

DRAFT Pierce County Transportation Plan

Ferry Transportation System Discussion

October 2, 2008



Contributing Authors:

Toby Rickman, *Deputy Public Works and Utilities Director*
Sandra Pedigo-Marshall, *Public Works and Utilities Strategic Planning and Asset Manager*

Introduction

Pierce County is developing an update to the County Transportation Plan. This updated plan will include a comprehensive review of the goals, strategies, and costs of all maintenance, operation, preservation, improvement, and administration of the County road system. Since County ferries are a part of the County road system, it is appropriate to revisit the goals or objectives, strategies, and costs for the County ferry system. This transportation plan white paper will explore the trends over the last 20 years, forecast future use of the system, and propose recommendations to meet a proposed service level for the ferry system.

This paper will focus specifically on the improvements proposed to meet the capacity needs of the ferry system and cost of these improvements. The costs to maintain and operate the existing ferry service and system are covered in depth at the end of this paper. The cost to preserve the ferry system is covered at the end of this discussion but also in other transportation plan white paper discussions since the preservation of County roads will include the ferries as part of the County road system.

Current Service

Pierce County Ferries provide transportation for both vehicles and passengers from Anderson Island and Ketron Island to the mainland at the Town of Steilacoom as seen below.

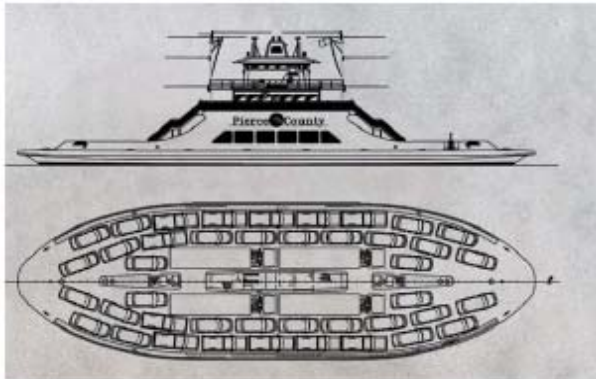


The ferry service provided by Pierce County began in 1937. Ferry service had been provided to Anderson Island by a private ferry operator from the early 1920s until 1937 when the service was no longer profitable, and as with almost all of the private ferry service in Washington, government entities were given the charge of providing this service. In this case, Pierce County was charged with providing ferry service as part of the County road system. Service was accomplished with a 10 vehicle capacity ferry named the *MV Tahoma* which was privately owned but under contract with Pierce County. As travel to the Islands grew, the *MV Tahoma* became too small and a new 18 vehicle vessel renamed the *MV Islander* was purchased by the County and used as the primary ferry. The *MV Tahoma* was retired in 1978 after being a backup ferry for 11 years. In 1976 a 34 vehicle ferry, renamed the *MV Steilacoom*, was obtained from the Navy and ran as the primary ferry for serving Anderson and Ketron Islands. At that time the *MV Islander* became the back up ferry. As ferry traffic grew, it became evident that a

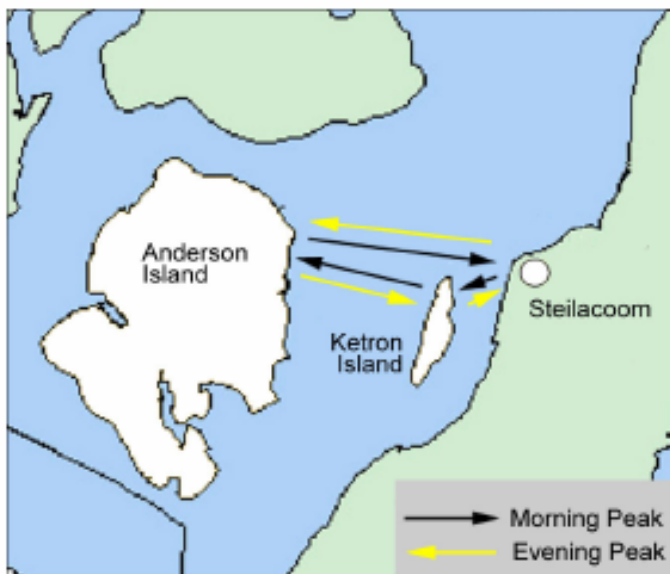
larger ferry would be needed and in 1994 a new 54 vehicle ferry was christened the *MV Christine Anderson*, which became the primary ferry and the *MV Steilacoom* then became the back up ferry.

The ferry service provided adequate capacity when the *MV Christine Anderson* was being used, but was inadequate when the smaller back up ferry was in service. In January 2007, the new 54 vehicle *MV Steilacoom II* was put into service. Rather than having a primary ferry and a back up ferry, the *MV Christine Anderson* and the *MV Steilacoom II* are operated on alternate 2-week periods when both vessels are available.

Exhibit 8
New 54 Car Vessel



Up until 2004, ferry service to Anderson and Ketron Islands had been provided by separate and direct runs to each island. In 2004 a triangle run was implemented as a recommendation from the 2003 *Waterborne Transportation Study* conducted by the County.



This new schedule of runs not only added stops to Ketron Island as part of the runs to Anderson Island, but also added runs during the day to both islands.

Department of Corrections use of dock

The Department of Corrections (DOC) provides ferry service to McNeil Island and the State prison. They use their own dock for their passenger-only boats that regularly transport employees and others. They also operate a tug and barge to transport vehicles to McNeil Island. This vehicle barge uses the County dock at Steilacoom to load and unload vehicles to and from the barge. The DOC pays the County a yearly rent for the use of the Steilacoom dock.

Goals – Current and Recommended

Current Ferry Concurrency Level of Service

The County Code has a requirement to improve the system when there is too much traffic on the ferry, similar to when there is too much congestion on a roadway. The code states that when ferry use reaches a certain level, this triggers a “Concurrency” requirement that increases ferry Level of Service (LOS). The current “Concurrency” requirement is to maintain LOS at 100 percent of peak winter weekday vehicle demand. This requirement would affect vehicular demand rather than walk-on passenger demand. This requirement is met as long as a vehicle, and driver, desiring to cross on the ferry, will be accommodated some time during the winter weekday, regardless of how many runs the person may need to wait for.

2003 Waterborne Transportation Study Goals

The long range planning effort in 2003 identified two additional goals for the ferry system. The first goal’s intent was to help reduce the number of vehicles left behind. A vehicle was considered “left behind” if the driver had intended to board a ferry run and was required to wait at least one run due to the ferry being full. The plan did not quantify this goal such as “reducing the number of vehicles left behind” to 1% or zero. Therefore, to help implement the intent of this goal, the decision was made to focus on reducing the number of vehicles left behind through the use of a triangular run and adding runs, building a new ferry with the same capacity as the primary ferry (54 car *MV Christine Anderson*), and building a second slip at Steilacoom.

The second goal was to increase the recovery of costs by the fare box to 80% by the year 2016. Specifically the goal was to increase the fare box recovery every other year until it reached 80% of the cost of maintenance, operations, preservation, and administration. This goal has been implemented through the proposed budgets and fare increases from 2004 through 2007.

While the goals were used in future budget policies and documents, the 2003 Waterborne Transportation Study was never formally adopted by the County Council.

Recommended Level of Service (LOS) Goal

While it has been easy to meet the current LOS goal of carrying all winter weekday traffic, and in fact all weekday traffic throughout the year, it would seem appropriate to find a level of service goal that recognizes ferry travelers expectations that more closely parallel the expectations of travelers on roads. Everyone traveling on a road expects to be able to arrive at their destination even though there may be delays associated with

congestion. As a means of encouraging pedestrian use of the ferry system it is recommended that a new LOS goal be:

Meet the daily vehicle demand for ferry service for 97% of the days throughout the year.

This would mean that 1 day per month someone would have to leave their vehicle and ride the ferry as a passenger. At that level of service, additional ferry service would need to be implemented.

Recommended Fare Recovery Goal

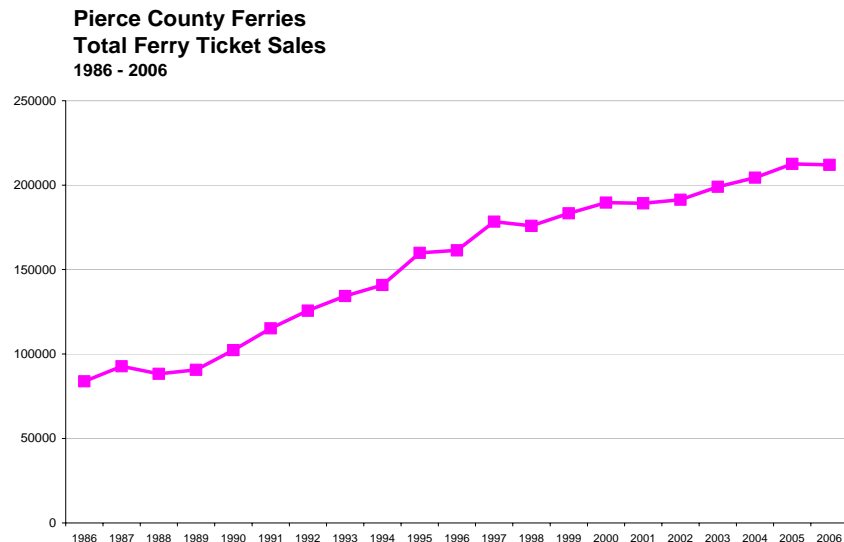
The goal for several years has been to steadily increase the percentage of maintenance, operations, preservation, and administrative costs covered by the fares from the current level of 60% to 80%. In 2006 and 2007, the goal was 60% of these costs which included the full cost of replacing ferries, docks and terminals when needed. In 2007, a decision was made to recover only ½ of the cost of replacing (preservation) the ferry in the recovery calculation since the other half of the cost of replacing ferries is expected to come from other state sources. There was also a decision to not include the portion of the docks and terminals that are included in the federal aid bridge system since the replacement of these “bridges” are expected to be covered by federal funding. The recommended fare recovery goal is proposed to be:

To cover 73% of the maintenance, operation, preservation (as negotiated in 2007), and administrative costs in 2008 and then increase by 1% each year until the recovery reaches 80% in 2015.

Trends in Use of the Ferry System

Ridership Over The Years

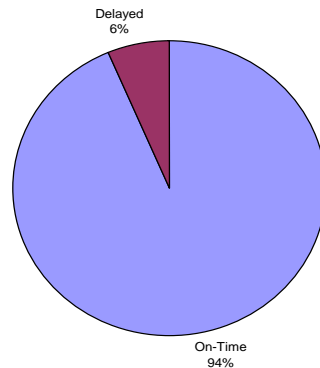
Over the past 20 years, ridership has steadily increased as population on the islands increased. In fact, ridership has increased 153% from 1986 to 2006. While there a few years where the ridership increase slowed or was near zero, overall, the ridership shows a steady increase.



On-Time Service Record

An indicator of service typically used for transportation systems such as transit, airlines, and ferries is the record of on-time service. For this discussion, a decision was made to evaluate the on-time **departure** record of the ferry system. A log is kept of each run of each day of arrivals and departures at each terminal. From this data and the schedule, it can be determined if the ferry is departing “on-time”. There is some reasonable flexibility in the schedule for arrivals and departures where the average user would still consider the departure “on-time”. It was decided that any departure within 5 minutes before or after the scheduled departure time was considered on-time. Since this data is not kept in any database, but rather only recored on a form, the data below was collected and analyzed requiring a look at each run of each day for the year. Given the amount of effort required, only the last full year of data (2006) was analyzed to indicate the latest on-time record.

Pierce County Ferries On-Time Service Record 2006



The data indicates an on-time record of approximately 94%. When looking at the 52 days with significant delays, 4 or more delays in a day, the two most significant causes of that delay were:

- Mechanical malfunctions, and
- Railroad Trains impacting loading and/or unloading.

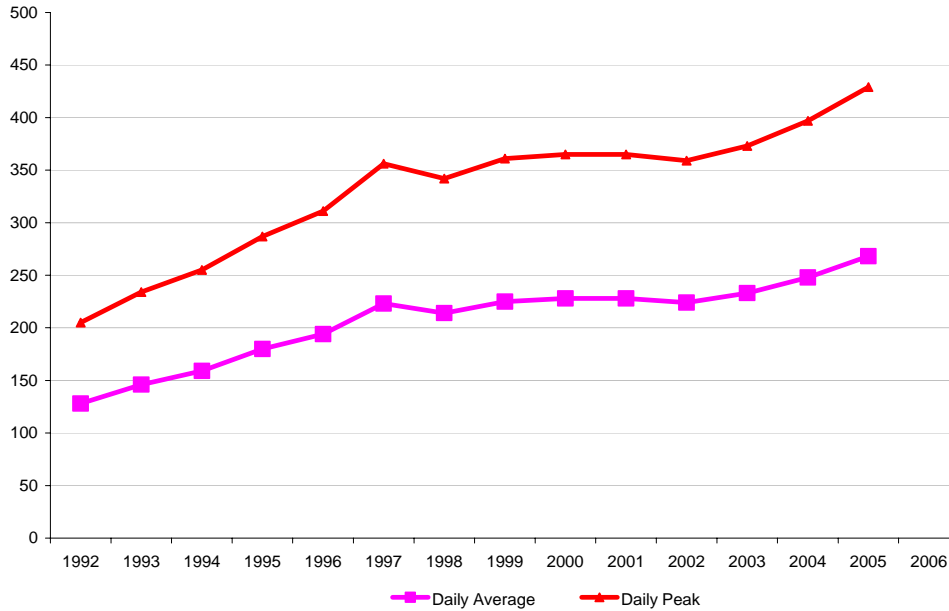
Other causes of delay are:

- Undocumented,
- Medical emergencies,
- Security emergencies,
- Weather such as fog,
- Extra runs added to the schedule,
- Overflow situations, and
- Department of Corrections barges using the slip at Steilacoom.

Winter Weekday Vehicles Carried

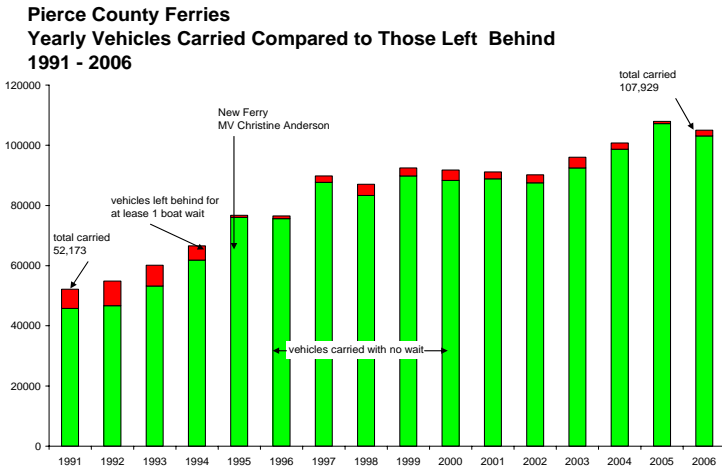
The current “Concurrency” requirement in County Code is to carry all vehicles on winter weekdays. That is weekdays from September 15th through May 15th. The data below shows a steady increase in both average winter weekday traffic and the peak winter weekday traffic. With 12 runs per day and 54 vehicles per run, the number of vehicles that can travel each day is 648. The number of vehicles using the ferry is still significantly below this maximum during winter weekdays.

**Pierce County Ferries
Winter Weekday Average Ridership
1992 - 2006**



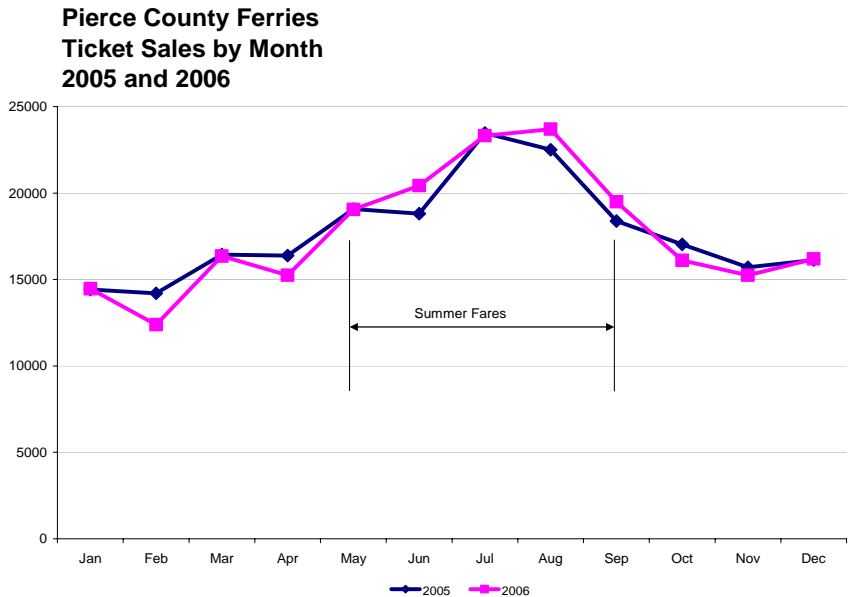
Overloads

The chart below shows the number of vehicles each year that had to wait at least one boat. The number of vehicles “left behind”, meaning left on the dock waiting for the next boat, is a small number each year compared to the total number of vehicles carried. In 2004, for example, the number of vehicles left waiting for the next boat was 2% of the vehicles carried that year. The trends show an increase in the number of vehicles carried increasing significantly over the past 15 years, but with the implementation of the *MV Christine Anderson* and a triangular run with more runs to the islands, the number of vehicles with passengers missing their boat they intended to take has not increased.



Seasonal variations

The use of the ferry increases substantially during the late spring and summer months, beginning around the middle of May through the middle of September and this is no doubt why the “peak” season fares were implemented. The peak fare can average from about 10% to 15% depending on the type of vehicle. The graph of 2005 and 2006 monthly ridership below shows a more than 50% increase in ferry riders at the peak of the year in August compared to an average winter month such as November.



MOPIA trends

The current cost categories in maintenance, operations, preservation, improvements, and administration have recently been compiled. From 2005 to 2007, the maintenance, operations, and administration costs have increased by about 5% per year.

Maintenance – Maintenance costs are expected to increase at approximately the rate of inflation.

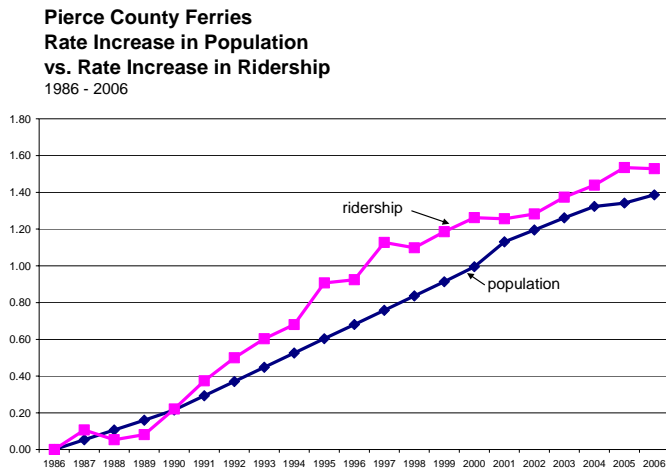
Operations – Operations costs include the operating contract for facilities and the vessels, fuel, security, and insurance. Fuel costs have increased rapidly and caused operational costs to rise above inflation. Other operational costs are expected to rise at the rate of inflation.

Preservation – The cost of preserving or replacing assets in the ferry system are increasing at a rate above inflation as construction costs rise more rapidly. Public works construction costs are rising at about 14% recently. A longer discussion of the plan for replacing or refurbishing ferry assets is provided later in this paper.

Improvements – The improvements needed for the ferry system are included later in this paper. The improvements identified in this update to the transportation plan are strategies to increase the capacity of the system to meet the future demand for ferry service.

Forecast

The best indicator of use of Pierce County ferries is the population on Anderson Island. The chart below shows a strong correlation between the change in population on Anderson Island and the change in ridership over the last 20 year period. The population information is based on Census counts in 1980, 1990, and 2000 with Washington State Office of Financial Management (OFM) population estimates for years in between the Census counts. The ridership is based on the annual count of ticket sales. The correlation between the population and ridership is strong. It can be inferred that even with purported changes in island demographics, the correlation between the growth in population and ridership seems unaffected.

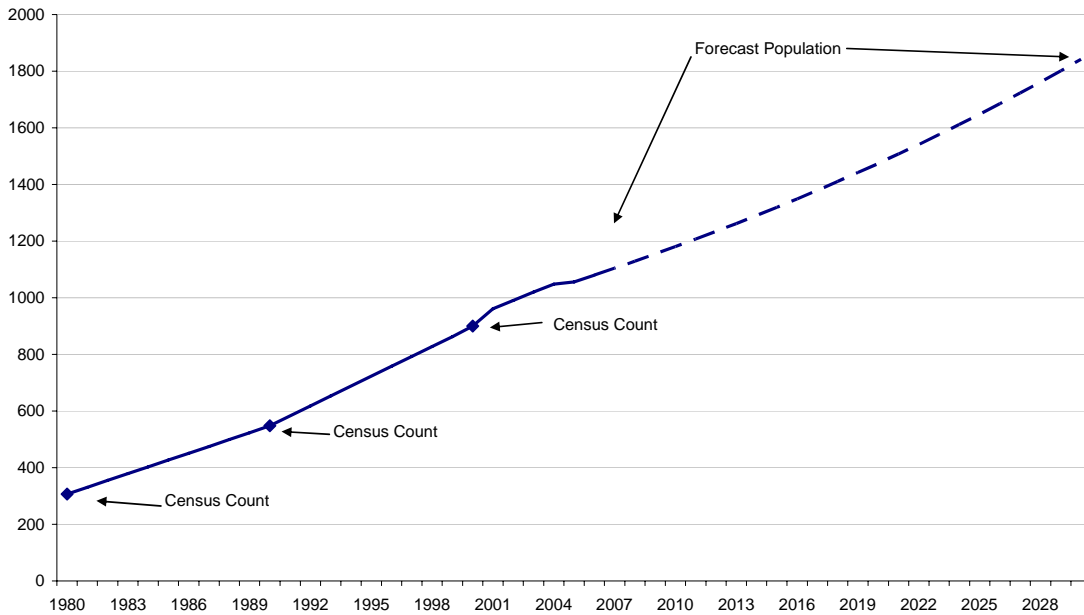


The population on Anderson Island is expected to continue to grow as shown below. The

current Anderson Island land use consists of 993 developed residential lots, of a total 2,723 lots that are available for residential development. For Ketron Island there are 16 developed residential lots out of a total 249 lots available for development.

It is estimated that the population on Anderson Island will increase to 1840 by the year 2030. While the population on Anderson Island has grown by an average of 4% per year over the past 20 years, this growth is expected to slow. This forecast is consistent with state, regional and county-wide forecasts.

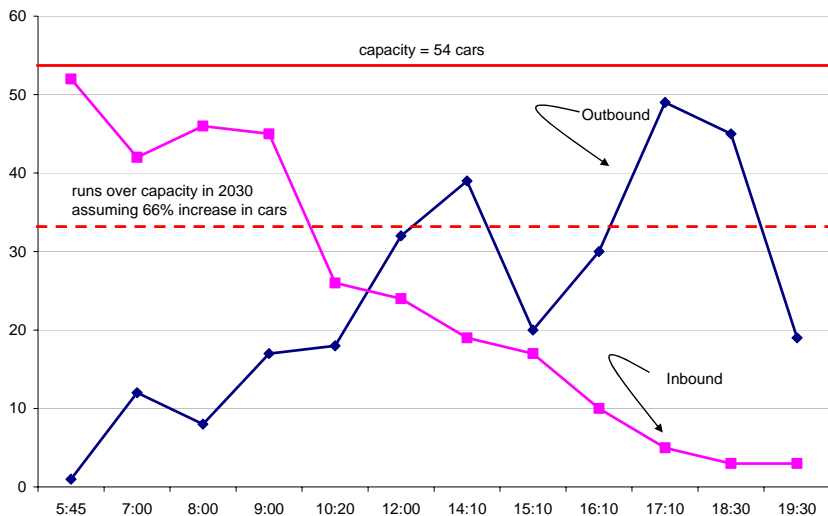
**Anderson Island Population
1980 to 2030**



The estimated population is expected to grow by about 66% by 2030, therefore it is estimated that the ferry system use will grow by the same 66% by 2030.

Given a projected 66% increase in population, it can be projected that ferry ridership will increase at the same rate. The chart below shows which runs are overly used today and which ones will be over used if the projected increase occurs. Explained in more detail, the chart below shows the number of vehicles carried on each run of a typical day. This shows that on an average day in 2006, the vessel had essentially reached its car carrying capacity on the first run of the day and during the 5:10 and 6:30 PM runs returning to Anderson Island. Assuming a 66% increase in traffic, the chart then shows which runs that currently carry 32 vehicles or more will then be at or over capacity (54 cars). Essentially, all runs will be at or over capacity throughout the day. Even though it shows that the 10:20 AM and noon runs may still have some capacity, the reality is that cars wanting to cross on the ferry during the runs that are close to capacity today will also experience and increase and will shift to fill these two runs. It is safe to conclude that the vehicle demand will exceed the vessel capacity throughout the day at some point before 2030.

**Pierce County Ferries
Vehicles Carried by Run
November 2, 2006**



Improvement Solutions for Ferry System Capacity

Increase service runs – The most often used approach to solve too much traffic on the ferry is to increase the number of runs made to the islands or simply increase service. The approach used in 1994 was to build a larger vessel, but both ferries are new and the same size, 54 vehicles, so larger vessels is an unlikely improvement option for more than 30 years. It is much easier to increase the service through more runs. The times of the day that are experiencing excess traffic are the morning coming from Anderson Island and the afternoon runs going to Anderson Island. To solve the congestion during these times, additional runs could be added.

Staffing of additional runs is the major consideration in such a solution. Currently, the minimum shift for staff is 4 hours and the maximum shift is 12 hours. These additional runs could be accomplished in three ways:

- Adding runs for 4 hours in the morning and 4 hours in the afternoon.
- Extending shifts for the morning and afternoon crews to add runs.
- Adding runs in the 8 hours in the middle of the day.

These additional runs would cost approximately \$690,000 per year in 2007 dollars.

Another major consideration in increasing ferry service through additional runs is the limitation of an additional slip at the Steilacoom dock. The current dock has one slip and while it could accommodate additional runs to Anderson Island if the Department of Corrections did not use the slip, it can not accommodate both the DOC runs and additional runs by the County ferries. To increase service would require the construction of an additional slip which is estimated to cost \$5.3 million. A federal grant has been secured to build a second slip and Department of Corrections is expected to contribute as well.

Additional runs would have an effect of reducing the need for other improvements such as additional parking and holding lanes. With additional runs, the number of vehicles in the holding lanes would be significantly reduced compared to the number of vehicles waiting for a larger ferry with the same schedule as today.

Shift mode from auto/driver to passenger – While the number of vehicles carried on the ferries is expected to exceed the capacity, the ferries can carry many more passengers. The *Christine Anderson* and the *Steilacoom II* can carry 250 and 300 passengers respectively. There is excess passenger capacity over the next 20 years, but encouraging the use for passenger travel instead of vehicle travel has costs and considerations as well.

The first consideration of encouraging more passenger travel is the probable need for additional parking in Steilacoom. For those wanting a vehicle on the mainland, additional 24 hour parking would be required. This idea has been explored in the past and, if recommended as a solution, would require additional analysis to know how it would be accomplished and what it would cost.

The other possible significant improvement needed to encourage pedestrian use of the ferry would be better connections to public transit. On June 01, 2008, Pierce Transit initiated new schedule changes for Bus Route 212 to better accommodate passenger connections between the Pierce County ferry system and Pierce Transit. The new schedule now provides 30-minute service at the bus stop near the Steilacoom Ferry Dock (Union Avenue & Commercial Street) during the morning and evening commutes. In addition, Pierce Transit has delayed the bus departure from the ferry dock in the morning so that the bus does not leave the dock before the ferry arrives. In the early evening, the bus schedule has been adjusted so that bus arrival at the ferry dock is 10 to 20 minutes before the ferry departs. Over time, these improvements should be evaluated to see what improvements are seen in pedestrian use of the ferry.

Adjust Finances – Some of the solutions may require significant changes to the financial policies or strategies that the ferry system operates under. The ferry system currently has a complex fare structure that has evolved to encourage different policies than may be needed to address the growing demand on the ferry system. The current system encourages commuters and use of the ferry during peak runs of the day. The system also discourages use of the ferry during the summer with seasonal surcharges. Adjustments in fare structure and/or rates may be needed along with improvements outlined above to be effective.

A financial opportunity that may need to be explored is to argue for an increase in the state subsidy of the ferry system. Policy decisions were made in the 1990s in the distribution of the state gas tax to counties with ferry systems that are a larger financial burden than normal county roads. A state allocation of gas tax goes to the 4 counties with ferry systems. This state subsidy is based on the operational and maintenance costs of each ferry system and how much of those costs are covered by fares. This subsidy has not been increased since its inception over 15 years ago even though costs have increased

with inflation.

Key Performance Measures

Ridership over time – the change in ridership over time must be monitored to see when ferry traffic is reaching capacity. Depending on the level of service goal(s), ferry use may need to be measured on a daily basis, monthly basis, yearly basis or all three.

Fare recovery of O&M costs – the financial policies of the ferry system involve monitoring the portion of the maintenance and operations costs covered by fares.

Overloads (or LOS goal) – Again, depending on the level of service goal(s) selected it is likely important to monitor the number of vehicles left waiting for the next boat due to an overload situation.

On-time performance – an aspect of customer service that is influenced by how effectively the ferry service is provided is the on-time performance. Discussions in transportation planning indicate that the reliability of trips is often more important than the length of the trip.

Maintaining and Operating County Ferries

County ferry system assets consist of the ferries, docks, terminal buildings, and a parking lot. There are daily activities associated with maintaining and repairing all assets in the ferry system as well as paying for the operation of the ferry system.

Maintenance of the system includes:

- general vessel maintenance like cleaning decks and restrooms including the supplies for this maintenance, and engine repair,
- vessel maintenance every other year accomplished during drydocking, and
- facility maintenance for the docks and terminals like cleaning and repair.

The goals for the maintenance of the ferry system are as follows:

Vessels: Meet Coast Guard requirements by maintaining vessels to operate in the same condition as when the vessel was constructed. Maintain the vessels in the most effective matter to provide a high level of cleanliness, safety, and comfort for ferry users.

Terminals: Maintain the terminals in the most effective matter to provide a high level of cleanliness, safety, and comfort for ferry users.

The estimated cost to maintain the ferry system over the next 20 years is \$14.7 million.

Operation of the existing system includes:

- fuel,
- operating contract for the vessels,
- operating contract for the facilities, including tickets sales, and
- insurance.

The goals for the operation of the ferry system are as follows:

Vessels: Provide capacity at 97% of weekday demand with no more than a one ferry boat wait. Reduce the number of vehicles left behind during a.m. and p.m. peak ferry use.

Terminals: Provide ticket sales and customer service to meet customer needs and per the Maintenance and Operations Contract. Meet Homeland Security (Coast Guard) Plan requirements to ensure the safety of passengers, crew, vessels, and facilities.

The estimated cost to operate the ferry system over the next 20 years is \$37 million.

Preserving County Ferries

County ferry system assets consist of the ferries, docks, terminal buildings, and a parking lot. The docks, or landings, are considered county road bridges and thus, deteriorate over time as any bridge would deteriorate. These bridges are inspected every other year and given a sufficiency rating along with other bridges. The Anderson Island landing was rebuilt in 1983, and the Ketron Island and Steilacoom landings were rebuilt in 1998. All three have a design life of 40 years so the Anderson Island landing, while still in good condition, is expected to require refurbishment within the 20 years of this plan. All three docks are in good condition.

The terminal buildings, or waiting facilities, at Anderson Island and Steilacoom were rebuilt in 1987 and 1986 respectively. Portions of these facilities will need refurbishment in the next 20 years as their currently fair condition deteriorates. The parking lot may need some repaving in the next 20 years.

The ferry assets are handled differently due to Coast Guard requirements. The Christine Anderson and the Steilacoom II were built in 1994 and 2006 respectively. These ferries are required to undergo a dry dock repair every other year. This repair requirement is covered under the maintenance of the vessels, but the Coast Guard requires that the ferry be repaired to a condition equal to when it was constructed. This is for safety purposes, so while a ferry has a design life of 50 years, it is not allowed to deteriorate as other assets do. Therefore, the condition of ferries is always maintained as good.

Road Asset	Inventory Quantity	Unit	Life-Cycle	Replacement Cost	Cost/Year		
					Per Unit	Annual Cost	20 -Year Cost
Ferries	2	each	50	\$12,000,000	\$240,000	\$480,000	\$9,600,000
Ferry Docks	3	each	40	\$2,860,000	\$71,500	\$214,500	\$4,290,000
Ferry Terminals	2	each	40	\$622,500	\$15,563	\$31,125	\$622,500
Ferry Parking	1	each	40	\$690,000	\$17,250	\$17,250	\$345,000
Ferry Ticket Systems	1	each	10	\$100,000	\$10,000	\$10,000	\$200,000
TOTAL						\$752,875	\$15,057,500

Estimated Life-Cycle of Transportation System Elements

The table above includes an estimate of the life cycle, for different elements of the transportation system, for the purposes of developing a 20 year estimate of the preservation needs of the transportation system. These design life values are based on both years of experience maintaining these assets as well as investigating the experience of others across the country through literature reviews. The actual determination of when to replace an asset is based on the individual performance of that asset and a calculation of when is the most cost effective time to replace or refurbish the asset. This is done through a comprehensive asset management system. The preservation of assets is also not uniform over the 20 years and the overall targeted amount for preservation should be balanced with the need for that year, while keeping in mind the need for subsequent years. In some cases, a preservation account will be needed since an asset replacement will come due all at once, such as a ferry.

Strategies for Replacing Ferries

The two ferries owned by Pierce County have been funded by a combination of County Road Funds and Public Works Trust Fund loans that are being repaid by state funding. While it is difficult to know if this source of funding will be available in 40 to 50 years when the ferries need to be replaced, it is reasonable to assume that half of the cost of replacing the ferries will be paid by a loan. If the state funding is not available to repay the loan at that time, it is assumed that ferry users will pay higher fares or other fees, such as a ferry district fee, to cover the repayment of the loan. The other half of the ferry replacement cost will be covered each year in the budget process to form a replacement fund. It is assumed that this fund will gain interest over time and be fully available when the ferries need to be replaced. It is estimated to cost the County Ferry Fund \$3,940,00 over the next 20 years toward this preservation expense that will occur in 40 to 50 years.

Strategies for Replacing Terminals

There are two ferry terminals which need elements replaced at different times just as any building needs. An asset management system will monitor the condition of each element of the terminals and determine the most cost effective time and method to replace them. Unlike the docks, these facilities are not eligible for bridge funding and the County is unlikely to receive state fund for these buildings. The cost of replacing or rehabilitating these facilities will be annualized and included fully in the budget. As with the ferries, a preservation fund will be built up over time and is assumed to collect interest so that the full cost of replacing or rehabilitating these facilities is covered by the preservation fund. The 20 year cost for these terminals is estimated to be \$640,000.

Strategies for Replacing the Ferry Ticket System

A new ticket system for the ferries was purchased and implemented in 2007. As with any significant information technology system, hardware and software need to be upgraded and replaced at periodical intervals to maintain the ability to operate in the global information technology environment. While it is estimated that yearly maintenance and operations costs will cover any upgrades, it is estimated that the system will need to be replaced in its entirety every 10 years or at least once during the 20 year time period of this plan. The estimated cost is \$125,000, based on the cost of the new system.