

Bridge Volume Forecast Memo

Introduction

The Alaska Department of Transportation (DOT&PF) has retained Kinney Engineering, LLC (KE) as a subconsultant to DOWL for the *Juneau-Douglas North Channel Crossing Planning & Environmental Linkage (PEL) Study*, which will evaluate alternatives and determine recommended crossing location(s) for a second bridge crossing of the Gastineau channel to and from Douglas Island, north of the existing Juneau-Douglas Bridge. This memo provides volume forecasts for each bridge alternative location using data from two previous memos: the Origin-Destination Data memo and the Volume to Capacity of the Existing Juneau-Douglas Bridge memo.

Figure 1 shows the study areas from the Origin Destination memo and the bridge alternatives.

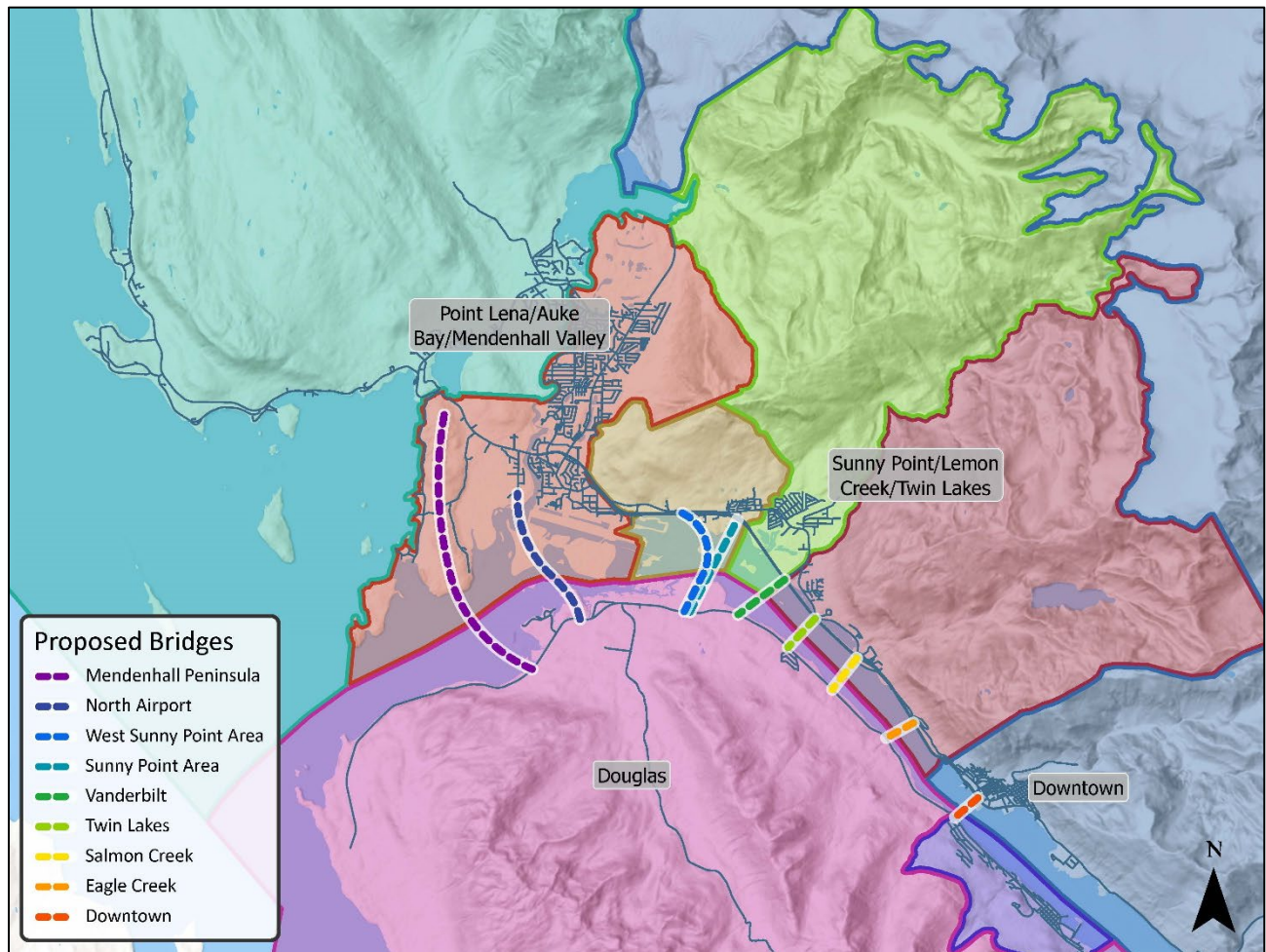
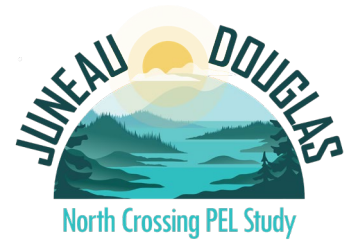


Figure 1: Study Areas and Bridge Alternative



Analysis

Travel Time & Travel Distance for Each Bridge Alternative Location

For the existing bridge and for each of the bridge alternative locations, the travel time and distance between each pair of census blocks was determined using Google Maps travel time and distance estimates, supplemented with estimates of travel time using distance and estimated speed, as applicable.

A table showing the calculated travel times and distances is presented in the Appendix.

Forecast Bridge Volumes (Existing Bridge)

Volume forecasts for the existing bridge were developed previously in the Volume to Capacity of the Existing Juneau-Douglas Bridge memo and are presented in *Table 1*. Note that the forecasted volumes have been rounded to the nearest 100.

Table 1: Forecast Bridge Volumes for Existing Juneau-Douglas Bridge

Year	2022	2030	2040	2050	2060
AADT	13,900	14,200	14,600	14,900	15,300

Origin-Destination Proportions

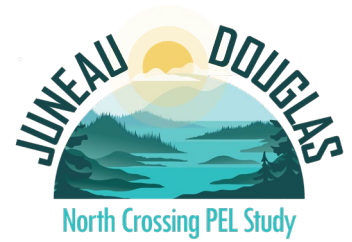
The proportion of the total traffic using the existing bridge that travels between each Census Block Group and Douglas Island was estimated using location based services (LBS) data, as described previously in the Origin-Destination Data memo.

Forecast Bridge Volumes (Bridge Alternative Locations)

For each of the bridge alternative locations, the travel time using the alternative bridge location was compared to the travel time using the existing bridge. For each origin-destination pair, the proportion of the existing bridge traffic volume corresponding to that pair was assigned to either the alternative bridge or the existing bridge, based on the bridge with the shortest travel time for that pair. If the travel times for the alternative and the existing bridge were within 10% of each other, the proportion was split evenly between the two bridges. For the downtown alternative bridge location, it was assumed that traffic would split evenly on each bridge (assuming each bridge would serve one-way traffic).

Any traffic that would use a bridge in any of the alternative locations would increase traffic volumes on Douglas Highway and reduce volumes on Egan Drive. Since Egan Drive is not operating near capacity, average speeds on Egan Drive are mostly impacted by the traffic signals and would not change with a decrease in volumes. However, increased volumes on Douglas Highway could have an impact on speeds. The Highway Capacity Manual Exhibit 15-2 provides an estimate for how vehicle speeds are impacted by directional volumes on two-lane highways. After initial estimates of traffic volumes for each bridge were completed, travel speeds on Douglas Highway were revised to reflect the increased volume. This resulted in longer travel times on Douglas Highway. Estimates of the proportion of traffic using each bridge were adjusted to reflect these new travel times.

Table 2 shows the resulting proportion of traffic that is forecast to be using each bridge based on this analysis. The analysis indicates that 5 to 50% of the traffic would be diverted from the existing bridge to one of the proposed bridge alternatives. The table also shows the travel time savings for each set of bridges, calculated as the average travel time saved per user. While a bridge at the Mendenhall/North Airport location would result in the highest time savings for



individual users (up to 15 minutes), the Sunny Point/Vanderbilt/Twin Lakes/Salmon Creek locations would result in the greatest overall travel time benefit.

Table 3 shows the range of volumes forecasted for each alternative bridge location.

Table 2: Proportion of Traffic Volumes Selecting each Bridge Alternative Location

Bridge	Mendenhall or North Airport	Sunny Point Area or Vanderbilt	Twin Lakes or Salmon Creek	Eagle Creek Bridge	Downtown/ Juneau Douglas
Proposed	5 to 15%	20 to 30%	30 to 40%	40 to 45%	50%
Existing	85 to 95%	70 to 80%	60 to 70%	55 to 60%	50%
Individual Travel Time Savings	Up to 15 minutes	Up to 13 minutes	Up to 10 minutes	Up to 5 minutes	Minimal
Average Time Saved	20 to 35 seconds per vehicle	55 to 65 seconds per vehicle	60 to 65 seconds per vehicle	40 seconds per vehicle	Minimal

Table 3: Alternative Bridge Location Volume Forecast

Mendenhall or North Airport					Sunny Point Area or Vanderbilt				
AADT 2022	AADT 2030	AADT 2040	AADT 2050	AADT 2060	AADT 2022	AADT 2030	AADT 2040	AADT 2050	AADT 2060
Proposed Bridge					Proposed Bridge				
700 to 2100	700 to 2150	750 to 2200	750 to 2250	750 to 2300	2800 to 4150	2850 to 4250	2900 to 4400	3000 to 4450	3050 to 4600
Existing Bridge					Existing Bridge				
11800 to 13200	12050 to 13500	12400 to 13850	12650 to 14150	13000 to 14550	9750 to 11100	9950 to 11350	10200 to 11700	10450 to 11900	10700 to 12250

Table 3: Alternative Bridge Location Volume Forecast (cont)

Twin Lakes or Salmon Creek					Eagle Creek				
AADT 2022	AADT 2030	AADT 2040	AADT 2050	AADT 2060	AADT 2022	AADT 2030	AADT 2040	AADT 2050	AADT 2060
Proposed Bridge					Proposed Bridge				
4150 to 5550	4250 to 5700	4400 to 5850	4450 to 5950	4600 to 6100	5550 to 6250	5700 to 6400	5850 to 6550	5950 to 6550	6100 to 6900
Existing Bridge					Existing Bridge				
8350 to 9750	8500 to 9950	8750 to 10200	8950 to 10450	9200 to 10700	7400 to 7850	7600 to 8050	7800 to 8250	7950 to 8450	8150 to 8650

Downtown/Juneau Douglas				
AADT 2022	AADT 2030	AADT 2040	AADT 2050	AADT 2060
Proposed Bridge				
6750 to 7150	6900 to 7300	7100 to 7500	7250 to 7650	7400 to 7900
Existing Bridge				
6750 to 7150	6900 to 7300	7100 to 7500	7250 to 7650	7400 to 7900

In winter, the Eaglecrest Ski Area is estimated to attract 500 to 800 trips per day to the North Douglas area. This could result in a shift of traffic of up to approximately 5% from the Downtown/Juneau Douglas Bridge to the proposed bridges.