Appendix C - Washington State Ferries

1. December 22, 1996 Memorandum For The Record From Russ East Re. Bainbridge Island Multimodal Ferry Terminal – Ridership Estimate

Sverdrup Civil, Inc. Northwestern Region/Seattle

December 22, 1996

MEMORANDUM FOR THE RECORD

FROM: Russ East

SUBJECT: Bainbridge Island Multimodal Ferry Terminal -- Ridership Estimate

This memorandum summarizes the methods used in developing ridership and growth estimates for the Bainbridge Island Terminal. The estimates are based upon 4 hour westbound commuting estimates from WSF. Eastbound estimates are projected from westbound data, and from ridership profiles developed from actual counts conducted by the IBI group for ticketing sales analysis. The basis for the estimate is as follows:

Forecasting periods:

Ridership estimates are developed for two time periods. A time period of 20 years will be used to predict the demand on the terminal within the planning period used by the City for the project. A 30 year time period will be used to develop the program for sizing the terminal facilities. The longer period is used for sizing facilities in order to reflect the longevity of capital facilities and the need for prudent investment of taxpayer's money.

Distribution of ridership:

The existing ridership distribution by sailing for the 4 hour commuter period is summarized in the following table.

	Bainbridge to Seattle		Seattle to Bainbridge		
	Weekday Vehicle	Weekday Passenger	Weekday Vehicle	Weekday Passenger	
Sailing Time	% per sailing	% per sailing	% per sailing	% per sailing	Sailing Time
5:30 AM	16%	13%	25%	14%	3:50 PM
6:20 AM	24%	26%	25%	26%	4:40 PM
7:10 AM	20%	28%	21%	35%	5:25 PM
7:50 AM	19%	23%	16%	15%	6:10 PM
8:40 AM	22%	11%	13%	10%	7:00 PM
	100%	**100%**	**100%**	**100%**	

Demand Model:

The demand model is based upon current ridership distribution redistributed to reflect the addition of a third vessel on the route and effectiveness of TDM methods. The distribution reflects WSF policy to accommodate foot passengers on the sailing they choose to ride, TDM methods to shift passengers from vehicular mode to walk-on passenger mode, and recognizes the propensity of passengers to commute during the same general commuting hour that they presently do, while balancing the need to shave the peak commuting demand. Under current ridership, the peak afternoon demand for walk-on passenger totals 35% of the total ridership over the four hour commuting period. TDM methods are effective in equalizing peak ridership during the morning commute from the terminal. The average of the peak 3 sailings in the morning is 26% and ranges from 23% to 28% per sailing. However in evening commuting hours, TDM for walk-on passengers has not been as effective. The average for the 3 peak sailings is still 25% but the peak totals 35% of the passengers riding a single sailing. In the future, this plan reduces peak demand for walk-on passengers to 26% of total ridership. Current TDM methods have been very successful, and therefore, vehicle ridership is not peak driven and arrives at the terminal in relatively equal volumes throughout the commuting period.

Holding Demand:

In general eastbound travel mimics westbound travel over the commuting periods, and therefore, westbound demand will be used for determining the size of holding lanes. Presently holding demand totals 1,330 vehicles westbound over the four hour commuting period. WSF projections for the year 2015 predict that the commuter demand for holding will increase to 1,730 vehicles for the same commuting period. Holding demand is driven by the arrival pattern of vehicles prior to sailing and by regional policy for total trip time from Kitsap County to Seattle through the Bainbridge Island Terminal. Regional policy for parity establishes a total trip time of 2 hours through the Bainbridge Island Terminal, which results in holding lane capacity of 2.2 vessels or 480 vehicles. Actual demand is somewhat greater due to differences in actual demand and capacity at the terminal. The following table and graph demonstrate holding lane sizing characteristics, assuming an arrival pattern similar to the present conditions.

20 year growth plan -- Holding lane Demand					
Sailing Time	Distribution	Vehicle Demand per Sailing	Vessel Capacity[1] per Sailing	Excess Holding Demand per Sailing	Total Holding Demand
5:30	11%	185	210	-33	185
6:05	16%	272	150	122	272
6:40	16%	284	210	74	406
7:15	14%	247	210	37	443
7:50	14%	247	150	97	480
8:25	14%	247	210	37	577
9:00	14%	247	210	37	**614**
Total	**100%**	**1,730**	**1,350**		

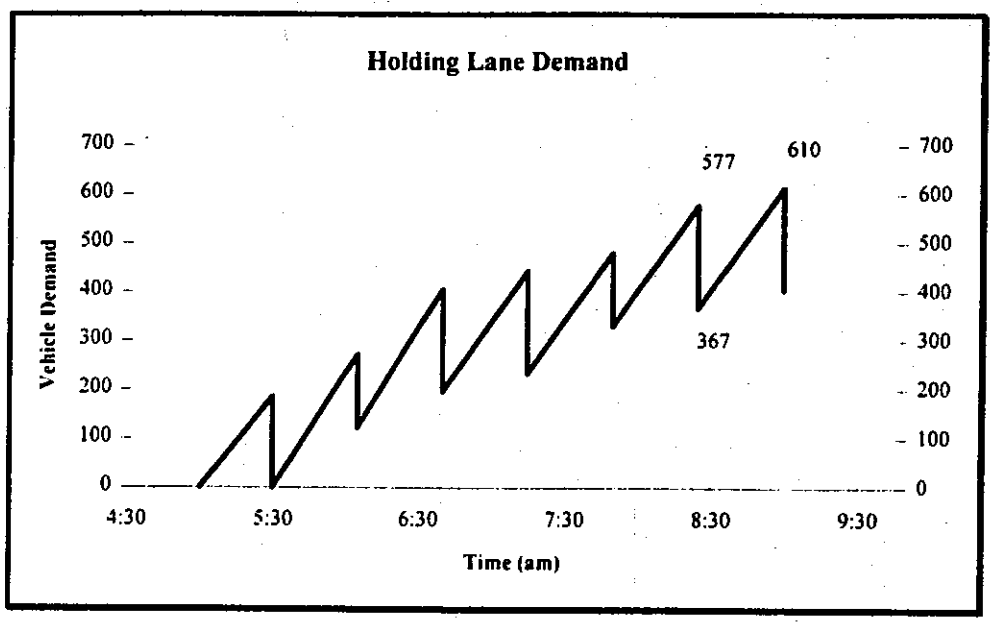

Figure 1 - Holding Lane Size Demand (2015)

[1] Vehicle capacity adjusted from 218 to 210 for Jumbo Mark 2 vessel and from 160 to 150 for Super Class vessels to reflect space allocation for bicycles and motorcycles.

Passenger Demand:

Present demand totals 5.070 walk-on plus vehicle passengers in the four hour commuting period, resulting in a peak sailing demand of approximately 1.500 passengers. WSF projections for the year 2015 predict that the demand for passengers will total 8.600 walk-on plus vehicle passengers for the four hour commuting period. Facilities will be constructed based upon needs through the year 2015. However, passenger facilities will be sized for 30 year growth for sizing purposes and capital investment requirements. At 1% nominal growth the total passenger demand totals 9.500 passengers in 2025. The resulting peak demand totals 1.970 passengers in 2015, and 2.200 passengers in the year 2025. Each scenario is depicted in the tables on the following pages.

Existing Passenger Distribution -- 1995 Seattle to Bainbridge Island				
Sailing Time	Passenger Distribution	Passenger Demand per Sailing	Vehicle Psgr. Demand[2] per Sailing	Total Passenger Demand
3:50	15%	480	375	855
4:40	25%	800	375	1.175
5:25	35%	1.120	375	1.495
6:10	15%	480	375	850
7:00	10%	320	375	695
Total	**100%**	**3,200**	**1,870**	**5,070**

20 year projection - Bainbridge Island Terminal Seattle to Bainbridge Island				
Sailing Time	Passenger Distribution	Passenger Demand per Sailing	Vehicle Psgr. Demand per Sailing	Total Passenger Demand
3:40	10%	608	392	1.000
4:15	14%	837	288	1.125
4:50	20%	1.208	392	1.600
5:25	26%	1.578	392	1.990
6:00	14%	842	288	1.130
6:35	9%	538	392	930
7:00	7%	433	392	825
Total	**100%**	**6,064**	**2,536**	**8,600**

[2] Vehicle passenger demand based upon actual counts from Point of Sale data, Summer 1995.

least 30 years. The project seeks to comply with regional transportation plans and goals while balancing the needs of the traveling public, environmental impacts, and the community at large. The project must also comply with current and known future governmental codes and regulations.

In meeting this purpose, the project will:

- Contribute to the overall success of the SR-305 corridor by providing safe, efficient, multimodal connections between ferry vessels and transit, bicycles, pedestrians, and automobiles with facilities that are accessible to disabled persons in conformance with ADA requirements.
- Provide facilities with clear defined and separated modes of travel to promote safe and reliable operations
- Provide the marine facilities needed for safe and reliable ferry service.
- Meet regional plans by providing transit with a competitive advantage over single occupancy vehicles, by providing terminal facilities able to meet projected passenger growth, and by providing attractive opportunities for travel other than by single occupancy vehicle.
- Provide a level of service for vehicular travel consistent with Peninsula Regional Transportation Planning Organization goals for Kitsap County. Regional transportation plans call for a total trip time from Kitsap County to Seattle of 2 hours using three vessel service.

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Holding Lanes:

The terminal needs more efficient operations for its holding lanes. Presently, the capacity in the holding lanes is 210 vehicles, which is the number of vehicles that can fit onto one vessel. Once the holding lanes are filled to the capacity of one vessel, ticket sales are suspended for the following sailings. Demand regularly exceeds this capacity, causing regular traffic back-ups on Olympic Drive and SR-305. Washington State Ferry staff and Washington State Patrol officers have been added to accommodate the local access into the Eagle Harbor developments as well as to monitor vehicles along Olympic Drive. The vehicles backing up on SR-305 generate traffic conflicts, safety concerns, and pollution while holding.

Currently, within the holding area there are inadequate provisions for registered HOV's, oversized vehicles, bicycles, ADA facilities, safe pedestrian routes, and passenger amenities. In addition to meeting current

30 year projection - Bainbridge Island Terminal (10 additional years at 1.0% per year) Seattle to Bainbridge Island				
Sailing Time	Passenger Distribution	Passenger Demand per Sailing	Vehicle Psgr. Demand per Sailing	Total Passenger Demand
3:40	10%	698	392	1,090
4:15	14%	977	288	1,265
4:50	20%	1,393	392	1,785
5:25	26%	1,809	392	2,200
6:00	14%	967	288	1,255
6:35	9%	623	392	1,015
7:00	7%	498	392	890
Total	**100%**	**6,964**	**2,536**	**9,500**

Mode Split:

Passenger mode splits are based upon the following criteria:

1995 Baseline

Actual counts conducted by the IBI Group were used to establish ridership distribution for commuters in 1995. Actual counts conducted independently by Sverdrup and the IBI Group in the fall of 1995 conclude that approximately 1,500 passengers ride the peak sailing each day. The following basis is used for deriving mode splits.

Drive on Vehicle Passengers

Vehicle occupancy is based upon Point of Sale (POS) data from WSF for a two week period in the summer of 1995.

Use 1.8 persons per vehicle x 208 =
375 passengers per sailing

Transit

Ridership is based upon actual counts conducted by Kitsap Transit during the fall of 1995.

Use 310 transit passengers per sailing

Pedestrians

Pedestrian counts were conducted in 1995 for the Ferry Terminal Zone Plan.

Use 260 pedestrians per sailing

Park and Ride

The actual number of parking spaces is known to be 1,235 commuter spaces within the ferry terminal district. Nearly all the spaces are used for the ferry terminal parking. Actual count determined that 80% of the spaces are used during the commuting hours. Actual count established a baseline of 1.15 persons per vehicle that parked in the parking lots.

Use 1.15 x 1235 x 80% x 35% =
400 passengers per sailing

Kiss and Ride

Ridership will be fixed at the same rate observed during passenger counts conducted during the fall of 1995. (Note that subsequent counts in 1996 determined that peak sailings may have as many as 140 Kiss and Ride passengers. Other observations note that many passengers are dropped off outside the Ferry Terminal zone and walk to the terminal.)

Use 90 passengers per sailing

Bicycles

Ridership is based upon Point of Sale (POS) data from WSF for a two week period in the summer of 1995.

Use 25 bicyclists per sailing

Motorcycles

Ridership is based upon Point of Sale (POS) data from WSF for a two week period in the summer of 1995.

Use 35 motorcyclists per sailing

1995 Mode Split Summary

Mode	Calculation	Extension
Vehicle Passengers	1.8 passengers/vehicle x 208 vehicles	375
Transit	310 passengers by actual count	310
Pedestrians	260 passengers by count and observation	260
Park and Ride	1235 spcs x 35% distribution x 80% capacity x 1.15	400
Kiss and Ride	90 passengers by actual count	90
Bicycles	25 bicyclists by POS data	25
Motorcycles	35 motorcyclists POS data	35
	Total	1.495
		Say 1,500

2015 Mode Split Baseline Conditions -- 2025 Ridership; Facility Sizing Criteria

Modal distribution for the design year of 2015 is limited by capacities built in to the facility or by limitations imposed by the plan. Parking is limited. drive on vehicle passengers are at a very high level and have limited growth capacity. kiss and ride is limited by facility design and city policy may charge persons to enter Kiss and Ride area. bicycles and pedestrians are limited to the growth of the local community (use 209%

growth per City plan), and motorcycles are limited by space available on the vessel. Transit must grow to meet any remaining demand. Two scenarios are presented. One scenario models demand in 2015 and the other scenario models demand in 2025. The following conditions apply:

Drive on Vehicle Passengers

There is no capacity to grow beyond car deck space. Average vehicle occupancy is very high by planning standards. Do not increase beyond car deck capacity.

Use 1.8 persons per vehicle x 210 =
380 persons per sailing

Transit

Allow transit to absorb all excess capacity beyond defined ridership from growth projections.

Assign remaining passengers to transit

Pedestrians

Assign pedestrians according to modal distribution and population growth in area. Assign according to 209% population growth in local area and a present peak distribution at 35%. Use future distribution of 26% according to the growth scenario.

Assign 250/35% x 209% x 26% =
400 pedestrians per sailing

Park and Ride

Assign park and ride passengers from available parking according to peak distribution. Allow nominal increase in AVO from 1.15 to 1.25 to reflect effectiveness of TDM methods in the terminal zone. Assign 80% of parking spaces to the commuting hours.

Assign 1235 x 80% x 1.25 psgrs x 26% =
320 passengers per sailing

Kiss and Ride

Ridership will be fixed at the same rate observed during passenger counts conducted during the fall of 1995.

Use 90 passengers per sailing

Bicycles

Assign bicyclists according to modal distribution and population growth in area. Assign according to 209% population growth in local area and a present peak distribution at 35%. Use future distribution of 26% of total demand onto peak sailing.

Use 25/35% x 209% x 26% =
40 bicyclists per sailing

Motorcycles

Motorcycle ridership is fixed. Allow to grow at same rate of passenger demand (170%).

Use 35 x 170% = 60 motorcyclists per sailing

2015 Mode Split -- 26% Peak Distribution

Mode	Calculation	Extension
Vehicle Passengers	1.8 passengers/vehicle x 210 vehicles	380
Transit	700 passengers remaining from other mode splits	700
Pedestrians	260/35% x 209% x 26%	400
Park and Ride	1235 spcs x 26% distribution x 80% capacity x 1.25	320
Kiss and Ride	90 passengers by limited design	90
Bicycles	25/35% x 209% x 26%	40
Motorcycles	35 x 170%	60
	Total	**1,990**

2025 Mode Split - Facility Sizing

Drive on Vehicle Passengers

Capacity is limited by car deck space and current success of TDM program. TDM programs will be most effective in moving persons from vehicle mode to pedestrian mode. Do not increase AVO for this mode.

Use 1.8 persons per vehicle x 210 =
380 persons per sailing

Transit

Allow transit to absorb all excess capacity beyond defined ridership from growth projections.

Assign remaining passengers to transit=
890 persons per sailing

Pedestrians

Pedestrian ridership comes from the Winslow community. The area is fully mature in 20 years. Allow no further growth in last 10 years.

Assign 400 pedestrians per sailing

Park and Ride

Park and Ride will be more expensive and discouraged by city policy and State TDM programs. Utilize minimal growth in park and ride AVO to 1.3 persons per car.

Assign 1235 x 80% x 26% x 1.3 psgrs =
335 passengers per sailing

Kiss and Ride

Ridership will be fixed at the same rate observed during passenger counts conducted during the fall of 1995.

Use 90 passengers per sailing

Bicycles

Bicyclists will be drawn from the same community as pedestrians. The area is fully mature in 20 years. Allow no further growth in last 10 years.

Use 40 bicyclists per sailing

Motorcycles
Allow to grow at same rate of passenger demand (188%).
Use 35 x 188% = 65 motorcyclists per sailing

2025 Mode Split -- 26% Peak Distribution -- 1% Growth, last 10 years

Mode	Calculation	Extension
Vehicle Passengers	1.8 passengers/vehicle x 210 vehicles	380
Transit	890 psgrs demand remaining from other mode splits	890
Pedestrians	Assign 390 due to maturity of Winslow area	400
Park and Ride	1235 spcs x 26% distribution x 80% capacity x 1.3	335
Kiss and Ride	90 passengers by limited design	90
Bicycles	Assign 40 due to maturity of Winslow area	40
Motorcycles	35 x 188%	65
	Total	**2,200**