Sellwood Bridge Project Evaluation Framework

This memorandum outlines the approach for screening Sellwood Bridge Project concepts and evaluating alternatives adopted by the Policy Advisory Group on January 29, 2007. The outcome of this evaluation process will be the selection of a few alternatives to be analyzed in the Draft Environmental Impact Statement (Draft EIS).

Screening and Evaluation Process

The ~~proposed~~ evaluation framework includes two parts: screening and evaluation. The first part screens concepts against the minimum requirements of the project purpose and need. Threshold criteria represent this set of minimum requirements. In this screening process, if concepts do not meet the thresholds, they are considered infeasible and are dropped from consideration. Concepts that meet the threshold criteria are considered feasible and are developed into project alternatives.

The second step of the framework compares the project alternatives against a set of evaluation criteria. Evaluation criteria are used to compare the alternatives with one another to determine how they perform against a broad range of stakeholder values.

The performance of each of the project alternatives will be rated by technical staff for each evaluation criterion. The Community Task Force (CTF) will set a weighting factor for each criterion to establish its level of importance in relation to the other criteria. A total score (the sum of all the performance ratings times the weighting factors) will be calculated for each alternative, and an associated ranking of alternatives prepared. The higher the score, the more successfully the alternative matches the CTF values for the project. The ranking will be used by the CTF in developing its recommendation of alternatives to be evaluated further as part of the environmental documentation process.

The framework serves three primary purposes. First, it ensures that all project alternatives address the project's purpose and need. The threshold criteria determine the minimal requirements in relation to the Purpose and Need Statement. Second, it helps frame a discussion with a wide variety of stakeholders about what project features are most valuable. These values are reflected in the evaluation criteria. Third, it establishes the relative advantages and disadvantages of feasible alternatives to support selection of a few for further analysis in the Draft EIS.

The evaluation process for the Sellwood Bridge project is comprised of the following tasks:

- Develop threshold criteria
- Develop evaluation criteria
- Identify a broad range of concepts
- Evaluate concepts for feasibility
- Develop alternatives from feasible concepts

- Collect performance data for each criterion for each alternative
- Evaluate alternatives
- Select alternatives for more detailed analysis in the Draft EIS

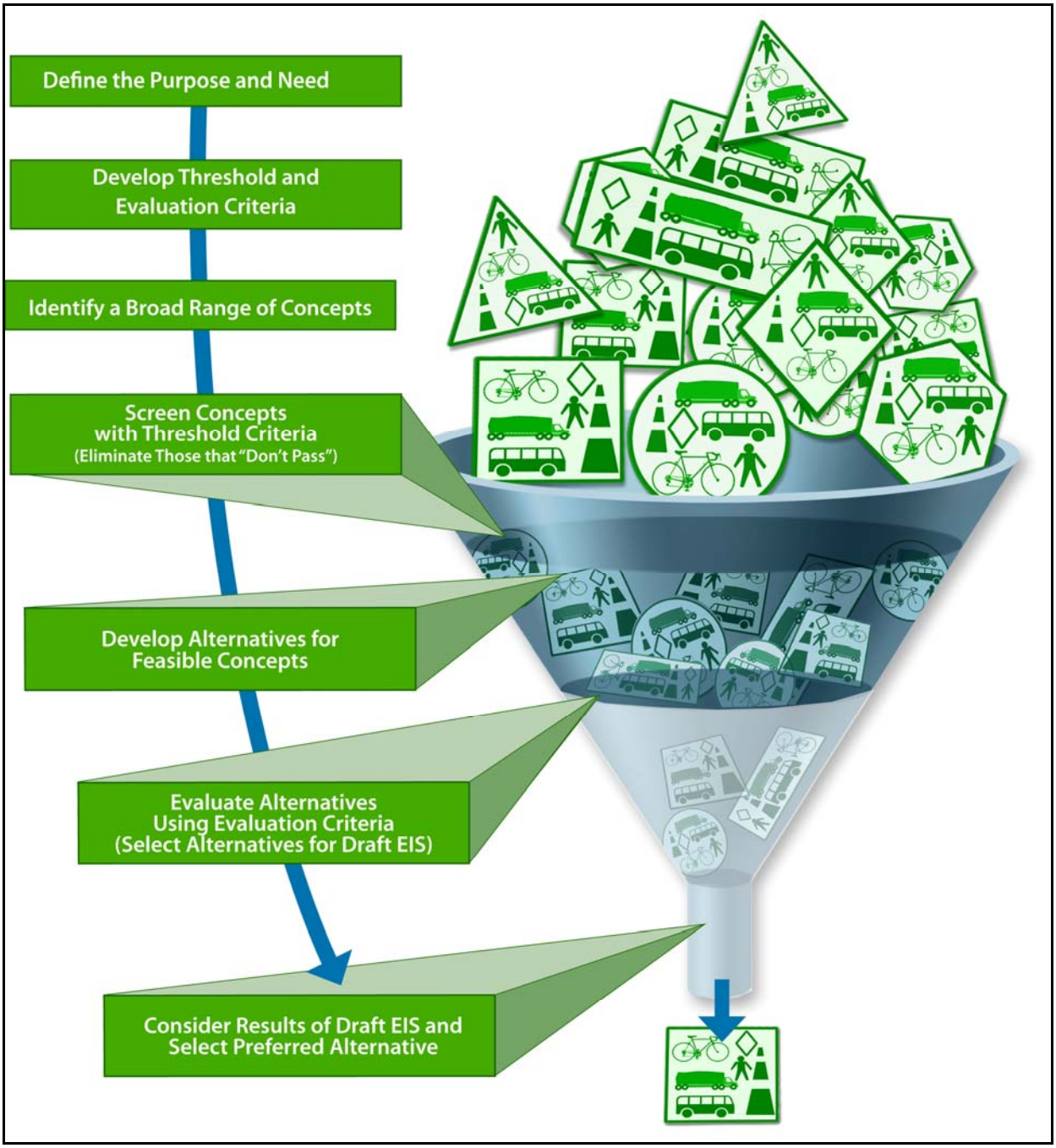

FIGURE 1 – Screening and Evaluation Process

Screening of Concepts Using Threshold Criteria

The first step of alternative evaluation is to compare a wide variety of concepts against a set of threshold criteria. Threshold criteria serve as a set of minimum requirements for project concepts before they can be developed into full-fledged alternatives. Concepts either meet the threshold criteria or they do not, and those that meet these criteria are deemed feasible.

Threshold criteria are based on existing or readily available data, and may reflect regulatory or policy imperatives. Threshold criteria are used throughout the evaluation process to eliminate concepts or alternatives as more information becomes available.

Threshold criteria were initially prepared by the Project Management Team, reviewed and revised by participating agency staff, recommended by the CTF, and approved by the Policy Advisory Group.

Threshold criteria are directly linked to project needs specified in the Purpose and Need statement, as shown in Table 1 below.

Table 1

Sellwood Bridge Threshold Criteria

Number	Identified Project Need, from Project Purpose and Need Statement	Threshold Criteria
1	Provide structural capacity to accommodate safely various vehicle types, including transit vehicles, trucks, and emergency vehicles; and to withstand moderate seismic events.	Concept must accommodate AASHTO[1]/ODOT legal loads. Replacement concepts must accommodate streetcar loading. Concept must meet the AASHTO/ODOT Load-and-Resistance Factor Design (LRFD) standard of 75 years. Concept must be built to meet current seismic standards, as per AASHTO/ODOT LRFD standards. Bridge rehabilitation concepts must meet Phase I seismic retrofit standards, as documented in the ODOT's 2004 Bridge Design and Drafting Manual. Concept must meet horizontal and vertical clearance requirements for the Willamette River, as per the U.S. Coast Guard.
2	Provide a geometrically functional and safe roadway design.	Concept must connect with Highway 43 on the west and with a District Collector or higher classified street on the east within 500 feet north or south of the existing Tacoma Street alignment. Concept must be designed to meet the geometric requirements as outlined in the project's geometric design criteria.[2] Bridge rehabilitation concepts can be considered with exceptions to the minimum width criteria (travel lane, median, shoulder, multi-use path); bridge replacement concepts must meet the minimum width criteria. Concept must provide for clearance over the existing railroad tracks on the east side of the Willamette River, as per American Railway Engineering and Maintenance of Right of Way Association (AREMA) standards.
3	Provide for existing and future travel demands between origins and destinations served by the Sellwood Bridge.	Concept must maintain or improve traffic-carrying capability when compared to the 2035 No Build alternative. Concept must continue to serve the travel markets it currently serves.
4	Provide for connectivity, reliability, and operations of existing and future public transit.	Concept must meet the minimum turning radius of 40' Tri Met buses. Concept must provide sufficient (23 foot) clearance over the existing railroad tracks on the west bank of the Willamette River, preserving that corridor for future streetcar extension or other public use.

[1] AASHTO stands for the American Association of State Highway and Transportation Officials

[2] Project geometric design criteria are attached as Appendix 1.

Table 1

Sellwood Bridge Threshold Criteria

Number	Identified Project Need, from Project Purpose and Need Statement	Threshold Criteria
5	Provide for improved freight mobility to and across the bridge.	Concept must accommodate the turning radius of the WB67 design vehicle. 3
6	Provide for pedestrian and bicycle connectivity, mobility, and safety to and across the river in the corridor.	Concept must provide minimum bicycle and pedestrian facilities as per the project's geometric design criteria. Bridge rehabilitation concepts can be considered with exceptions to the minimum width criteria (travel lane, median, shoulder, multi-use path), but must improve upon width of existing shared path for bicycles and pedestrians. Concept must provide connections to designated City Bikeways, City Walkways, and City Off-Street Paths in the vicinity of the bridge. Concept must not preclude access to the river for boats and boat trailers at Powers Marine Park and Sellwood Park.

Concepts that meet each of the threshold criteria above are deemed feasible, and moved forward into the evaluation process.

Evaluation of Feasible Alternatives Using Evaluation Criteria

Evaluation criteria are used to differentiate and identify trade-offs among feasible alternatives. To be most effective, an evaluation criterion must be measurable and well-defined. This ensures a common understanding of each criterion's meaning, and allows for a clear comparison among alternatives.

Evaluation criteria were developed by the CTF with input from the participating agencies and the public, recommended to the Policy Advisory Group for adoption, and forwarded to the Collaborative Environmental Transportation Agreement for Streamlining (CETAS) group and other participating agencies for concurrence. Some criteria important to stakeholders cannot be used for initial screening of alternatives due to lack of applicable data, but are included because they will be used later in the process for selection of a preferred alternative, during final design, or during the procurement of construction contractors.

Note: No criteria category is established for safety. Safety is considered in the design standards as well as throughout the evaluation criteria in relation to particular facility users -- bicyclists, pedestrians, automobiles, freight, and transit.

Note: No criteria category is established for sustainability. Sustainability considerations are reflected throughout the evaluation criteria. Sustainability means using, developing and protecting resources in a manner that enables people to meet current needs and provides that future generations can meet future needs. Sustainability is a broad and long-term concept that addresses quality of life and efficiency concerns from the joint perspective of environmental, economic and community objectives. It takes into account both local and global views, applying a timeframe that considers long term costs and benefits.

3 Wheelbase (WB) is the distance, in feet, measured between the front wheel axle of a vehicle and its most rear wheel axle. For a tractor-trailer semi, WB is measured from the front wheel axle of the tractor to the most rear wheel axle of its trailer. The WB67 design vehicle has 67' between the front and the rear wheel axles.

1. Aesthetics

Goal: Ensure an aesthetically pleasing solution that enhances visual quality to the bridge, on the bridge, and from the communities on both sides of the river.

Note: Criteria 2 and 3 (in grey) will be used to select bridge types for consideration in the Draft EIS (following selection of alignment alternatives to be considered in the Draft EIS).

	Criteria	Measure
1	Maximize flexibility in bridge design types.	Constructed scale (high, medium, low) to assess whether the alternative maintains flexibility to use different bridge design types.
2	Enhance pedestrian/bicycle experience on the bridge	Qualitative scale considering architectural detail, interpretive displays, viewing facilities/vantage points, and human scale.
3	Provide a structure that instills a sense of community pride	Qualitative scale considering of views of the bridge from the community and gateway treatments that provide a presence for the bridge.
4	Preserve, enhance, or create views from the bridge	Qualitative scale considering quality of views provided from the bridge for bicyclists, pedestrians, and vehicle occupants.
5	Provide aesthetically pleasing intersection/interchange designs that instill a sense of community pride	Qualitative scale considering views of the intersections/interchanges from the community

2. Bike and Pedestrian

Goal: Improve pedestrian and bicycle connectivity, mobility, and safety to and across the Sellwood Bridge.

	Criteria	Measure
1	Maximize bicycle and pedestrian safety	Qualitative scale considering: – Width of sidewalk – Width of bike facility – Width of travel lanes – Separation to minimize conflicts between bikes and pedestrians – One-way vs. two-way facilities – Separation to minimize conflicts between low and high speed bicyclists – Separation to minimize conflicts between motor vehicles and non-motorized users (including separation of bicycle and pedestrian facilities from travel lanes)
2	Maximize convenient and direct connections for bicyclists and pedestrians	Qualitative scale considering: – Out of direction travel – Grade – Ease of crossing of OR 43 and SE Tacoma – Connections to OR 43, SE Tacoma, cemetery access road, the regional trail network, and the north sidewalk on Macadam

3. Community Quality of Life

Goal: Protect and preserve the existing quality of life of the neighborhoods in the Sellwood Bridge influence area on both sides of the Willamette River.

Note: Criterion 10 (in grey) will be used in selection of the preferred alternative (following preparation of the Draft EIS).

	Criteria	Measure
1	Minimize noise impacts caused by traffic on residents, businesses, bridge users and visitors	Assessment of predicted noise levels compared to the future No Build, based on traffic volumes and speeds, at the following locations: – Riverfront condos – Mid-point of bridge – Powers Marine Park – Sellwood pool (in Sellwood Park)
2	Minimize through traffic intrusion in Sellwood and South Portland neighborhoods	Comparison of average daily traffic volumes on neighborhood streets against future No Build alternative (using screenlines)
3	Minimize impacts to recreational facilities	Qualitative scale considering impact on recreational use, constructive use, and long-term construction impacts on recreation properties.
4	Preserve historic and archaeological resources along project corridor	Number of potentially significant historic properties and archaeological resources affected by alternative
5	Minimize residential relocations	Number of residential units displaced by alternative
6	Minimize residential impacts	Number of residences currently within 30 feet of the street that will have a reduced distance to the proposed alternative (loss of front yard space)
7	Minimize business relocations	Number of businesses displaced by alternative
8	Preserve viability of local businesses	Qualitative scale considering auto access, parking, visibility, and access for delivery trucks
9	Achieve consistency with adopted community plans	Qualitative scale considering consistency with relevant regional and local plans on both sides of the bridge (including Tacoma Main Street Plan) in terms of: – Number of lanes – Classification – Presence of bicycle facilities and sidewalks – Bicycle and pedestrian connections – Accommodation of freight – Connection with the local street network
10	Minimize disproportionately high and adverse impacts to minority and low income populations	(Results of the Environmental Justice analysis from Draft EIS)

4. Automobile, Freight, and Emergency Vehicles

Goal: Improve freight and commuter mobility and safety. Minimize bottlenecks for freight, automobiles, and emergency services.

	Criteria	Measure
1	Minimize congestion delay in bridge area	Vehicle hours of delay along the following corridors: – OR 43 between Lake Oswego and Taylors Ferry – Tacoma Street between 6th and 17th – 99E to Taylor's Ferry – Hwy 224 to 17th to Macadam and Taylor's Ferry – Taylor's Ferry between Terwilliger andOR 43
2	Improve accessibility to residences and businesses	Area within a 20-minute travel time contour from the center of the Sellwood Bridge
3	Minimize impact of incidents and allow the passing of emergency vehicles	Combined width of travel lane and shoulders (curb-to-curb)
4	Accommodate trucks	Combined width of travel lane and shoulders (curb-to-curb)
5	Retain flexibility to respond to future transportation needs along the corridor	Qualitative scale assessing ability to add capacity on the bridge alternative's alignment, or ability to add to the bridge alternative in the future.
6	Remain open to traffic during periods of required maintenance	Combined width of travel lane and shoulders (curb-to-curb)

5. Construction

Goal: Minimize construction impacts and risks.

Note: Criterion 4 (in grey) will be used in selection of the preferred alternative (following preparation of the Draft EIS).

Criteria		Measure
1	Minimize closure time	Estimated months of bridge closure during construction
2	Minimize construction time	Estimated months of construction time, defined as starting with construction mobilization and ending with the opening of the completed project.
3	Minimize travel impacts during construction	Length of detour route during construction for all modes.
4	Minimize impacts of demolition	(Results of construction impact analysis in Draft EIS)

6. Cost and Economic Impacts

Goal: Design, build, and maintain a cost-effective project.

Note: Criterion 2 (in grey) will be used in selection of the preferred alternative (following preparation of the Draft EIS). Criterion 3 (in grey) will be considered during construction contracting procurement.

	Criteria	Measure
1	Minimize life cycle cost	Cost of design, construction, right-of-way acquisition, and maintenance in ~~2007~~year of construction dollars
2	Stimulate the local economy	(Results of economic impact analysis from Draft EIS)
3	Provide contracting opportunities to disadvantaged, minority, women-owned, and emerging small businesses.	(Will be considered during construction contracting procurement)

7. Natural Environment

Goal: Preserve or improve the natural environment.

Note: Criteria 8, 9, and 10 (in grey) will be used in selection of the preferred alternative (following preparation of the Draft EIS).

	Criteria	Measure
1	Minimize impacts to floodplain; meet OTIA III floodplain/fluvial standards to the greatest extent practical	Cubic yards of fill encroachment in 100-year floodplain
2	Maximize benefits to threatened and endangered fish species and other fish habitat; minimize impacts	Cubic yards of pier encroachment in the floodway (ordinary high water level)
3	Maximize benefits to threatened and endangered terrestrial species; minimize impacts	Acres of impacted native planting habitat lost
4	Maximize benefits to wildlife habitat; minimize impacts	Acres of lost wildlife habitat
5	Maximize benefits to riparian areas; minimize tree loss	Square feet of tree canopy removed
6	Maximize benefits to air quality; minimize impacts	Number of intersections along a major collector or arterial within study area where primary approach exceeds volume-to-capacity ratio of 0.9 during the PM peak hour.
7	Preserve recreational fishing; maintain instream structure and cover	Location and square feet of instream structure and cover loss.
8	Meet or exceed the requirements for stormwater treatment, both for water quantity and water quality	(Results of water quality analysis from Draft EIS)
9	Minimize impacts to fish passage	(Results of biological analysis from Draft EIS)
10	Minimize wetland impacts and maximize benefits of avoidance, enhancement and	(Results of wetlands analysis from Draft EIS)

	Criteria	Measure
	replacement	

8. Material Use

Goal: Use material resources as efficiently as possible.

Note: Criteria 2, 3 and 4 (in grey) will be considered in final design and construction contracting procurement.

	Criteria	Measure
1	Maximize use of materials from existing bridge	Percentage of project materials obtained from existing bridge
2	During construction, maximize use of materials from existing bridge; reuse and recycle.	(Will be considered during final design and construction contracting procurement)
3	Reduce material used and waste generated.	(Will be considered during final design and construction contracting procurement)
4	Consider material resource impacts during other phases of the structure's life, such as maintenance/operation, and deconstruction/disposal	(Will be considered during final design and construction contracting procurement)

9. Mass Transit

Goal: Improve mass transit circulation, capacity, connectivity, and local access to and across the bridge.

	Criteria	Measure
1	Increase mass transit reliability	Qualitative scale considering mass transit travel times, based on ability to provide dedicated mass transit facilities or operational priority for mass transit and overall vehicle hours of delay.
2	Accommodate future streetcar or express transit alternatives	Qualitative scale considering number of lanes, geometrics, and load capacity
3	Ensure efficient cohabitation of mass transit and auto/truck traffic	Qualitative scale considering presence of dedicated bus pullouts, mass transit stops, transfer points
4	Ensure effective transit connectivity	Qualitative scale considering connectivity of all transit modes

10. Seismic

Goal: Bridge should resist moderate earthquakes.

	Criteria	Measure
1	Minimize loss of life, loss of property, and damages to bridge due to earthquake	Qualitative scale considering ability of bridge to resist moderate earthquake.

Design Standards

Sellwood Bridge Roadway Design Standards

Design Feature	Design Criteria	Source
Classification	District Collector Community Corridor City Bikeway City Walkway Minor Truck Street Major Emergency Response Street Transit Access Street	City of Portland's Transportation System Plan (TSP)
Design Vehicle	WB-67	Roadway Working Group
Design Speed	35 mph	City of Portland
Stopping Sight Distance	250 feet (design speed dependent)	AASHTO[4]
Minimum KSAG	49	AASHTO
Minimum KCREST	29	AASHTO
Vertical Clearance Above Other Roadways	17 feet[5]	ODOT HDM[6]
Vertical Clearance Above Railroads	23 feet	ODOT HDM
Maximum Grade	5%	Americans With Disabilities Act (ADA)
Minimum Grade	0.5% for standard curbed sections, >0.3% for curb and gutter sections	City of Portland's Design Guide for Public Street Improvements
Pavement Cross Slope	2.0% to 6.0%	City of Portland's Design Guide for Public Street Improvements
Maximum Superelevation	6.0%	AASHTO
Major Emergency Response Street	Major Emergency Response Routes are not eligible for traffic slowing devices.	City of Portland's Transportation System Plan (TSP)

[4] American Association of State Highway and Transportation Officials: *A Policy on Geometric Design of Highways and Streets*, 2001.

[5] For a rehabilitation project, existing clearances between 16 and 17 feet may be maintained with notification to the Motor Carrier Transportation Division.

[6] Oregon Department of Transportation, Highway Design Manual.

Travel Lane Width[7]	Minimum	Desirable	Min. – City of Portland Des. –Roadway Working Group
	11 feet	12 feet	
Bike Lane	On a designated City Bikeway, bicycle lanes recommended. Where not possible due to width constraints and parking needs, a parallel alternative should be developed.		Min. – City of Portland Bicycle Master Plan Des. – Roadway Working Group
	Minimum	Desirable	
	5 feet	6.5 feet	
Sidewalk	On a designated City Walkway, sidewalks are required to provide safe, convenient, and attractive pedestrian access to activities along streets and to recreation and institutions within and between neighborhoods. All construction of new public streets will include sidewalk improvements on both sides.		Min. – Portland Pedestrian Design Guide Des. – Roadway Working Group
	Minimum	Desirable	
	8 feet clear of obstructions (6 feet Through Pedestrian Zone plus 2 feet Furnishings Zone/Curb Zone).	12 feet clear of obstructions (6 feet Through Pedestrian Zone plus 2.5 feet Furnishings Zone/Curb Zone plus 1.5 feet Frontage Zone adjacent to bridge rail).	
Shared Use Path(if Bike and Ped facilities are combined)[4]	Minimum	Desirable	Min. – City of Portland Bicycle Master Plan Des. – Roadway Working Group
	16 feet clear of obstructions for a two-way path (12 feet plus 2 feet of shy on both sides)	20 feet clear of obstructions for two-way path (16 feet plus 2 feet of shy on both sides).	
Minimum Shoulder Width[4] (if no bike lane)	3 feet on bridges in excess of 100 feet.		AASHTO
Minimum Horizontal Curvature	R = 460 ft (Low speed, urban streets, normal crown) R = 320 ft (Low speed, urban streets, 6% superelevation)		AASHTO
Side slopes Cut Fill	 2:1 Max 3:1 Max		City of Portland's Design Guide for Public Street Improvements

[7] The rehabilitation concepts, as currently developed, do not meet these minimum standards for width. A design exception would be required.

SELLWOOD BRIDGE Project
MULTNOMAH COUNTY

Design Standards

Highway 43 Design Standards

Design Feature	Design Criteria	Source
Classification	Non-Designated Urban Highway, Urban Fringe / Suburban	ODOT HDM[8]
Design Vehicle	WB-67	ODOT HDM
Design Speed	40 mph	ODOT HDM
Stopping Sight Distance	305 feet (design speed dependent)	ODOT HDM
Minimum KSAG	64	ODOT HDM
Minimum KCREST	70	ODOT HDM
Vertical Clearance	17 feet	ODOT HDM
Maximum Grade	7%	ODOT HDM
Minimum Grade	0.5% for standard curbed sections, >0.3% for curb and gutter sections	ODOT HDM
Minimum Cross Slope	2.0%	ODOT HDM
Maximum Superelevation	4.0%	ODOT HDM
Minimum Lane Widths Travel Lanes Medians Striped Continuous Left Turn Lane Raised Curb Median Bike Lanes Sidewalk Shoulder(if no bike lane) Shared Use Path	 12 feet 2 feet 14 feet 16 feet Travel lane to travel lane 8 feet 6 feet 8 feet (10 feet with barriers) 8 feet	ODOT HDM
Maximum Degree of Curvature	10^{o} 00' (573 feet radius), with 4% superelevation 1^{o} 15' (4584 feet), with normal crown	ODOT HDM
Spirals	240 feet (2 Lanes) 360 feet (4 Lanes)	ODOT HDM
Side slopes Cut Fill	 2:1 Max 3:1 Max (with Guardrail) / 4:1 Max (without Guardrail)	ODOT HDM
Access Spacing from interchange	1320 feet	ODOT HDM

[8] Oregon Department of Transportation, Highway Design Manual.

SELLWOOD BRIDGE Project MULTNOMAH COUNTY

Design Standards

Highway 43 Interchange/Intersection Design Standards

Design Feature	Design Criteria	Source
Classification	Non-Freeway Ramps	ODOT HDM[9]
Design Vehicle	Design for WB-40 (accommodate WB-67)[10]	Roadway Working Group
Design Speed	25 mph	ODOT HDM
Stopping Sight Distance	155 feet	ODOT HDM
Minimum KSAG	26	ODOT HDM
Minimum KCREST	19	ODOT HDM
Vertical Clearance	17 feet	ODOT HDM
Maximum Grade	7% ascending, 8% descending	ODOT HDM
Minimum Grade	0.5% for standard curbed sections, >0.3% for curb and gutter sections	ODOT HDM
Minimum Cross Slope	2.0%	ODOT HDM
Maximum Superelevation	12%	ODOT HDM
Minimum Lane Widths Travel Lane Shoulder Sidewalk	 14 feet 6 feet Right Shoulder (8' with barrier) 2 feet Left Shoulder (4' with barrier) 6 feet	ODOT HDM
Radius	36° 00' (159.15 feet) with maximum superelevation.	ODOT HDM
Spirals	200 feet	ODOT HDM
Side slopes Cut Fill	 2:1 Max 3:1 Max (with Guardrail) / 4:1 Max (without Guardrail)	ODOT HDM

Note: For at-grade intersections and roundabouts, the standards of the ODOT HDM, Section 9 will apply.

[9] Oregon Department of Transportation, Highway Design Manual.

[10] 'Accommodate' refers to the ability to make the maneuver by encroaching on other lanes, shoulders, or over mountable curbs. 'Design for' means the vehicle does not require encroachment.