, the Build Alternatives present similar potentially adverse impacts to the natural environment of South Medford. However, for high value habitats such as riparian forests, wetlands and woodlands, the Ellendale Alternative has a consistently higher level of potential impact for each vegetation community.

### *No-Build Alternative*

The No-Build Alternative would not result in biological impacts within the study area.

### *Consequences Common to Both Build Alternatives*

Both Build Alternatives would have potentially adverse impacts on the biological resources of South Medford. The differences in the levels of impact between the two are small but measurable, as indicated by the data in Table 4-11. As detailed within this section, the project study area encompasses a developed urban area where remaining open space and undeveloped parcels have been heavily degraded or altered by past land use practices. Neither of the Build Alternatives would impact truly high quality or undisturbed habitats. While there are differences in the amount of potential impact between the two, the differences are relatively small. The potential impacts from either Build Alternative could be offset by

the implementation of the recommended mitigation measures presented in Chapter 5.

Vegetation Communities

Construction of either Build Alternative would result in additional fragmentation and subdivision of existing, natural vegetation communities. The larger natural communities of abandoned fields and riparian forests west of Bear Creek would be the most affected communities (Figures 4-4 and 4-5). Outside of developed urban areas, the greatest direct loss of natural vegetation would be within the abandoned field community. Vegetation loss by community for both the primary and buffered footprint of each Build Alternative of the project is presented in Table 4-11.

Wildlife

The construction of either Build Alternative would result in the direct removal and conversion of existing vegetation within relatively high quality habitats such as riparian forests, wetlands and woodlands. Each Build Alternative would result in additional fragmentation and subdivision of existing, natural vegetation communities. Both alternatives would require removal of the overstory trees within the riparian forests along Bear Creek, resulting in the loss of potential nest and den sites for small mammals and birds. Crossing woodlands or riparian forests with either alternative would further fragment and subdivide habitat.

Given the relatively large bridge structures proposed over Bear Creek and its floodway for either alternative, wildlife travel and migration corridors along Bear Creek would be maintained.

Threatened and Endangered Species

Removal of riparian forest vegetation within the immediate vicinity of each bridge crossing would be required, thereby reducing stream shade and cover. Short-term reduction of shade and cover would be localized and limited to the alignment of the bridge crossing until forest vegetation can recover in areas not directly underlying the bridge.

Relative to the operation of either Build Alternative, the potential exists for long-term impacts to listed coho salmon due to changes in water quality and quantity in Bear Creek as a result of creating new impervious surfaces (pavement). Stormwater detention swales along the new roadway alignments are proposed for the project, thereby minimizing potential impacts.

During road construction, the most important impacts on fisheries resources are often those related to direct disturbances to stream channels at proposed bridge crossings. Worst-case scenario estimates of the amount of proposed stream channel disturbance associated with each Build Alternative are presented in Table 4-12. In addition to stream channel disturbance, the construction of new bridges can adversely affect fish due to the installation of rip-rap (large rock) for scour erosion protection of piers located in the floodway (but not in the main channel) during flood events.

The proposed roadway bridge structures over Bear Creek would span the stream. Bridge supports would be located outside the channel of Bear Creek and no direct encroachment by construction equipment would occur within the channel except during in-water work.

**Table 4-11**
**VEGETATION COMMUNITY DISTURBANCE ASSOCIATED WITH THE SOUTH MEDFORD INTERCHANGE BUILD ALTERNATIVES**
**(Data in Hectares/Acres)**

| Vegetation Community | Highland Primary Footprint | Highland Buffered Footprint | Ellendale Primary Footprint | Ellendale Buffered Footprint |
|---|---|---|---|---|
| Developed Urban Areas | 6.5 /16 | 8.0/19.9 | 7.6 /18.8 | 9.8/24.2 |
| Abandoned Field | 5.2 /12.9 | 6.5/16.2 | 4.4/10.8 | 5.7/14.2 |
| Riparian Forests | 0.3/0.7 | 0.4/0.9 | 0.5/1.3 | 0.7/1.7 |
| Woodland | 0 | 0.01/0.03 | 0.6/1.4 | 0.7/1.7 |
| Wetlands | 0.04/0.1 | 0.04/0.1 | 0.2/0.5 | 0.2/0.5 |
| Grand Total | 12.0/29.7 | 14.9/37.1 | 13.3/32.8 | 17.1/42.3 |
| **Total Excluding Developed Areas** | **5.5/13.7** | **6.9/17.2** | **5.7/14.0** | **7.3/18.1** |

**Table 4-12**
**ESTIMATES OF MAXIMUM STREAM CHANNEL DISTURBANCE**

| Alternative | Length of Stream Channel Disturbance – Meters (feet) |
|---|---|
| Highland | |
| Primary Footprint | 52.8 (173.2) |
| Buffered Footprint | 58.9 (193.2) |
| Ellendale | |
| Primary Footprint | 41.8 (137.1) |
| Buffered Footprint | 50.2 (164.7) |

Wetlands

The construction of either Build Alternative would result in the direct filling and loss of wetlands at widely scattered locations within the study area.

For both Alternatives, the majority of the wetlands impacted are those associated with small, poorly drained depressions or swales within the landscape. The affected wetlands are also hydraulically isolated from Bear Creek or Larson Creek.

Invasive Species

The selection of either Build Alternative has the potential to further the spread of invasive species. Clearing and grading activities can spread invasive seed sources within the soil and incoming construction equipment could carry new invasive seed sources from other locations. Bare soil areas in newly graded areas (where seed sources exist) facilitate the establishment of new populations of invasive species. Fill materials, which would be imported by the contractor, could be a source of invasive species. The contractor would export materials from permitted sites only, and the potential for

introduction of invasive species will be evaluated.

Given the already extensive coverage of invasive species in the study area, the potential for increasing the spread and coverage of invasive species is expected to be minimal.

Due to the pervasiveness of invasive species in the study area, ground clearing and grading activities associated with construction could be viewed as a benefit since such activities would provide an opportunity for control. In addition, landscaping and restoration activities would also provide an opportunity to introduce new plantings of native species and help control the existence of invasive species. Dominant invasive species that may be locally reduced by construction include diffuse knapweed, medusahead, yellow star thistle, field bindweed, and Himalayan blackberry.

### *Highland (Preferred) Alternative*

Vegetation Communities

Construction of the Highland Alternative would result in approximately 12.0 hectares (29.7 acres) of vegetation being lost or disturbed within the primary footprint and approximately 14.9 hectares (37.1 acres) within the buffered footprint.

Wildlife

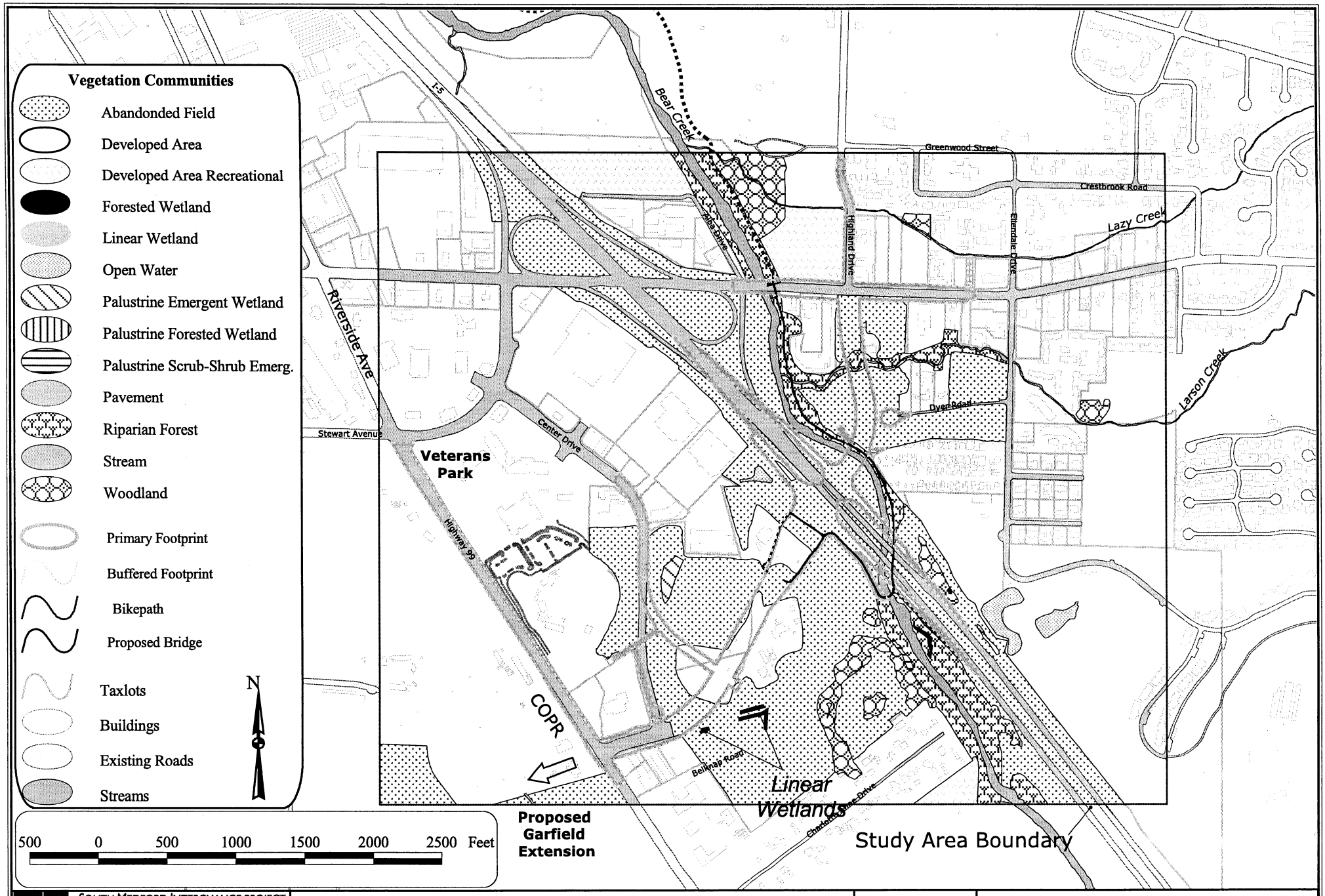
Outside of developed urban areas, the abandoned field community would be subjected to the greatest direct loss (see Table 4-11). Loss of this habitat would affect small herbivores, such as field mice and meadow voles, and small reptiles. This habitat is favored by pheasant and several species of migratory songbirds for cover and nesting. Several species of raptor, such as the red tailed hawk, would experience a loss of available food sources, as the prey population would decline as portions of the abandoned fields are removed.

The riparian forests along Bear Creek represent the most valuable habitat for wildlife species in the study area. This habitat provides cover and nesting opportunities for a number of mammals, reptiles, amphibians and migratory songbirds. Construction of the Highland Alternative would result in the minor loss of approximately 0.3 hectare (0.7 acre) of riparian forest habitat within the primary footprint and 0.4 hectare (0.9 acre) for the buffered footprint.

Threatened and Endangered Species

For the widening of the existing Barnett Road Bridge and new Larson Creek crossing, riprap may be placed along the immediate stream channel. The placement of this new riprap could remove existing streambank vegetation and alter steam habitat.

Estimates on the amount of net impervious surfaces created for each Build Alternative are presented in Table 4-13. Construction of the Highland Alternative would result in a net increase of 8.3 hectares (20.4 acres) of impervious surfaces in the study area for the primary footprint. Construction of the bike path component of the Highland Alternative would result in an additional 0.5 hectare (1.1 acres) of impervious surfaces along Bear Creek. The additional impervious surfaces could impact the existing hydrology of local streams (without proper controls) by increasing the rate of run off to streams and the peak flood flows in streams. In comparison to the Ellendale Alternative, the Highland Alternative would result in a lower amount of new impervious surfaces.




SOUTH MEDFORD INTERCHANGE PROJECT
ALTERNATIVES & SOLUTIONS

# Highland Vegetation Communities

**Figure 4-4**

Oregon Department of Transportation

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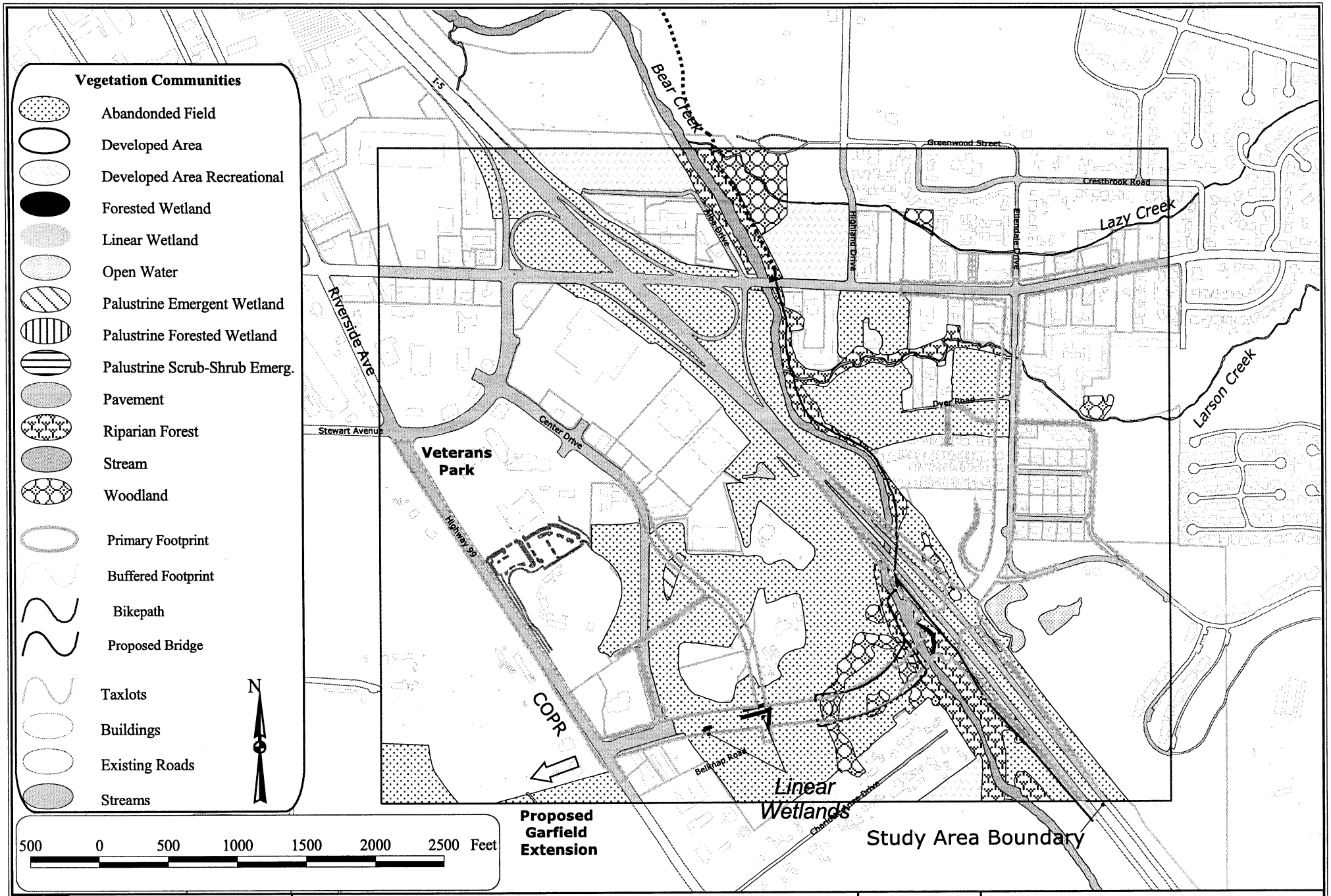


SOUTH MEDFORD INTERCHANGE PROJECT
ALTERNATIVES & SOLUTIONS

# Ellendale Vegetation Communities

**Figure 4-5**

Oregon Department of Transportation

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Wetlands

Implementation of the Highland Alternative would disturb approximately 0.04 hectare (0.1 acre) of wetlands within the primary and buffered footprints. The two wetlands that would be filled during construction of the Highland Alternative are "palustrine emergent wetlands" associated with a poorly drained alluvial bench along the east bank of Bear Creek just south of Barnett Road, and an isolated, poorly-drained depression along the southbound lane of I-5. Both impacted wetlands are small and of low quality, providing only limited functions for sediment and nutrient retention and localized groundwater recharge.

The operation of the Highland Alternative would not have any additional impacts on wetlands within the study area. The majority of the wetlands within the study area is hydrologically isolated from Bear and Larson creeks and would not receive stormwater discharges from the roadway.

### *Ellendale Alternative*

Vegetation Communities

Implementation of the Ellendale Alternative would result in approximately 13.3 hectares (32.8 acres) of vegetation being lost or disturbed within the primary footprint and approximately 17.1 hectares (42.3 acres) would be lost or disturbed within the buffered footprint (Table 4-11).

Although the loss of abandoned field vegetation is less under this alternative when compared with the Highland Alternative, the Ellendale Alternative would have a greater impact on other natural vegetative communities. For example, the Ellendale Alternative would result in a greater impact to high value riparian forest vegetation by removing 0.5 hectares (1.3 acres) within the primary footprint when compared with the 0.3 hectares (0.7 acres) removed under the Highland Alternative primary footprint. A similar relative increase in impact exists between the buffered footprint of the two Build Alternatives. The Ellendale Alternative also results in an increased impact to woodland and wetland vegetative communities. The majority of the loss to natural vegetative communities would be from the Ellendale Connector from the west side of I-5 to Highway 99.

Wildlife

Construction of the Ellendale Alternative primary footprint would result in the loss or removal of approximately 4.4 hectares (10.8 acres) of vegetation from the abandoned field community (Table 4-11). Impacts would be similar to those that would occur under the Highland Alternative.

The riparian forests along Bear Creek represent the best or most valued habitat for wildlife species in the study area. This habitat provides cover and nesting opportunities for a number of mammals, reptiles, amphibians and migratory songbirds. Construction of the Ellendale Alternative would result in the loss of approximately 0.5 hectare (1.3 acres) of riparian forest habitat within the primary footprint and 0.7 hectare (1.7 acres) for the buffered footprint.

Threatened and Endangered Species

Replacement of the culvert with a bridge for the Ellendale Drive crossing over Larson Creek would result in approximately 41.8 meters (137.1 feet) of stream channel disturbance within the primary footprint and 50.2 meters (164.7 feet) within the buffered footprint. The potential stream channel

**Table 4-13**
**NET INCREASE OF IMPERVIOUS SURFACES**

| Alternative | Net Increase in Impervious Surfaces Data in Hectares (Acres) |
|---|---|
| Highland | |
| Primary Footprint | 8.3 (20.4) |
| Bike Path | 0.5 (1.1) |
| Ellendale | |
| Primary Footprint | 8.9 (22.1) |
| Bike Path | 0.6 (1.5) |

disturbance for the Ellendale Alternative is less than the total stream channel disturbance proposed for the Highland Alternative. The widening of the Ellendale Drive crossing would result in some limited removal of existing streambank vegetation and would alter existing stream habitat along the streambank in the immediate vicinity of the crossing. The replacement and widening of this crossing would likely result in stream channel disturbance and short-term turbidity and sedimentation impacts to Larson Creek.

In comparison to the Highland Alternative, the Ellendale Alternative presents a greater impact to riparian forests. Construction would remove overstory vegetation within the limits of the proposed bridge rights-of-way, thereby fragmenting the vegetative community and reducing natural stream shade at four points along Bear Creek.

Additional impacts to fisheries resources would be changes in water quality and quantity as a result of creating new impervious surfaces. Construction of the Ellendale Alternative would result in a net increase of 8.9 hectares (22.1 acres) of impervious surfaces from the primary footprint.

Given the larger net increase in impervious surfaces associated with the Ellendale Alternative, it would appear that this Build Alternative would have a greater potential impact on fisheries resources within local streams. However, potential impacts from the larger net increase in impervious surfaces with the Ellendale Alternative are somewhat minimized by the fact that the Highland Alternative would result in a greater length of stream channel disturbance, 52.8 meters (173.2 feet) versus 41.8 meters (137.1 feet). In addition, the implementation of the Ellendale Alternative would likely remove an existing barrier to fish passage on Larson Creek. The existing Ellendale Drive crossing of Larson Creek has a culvert that is considered a fish barrier by the Oregon Department of Fish and Wildlife (ODFW). The construction of the Ellendale Alternative calls for the expansion and improvement of the existing Ellendale Drive culvert, which would likely result in the replacement of the existing fish barrier with a new fish-friendly culvert or bridge. This would be a beneficial impact over existing conditions.

Wetlands

Implementation of the Ellendale Alternative would disturb approximately 0.2 hectare (0.5 acre) of wetlands within the primary and buffered footprints (Table 4-11). In comparison to the Highland Alternative, this alternative presents a greater impact to wetlands. Wetlands which would be impacted during construction include palustrine forested, palustrine scrub/shrub-emergent and palustrine emergent wetland communities. Several small, linear wetlands associated with ditches and drainage swales in the vicinity of existing Belknap Road would also be impacted.

The majority of the wetlands impacted by this alternative are small isolated wetlands that are associated with poorly drained depressions or excavations within the landscape. Due to their small size and lack of hydrologic connectivity with surface streams, these wetlands are limited in their ability to retain stormwater and to provide for flood control. Their size also limits their value as wildlife habitat. The dense vegetation in these wetlands and standing surface water can provide some retention of sediment and pollutants adhering to sediment particles. The value of these wetlands for all of these functions is considered to be low due to their small size, hydraulic isolation from streams, and widely scattered positions across the landscape.

Wetlands along Bear Creek include a palustrine-forested wetland associated with a narrow stream overflow channel and a palustrine scrub/shrub-emergent wetland associated with a poorly drained rectangular depression near a sanitary sewer easement. Both of these wetlands are located within the floodway of Bear Creek and would be spanned by the bridge structure that would carry the Highway 99 Connector over Bear Creek. Although no direct filling or encroachment within these wetlands is expected, removal of trees and tall shrubs may be required to facilitate bridge clearance. The vegetative structure of these wetlands would be altered. Given their small size, the forested wetlands have moderate value as wildlife habitat, riparian cover and aesthetics to the urban environment. In addition, their size limits their function for stormwater retention and sediment trapping. These wetlands are not likely to retain floodwater much beyond the flood stage. Some reduction in flow velocity is likely due to friction with standing trees and vegetation.

## Cumulative Impacts

Cumulative impacts are those that are additive and incremental over time. The combined effects of development and activities in the past and present, and development and activities that are reasonably foreseeable in the future, are assessed. The fundamental premise of considering cumulative impacts is that, while impacts might be unsubstantial if considered individually, the accumulation of impacts from one or more sources and over time can become substantial. By its additive nature, cumulative impact analyses often incorporate a combination of direct and indirect impacts of the proposed improvements.

Under the No-Build Alternative, it is assumed that several other projects or actions have been developed, are being constructed, or are anticipated regardless of the South Medford Interchange Project being constructed. The combination of these projects or actions and the No-Build Alternative forms an important basis for the comparative assessment of South Medford Interchange

Project Build Alternatives, particularly the assessment of cumulative impacts.

### *Other Roadway Improvements*

This study assumes capital investment (roadway) projects currently developed or "committed" in the *RTP* would be built under the No-Build Alternative. Only the roadway improvement projects included in the *RTP*'s "financially constrained," short-term, Tier 1 project list would be constructed under this alternative. These would include the following past, present/ongoing, and future roadway improvement projects:

Past

- North Medford Interchange Revision - built in 1998, realignment of the southbound off-ramp and construction of new southbound I-5 access loop from westbound Highway 62.

- North Phoenix Road Widening – widening between Barnett Road and Hillcrest Road to five lanes with curb, gutter, bike lanes and sidewalk.

- McAndrews Road Right-Turn Only Lane – construction of a right-turn only lane on westbound McAndrews Road at Biddle Road.

- Riverside Avenue Turn Lane – construction of a right-turn only lane from Walnut to McAndrews Road.

Present/Ongoing

- Hamrick Road Widening – under construction, it involves widening the road from Pine Street to Table Rock Road, including widening to three lanes with curb, gutter, bike lanes and sidewalks.

- East McAndrews Road New Roadway – under construction between Brookdale Avenue and Foothill Road, it involves constructing a new five-lane roadway with curb, gutter, bike lanes and sidewalk.

- Highway 238 Unit 1 Widening – planned for construction by 2003, it involves widening the highway from the Highways 62/99 interchange to North Ross Lane, including four lanes with curb, gutter, bike lanes and sidewalks. Planned for construction by 2001, and also involves constructing new roadway from west Table Rock Road to Central Avenue (including McAndrews Road), including three lanes with bike lanes, curb and gutter, and a cul-de-sac.

Future

- Garfield Street Extension – planned for construction by 2003, it involves constructing new roadway from Holly Street to Highway 99, including a new 5-lane roadway with curb, gutter, bike lanes and sidewalks.

- North Phoenix Road Realignment and Widening – planned for construction by 2003, it involves realigning and widening from Cherry Lane to Foothill Road, including five lanes with curb, gutter, bike lanes and sidewalk.

- Junipero Way New Roadway – planned for construction by 2003, it involves constructing new roadway from Olympic Avenue to Golf View Drive, including 3 lanes with curb, gutter, bike lanes and sidewalk.

- Lone Pine Road Widening – widening to 3 lanes with bike lanes and sidewalks.

### *Other Development*

Other past, present/ongoing, and future projects that have, are, or are anticipated to occur in the include the following:

Past

- Generally, urban and other land management activities that have occurred in the Southeast Medford area, with particular focus on the activities very near the project vicinity that have had particularly important influences on forming the landscape, such as:
  - ➢ Past aggregate mining of the stream on the west side of the highway in the vicinity of the Ellendale Alternative.
  - ➢ Residential, commercial, and private recreational development.
  - ➢ Existing roadway bridges across and culverts within Bear and Larson creeks.
  - ➢ Bear Creek Greenway multipurpose path (bike/pedestrian) north of Barnett Road and the bridge across the creek just north of the street.

Future

- Barnett Road to South Stage Road Bear Creek multipurpose path extension (anticipated construction in 2003).
- Multipurpose path connection between the Bear Creek Greenway multipurpose path and a Section 6(f) (Land & Water Conservation Fund) mitigation bikepath leading west of the Bear Creek area toward the South Gateway Center area.

### *Traffic*

Traffic modeling conducted for the project assumed the existing street system (thereby incorporating past street improvements and current conditions) and implementation of "committed" projects in the *RTP* (thereby incorporating reasonably foreseeable improvements). These assumptions were used in modeling future conditions for both the No-Build Alternative and the Build Alternatives. To accommodate traffic growth, the Build Alternatives are designed to serve the predicted demand at the interchange out to the year 2030 and provide a hub for other improvements needed in South Medford. Because the traffic analysis is inherently cumulative, other analyses that fundamentally rely on the traffic analysis are also cumulative. This is particularly true with respect to elements of the air quality, noise, socioeconomic, and land use analyses that relate to traffic volumes and patterns, vehicle types, and accessibility.

### *Land Use*

Cumulative project impacts associated with the Build Alternatives relate to the combination of factors that create development pressure on lands planned and zoned for exclusive farm use lying just outside and south of the City of Medford's Urban Growth Boundary and east of Highway 99. The manner and extent to which the proposed Build Alternatives would increase development pressure as a result of improved accessibility to this area are important factors in the cumulative impacts assessment. The cumulative impacts of the improved accessibility would occur as a result of the project's proposed improvements when coupled with the City of Medford's planned extension of Garfield Street. These farmlands have been somewhat isolated, requiring access via

Stewart Avenue (an arterial street) and then by either 1) South Holly Street (a collector street) to Holmes Street (collector street) to Kenyon (a minor residential street) and then east via Garfield Street (an arterial) or 2) Myers Lane (a minor residential lane).

With the City's extension of Garfield Street to the west of Highway 99, these lands would have frontage along Garfield Street. The relocated interchange would provide quicker and easier access to Garfield Street at Highway 99. The outcome of this pressure could be quite variable and range from 1) inclusion of these lands in the urban growth boundary and their conversion from resource to urban uses, 2) development of farm or rural non-farm uses permitted under the County's Exclusive Farm Use Zone, and 3) maintenance of farm uses through rigorous application of existing *Comprehensive Plan* and zoning requirements.

The farm or non-farm uses might include public or private schools, churches, farm and non-farm dwellings, kennels, or golf courses. Inclusion in the city's urban growth boundary would be unlikely unless applicable provisions of the state land use planning program, specifically provisions of ORS 197.298, were met. This statute requires that farmlands are not included in urban growth boundaries except when other developed rural lands (i.e., committed) or lower value farmlands (i.e., lands with relatively lower quality soils) cannot serve urban land needs.

The relocation of the interchange and the extension of Garfield Street to Highway 99 could also stimulate plan-designated development on the west side of the highway. The combination of these two improvements would substantially improve accessibility to this area from residential areas in Medford and throughout the Rogue Valley region. The city's *Comprehensive Plan* provides for commercial development on approximately 5.5 hectares (13.5 acres) of land in this area.

Although planned street and accessibility improvements influence the developability of land, the extent and timing of development are also dependent on other factors, any one of which may be as controlling as transportation factors. These factors include, but are not limited to, availability of other utilities (e.g., water, sewer, power), real estate market factors (e.g., competition with vacant land in the vicinity of the I-5/Highway 62 interchange, or willingness/expectations of property owners), and overall economic conditions.

### *Socioeconomics*

The socioeconomics analysis of direct and indirect impacts is based on regional traffic forecasts. In many respects, therefore, it is a cumulative impact analysis of the socioeconomic impacts. The cumulative effects that would occur resulting from a combination of the No-Build Alternative and other factors influencing the socioeconomic environment would include a potential reduction in the economic viability of the commercial activities and recreational facilities associated with Bear Creek Park in the vicinity of the existing interchange. As congestion would increase, accessibility to these businesses would decrease, thereby adversely affecting their operations. Congestion would also adversely affect emergency services response times and pedestrian and bicycle safety (which would also be adversely affected by the continued paucity of bicycle facilities). Combined with other factors, such as noise impacts resulting from increased congestion, the socioeconomic environment would be

substantially impaired under the No-Build Alternative.

The extent to which the proposed Build Alternatives would combine with other factors influencing the broader economic-development changes in the project area and even broader regional economic growth is difficult to predict. As discussed in the land use cumulative impacts evaluation, the proposed project, in combination with the City's proposed Garfield Street extension project to the west of Highway 99, could encourage commercial development of lands in proximity to the Highway 99/ Garfield Street intersection. This would need to occur in compliance with local planning processes. Both Build Alternatives, when coupled with other roadway improvement projects in the area, particularly large projects such as the Highway 62 project, would contribute to cumulative short-term (construction-related) and long-term (indirect impact related) job creation in the region.

### *Cultural Resources*

Past development in the project vicinity, as well as the Bear Creek drainage basin in general, has undoubtedly adversely impacted the archaeological and historical built environment record of the area. These past impacts, when combined with the paucity of known recorded sites, substantially increases the relative value of any archaeological resources in the project area in comparison with similar resources that might be discovered in an area for which the record is better documented.

The City of Medford is currently designing a turn-lane on Highway 99 associated with the City's future extension of Garfield Street to the highway across from the current intersection with existing Belknap Road. The new lane would encroach upon the COPR right-of-way. In combination with the proposed turn lanes associated with both Build Alternatives, the railroad would need to issue an encroachment to ODOT. The two projects are being developed in coordination with the COPR, and no adverse impacts to cultural resources resulting from the combination of the two roadway projects are anticipated.

The City of Medford recently constructed a northbound right turn lane from Highway 99 onto Stewart Avenue. This city project required use of approximately 0.09 hectares (0.2 acres) of the Veteran's Park property along the highway and Stewart Avenue and required relocation of the powerlines between the highway and the park. Both the turn lane and Stewart Avenue were constructed using fill material and created a depression within the northern portion of the Park, which contains the historic trees. Although the Park continues to serve its recreational and commemorative purposes, surface water drainage from the portion of the site containing the historic trees has been impaired from this construction, which could affect the survivability of the trees. The South Medford Interchange project would also include placement of fill on approximately 0.13 hectares (0.3 acres) of park property. Combined, these roadway improvement projects would use approximately 0.35 hectares (0.5 acres) of the 0.95 hectares (2.34-acres) park property. The Park would continue to serve its recreational and commemorative purposes resulting from this use. However, drainage on the site should be improved

Also, maintenance of the powerlines, which were relocated as part of the City turn lane project, led to substantial pruning of the trees. Any further pruning might endanger the trees. Consequently, the powerlines

should not be placed or elevated any closer to the trees.

Other development anticipated in the project area and in Medford in general may adversely affect cultural resources through altering their integrity. The likelihood that archaeological resources may be located near Bear Creek in the general project vicinity is quite high. Given that future urban development is expected to occur in much of the same area, the potential for cumulative impacts to the archaeological resource record in this area is also quite high. However, the extent of these impacts can not be determined. Diligent implementation of local, state and federal regulations regarding identification, evaluation, and protection of important cultural resources are expected to minimize the potential adverse effects of new development and redevelopment.

### *Visual Resources*

Participants in the South Medford Interchange Project Land Use Charrette determined "desired" development scenarios for the project area (*Land Use Charrette Summary Report*, 2000). Cumulative impacts are based in part on the proposed project in combination with the type of development that may occur, the Regional Center Scenario. A range of development types could occur that would affect the visual environment. Other development anticipated to occur in the foreseeable future includes intense commercial development in the area west of Ellendale Drive, from the golf course north to Larson Creek. This development, by the Rogue Valley Manor, would contain a combination of businesses such as motels, offices, and a conference center, as well as some housing.

For both Build Alternatives, the Regional Center Scenario shows mixed-use development west of Ellendale Drive, from the golf course north to Larson Creek. Commercial development is shown along Barnett Road and west of I-5. Open space is shown for an area adjacent to Bear Creek. The actual form and character that future development will take is unknown. No design guidelines are in place that would apply to the study area.

In general, undeveloped parcels within the study area, which currently appear mostly as open fields with scattered trees and shrubs, would be replaced by urban development containing buildings, parking lots, roadways, and other structures. Since they are currently undeveloped, these parcels appear dark at night. The area would likely be lit at night once facilities are built, thus adding to the cumulative effects of lighting on night views.

Although each project individually may not substantially alter the visual character of the area, taken together, the area's character would change from a moderate level of urbanization to a densely built area. More lights would be visible at night.

Compared to the amount of expected development in this area, the proposed project would not substantially increase general urban visual features or views of urbanized land. Several segments of the Bear Creek Greenway multipurpose path are currently located under or near the I-5 roadway. The proposed Build Alternatives would involve placing the path under or very near the new interchange. The resulting cumulative effects to the visual environment along the path resulting from its proximity to the highway, and to potentially more dense urban settings, would increase the sense of an urban setting.

### *Noise*

As discussed above, because it relies substantially on traffic forecasts, the noise analysis of direct and indirect impacts is in many respects a cumulative impacts analysis of noise impacts.

Noise impacts under the No-Build Alternative, when combined with other factors influencing the socioeconomic environment, would result in adverse impacts to the overall quality of residential life in the project vicinity. The combined effects of new commercial development and the roadway improvement projects would be particularly noticeable in the vicinity of the residential developments along existing Ellendale Drive south of Barnett Road where a large development plan is proposed on the west side of the street.

Noise impacts under the Build Alternatives, in combination with other factors influencing local neighborhoods could be particularly noticeable to residents along Charlotte Anne Drive. This is where the proposed improvements would, and commercial development might, occur on properties north of the residential development.

### *Air Quality*

Cumulative air quality impacts can occur as the project study area becomes more developed, due to increased stationary, area, and mobile emission sources. Most of these sources are likely to have reduced potential for emissions, on an individual unit basis, due to improved technologies in pollution control. Development and further urbanization of the project area would be consistent with current comprehensive land use plans.

The RVCOG traffic model includes the anticipated transportation improvement projects for all of the Rogue Valley. These have already been shown to meet conformity, and it is expected that the South Medford Interchange Project Build Alternatives would also aid in reducing vehicle emissions in the area.

The *Draft Transportation, Traffic, Safety Technical Report* provides the VMT data for the project area for the Build and No-Build Alternatives. Predicted emissions were based on VMT. The Build Alternatives reduce overall VMT by reducing out-of-direction travel. The Ellendale Alternative would reduce Year 2030 VMT from the No-Build by 27,961 kilometers (17,374 miles) (approximately 11 percent). The Highland Alternative would reduce Year 2030 VMT from the No-Build by 27,270 kilometers (16,945 miles) (also approximately 11 percent).
The *RTP* for the Rogue Valley includes an analysis of conformity for all transportation projects included in the *RTP* to address long-term regional impacts. RVCOG (as part of the RVMPO) evaluates the total emissions associated with all these projects and determines if they are within the emissions budget for on-road mobile sources to ensure compliance with ambient air quality standards for CO and $PM_{10}$ included in the air quality *SIP*. If they were within the budget, no regional adverse air quality impacts would occur as a result of the planned projects.

The current air quality conformity analysis for the Rogue Valley is in final draft. The *RTP* and *MTIP* were both found to conform with the requirements of the Federal Clean Air Act and Amendments and the State Conformity Rule. In every case, the future year build scenarios produced lower emissions than the no-build scenario. For the

South Medford Interchange project, both of the Build Alternatives exhibit similar design features to the *RTP* project in the area. In addition to the *RTP* build scenarios, the *RTP* no-build scenarios also fall within the CO *SIP* emission budget. The regional air quality analyses presented in this report is based on the existing *RTP* conformity and net emissions due to the South Medford Interchange Build alternatives as compared to the No-Build Alternative. Project emissions are based on VMT data provided in the *Draft Transportation, Traffic, Safety Technical Report*. Vehicular CO, $NO_x$, and HC emission factors (grams per vehicle mile) were obtained using the MOBILE5b (EPA, 1996) emissions model, using guidance from ODEQ on appropriate model input assumptions. $PM_{10}$ emission factors (grams per vehicle mile) were obtained from the final draft of RVMPO's *RTP* conformity analysis.

### *Hazardous Materials*

Development associated with the proposed project may affect various sites identified through the studies conducted for this DEIS. Although the current proposed project might not affect a specific site, another development project could impact the site due to, for example, its closer proximity to the site. The cumulative effects of the Build Alternatives coupled with other likely development in the project area would be to increase the probability of disturbing contaminated sites and the release of pollutants into the environment. Federal and State regulations substantially reduce the likelihood of such individual or cumulative effects to occur.

### *Energy*

Because it relies substantially on the traffic analysis, which is a cumulative impact assessment of traffic (the energy use of which is the primary factor in the long-term energy analysis), the operations energy analysis is in many respects a cumulative impacts analysis of energy impacts. This project, in association with the other multi-modal improvements adopted under the *RTP,* would substantially improve traffic safety and capacity within the transportation system in the Medford area. Consequently, although the combined projects would require use of energy resources, they would improve the operational efficiency of transportation facilities and systems in the area. Other development, of which the construction might be supported by the proposed project, would consume energy for construction and operations. The extent to which this combined development can be accommodated by existing or planned energy supply is dependent on many local, state, regional, and national factors associated with the development, transmission, conservation, and use of energy resources.

### *Water Resources: Hydraulics and Water Quality*

Past and ongoing development and activities within urban and rural areas have combined to severely degrade the surface water resources within the Bear Creek drainage basin. This has resulted in flashy flood events associated with storm runoff, and associated water quality problems that affect stream-related biota.

Implementation of either Build Alternative would improve local traffic patterns and could increase the pace (or maintain the existing rapid pace) of future commercial, industrial and residential development in the study area, consistent with land use plan designations. Additional development that might occur in the floodplain would result in

future flood risks, as well as impacts to the natural and beneficial use of the floodplain in the study area. The greater flood risks would likely be in the area of the floodplain where frequent flooding problems currently exist. However, given the current regulatory environment, future development in the floodplain of Bear, Larson and Lazy creeks would likely be restricted and tightly controlled by local government. Therefore, cumulative future flood risks to the Bear Creek floodplain are likely to be minimal.

Other development in the project area, which is largely planned for urbanization except for areas along Bear Creek, would increase the overall amount of impervious surface and the potential rate at which stormwater runoff might be discharged to area streams. The increased runoff would also increase the potential for discharge of pollutants from impervious surfaces into area streams that encompass sensitive habitats. Combined construction-related contribution of sediments to streams during storm events would also increase over time. The proposed project would include stormwater management and water pollution control facilities that would minimize the adverse hydraulic and water quality effects of increased runoff resulting from the project's impervious surfaces. Consequently, the extent of the cumulative effects to area stream hydraulics and water quality would largely depend on local planning and regulatory programs that encourage minimizing potential impacts.

### *Biological Resources*

Implementation of either Build Alternative would improve local traffic patterns and likely increase the pace of future commercial, industrial and residential development in the study area. Additional development would result in future losses to various vegetation communities in the study area.

The majority of the existing wildlife habitat in the study area is degraded and highly fragmented by past land use activities. Large undisturbed areas with complex forest vegetation or wetland habitat are absent from the study area. Human activity and presence is high. Remaining areas are generally poor habitats and are used by species that have adapted to the human presence and the degraded condition of the habitats. Wetland and riparian mitigation areas resulting from current and future projects would likely serve as increasingly important habitats as development in the study area increases.

The concerns about long-term cumulative impacts of this project are mostly related to water quality and fish passage issues. The South Medford Interchange Project is one of several ODOT projects that would discharge stormwater to the Bear Creek watershed. While the ODOT projects are expected to have appropriate controls for stormwater management, they might support private development as an indirect result of an improved transportation network in the Medford area. Future adverse impacts on water quality and fisheries habitat to Bear Creek and its tributaries are inevitable if appropriate controls for stormwater management are not employed for the private developments.