

LUMMI ISLAND
FERRY ADVISORY COMMITTEE (LIFAC)

LEVEL OF SERVICE (LOS)
PROJECT

Progress Report
Part One

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LUMMI ISLAND FERRY ADVISORY COMMITTEE (LIFAC) Level of Service (LOS) Project

Desired Outcome

Develop and/or validate a defensible Level of Service (LOS) recommendation for Whatcom County Public Works to use for future Lummi Island ferry planning.

WORK PLAN PART 1:

Due Date: 12/31/2015 (or sooner)

1. Locate all available source documents from past efforts
 - a. Public Works is searching their archives to find relevant documents to deliver to LIFAC.
 - b. Search Island archives for relevant documents.
 - c. Seek information from Island residents.
 - d. Research information available from other sources (County Planning, State Transportation, etc.)
 - e. Check for County, State and Federal LOS requirements or standards
2. Review documents found to identify:
 - a. Assumptions used
 - b. Statistical data to support LOS development
 - c. Gaps: information needed but not available
3. Analyze past assumptions and data to determine current validity.
4. REPORT progress to County Public Works, Council, and Executive, as well as the public.

WORK PLAN PART 2:

Due Date: 6/30/2016 (or sooner)

1. Where possible, help to fill essential information gaps identified in Part 1 of this Work Plan.
2. Using assumptions and data validated in Part 1, identify or develop a practical model of Level of Service (LOS) as it applies specifically to the Lummi Island Ferry operations.
3. Develop a defensible LOS recommendation for Public Works to use as a basis for planning future ferry replacement.
4. REPORT final recommendations to the County and the public.

PROGRESS REPORT for Part 1

1. Locate all available source documents from past efforts.

a. Documents Received from Public Works:

1. Lummi Island Ferry 20-Year Plan Phase I “Charette” Report (August 6, 2001) by Hanson Professional Services in conjunction with Art Anderson Associates and Robert Williams for Whatcom County Public Works Dept.
2. Lummi Island Ferry Capacity Study (April 11, 2005) by Elliott Bay Design Group for Whatcom County Public Works Dept.
3. Exhibit B from Whatcom County 2007-2020 Fourteen-Year Ferry Capital Program (Public Works document)
4. Emails (12/9 and 12/23/2015) from Rob Ney, Special Programs Manager, Public Works, describing current method used in 2015 to calculate **actual** LOS

b. Archival documents located on Lummi Island:

1. Lummi Island Community Club (LICC) Ferry Committee minutes (2000-?)
2. Minutes of Transportation Committee created when Lummi Island Sub-area Plan was updated (2002-2003)
3. Lummi Island Ferry Task Force minutes and documents (2010)
4. Long-range Planning Subcommittee minutes and document collection (a temporary subcommittee of LIFAC) (2014)

c. Input from Lummi Island community members:

1. Verbatim comments gathered from people who stopped by PLIC’s stand at the Lummi Island Farmers Market over two weekends in August, 2015
2. Public comments at LIFAC meetings

d. Documents from other sources:

1. 2015 approved draft of Pierce County Comprehensive Plan, Appendix B: Anderson – Ketron Islands Community
2. Guemes Island Ferry Operations Status Report 2009-2010 (Skagit County)
3. 2002 Staff Report from Whatcom County Planning and Development Services (re: Comprehensive Plan updates)

e. County, State, and Federal LOS Standards:

1. **County:** March 2015 draft of Whatcom County’s Comprehensive Plan, page 6-4, showing current Lummi Island Ferry LOS standard
2. **State:** WA State Dept. of Transportation Ferries Division Final Long-Range Plan (June 30, 2009) – Customer Service: Level of Service (LOS) Standards Sections 8-10

3. **Federal:** No federal LOS standards specifically for ferries were located, except ADA standards requiring the same LOS to be provided for persons with and without handicaps.

COMBINED:

2. Review documents found to identify assumptions and statistical data used, as well as gaps where information is needed.

3. Analyze past assumptions and data to determine current validity.

Overview:

Most of the documents reviewed either did not discuss LOS, or addressed it only in terms of:

- Describing an actual LOS,
- Describing a desired LOS, or
- Relating an actual LOS to cost management.

The majority of documents did not include definitions of LOS or attempt to establish LOS standards.

Exceptions were the documents listed in “Documents from other sources” above.

1. The 2015 draft of the Whatcom County Subarea Plan indicates the last known rationale for an LOS for the Lummi Island ferry. The 2002 PDS Staff Report provides necessary additional information about the most recent previous standard.
2. Origins of the current actual LOS calculation used by Public Works in 2015 are unknown to LIFAC at this time.
3. Pierce County’s 2016 Comprehensive Plan Update includes a ferry LOS standard.
4. The State 2009 Final Long-Range Plan describes in detail the current LOS standards for State ferries, including the rationale and data used.
5. The 2011 Guemes Ferry document indicates that Skagit County is working on moving toward a ferry LOS standard similar to that of the State. (Skagit County has not yet finished updating their Comprehensive Plan.)

Because the WA State ferry LOS standards, Pierce County ferry LOS standards, and the current Whatcom County ferry LOS standards were the only actual standards found so far, our analysis is focused on those three. We also hope to add information about the method Skagit County is using before this LOS Project is completed later in 2016.

WHATCOM COUNTY Ferry Level of Service (LOS) Standards

LOS Standard:

The 2015 draft of the Whatcom County Subarea Plan indicates the current LOS for the Lummi Island ferry: **“513 ferry passenger trips annually per capita Lummi Island population.”** The Plan included no further explanation or discussion of that standard.

However, the 2002 Planning & Development Services Staff Report quotes from the 1996 Capital Facilities Plan and Capital Improvements document giving more details:

“The 1995 LOS of 553 passengers carried annually per Lummi Island population is calculated from the total number of passengers carried in 1995 (360,950) divided by the 1995 estimated Lummi Island population (653). The proposed LOS of 513 passengers per capital Lummi Island population is based on maintaining the existing ferry service for the projected Lummi Island population through the year 2002...(p. 23)”

They go on to note that the “level of service standard was based on the premise that the number of ferry trips over the six-year planning period from 1996 to 2002 would not increase, even though the Island population was increasing...The standard of 513 was adopted into the Comprehensive Plan in 1997.”

a. Assumptions:

Assumptions underlying this model:

- Maintain actual 1995 LOS through 2002 (and now into the future)
- Number of ferry trips would not increase from 1996-2002
- Island population was increasing

Unstated assumption appear to include:

- New residents to the Island will make the same number of trips per year as residents did in 1995
- “Trips” were calculated by using ridership (based on ticket sales) times 2, assuming that everyone who came to the island (i.e., bought a ticket) also left as many times.

b. Statistical Data Used:

1. Ridership data from Public Works (total vehicle drivers plus additional passengers transported each year)
2. US Census information

c. Further Data Needed:

- Even though the method described above was used to calculate the current LOS **standard**, a very different method was used in 2015 (and perhaps earlier) for calculating the **actual** LOS. The origin and rationale for the actual method being used is needed.

- It's also unknown why a different method is currently used to calculate actual LOS than the LOS standard with which it is being compared. Locating the origin of the new formula may provide an explanation.
- Island population change between 2010 US Census information and the end of 2014
- OFM population estimates, since OFM population figures were used in the actual LOS calculation in 2015
- Population projections and methods used by Council of Governments (COG), since COG is involved in transportation funding for Whatcom County
- 2014 Ridership update (available)
- Comparison of actual Island-bound passenger trips to actual mainland-bound passenger trips, including non-paying passengers (such as students). Many of the reports reviewed noted the lack of eastbound data as a limitation for planning.

d. Analysis of Current Validity of Assumptions and Data:

The 2010 US Census information on total Island population is 964. 2014 ridership (from Public Works Ferry Operations Financial Report) was 111,590 vehicle and driver plus 65,208 additional passengers. The total is 176,798 passenger trips times 2 (return trip assumed), which equals 353,596 trips in 2014. Using those numbers, the actual LOS for 2014 would have been 367. If the population increased between 2010 and the end of 2014, the number would be even lower. (Note: Figures above vary depending on the reports used. Those above are used as an example only.)

Calculations used for this LOS standard appear to omit children who ride for free from the ridership numbers. They are included in census population data, though. That is an inconsistency that might need to be examined further to see how much it distorts the figures.

The idea that a changing population will continue to use the same average number of trips per year seems unlikely. For example, fare increases could easily cause people to start using the ferry fewer times each year. An increase in the number of retired persons with a reduction in the number of families could also result in fewer needed trips and a lower LOS. The point is that changes in actual LOS could easily be due to changes in ferry usage for reasons that have nothing to do with capacity or availability for service.

A second concern is the assumption that the numbers of trips to and from the Island are equal. The lack of mainland-bound data was a recurring theme throughout many of the documents we reviewed.

Finally, planning assumptions about population projections have shifted in recent years. See a draft document, authored by LIFAC member Charles Antholt, about population issues in Appendix A attached to this document.

An LOS standard that is more directly related to capacity and demand would be of more practical use.

The current method used to calculate **actual** LOS in 2015 introduces parking availability into the equation. Parking on the Lummi Island side was determined to be the most limiting in its effect on ferry operations. However, public perception may be different. Parking has been part of ferry operating expenses in the past when leases were involved. Parking also directly relates to how ferry traffic interacts with other sources of transportation on the mainland. The usefulness and effects of including parking in the LOS calculations needs to be explored.

PIERCE COUNTY Ferry Level of Service (LOS) Standards

LOS Standard:

From the document (bolding added):

“In compliance with the concurrency requirements of the Growth Management Act (GMA), the County has adopted a level of service (LOS) policy for the ferry system to **maintain capacity at 100% of the peak winter weekday vehicle demand** (i.e. to meet the total vehicle demand on the ferry during each weekday between mid-September and mid-May). With 12 runs per weekday and 54 vehicles per run, the vehicle capacity of the ferry during winter weekdays is 648 vehicles. Based on ridership data collected by Pierce County, the average number of vehicles using the ferry during winter weekdays in 2007 was 444 vehicles, which is significantly below the vehicle capacity (648) of the ferry.”

a. Assumptions:

According to the documents, we can perhaps infer two assumptions underlying the current Pierce County ferry LOS standards:

- Service to year-round residents is the main priority (since the standard is based on winter ferry usage). This may have to do with limits on operational costs.
- Commuter needs are also a top priority (since the standard is based on weekday traffic).

b. Statistical Data Used:

1. Capacity: number of ferry runs per weekday between mid-September and mid-May.
2. Demand: average number of vehicles using the ferry per winter weekday.

c. Further Data Needed:

- Ratio of peak summer vehicle trips to peak winter vehicle trips, to see if summer recreational traffic exceeds unused winter capacity.

d. Analysis of Current Validity of Assumptions and Data:

This LOS standard is more useful than the current Whatcom LOS standard, since this one is directly based on capacity and at least a particular segment of demand (resident commuters). It also takes into account actual rider behavior.

A shortcoming of these assumptions, though, is that any summer congestion due to increased recreational and part-time resident traffic affects resident commuters just as much as all other rider segments. Everyone is equally delayed. Unless some method was used to give resident commuters loading priority in the summer, commuters would only be well served in the winter months.

WASHINGTON STATE Ferry Level of Service (LOS) Standards

LOS Standard:

Daily percent of sailings at vehicle capacity in January, August, and May. The standards have two levels. Level 1 is used to indicate approximately when targeted strategies to spread demand should be considered, and Level 2 estimates when a vessel is operating near practical capacity and planning for additional capacity may be considered. (Level 2 is not a trigger for adding capacity; it is intended to be a planning indicator.)

Level 1 standards for commuter routes with seasonal recreational traffic are: January 25%, May 30%, and August 35%. Level 2 standards are: January 65%, May 65%, and August 75%.

a. Assumptions:

According to the documents, current State ferry LOS standards are based on the following assumptions:

1. LOS standards should capture the customer experience.
2. LOS standards should describe how well assets are being used
3. LOS standards should be relevant to demand management, including operational and pricing strategies.
4. Vehicle capacity is the most limiting factor in vessel usage
5. Ferry system planning should move away from focusing on peaks in usage and instead focus on how to best fit the service to the overall demand and filling up the space outside the peaks.
6. Standards should be determined per route.
7. Higher LOS standards are applied during seasonal recreational peaks based on the assumption that the timing of recreational usage is more flexible and can be spread out over more runs.
8. Funding for increasing assets is very limited.

b. Statistical Data Used:

Washington State tracks the total number of runs each way (both westbound and eastbound), and also the number of those trips where the ferry vehicle deck is full

during January, May, and August of each year. They further break down the data into time periods: morning peak (before 11am), midday (11am to 3pm), afternoon peak (3pm to 7 pm) and evening (7pm to final run).

c. Further Data Needed:

Data on runs with full vehicles is not currently tallied, nor is eastbound ridership. Federal Code requires the ship's master to have a head count for every sailing, and that might provided the necessary information. However, Public Works indicates there is a waiver relieving the Whatcom Chief's master of this responsibility. Further research is necessary to determine the most practical way to gather eastbound ridership data.

d. Analysis of Current Validity of Assumptions and Data:

Most of the assumptions appear to be as valid today as they were in 2009. The assumptions most subject to dispute are numbers 5 and 7. However, it seems difficult to argue that it would not be beneficial to try to maximize use of a ferry's capacity (number 5). Similarly, assumption number 7 (allowing for higher LOS during peak months for recreational ridership) is also logical, since for our ferry the majority of the year is fairly stable traffic by year-round residents.

Another assumption relevant to our Whatcom County ferry is that there are means available to incentivize spreading out vehicle trips more evenly over more runs. That would need further exploration before adopting an LOS like the State's version.

APPENDIX A

DRAFT – for comments, Dec. 15, 2014

Lummi Island Population: Where we are, how will we change?

by Charles Antholt

In 2010, the US. Bureau of Census recorded 964 residents for Lummi Island.¹ In 2000 the residents numbered 812.² The average annual increase from 2000 was 1.73 percent. Historically the overall 50 year annual population growth rate for Whatcom County was 2.1 percent. For 2000-2010 the population growth rate in Whatcom County was 1.4 percent outside the Urban Growth Areas (UGAs) which includes Lummi Island.³ This pattern of slowing in population growth is consistent with findings of the Washington State’s Office of Financial Management’s Forecasting Division for the state as a whole. The Forecasting Division notes that ‘...in the 2010 census that rural and remote counties without a solid base (economic) or infrastructure for retirement communities are unlikely to attract movers or sustain current population levels.’⁴ Lummi Island falls into this characterization. Furthermore the same office notes Whatcom County’s Total Fertility Rate (TFR) is estimated at 1.6 the fourth lowest in the State and well below the replacement rate of 2.1.⁵ Annex B suggests this TFR is plausible for Lummi Island and can be expected to remain as per the U.S. Census Bureau’s Community

¹ U.S. Bureau of Census, Profile of General Population and Housing Characteristics 2010.

² U.S. Bureau of Census Summary File for Lummi Island, Profile of General Population and Housing characteristics 2000.

³ Berk, November 1, 2013. *Whatcom county Population and Employment Projections and Urban Growth Areas Allocations.* pp 6 and 10.
<http://www.co.whatcom.wa.us/pds/plan/lr/compplan/pdf/revised-phase-1-technical-report-20131101.pdf>

⁴ Forecasting Division, November, 2013. *Forecast of the State Population.* Office of Financial Management, State of Washington. p 8. http://www.ofm.wa.gov/POP/stfc/stfc2013/stfc_2013.pdf

⁵ Ibid, p. 10.

Survey 5-Year estimates. On this basis Lummi Island will likely grow at a significantly slower rate than realized in the first decade of the 21st century. The purpose of this paper is to feed into a planning process that will look ahead to the island’s need for ferry services. In that context we need a reasoned view of what the island’s population growth might evolve to be and to do that we simulate a range of reasonable possibilities. We do that below with plausible estimates of growth rates developed by Berk for non-urban growth areas in Whatcom County including Lummi Island. Berk uses 1.7 percent growth for a high rate, 1.3 percent for a medium rate, and 0.7 percent for the low rate.⁶ Without a sound reason to do otherwise, we’ll apply the same rates to the Census Bureau’s 2010 population figure for the island in Table 1. Estimating future population growth has a good deal of uncertainty. Still, using the high, medium, and low rates Berk suggested we should bracket the possibilities for Lummi Island reasonably well. Note that these estimates are simulations, not probabilities. Also note going beyond 2020 has even higher levels of uncertainty. Confidence in the estimates for 2030 further declines for a number of reasons, e.g., changes in retirement patterns, housing costs, etc.

Table 1. Population estimates for Lummi Island (2010 to 2020 and 2030)

Rate of Growth	Est. Population 2020	Est. Population 2030	% Increase 2010 - 2030
1.7	1,141	1,350	40
1.3	1,096	1,248	29
0.7	1,033	1,108	15

Source: US Bureau of Census 2000 and 2010

Berk, Nov. 1, 2013. *Whatcom county Population and Employment Projections and Urban Growth Areas Allocations*

Given changes since 2008 it is not likely the same rate of increase in the island’s population will continue. In particular we note changing circumstances such as older retirement, i.e., longer working lives; the uncertainty regarding the school; the

⁶ Berk, November 1, 2013. *Whatcom county Population and Employment Projections and Urban Growth Areas Allocations. pp 6 and 10.* <http://www.co.whatcom.wa.us/pds/plan/lr/compplan/pdf/revised-phase-1-technical-report-20131101.pdf>

recent cessation of the Boys and Girls Club; stagnant wages (in real terms) for young, middle class employees; and Lummi Island's relatively higher cost housing (Annex C) suggests the medium or lower rates of growth projected have a higher probability.

For the period 2020 to 2030 we'll hypothesize the rate of change will slow to somewhere between 1.4 for a high estimate, 1.0 for the medium estimate, and to 0.5 for the low estimate. Table 2 and Figure 1 below show these estimates.

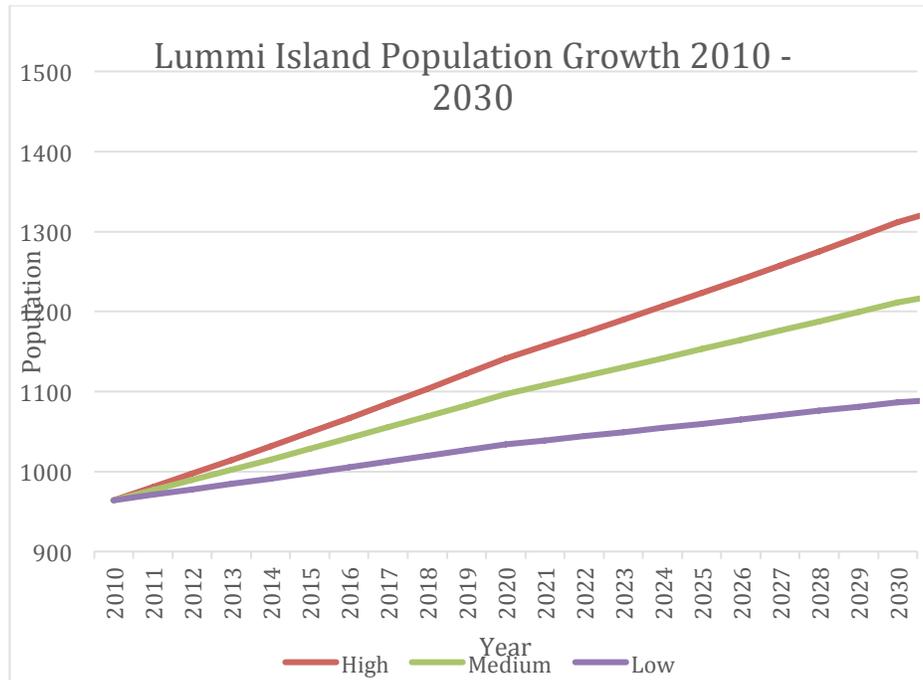
Table 2. Population estimates for Lummi Island (2010 to 2020 and 2030)

Rate of growth 2010 to 2020	Est. population 2020	Rate of growth 2020 to 2030⁷	Est. Population 2030	% increase 2010 - 2030
1.7	1,141	1.4	1,311	36
1.3	1,096	1.0	1,211	26
0.7	1,033	0.5	1,085	13

Source: US Bureau of Census 2000 and 2010

Berk, Nov. 1, 2013. *Whatcom county Population and Employment Projections and Urban Growth Areas Allocations*

Figure 1. Lummi Island Population Projections by Growth Rate 2000-2030



Next we'll look at population projections on the basis of age groups for Lummi Island. In Table 3 the age groupings of the 2000 and 2010 census findings are split into four categories for simplicity. The < 19, (infants, grammar school, and high school); 20-44 (college students, young adults/families); 45-64 (working

⁷ Authors estimate.

adults/families); 65> (mature working adults and retired). Table 3 clearly points out the strong trend toward an older population on Lummi Island.

Table 3. Lummi Island Population by Age Group 2000, 2010

Age group	2000	%	2010	%	Δ in % 2000-2010
<19	170	21	144	15	- 3
20-44	196	24	164	17	- 7
45-64	317	39	412	43	+ 4
65>	129	16	244	25	+ 9
Total	812*	100	964**	100	

Source: U.S. Bureau of Census 2000*, 2010*

Table 4 estimates the population distribution to 2020 and 2030. To 2020 we've assumed the rate of change will be the same as that for 2000 to 2010. It is a strong assumption, but we do not have another that is any more defensible. For 2020 to 2030 we'll assume the rate of change for each of the four age groups will be half of that between 2010 and 2020. That too is a strong assumption. Again, for lack of a more defensible assumption and for illustration purposes we'll assume the slower rate of change in the age distribution for 2020 – 2030.

Table 4. Projections of Lummi Island Age Groups to 2020 and 2030 with Berk's Medium Growth Rate (1.4% per annum).

Age	2020	%	2030	%
<19	96	9	73	6
20-44	110	10	79	6.5
45-64	515	47	593	49
65>	373	34	466	38.5
Total	1,096*	100	1,211**	100

*From table 2, column 2, row 3.

**From Table 2, column 4, row 3

Annex A has population pyramids projected for Lummi Island to 2020 and 2030. Annex A projections are for illustration. Age groupings are in 10 year increments

based on the 2000 and 2010 census data. The same rate of change from 2000 - 2010 is assumed for 2010 to 2030.

The message is the same from Tables 3 and 4. That is, Lummi Island is growing older. These findings can need to be used in projecting future need for ferry services, but they do not go far enough. Understanding daily and hourly (or current run use) by the major age groups is necessary, but beyond the scope of this paper. It is, however, a next step that is imperative for estimating capacity and scheduling future ferry services that may be needed over the next ten to twenty years.

Annex A Population Pyramids, Lummi Island 2000 to 2030



Source: U.S. Census Bureau, Census 2000 and 2010 Summary File and Demographic Profile Data respectively.