

CHAPTER 5 – RECOMMENDED MITIGATION/CONSERVATION MEASURES

The following measures are recommended to offset in part or in whole impacts resulting from the proposed build alternatives.

Traffic, Transportation and Safety

Both Build Alternatives

1. To increase safety for bicyclists and pedestrians, separate and continuous bicycle lanes and pedestrian facilities will be added on both sides of Highway 99 between existing Belknap Road and Stewart Avenue and in the intersection areas. Increasing the width of Highway 99 would require additional right-of-way from adjacent businesses, including Les Schwab, a car lot, Rogue Valley Credit Union, the Veteran's Park, and the railroad. Widening Highway 99 would require approximately 0.13 hectares (0.32 acres) of the Veteran's Park. Highway improvements on the southern portion of the Veteran's Park would place the sidewalk adjacent to the rose bed associated with the flag pavilion, and improvements would taper toward the north. The affected portion of the park would consist entirely of lawn area. Improvements would be located at least 6 meters (20 feet) from existing tree trunks, and largely outside the tree drip lines. Proposed improvements would not adversely affect the trees. The improvements would require relocation of the power lines, either by moving them across Highway 99 or by placing them underground in a manner that would not damage the existing trees. Opportunities might exist to minimize

impacts further by using minimum roadway design standards that nonetheless maintain the highway's safe and efficient operation.

2. To increase safety for bicyclists and pedestrians, a combined bicycle/pedestrian path along Barnett Road and Highland Drive that is consistent with the Bear Creek Park Master Plan Map would be constructed.
3. To resolve the flaw associated with the location of the planned Bear Creek Greenway multipurpose path bridge, alternative access would be provided across Bear Creek on the new on-ramp (Highland Alternative) or off-ramp (Ellendale Alternative). This ramp bridge would be constructed as part of the interchange. The ramp bridge would be wide enough to accommodate a path separated from traffic by a barrier. Changes to the design of the Bear Creek Greenway multipurpose path bridge could also increase right-of-way impacts on park land.

Highland Alternative

1. To increase safety for bicyclists and pedestrians, separate and continuous bicycle and pedestrian facilities should be added on the east side of Highland Drive north of Barnett Road to Greenwood Street and to Barnett Road in the project area (including the Barnett Bridge across I-5). Note that widening of Barnett Road for mitigation would extend the project beyond the primary footprint and would increase right-of-way acquisitions from businesses, as well as biological impacts.
2. To increase safety for bicyclists and pedestrians, a combined

bicycle/pedestrian path along the north side of Highland Drive that is consistent with the Bear Creek Park Master Plan would be constructed as a part of this alternative.

Ellendale Alternative

1. To increase safety for bicyclists and pedestrians, separate and continuous bicycle and pedestrian facilities would be added along both sides of Barnett Road for the full length of the unpaved section.
2. To discourage non-local traffic from using Ellendale Drive north of Barnett Road, traffic calming measures would be installed.
3. Mitigation appears infeasible for improving access to Rogue Valley Manor and the housing east of Ellendale Drive, where a right-in, right-out intersection would cause out-of-direction travel. Accident statistics indicate that allowing full turning access at an unsignalized intersection within 0.402 kilometer (1,230 feet) of an interchange is dangerous. Relocating the access under the Ellendale Connector to the Highland Drive/Barnett Road intersection was explored but rejected by the Solution Team because of the added impacts.

Land Use

Both Build Alternatives

1. Future design efforts associated with any build alternative would avoid or minimize impacts to the wastewater pipe that parallels Bear Creek. After an alternative is selected, the project team would coordinate with the Bear Creek

Valley Sanitary Authority to identify special characteristics and maintenance requirements associated with this utility.

Highland Alternative

1. Access would be provided to the 1.8-hectare (4.42-acre) parcel located to the north of the project and south and east of the RRRink, or the parcel could be purchased as part of the project. Alternatively, the tract could also be consolidated with adjoining properties to the west under different ownership.
2. Access would be provided for two parcels that currently derive their access off of Belknap Road. Extending Center Drive approximately 50 meters (165 feet) south from its planned intersection with the Highway 99 Connector could accomplish this.

Ellendale Alternative

1. Future design efforts would explore alternative design of the interchange's northbound on-ramp that might avoid or minimize impacts to publicly owned lands.
2. It would be difficult to avoid displacement impacts to the Pacific Power & Light power transmission line without substantial modification of the Ellendale Alternative. During future design activities, the project team would coordinate with the private utility to identify special characteristics and maintenance requirements associated with the transmission line.

Rights-of-Way and Relocation

Both Build Alternatives

Applicable federal and state laws govern property acquisitions and relocation for highway projects. Relocation assistance would be provided to anyone whose residence or business is displaced. Property acquisition, relocation assistance, and compensation procedures would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Code of Federal Regulations (CFR Volume 49 Part 24), Federal Law 91.646, and pertinent state laws, including Oregon Revised Statutes 281.045 to 281.105. In addition, local governments would be encouraged to take appropriate public/private actions to support development that would increase the property tax base and offset initial losses. A summary of ODOT's land acquisition and relocation programs can be found in Appendix F.

Relocation benefits are quite different for businesses than for residential occupants. Businesses are eligible for moving costs, search costs and reestablishment costs. The reestablishment cost is limited to \$10,000. Also, ODOT could provide a fixed payment for project-related impacts. The fixed payment is in lieu of all other relocation payments and has a limit of \$20,000.

Highland Alternative

No special mitigation measures are required.

Ellendale Alternative

The Ellendale alternative poses relocation problems because of the large number of low-income elderly Housing and Urban

Development-sponsored residences that would be displaced (60). There already is a waiting list for this type of housing. Sixty new requests at the same time would compound the problem. If an insufficient number of low-income housing units are available, other options may include construction of comparable replacement units.

Relocation of the seven mobile home occupants affected by the Ellendale Alternative should not be too difficult in the Medford area. In some cases, people who are relocated may move into standard housing. The acquisition and relocation procedures are flexible enough to accommodate almost any mobile home. The Medford-area housing market should be able to accommodate the mobile home occupants under normal market conditions.

The Ellendale Alternative would have more substantial impacts to businesses than the Highland Alternative. Most of the businesses that choose to relocate would likely have to move to a different area of town. The business relocation process for the Ellendale Alternative would take longer and be more difficult than for the Highland Alternative.

Socioeconomics

Both Build Alternatives

1. For impacts to businesses resulting from altered access, mitigation measures would include providing reasonable access to affected properties or compensating owners at fair market value for any measurable loss of property. Compensation for losses or damage would be at fair market value based on appraisal. In some cases, access would also be changed from full ingress

and egress to “right in, right out” only or “left in, left out” only. These access changes are considered regulatory, and no compensable damages can be appraised.

2. Mitigation during construction will include construction-site traffic management, alternative routing, signage, and phasing the project so disruptions to businesses and neighborhoods are minimized.

Highland Alternative

To mitigate the reduction in access to the businesses on the south side of Barnett Road between Bear Creek and Highland Drive under the Highland Alternative, traffic signals will be added to the intersection of Barnett Road and Alba Drive and a U-turn for westbound traffic provided. This will necessitate widening Barnett Road, including the bridge over Bear Creek. If the Highland Alternative is selected, the FEIS would address additional hydraulics, biological, and right-of-way acquisition impacts caused by the widening, along with those processes required to obtain necessary regulatory permits.

Ellendale Alternative

The Federal Highway Administration proposes measures to avoid, minimize, and/or mitigate impacts on communities, neighborhoods, and individuals affected by FHWA programs, policies and activities, where permitted by law and consistent with EO12898 (Environmental Justice). These measures include providing offsetting benefits and opportunities to affected people and their communities. Alternative programs, policies and activities that would avoid and/or minimize disproportionately high and adverse human health and

environmental impacts should be given priority, consistent with EO12898. The Highland Alternative would have fewer environmental justice impacts than the Ellendale Alternative. If the Highland Alternative is not selected, other opportunities to avoid or minimize environmental justice impacts should be explored.

Cultural Resources: Archaeological Resources

Both Build Alternatives

1. To minimize impacts to the archaeological record, archaeological testing is recommended within the area that underlies both Build Alternatives and that contains prehistoric artifacts. Areas determined to be archaeological sites would be formally recorded on State of Oregon archaeological site record forms and should receive a state trinomial designation. Formal testing would provide the data necessary for National Register of Historic Places evaluation of each site.
2. If any unrecorded historic or prehistoric archaeological resources are revealed during construction activities associated with either of the Build Alternatives, then all work would cease until a qualified, professional archaeologist can ascertain the nature of the discovery. All equipment would be removed from the area of discovery to a minimum of 30 meters (98 feet) from the site, and barrier fencing installed around the discovery, until such discovery is officially recorded and evaluated by an archaeologist. If the newly discovered resource is determined significant (eligible for listing on the National Register of Historic Places), then

appropriate mitigation measures would be developed and approved by the SHPO and ODOT.

Highland Alternative

Except those mitigation measures mentioned above for both Build Alternatives, no mitigation measures are proposed that are specific to the Highland Alternative.

Ellendale Alternative

To minimize impacts to the archaeological record, archaeological testing is recommended within the second concentration of artifacts. Owing to the possible presence of historic cultural materials within the Ellendale Alternative's proposed rights-of-way, archaeological monitoring by a professional archaeologist would be conducted during initial ground disturbing/clearing/grubbing activities to identify any potentially important artifacts or features that might be uncovered.

Cultural Resources: Historic Resources

The following measures apply to both Build Alternatives.

1. To minimize impacts to the historic Central Oregon and Pacific Railroad and Veteran's Park properties, the following design modifications would be implemented:
 - Shoulder width reduced from 2.4 meters to 1.8 meters (7.9 feet to 5.9 feet).
 - Planter strip eliminated, reducing facility width by 0.9 meters (3.0 feet).

These minimization measures would reduce the width of roadway improvements by approximately 1.5 meters (4.9 feet) along the railroad's and park's Highway 99 frontages and would continue to provide for safe use of the railroad, park and highway.

2. The proposed project and construction of the northbound right turn lane on Highway 99 at Stewart Avenue could cause drainage problems within the Veteran's Park. Stormwater drainage facilities that would prevent water retention on the park site, and that would not adversely affect the historic trees, would be constructed as part of the South Medford Interchange Project.

Visual Resources

1. To mitigate visual impacts, the following mitigation measures would be implemented for both of the Build alternatives, form, texture, and/or color contrasts in large fill slopes would be reduced by:
 - slope warping, to vary their pitch.
 - revegetating slopes with appropriate grasses, shrubs, or trees (native, whenever possible) to soften visual discontinuities, considering soil type and depth, suitability for prevailing weather conditions, degree of slope, and safety concerns.
 - texturing slopes by regularly serrating them with adequate soils (which also enhances revegetation) and random-appearing scarification that introduces surface variation (especially in areas near relatively natural sites, such as the floodway and Bear Creek) to improve moisture retention and revegetation potential.

2. To lessen visual impacts of retaining walls and bridge/interchange structures the project would:
 - use treated (painted, stained, pigmented, or chemical-pressured) materials with low color contrast (to blend into the predominate surrounding environment).
 - use surface textures.
3. To buffer or screen sensitive viewers from modified and adverse visual elements (e.g., planting trees at the bottom of large and tall fills), the project would limit removal of existing vegetation. Vegetation screening is most effective if installed close to the viewer. Specific locations would be field-verified and designed during the next stage of project design.
4. To lessen visual impacts along creeks, the project would consider the natural appearance desired for the Bear Creek Greenway multipurpose path. Vegetation planted along the creeks to offset visual impacts would also be consistent with the mitigation measures recommended in the Biological Resources section.
5. To minimize night lighting impacts, consideration would be given to using directional luminaries for street lighting.
6. If noise walls are required, to minimize their visual impacts, consideration would be given to:
 - staggering wall alignments where possible to provide relief and allow planting space.
 - varying the height where adequate noise mitigation can be accomplished with a shorter wall.
 - minimizing the dominant appearance of the wall (especially where single-

story to two-story residences dominate) by placing it on top of an earthen berm.

- incorporating color, texture, and other design elements within wall materials to create contrasts and offset monotony.
- including returns and/or transitions where a wall begins and ends e.g., tie the wall into a berm, taper or step the wall to grade, and/or terminate it with appropriately shaped and sized vegetation.
- including plant material along with the wall, such as trees, shrubs, or vines, depending on space and scale parameters.
- blending earthwork into existing slopes to minimize new slopes.
- ensuring that edges of newly planted areas blend into any natural plant communities that remain.

Noise

The STAMINA/SOUND32 noise model was used to analyze a range of barrier configurations. Reductions in noise levels (i.e., insertion losses) from soundwalls were considered, for heights ranging from 2.4 meters (8 feet) to 4.9 meters (16 feet). The placement of the barriers varied depending upon the specific site conditions, but focused on edge-of-shoulder and right-of-way placements. Additionally, barriers outside the ODOT right-of-way were considered (such as atop the berm in the golf course adjacent to I-5 on the northbound side) for sites where barrier placement options within ODOT right-of-way were found to be ineffective. The lengths of the barriers were determined based upon site-specific conditions and ODOT guidelines. Barriers were designed to minimize flanking-path noise (noise passing around the ends of the barrier). Table 5-1

summarizes the considered noise barriers, showing barrier heights, lengths, number of benefited receivers, and cost-effectiveness results for a screen wall. Table 5-1 also indicates whether each noise barrier is or is not preliminarily recommended for construction. The range of abatement options considered, such as barrier heights, placement and locations, are shown in Tables 5-2 and 5-3. Figure 4-2 shows the considered noise barriers for the Highland Alternative, and Figure 4-3 shows the feasible noise barriers for the Ellendale Alternative. Using guidance contained in the ODOT Noise Manual, cost per benefited receiver was calculated.

With the exception of Barrier E-4, the considered barriers were found to be either not feasible because of the need for breaks in the wall for vehicle access, or not cost-effective to construct. Barrier E-4 would be 3.1 meters (10 feet) tall, and approximately 427 meters (1,400 feet) long. Although all but one of the barriers were preliminarily found to be not practicable to construct, the barriers would be re-considered during the final project design phase to optimize barrier effectiveness.

The following construction noise control measures would be included in the project specifications:

1. No construction would take place within 300 meters (984 feet) of an occupied dwelling unit on Sundays, legal holidays and between the hours of 10:00 p.m. and 6:00 a.m. on other days without the approval of the project manager. Some traffic control measures may not be practicable or safe to implement during daytime hours. Completing these measures may require exceptions or modifications to the limitation on hours of construction.
2. Each internal combustion engine used for any purpose on the job or related to the job would be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine would be operated on the project without said muffler.
3. All equipment would comply with pertinent equipment noise standards of the U.S. Environmental Protection Agency.
4. No pile driving or blasting operations would be conducted within 900 meters (2,953 feet) of an occupied dwelling unit on Sundays, legal holidays and between the hours of 8:00 p.m. and 8:00 a.m. on other days, without the approval of the project manager.
5. The noise from rock crushing or screening operations performed within 900 meters (2,953 feet) of any occupied dwelling would be mitigated by strategic placement of material stockpiles between the operation and the affected dwellings or by other means approved by the project manager.
6. Maintenance yards, batch plants, haul roads, and other construction-oriented operations would be placed in locations that would be the least disruptive to the community.
7. Should a specific noise-impact complaint occur during the construction of the project, the contractor at its own expense may be required to implement one or more of the following noise mitigation measures as directed by the project manager:
 - Shut off idling equipment.
 - Reschedule nearby construction operations to avoid periods of noise

annoyance identified in the complaint.

- Notify nearby residences whenever extremely noisy work will be occurring.

Use portable noise screens to provide shielding for jack hammering or other similar type activities when work is close to noise-sensitive areas.

Air Quality

1. To minimize combustion emissions during construction, all heavy-duty equipment would be properly maintained.
2. Standard operating procedures will be incorporated into project construction in order to reduce potential sources of fugitive dust from the project area. These practices will include such practices as (but not necessarily limited to):
 - covering piles of fill material as much as feasible
 - restricting the size of active piles to the extent practicable
 - preventing trucks and shovels from dumping material at excessive heights
 - maintaining roadways
 - maintaining low vehicle speeds
 - watering surfaces that might produce dust in dry weather
 - washing truck wheels

Hazardous Materials

The following actions are recommended for either Build Alternative prior to land acquisition. Any actions taken would need

to comply with ODOT's Hazardous Materials Procedure for Transportation Projects (ENV-16-02):

1. *General Recommendations for Recorded Sites:* Available ODEQ documents will be reviewed for the identified sites. Based on the results of these reviews, subsurface investigations of soil and/or groundwater may be conducted for those sites assessed to have a potential or known impact to the footprint.
2. *General Recommendations for Visually Identified Sites:* For those sites identified during drive-by survey, interviews will be conducted with current property owners, if possible, and with past property owners, if they can be identified. Based on these interviews and further visual assessment of site, if evidence is found of surface and/or groundwater impacts, subsurface investigation will be conducted as appropriate.
3. *Site-Specific Issues:* On the basis of preliminary work completed to date, additional environmental site investigation may be necessary at the Hale Property. A sampling and analysis program at this property will help establish background levels of hazardous substances. If necessary, a remedial action plan will be developed and implemented from information collected. Sampling might include a number of activities, depending on the nature of the situation. However, given observations at the site, sampling investigation would involve geoprobe drilling at the property utilizing a continuous sampling method.

Table 5-1
SUMMARY OF RESULTS: NOISE BARRIERS CONSIDERED

Noise Barrier No.	No. of Benefitted Residences	Barrier Height (m)	Barrier Length (m)	Estimated Cost of Noise Abatement per Benefitted Residence ¹	Cost-effectiveness Results (Reasonable/Not Reasonable) ²	Preliminarily Recommended for Construction? ³
Highland Alternative						
H-1	3	4.88	655	\$206,667	NOT REASONABLE	No
H-2	4	3.10	185	\$27,750	NOT REASONABLE	No
H-3	3	2.44	46	\$7,333	REASONABLE	No
H-4	4	2.44	91	\$10,750	REASONABLE	No
H-5	2	2.44	61	\$14,500	REASONABLE	No
H-6	3	2.44	183	\$29,000	NOT REASONABLE	No
H-7	8	2.44	228	\$13,500	REASONABLE	No
Ellendale Alternative						
E-1	7	3.66	490	\$49,714	NOT REASONABLE	No
E-2	3	3.66	245	\$58,000	NOT REASONABLE	No
E-3	3	4.88	488	\$154,000	NOT REASONABLE	No
E-4	15	3.10	427	\$17,133	REASONABLE	Yes
E-5	7	3.10	381	\$32,714	NOT REASONABLE	No
E-6	8	2.44	228	\$13,500	REASONABLE	No
E-7	3	2.44	183	\$29,000	NOT REASONABLE	No
E-8	2	2.44	61	\$14,500	REASONABLE	No
E-9	3	2.44	46	\$7,333	REASONABLE	No
E-10	4	2.44	91	\$10,750	REASONABLE	No
E-11	4	2.44	185	\$22,000	NOT REASONABLE	No
E-12	1	2.44	150	\$71,000	NOT REASONABLE	No

1- Based upon the considered barrier height, length and a typical cost of \$18.00 /ft² (\$194/m²)

2- Based upon an allowance of \$20,000.00 per benefitted residence.

3- Preliminary recommendation for construction based upon cost-effectiveness or other factors such as effects on ingress/egress, sightlines and aesthetics.

**Table 5-2
SUMMARY OF RESULTS: EXISTING, FUTURE NO-BUILD AND HIGHLAND ALTERNATIVE**

Site ID	Primary/Closest Traffic Noise Influence	Location	Existing Conditions					Future Conditions													
			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?	Soundwall at Edge-of-Shoulder L_{eq} (dBA)					Soundwall at Top-of-Berm L_{eq} (dBA)				
												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	n/a	n/a	0	64	No	65	Yes	66	Yes	66	66	66	65	64					
115	NB I-5	Residence, Dyer Rd.	n/a	n/a	0	59	No	61	No	59	No										
122	NB I-5	Economy Inn, Barnett Rd.	n/a	n/a	0	63	No	64	No	64	No										
123	NB I-5	Residence, near golf course	n/a	n/a	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	n/a	n/a	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.	n/a	n/a	0	63	No	63	No	65	Yes	64	64	63	62	60					
117	SB I-5	Residence, Charlotte Anne Rd.	n/a	n/a	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)	n/a	n/a	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	n/a	n/a	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.	n/a	n/a	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.	n/a	n/a	0	69	Yes	70	Yes	71	Yes	62	60	59	58	57					
121	WB Barnett Rd.	Residence, Barnett Rd.	n/a	n/a	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 5-3
SUMMARY OF RESULTS: EXISTING, FUTURE NO-BUILD AND ELLENDALE ALTERNATIVE

Site ID	Primary/Closest Traffic Noise Influence	Location	Existing Conditions					Future Conditions													
			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?	Soundwall at Edge-of-Shoulder L_{eq} (dBA)					Soundwall at Top-of-Berm L_{eq} (dBA)				
												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	n/a	n/a	0	63	No	65	Yes	67	Yes	65	64	62	61	60					
114	NB I-5	Putting green near lake, The Manor	n/a	n/a	0	65	Yes	65	Yes	65	Yes	62	61	60	60	59					
115	NB I-5	Residence, Dyer Rd.	n/a	n/a	0	59	No	61	No	58	No										
123	NB I-5	Residence, near golf course	n/a	n/a	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.	n/a	n/a	0	63	No	63	No	64	No	61	60	60	59	58					
117	SB I-5	Residence, Charlotte Anne Rd.	n/a	n/a	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)	n/a	n/a	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	n/a	n/a	0	58	No	59	No	58	No										
ST-8	NB Ellendale Dr.	Behind apts. near proposed relocated Rogue Valley Dr.	51	n/a	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.	n/a	n/a	0	59	No	55	No	67	Yes	61	59	57	55	54					
125	NB Ellendale Dr.	Residence off Ellendale Rd.	n/a	n/a	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	n/a	n/a	0	64	No	65	Yes	65	Yes	61	60	58	57	55					
118	SB Ellendale Dr.	East side of trailer park	n/a	n/a	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.	n/a	n/a	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.	n/a	n/a	0	69	Yes	70	Yes	70	Yes	62	60	57	56	54					
121	WB Barnett Rd.	Residence, Barnett Rd.	n/a	n/a	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 L_{eq} .

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

Hydraulics

Recommended mitigation measures to offset adverse impacts to the floodplain and floodway are presented below. These measures would be applicable to both the construction and operational stages of the project. The following mitigation measures are recommended for both Build Alternatives.

1. Project-related stormwater treatment facilities should be compatible with related, privately funded stormwater control systems.
2. Placement of bridge piers in the designated floodway will be minimized.
3. Roadway fill will be restricted in the designated floodway.
4. Conveyance compensation measures will be designed at appropriate channel cross section locations where there are identified conveyance losses.
5. Measures should be implemented to offset the loss of conveyance capacity caused by the proposed obstruction. These measures could include excavating channel overbank. The conveyance compensation measures will be coordinated with relevant environmental issues, particularly habitat mitigation plans, and verified using a standard hydraulic analysis method approved by FEMA.
6. The levee on the west side of Bear Creek may be relocated to create more floodplain. This relocation would need to be coordinated with resource experts (especially biological and cultural) and rights-of-way specialists to minimize potential adverse impacts.
7. If overbank excavation or other mitigation measures are inappropriate for the site, bridges across the floodway may be designed to lessen the hydraulic impacts by decreasing or eliminating piers in the floodway.
8. Maintenance plans will be provided and implemented for the adopted mitigation measures.
9. Mitigation for these impacts and those associated with floodplain excavation needed for local improvement of conveyance could include re-establishment of riparian flora in other nearby floodplain areas. The preliminary hydraulic analysis performed for this DEIS is not sufficient to determine to what extent this could occur within the study reach. The next level of analysis, to be performed after completion of the final bridge design, is needed to determine where this could occur in the study reach without a net loss in conveyance in the floodway.

Water Quality

Construction Impacts

1. The NPDES 1200-CA permit for the discharge of stormwater from construction sites, as well as ODOT's policies on erosion and pollution control, would cover this project. The NPDES permit requires the development and implementation of an erosion and sediment control plan. The erosion and sediment control plan will be completed and approved prior to the beginning of construction. Alterations to the plan may be made during the course of the project, subject to the approval of the project engineer. At a minimum, the erosion control plan will call for the placement of features to limit the amount of water

flowing across disturbed ground, barriers or settling ponds to trap eroded sediments, temporary ground cover while construction is ongoing, and permanent erosion control upon completion of the project. Periodic inspection of the construction site will be conducted to ensure that erosion and sediment controls are in place and are effective.

2. To minimize turbidity impacts, mitigation measures will include features such as coffer dams and in-stream silt curtains, as well as designs that avoid or minimize the number of piers in the channel. Restrictions on the length of time turbidity may be elevated from in-stream work may be imposed by the regulatory agencies.
3. To avoid contamination by chemical pollutants, pollution control plans will specify the following:
 - Construction chemicals and fuels must be stored a minimum of 46 meters (150 feet) from any potential receiving water and should be above the 10-year flood elevation.
 - Storage sites must be contained to prevent groundwater as well as surface water contamination.
 - Clean up and containment materials must be stored on site and be accessible in case of an accident.
 - Equipment must be in good working order to minimize the chance of accidental leaks.
 - Equipment used in water needs to be cleaned of dirt, oil and grease prior to entering the water.
4. Green or curing concrete should not come in contact with streams. Water that has come in contact with curing concrete should not be discharged into streams.

Operational Impacts

1. Effective treatment of stormwater for 140 percent of the new impervious surface area will be provided. It is necessary to ensure that stormwater flowing to Larson Creek be treated as well as that flowing directly to Bear Creek. A focus on just Bear Creek proper would result in a deterioration of conditions in Larson Creek.
2. Additional stormwater treatment above the 140 percent of net new impervious surface area would lead to an incremental improvement in the water quality of Bear Creek and its tributaries. Because Bear Creek is salmonid habitat, treatment of additional highway runoff would be justified to the extent that it does not begin to adversely affect other natural or cultural resources or threaten the financial stability of the project. Treatment of stormwater from adjacent, non-ODOT developments would require legal agreements outlining the financial and legal responsibilities of the parties. ODOT would not accept responsibility for others' stormwater or pollutants.
3. To minimize impacts to peak stormwater flows, the bioswales will need to be augmented by detention facilities. Extended dry detention ponds can be designed to operate as combined facilities that provide water quality treatment in addition to detention.
4. Mitigation for impacts to low flows is difficult. Stormwater treatment and detention facilities will be designed to incorporate or allow for infiltration. Basing the treatment on infiltration, however, is problematic, since infiltration facilities are extremely sensitive to soil characteristics and

groundwater and are maintenance intensive. Lack of maintenance can result in increasing stormwater problems, not ameliorating them. Wetland mitigation for the project should consider design and placement to maximize hydrologic functions. Larson Creek would benefit the most from hydrologic mitigation because of its small size, so opportunities in its watershed should be investigated first. Any benefits to Larson Creek would also affect Bear Creek.

Biological Resources

All of the listed biological mitigation measures below are common to each Build Alternative. The majority of the mitigation measures will be employed during the construction and operational stages of the project and are listed as such.

Construction Phase

Recommended mitigation measures designed to minimize impacts to biological resources are generally associated with Best Management Practices (BMPs) during the construction phase of the project. These measures incorporate avoidance, minimization, landscaping, and restoration measures. The following construction phase measures will apply:

1. Equipment staging areas and construction material stockpiles will be located in existing parking lots or vacant lots of developed urban areas away from vegetation communities. If this is impractical, staging areas and material stockpiles will be selected away from high value vegetation communities, such as riparian forests and wetlands, and at least 91 meters (300 feet) from the 2-year floodplains of the adjacent waterways. Disturbed vacant land should be used to the extent possible. Such areas should be clearly identified in the field prior to construction.
2. Operation of construction equipment will be limited to designated rights-of-way. Limits of clearing will be clearly marked with project-limiting fencing. Equipment operations will be limited in riparian forests and wetland communities. ODFW "in-water" work timelines will be followed for work within or adjacent to Bear Creek and Larson Creek.
3. During initial grading operations, topsoil will be stripped and stockpiled for landscaping and other mitigation projects. As appropriate, native trees and shrub plant material along the project alignment could be salvaged and replanted. All stockpiled material will be stored away from riparian forest and wetland communities.
4. Grading and replanting will be closely coordinated with hydraulic strategies (especially floodway conveyance compensatory measures) and water quality/quantity features, integrating designs and functions as much as possible.
5. Degraded vegetation communities along the project alignment will be improved by removing invasive species and introducing new plantings of native species.
6. Upon completion of final grading, appropriate portions of the project alignment will be landscaped with native species at densities and with species diversity matching existing native vegetation communities. Local growers

could provide new plant material with similar tolerances for cold and heat. Permanent vegetative cover will be provided for unpaved areas of the project alignment.

7. Lost wildlife habitat along shoulders and roadway embankments will be replaced by landscaping with native species. Species diversity and density of new plantings will be matched with historical native habitats along roadway alignment.
8. Degraded wildlife habitat along the project alignment will be improved with new plantings of native species. Native shrub and tree species will be introduced during landscaping to provide cover and food sources for wildlife.
9. Snags and perches will be installed in wetland and riparian forest areas to attract perching birds and raptors.
10. Stormwater control facilities will be designed and installed to capture and treat stormwater originating in the project alignment before it is discharged to area streams.
11. Project standards and specifications will be established for protection of fish species. Construction operations will be required to meet or exceed ODEQ requirements for the NPDES 1200-CA permit.
12. New bridge crossings of Bear and Larson creeks and, if the Highland Alternative is chosen, the culvert expansion in Lazy Creek will be designed using Best Management Practices for fish passage and habitat preservation. Throughout the construction period, clear passage will be maintained for both adult and juvenile forms of fish, if fish are present in the stream, except where passage is already precluded by natural or manmade features. ODFS and NMFS personnel will be consulted on the design of new or improved stream crossings.
13. A Pollution Control Plan will be developed to prevent point-source pollution related to construction operations. This plan will satisfy all pertinent requirements of federal, state, and local laws and regulations.
14. Equipment will be restricted from operating within the channel of any stream. All work below the 2-year flood elevation of any stream will be completed during the ODFW defined in-water work period for the study area (July 1- September 15)(ODFW 2000).
15. Any large deposits of caked mud will be removed from equipment prior to working in the vicinity of Bear Creek or Larson Creek. If equipment is rinsed, untreated rinse water will not be discharged into streams. Equipment with fluid leaks will not be operated in the vicinity of streams or riparian forest areas.
16. Vehicle maintenance, re-fueling of vehicles and storage of fuel will be conducted at least 91 m (300 ft) from the 2-year flood elevation.
17. No pollutants of any kind (petroleum products, fresh concrete, silt, sandblasting material, welding slag, etc.) will be discharged into area streams. No construction debris or rubble from the demolition of existing structures will be disposed of on the bed or banks of any waters or in any wetlands. Waste materials from construction sites will be disposed of in licensed disposal

- facilities. Burying, dumping or discharge of waste materials or unused materials at construction sites will be prohibited. Waste materials and spoils for removal will be temporarily stored above the bank line and away from any stream or riparian forest area.
18. Discharges of “green” or curing concrete into streams will be prohibited. Discharges of water having had contact with newly poured concrete (within 24 hours of pour) into streams will be prohibited. Use of moist burlap or an approved equal will be used for concrete curing.
 19. Disturbance of the adjacent riparian forest and streambanks will be limited to the minimum extent necessary. Tree stumps will not be removed after the corridor is cleared unless it is necessary to place bridge piers. Within seven calendar days of completion of the project, all disturbed areas will be protected from erosion using vegetation or other means. Banks and riparian areas will be planted with native or other approved woody plant species within one year of project completion.
 20. Fish stranded in a construction area or diversion reach will be safely moved to the flowing stream. Prior to construction, a local ODFW representative will be consulted to determine if the fish need to be moved.
 21. Wetland crossings will be clearly identified in the field. During construction, project-limiting fencing will be installed to keep equipment from operating within wetlands that are being preserved.
 22. Wetland crossings will be designed in accordance with current wetland protection regulations. At proposed wetland crossings, disturbance will be limited to the minimum extent necessary. Within seven calendar days of completion of the project, all disturbed areas will be protected from erosion using vegetation or other means. Temporarily disturbed wetland areas will be planted with native wetland species within one year of project completion.
 23. Mitigation projects will be designed and implemented in coordination with federal and state wetland permitting agencies. Preferred site(s) for wetland mitigation will be located within the proposed rights-of-way and the affected stream basin. For example, it would be preferable to mitigate first those impacts to wetlands that are within or adjacent to the project's wetland crossing. If preferred sites are not available, wetland mitigation efforts should be located within the same general area and watershed. Possible locations may include land being decommissioned at the existing interchange and/or city-owned property along the Bear Creek. Last preference would involve locating wetland mitigation outside the basin or substantially beyond the project study area. Where possible, wetland mitigation will be integrated with concurrent habitat (especially riparian), floodway (especially any compensatory floodway conveyance excavations), and water control mitigation/conservation measures, sites, or features. The *Bear Creek Mitigation Implementation Plan*, which was prepared under the direction of ODOT, should be used to identify potential mitigation sites and programs.

24. When possible, wetland topsoil and its seed bank will be salvaged for use in developing new wetland areas.
 25. Existing wetlands will be enhanced by removing noxious weed species and planting replacement native wetland plants wherever possible within the project direct impact areas and possibly outside the direct impact area, if appropriate.
 26. To minimize spread of weed seed, inspection and cleaning of construction equipment will be required prior to entry into construction sites.
 27. Mulches, topsoil and seed mixes used will be as free of invasive species as practicable. Controlling invasive species in this manner would reduce the cost of monitoring and future eradication efforts.
3. Stormwater control facilities will be maintained within federal and state standards. Accumulated trash, sediment or other debris will be periodically removed as required. Discharge of turbid stormwater to area streams should be limited to the maximum extent possible.
 4. Rights-of-way and bridge crossings will be monitored for excessive erosion or soil loss. Areas of active erosion will be immediately repaired and restored.
 5. New wetland areas will be monitored and managed for at least three years to guarantee functionality and prevent invasion of noxious weed species.
 6. If invasive species begin to spread, integrated pest management strategies should be deployed along all roadway rights-of-way. Integrated strategies offer the best results and would include biological, manual and chemical controls specific to the invasive target species.
 7. Newly landscaped rights-of-way should be monitored to ensure invasive plants do not regain their foothold in the area. The monitoring period should be long enough to ensure establishment of all new mitigation and landscape areas.
 8. The use of bioengineered structures in conjunction with riprap will be explored after the establishment of bridge design criteria and the performance of a detailed hydraulic analysis.

Operational Phase

The following recommended mitigation measures will be applied at the operational phase:

1. All new mitigation and landscaped areas will be monitored until fully established. Irrigation will be provided as required to landscaped areas to ensure survival of new plantings. Minimum survival rate for all new plant materials will be established.
2. Roadway rights-of-way will be maintained in accordance with ODOT maintenance standards. Lost vegetation should be replaced or restored as needed. The use of herbicides and pesticides should be minimized in vegetation maintenance.

Potential Design Changes Resulting from Mitigation Measures

Implementing the mitigation and conservation measures identified above would likely result in several modifications to the footprint of the

project. Some of these changes might be located outside the buffered footprints analyzed in this document. The mitigation measures of such changes and their potential environmental impacts that are in addition to those described in this document will be reported in the Final Environmental Impact Statement. The following provides a list of design features that may change from that analyzed in this assessment.

Both Build Alternatives

- Highway 99 may be widened to a point slightly south of the Les Schwab buildings to accommodate roadway alignment requirements.
- Highway 99 may be widened to the west between existing Belknap Road and Stewart Avenue to accommodate bicycle and pedestrian safety needs.
- Additional roadway width may be required on the Highway 99 Connector to accommodate an additional turn lane onto Center Drive and possibly Highway 99.
- The connection between the Bear Creek Greenway multipurpose path and the development on the west side of the stream will be relocated.
- The levee along the west side of Bear Creek on the west side of I-5 and in the general vicinity of

the proposed stream crossings may be relocated to facilitate floodway requirements and maintain protection of property.

- Stormwater detention facilities, such as ponds, may be located on both sides of I-5 to provide needed water discharge control.
- Wetland mitigation, and/or other biological mitigation measures, may require conversion of existing land uses, most likely within or very near the project area.

Highland (Preferred) Alternative

- Barnett Road and Highland Drive may be widened to accommodate wider bike lanes and sidewalks.
- Barnett Road may be widened for a U-turn at Alba Drive.
- The precise character of the Lazy Creek street crossing may include a wider culvert, culvert replacement, or construction of a bridge.

Ellendale Alternative

- Ellendale Drive may be widened just to the north of its intersection with Barnett Road to accommodate roadway alignment requirements.