

Appendix O

Level of Service Standard and Measurements

Definition

Level of service (LOS) is a mechanism used to determine how well a transportation facility is operating from a traveler's perspective.

Typically, six levels of service are defined and each is assigned a letter designation from A to F, with LOS A representing the best operating conditions, and LOS F the worst.

The Highway Capacity Manual (2010) defines level of service as a quantitative stratification of a performance measure or performance measures that represent quality of service.

Quality of service describes how well a transportation facility or service operates from a traveler's perspective.

Guidance on Establishing Level of Service

- Washington State's Growth Management Act (GMA) (RCW 36.70A.070) requires local jurisdictions to establish level of service standards for all locally owned arterials and transit routes to serve as a gauge to judge performance of the system. These standards should be regionally coordinated.
- The county-wide planning policies for Thurston County state that, "The transportation element of each jurisdiction's comprehensive plan will include level of service standards for all arterials and transit routes and services. Each jurisdiction will coordinate these level of service standards with all adjacent jurisdictions. Transit level of service standards will be consistent with Intercity Transit policies."

- The GMA also directs local jurisdictions to include level of service for state-owned transportation facilities in comprehensive plans, (RCW 47.06 and 47.80), to gauge the performance of the system. The purposes of reflecting level of service standards for state highways in the local comprehensive plan are to monitor the performance of the system, to evaluate improvement strategies, and to facilitate coordination between the county's or city's six-year street, road, or transit program and the Office of Financial Management's 10-year investment program.
- Public Highways and Transportation (RCW 47.80.030) requires that regional transportation plans establish level of service standards for state highways and state ferry routes, with the exception of transportation facilities of statewide significance.
- Washington State Statewide Transportation Planning (RCW 47.06.140) requires the Department of Transportation, in consultation with local governments, to set level of service standards for state highways and state ferry routes of statewide significance.

Regional Level of Service Standards

The regional level of service standards are the following.

Two-hour p.m. peak:

- LOS E or better in urban centers and corridors.
- LOS D or better elsewhere in the remainder of the cities and unincorporated urban growth areas.
- LOS C or better in rural areas (outside of the urban growth areas and Tribal Reservations).

Strategy Corridors

Strategy corridors are places where road widening is not a preferred option to address congestion problems. This may be because the street or road is already at the maximum number of lanes, or that adjacent land uses are either fully built out or are environmentally sensitive. In strategy corridors, level of service (LOS) may exceed adopted standards, suggesting instead that a different approach is needed for maintaining access in these areas. Options include increased transit service, more sidewalks or bicycle facilities, a complete and connected street grid, transportation technology measures that improve system operating efficiency, access management, parking management, or incentives for employees to telework or carpool.

Applying Regional Level of Service

The Thurston region uses the regional LOS standards for guidance as a minimum standard for local planning efforts, to ensure that local comprehensive plan LOS standards are regionally coordinated. The regional LOS standards are set in consultation with local jurisdictions. The RTP recognizes that the LOS standards for locally-owned arterials and transit routes will be set by local jurisdictions in their local comprehensive plans, and measurement of LOS occurs at the local, not regional, level. In general, local LOS standards will be the same or more stringent than regional LOS standards. If inconsistencies arise, they are resolved in a collaborative process.

A planning LOS evaluation is also used to identify study areas in Chapter 4 Future Conditions. This evaluation is for general planning purposes.

Measuring Level of Service

There are many ways to measure LOS, with some being more appropriate for different levels of analysis:

1. **Generalized planning**, the broad type of planning application that includes statewide analyses, initial problem identification, and future year analyses.
2. **Conceptual planning**, an analysis performed to support decisions related to design concept and scope.
3. **Operational analysis**, or a detailed analysis of a roadway's present or future level of service. The Highway Capacity Manual identifies methods of performing such an analysis.

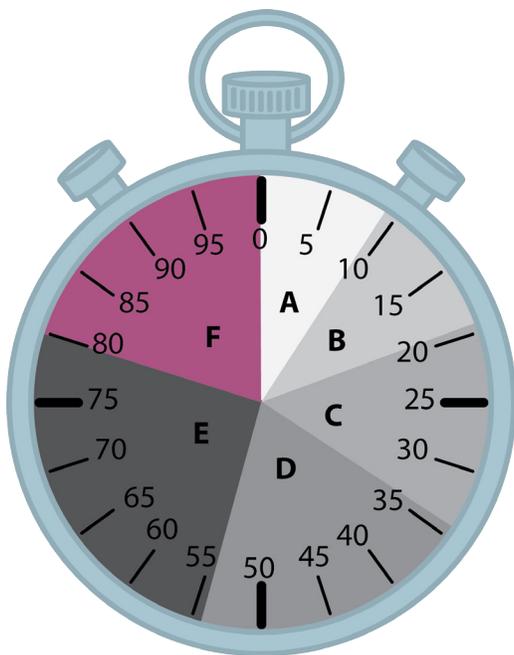
The following examples focused on generalized and conceptual planning, and not operational analysis.

Vehicle Level of Service

Volume-to-capacity (V/C) ratio for traffic can be used for generalized planning, such as that used in the RTP to identify study areas. When using a V/C ratio, demand (volume) is compared to the estimated capacity of each roadway during the evening peak period. The V/C ratio is separated into six levels, and assigned a letter from A to F.

Level of Service	Description	Volume-to-Capacity Ratio
A	Highest driver comfort; free flowing	<.60
B	High degree of driver comfort; little delay	0.60 – 0.70
C	Acceptable level of driver comfort; some delay	0.70 – 0.80
D	Some driver frustration; moderate delay	0.80 – 0.90
E	High level of driver frustration; high levels of delay	0.90-1.00
F	Highest level of driver frustration; excessive delays	>1.00

For conceptual planning, V/C ratios are not adequate measures of quality of service, and other supplemental methods, such as intersection delay, can be used for vehicle LOS. Intersection delay measures the time spent waiting in a signalized intersection.



Intersection Delay is measured in seconds.

Measuring Roadway Level of Service

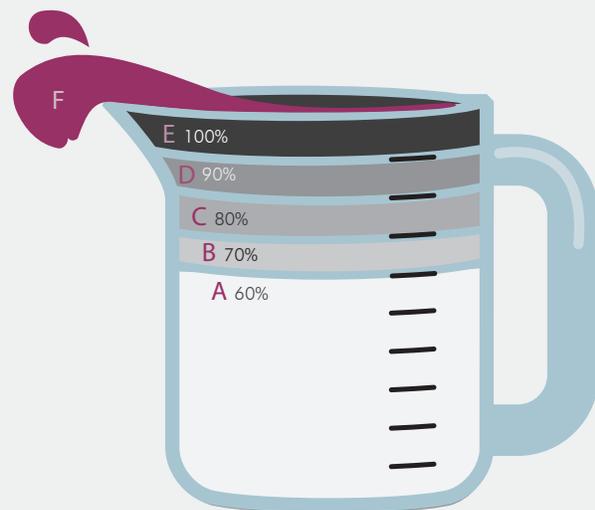
Roadway LOS may be based on a number of factors, including:

- Traffic volume compared to facility capacity
- Travel time
- Multiple variables (e.g. distance traveled, road conditions, safety hazards)

Roadway LOS may be measured at:

- An intersection
- A road segment
- A traffic corridor
- A transportation analysis zone

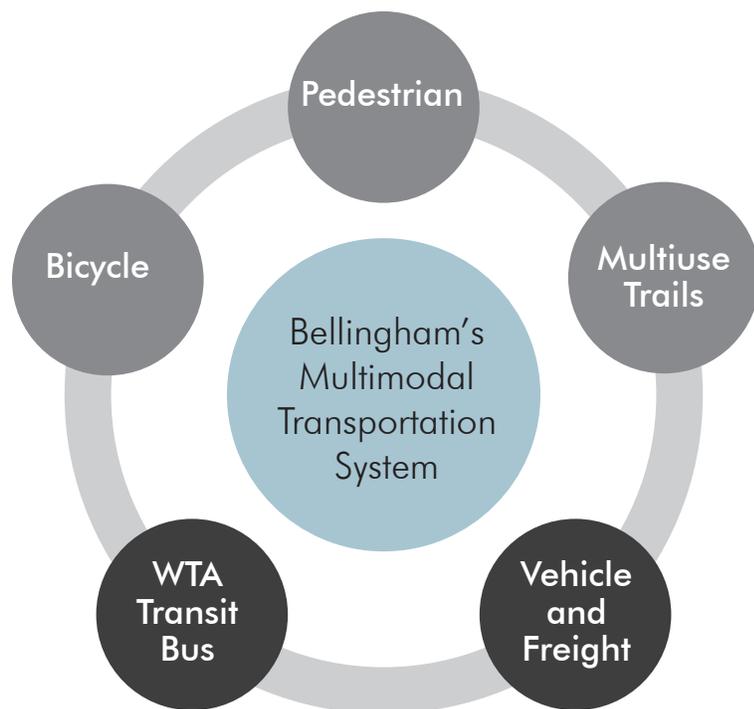
Local jurisdictions are exploring innovations in level of service for transportation that can take into account overall people-moving performance (multimodal level of service).



Roadway level of service measures how “full” the roads are.

Multimodal Level of Service

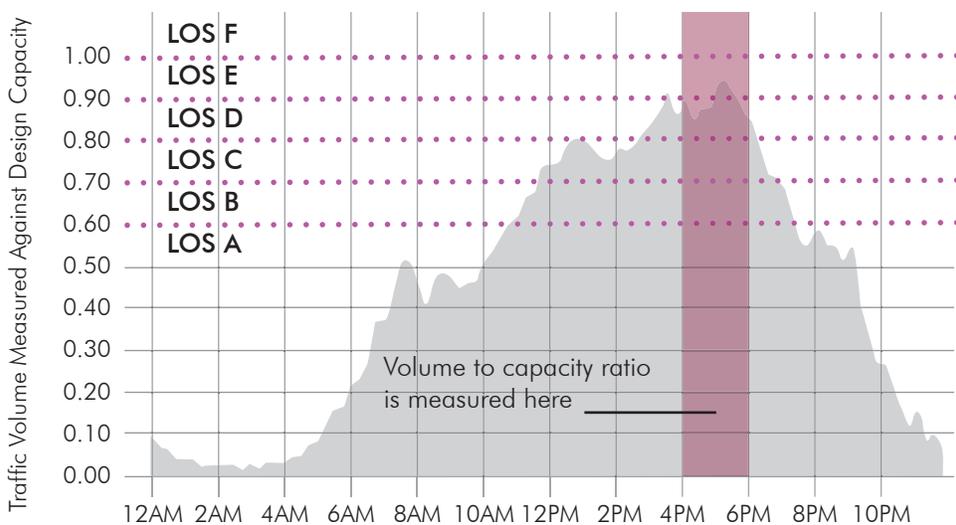
Multimodal level of service standards have been developed for other jurisdictions in Washington. Bellingham, for instance, uses a “complete network” approach to transportation planning, and sets measures for five travel modes. The measures used for trails, pedestrian, and bicycle are “completeness of the network,” as compared to goals in their pedestrian and bicycle plans. The measure used for transit is capacity and frequency as compared to ridership counts. The measure used for vehicles is the V/C ratio. Olympia, Lacey, and Tumwater are all exploring multimodal level of service.



Two-Hour Roadway Level of Service

The RTP contains a LOS standard for a two-hour p.m. peak level of service. This simply means that measurements of LOS are the average of the two consecutive busiest hours during the afternoon (p.m.) peak travel period (local evening rush hour). A two-hour period is used to accommodate “peak spreading,” the tendency for drivers to shift their commutes out of the busiest period to avoid congestion.

Traffic Volume Measured Against Design Capacity



Source: TRPC.

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