

WASHINGTON STATE FERRIES VEHICLE LEVEL-OF-SERVICE: SITUATION ASSESSMENT

During the 2007 legislative session, the Legislature passed Engrossed Substitute House Bill 2358 (ESHB 2358) - “the Ferry Bill” - and the associated biennial transportation budget ESHB 1094. Each of the pieces of legislation contains specific policy and operational directives to assess the efficiency and costs related to how Washington State Department of Transportation (WSDOT) /Washington State Ferries (WSF) provides service. The results of the studies conducted to address the legislation are intended to derive strategies for how WSDOT/WSF operates in the future.

The legislation identifies specific topics for study and requires new levels of cooperation and collaboration among the Legislature (through the Joint Transportation Committee (JTC) and the new JTC Ferry Policy Subcommittee), the Washington State Transportation Commission (WSTC), and WSDOT/WSF. These directives follow from the December 2006 JTC Ferry Financing Study (also referred to as Ferry Financing Phase 1 or the Cedar River Group Report) and are the next steps in the process of developing a policy framework to address the long-term sustainability of WSDOT/WSF.

The Legislation specifically spells out a list of tasks and a rough timeline that are designed to begin to address the questions raised in the Ferry Financing Study and to develop an information base that can support the ultimate question of how to address the long-term WSF funding requirements. Specifically ESHB 2358 and many of the Budget Provisos are designed to:

1. **Provide new, improved and “audited” information** – Ridership forecast reconciliation, life cycle cost model (LCCM), customer survey, cost allocation methodology, JTC Ferry Policy Working Group Studies, Pre-design study requirements
2. **Develop strategies to minimize costs or increase revenues** – Terminal design standards, operational strategies, pricing policy changes, Co-development study, evaluate 1-point toll collection, re-establish vehicle level-of-service (LOS)

This situation assessment provides historical context for the re-establishment of **vehicle level-of-service standards** as required by ESHB 2358. Historically, ferry investments were driven by changes in demand and the objective was to maintain the *adopted levels-of-service*. The new approach requires WSF to proactively manage demand for ferry services through the use of operational and pricing strategies to maximize the use of existing assets and minimize the need for additional investments. Given this new approach, the key questions are: (1) how should level-of-service standards be set; and (2) how should adopted standards be used to determine appropriate ferry investments. The balance of this memo addresses the following key issues:

- Legislative requirements for level-of-service standards
- Current WSF level-of-service standards

- Historical context for current LOS standards
- Relevant findings from recent studies
- Experience elsewhere: ferry LOS
- Areas for further study
- Additional study questions
- Relationship to other study elements
- Next steps

Legislative Requirements for Level-of-Service Standards: Growth Management Act

The Growth Management Act (GMA) requires local jurisdictions to adopt LOS standards for local transportation systems and to maintain “concurrency” between the level of new development and the provision of transportation infrastructure, *except for highways of statewide significance*. In this context, “concurrency” is the mechanism for ensuring an adequate level of public services in support of development. While it is the responsibility of the local jurisdiction to reach and monitor concurrency, the planning and operation of regional and/or state-run systems (like Washington State Ferries) must coordinate with local planning efforts. Recognizing the need for better regional coordination of transportation services, SHB-1928 requires Regional Transportation Planning Organizations (RPTO) to establish level of service standards for all state highways and state ferry routes.

Although they are required to adopt LOS standards, state facilities are generally exempt from the concurrency requirement. However, SHB-1487 requires counties comprised of islands to create and implement a concurrency management program for designated “Highways of Statewide Significance,” including ferry routes. In practice, this means that continuing development on Whidbey Island is tied to WSF’s ability to meet LOS standards for the Mukilteo/Clinton and Port Townsend/Keystone routes. In the early part of this decade, travel on this route began to approach the 1-boat wait standard. To avoid a concurrency issue, the Transportation Commission (WSTC), at the request of Island County, lowered the standard for Mukilteo/Clinton in 2000 from a one boat wait to two.

Current Level of Service Standards

For the majority of the WSF system, LOS standards are expressed in terms of “boat waits” – the number of vessel sailings a traveler would have to wait through before boarding a ferry. A “1 boat wait” means that 85% or more of general traffic would not have to wait more than one sailing after arriving at the dock before being able to get on a boat. This measure was developed in 1994 and is meant to reflect the following four criteria:

1. **Understandable** – the LOS measure must be easily understood by WSF officials and ferry customers
2. **Measurable** – the LOS measure must define service levels in quantitative terms to reflect the quality of ferry service

3. **Predictive** – the LOS measure must allow WSDOT to forecast future ferry system LOS given future forecasts of supply and demand
4. **Acceptable** – the LOS measure must comply with generally accepted planning and engineering principles

Current LOS standards call for a 0 boat-wait for all pedestrians, bicyclists and registered HOV vehicles. Boat wait standards for general vehicle traffic on all other routes, as measured during a May weekday, 4-hour afternoon peak traffic period, are summarized below:

Route	Current Vehicle Boat-Wait Standard	Actual Average Boat Wait as of May 2003
Mukilteo-Clinton	2	0.9 *
Port Townsend-Keystone	1	0.6
Edmonds-Kingston	1	0.6
Seattle-Bainbridge	2	0.8
Seattle-Bremerton	1	0.5
Fauntleroy-Vashon	1	0.9
Fauntleroy-Southworth	1	0.8
Pt. Defiance-Tahlequah	1	0.6

** Boat waits for Mukilteo-Clinton were measured through 2007, with 1.2 being the actual average boat wait on this route in 2007.*

Because of the unique characteristics of the San Juan Island routes, a different methodology is used to measure service in this corridor. During a typical peak month (August) and a typical off-peak month (March), total vehicle demand is measured and compared to total available capacity of all sailings scheduled for that month. This volume to capacity ratio is then translated into an estimate of the percentage of sailings for the month where demand exceeds capacity (i.e. overloaded sailings) and a level of service value (A-F) is assigned based on the ratio.

In March, LOS Standards dictate that less than 20% of sailings should be overloaded, whereas in August less than 25% of sailings should be overloaded. Actual measurements for March in the past two years show that 15.3% (2006) and 14.6% (2007) of sailings were overloaded each lower than the 20% threshold. Measurements for August indicate that 26.5% of sailings were overloaded in 2006 (exceeding the 25% standard) but only 22% of sailings were overloaded in 2007.

Historical Context for Current LOS Standards

Prior to Commission adoption of the current boat wait standards, ferry LOS standards were defined using monthly volume to capacity (V/C) ratios by route. The 1988 Vessel Study, which recommended building two new jumbo ferries (a third was later added to increase vessels for maintenance capabilities) was developed with the assumption that 1990 V/C ratios should not be any higher than 1987 V/C ratios. Therefore, boats needed to be added to the system. However, since V/C was defined at that time as a monthly number, concern was expressed by policy makers that using this approach to LOS could be manipulated by adding routes at night or at other low volume travel times, which would have no practical benefit to customers.

When it came time to review level of service standards during the development of the Ferry System Plan in the mid 1990's, there was a strong sentiment that level of service should be focused on measuring and responding to customer experience during peak times and thus momentum was gained for developing LOS standards that would reflect this.

The boat-wait parameters that now define a minimum level of service standard for general vehicle traffic were established with the intention of equalizing the overall weekday total trip time (including wait time, frequency of service, and crossing time) across ferry routes. As a guideline, a two-hour westbound weekday, PM peak total trip time was the benchmark from which the current boat-waits were established. Given that the Edmonds/Kingston and Port Townsend/Keystone routes serve as the main access routes for vehicles to the Olympic Peninsula, it was determined that they should have a higher level of service standard equating to a one hour and fifteen minute total trip time, or one-boat wait (instead of the two-boat wait the two-hour standard would have merited).

Regardless of the current applicability of this logic, the current LOS standards are embedded in other planning documents and have specific implications as in the Whidbey Island concurrency management program mentioned above. It is important to identify where LOS currently "live" so that any process for changing these standards is comprehensive. Examples include the Peninsula Regional Transportation Planning Organization's (PRTPO) Regional Transportation Plan, San Juan County and Island County transportation plans, and the transportation plans of many local jurisdictions in ferry served communities. The plans reference ferry LOS standards. For example in the PRTPO's Plan, it references ferry LOS in the discussion of a regional multimodal transportation system.

Examples of Implementation

Washington State Ferries Draft Long-Range Strategic Plan 2006-2030

The Draft Long Range Plan recommends re-stating the boat-wait LOS in terms of minutes. The current boat-wait measure depends on headway time. If another vessel is added to a route, that decreases headway and changes the meaning of "boat-wait" for that route. As such, a boat-wait measure does not capture the customer experience as well as measuring delay in minutes would.

The Draft Long Range Plan identified a potential future challenge related to current vessel and terminal configurations that might be inadequate to handle projected growth in riders without creating delays that would exceed the acceptable delays established in the LOS standards. On some routes, like Edmonds-Kingston and Seattle-Bainbridge, LOS acceptable waits were estimated to be exceeded prior to additional investment in service or capital facilities. Furthermore, LOS standards have impacts on the terminals and their adjoining roadways.

Washington State Ferries Financing Study

The Ferries Financing Study notes that the ferry system's inability to meet the projected growth in vehicular demand during peak periods at existing LOS standards is driving the need for further investment. However, WSF has little information on its various market segments and therefore

cannot predict willingness to endure longer waits or reactions to potential operations or pricing strategies to encourage non-peak travel.

If WSF maintains the current LOS standards through 2025, it would be one of the only parts of the highway system to maintain a constant LOS standard. Population growth and increasing congestion has led to deteriorating LOS standards in other parts of the highway system.

The Ferry Financing Study also notes that a “boat-wait” measure does not accurately reflect the customer experience and suggests reviewing the current LOS measure as well as reviewing whether or not the current LOS standards should be changed.

Areas for Further Study

Change the LOS measure from “boat-wait” to minutes.

An LOS measure in minutes is a more accurate measure of the customer experience and avoids the “moving target” issue potentially created by adding or subtracting a vessel from a route. Monitoring a minutes-based delay measure in lieu of boat-waits would paint a better picture of how congestion is affecting the customer experience over time.

LOS as a Combination of Measures

There could be advantages to expressing LOS on a route more broadly than a simple wait time measure allows. Other possible measures include volume to capacity or the spread and frequency of trips over time. The former is a measure of demand on the system, and depending on the time frame over which it is captured could be an indicator of how well demand management strategies are working. The latter is a customer convenience indicator. These or other measures, if tracked in combination, might provide a fuller picture of the system especially as demand management pricing and operational strategies are implemented.

Revise the minimum LOS standards

Regardless of whether LOS is expressed in boat-waits or minutes, WSDOT/WSF has the option to revise the minimum service standards that WSF will uphold to reflect

- changes in operational and pricing strategies (i.e. if reservation systems are in place how will that affect LOS)
- direction that WSF engage in adaptive management strategies in its operating and capital programs so as to keep the costs of the system as low as possible while continuously improving the quality and timeliness of service. (ESHB Section 1)
- Season changes (ESHB 2358 Section 2).

Redefine the Relationship between LOS Standards and Investment in the Ferry System

As currently defined, the LOS standards for WSF imply that once the system can no longer maintain service at the pre-determined level, investment is needed to add an additional vessel to a route or make other changes that would increase capacity on the affected route. Instead of serving as a trigger for additional investment, LOS could be tracked and monitored to gauge changes in the customer experience.

This performance measure component of LOS has always been intended in the current system, and it could serve both as a feedback loop to track whether or not pricing and operational strategies are working and as a management tool to be used by the Legislature. Equipped with this type of information, WSDOT/WSF and the Governor's Office could make informed decisions about when service changes or additional investment might be warranted and make appropriate requests for funding to the Legislature. While this option is appealing in that it allows more flexibility around investment decisions, it also has concurrency impacts for Whidbey Island, where a coordination process would need to be implemented to ensure compliance with the GMA.

Links with Other Multi-Modal Forms of Transportation

Since the new Legislative direction to WSF is to manage demand for services, and particularly demand placed on the system by single occupancy vehicles, it is necessary for LOS standards to consider linkages with other transportation systems. This could potentially imply greater coordination of ferry LOS standards with other transportation system LOS standards, such as WSDOT highway standards and local transit standards.

Monitoring

To be an effective management tool, an LOS standard should include a mechanism for monitoring system performance and tracking changes in LOS over time. It is through monitoring efforts that decision-makers are provided with an objective assessment of changes in both the customer experience and to measure the effectiveness of operating and pricing strategies designed to manage demand. With this type of information it is then possible to make more informed decisions about future strategies and system investments.

To measure boat-waits, WSF must record arrival and departure times for all vehicles over the course of a several days during peak travel times. Given the limitations at terminals (many terminals include off-site queuing) and the previous point-of-sale system, this required an extensive manual process and was quite labor intensive. Due to the staff time and costs involved in manually monitoring LOS under the current standards, WSF has implemented only limited system-wide monitoring. Due to the regulatory link to concurrency, the Mukilteo/Clinton route has been the only route to be consistently monitored. Depending on the outcome of the review of LOS standards, it may be necessary to consider the potential for some form of automatic monitoring system or to ensure regular monitoring through the Transportation Commission's survey and regular WSF origin and destination studies.

Additional Study Questions

In determining if changes to LOS standards are necessary, and what the impacts of changes might be, it is important to understand the customer's sensitivity to these types of changes. For example, would increased wait times cause the customer to use an alternative route? Would increased wait times lead to more walk-on traffic? As a baseline, it would be necessary to analyze the following:

- Customer travel options (Is an alternative route available? How likely is the use of this alternative route, and what are the impacts of increased traffic along this route?)

- Customer willingness to endure longer wait times, how do customers value time
- Customer willingness/ability to shift travel times to non-peak periods
- Customer sensitivity to or potential reaction to changes in operational and/or pricing strategies
- Customer willingness/ability to change mode from vehicular travel to walk-on travel

Relationship to Other Work Elements

The re-establishment of vehicle LOS will be closely aligned with several other concurrent tasks including: the WSTC customer survey; the development of terminal design standards; the development of operational and pricing strategies; and, the updated and reconciled ridership forecasts. In addition, the re-established LOS standards will be a key component of a revised Draft Long Range Plan.

Schedule and Next Steps

This situation assessment memo is a first step in the identification, formulation, and analysis of operational strategy recommendations. The following time line and actions are tentative and are subject to revision. JTC review of recommendations will occur throughout the process.

- **October 2007-December 2007:** Identification and preliminary evaluation of vehicle LOS alternatives.
- **January-February 2008:** Assessment of feasible LOS concepts.
- **March-April 2008:** Preliminary LOS recommendations – WSDOT/WSF.
- **May-June 2008:** Review preliminary recommendations with key stakeholders and finalize LOS standards.
- **July-October 2008:** Incorporation of LOS recommendations into Long Range Plan.
- **December 2008:** Adoption of the Long Range Plan, with revised LOS.