

Road Safety Audit for Prince of Wales Island, Alaska

October 25-27, 2010



IOWA STATE UNIVERSITY
Institute for Transportation

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Federal Highway Administration
Road Safety Audit
Peer-to-Peer Program

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ROAD SAFETY AUDIT FOR PRINCE OF WALES ISLAND, ALASKA

October 25-27, 2010

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- Sam Thomas, Organized Village of Kasaan
- Tom Llanos, Bureau of Indian Affairs
- Bryon Bluehorse, Alaska TTAP
- Dennis Nickerson, Klawock Community Association
- Tom McDonald, Iowa Local Technical Assistance Program (LTAP)

Crash and traffic data were provided by the Alaska Department of Transportation (DOT).

INTRODUCTION

On August 17, 2010, Tom McDonald, a member of the Iowa Local Technical Assistance Program (LTAP) and the Federal Highway Administration (FHWA) Road Safety Audit (RSA) Peer-to-Peer (P2P) Program, was contacted by Ms. Heather Rigdon, Science Applications International Corporation (SAIC), on behalf of the FHWA regarding interest in conducting one or more RSAs for selected roads on Prince of Wales Island, Alaska. The request for these services originated from Mr. Sam Thomas, transportation and infrastructure specialist for the Organized Village of Kasaan on Prince of Wales Island.

McDonald agreed and traveled to the site October 24th through October 30th, 2010 to lead an audit team in this activity. The following road sections were reviewed by a team invited by Mr. Thomas:

- Kasaan Road
- Hydaburg Highway

KASAAN ROAD

General Observations

In response to a safety concern by local citizens, a safety audit was conducted on this roadway. Observers for a general field review on October 25, 2010 were Sam Thomas, Organized Village of Kasaan; Tom Llanos, Bureau of Indian Affairs; and Tom McDonald, Iowa LTAP. Weather was partly cloudy with temperatures in the 50s.

Kasaan Road extends from the Village of Kasaan, population approximately 60, to Forest Highway 22 on Prince of Wales Island. The road is the sole access for this community and adjacent property. The nearest community is Thorne Bay, population approximately 560.

Length of the reviewed section is 17.2 miles, the surface is granular, and traffic volume was estimated at about 350 vehicles per day. According to Sam Thomas, the right of way width varies from about 120-200 ft, depending on the jurisdiction in control. The roadway alignment is extremely curvilinear horizontally with some variation in vertical alignment as well. Traveled-way width varies from about 15-30 ft throughout the length. However, the road is driven as single lane throughout by motorists, except when meeting another vehicle. Surrounding terrain is mostly estuary and floodplain, with some mountainous or steep side slopes.

The road surface exhibits considerable washboarding and numerous potholes, despite apparent frequent motor patrol blading. Posted speed is 20 miles per hour (mph) overall with some sections posted at 10 mph and one section posted at 30 mph. A large power line extends along the length of the roadway, with some poles very near the traveled way. Milepost markings are

painted on some of the poles. General information guide signing would be beneficial for the general public as well as government staff.

Beam guardrails are installed in several locations to shield roadside hazards and four bridges. Most of the guardrail is not in good condition, and the terminal sections are not of current design. In addition, many side hazards, such as high fills and steep slopes are not shielded. Conversely, a few guardrail installations don't appear to be warranted when comparing the side hazard being shielded with the potential hazard presented by the guardrail (from both the rail and the reduced roadway width at installation locations).

Some warning signs are in place to advise of hazards, but many are in need of maintenance or replacement. Additional signing is needed in many locations. All signing should be updated to comply with the 2009 edition of the *Manual on Uniform Traffic Control Devices* (MUTCD).

Drainage under the roadway is conveyed by corrugated metal pipes, mostly 30-36 in. in diameter. Condition is unknown.

Sam Thomas advised that a preliminary design for improving the roadway is being conducted by a consultant. The improvement would propose a reconstruction to provide a wider roadway with improved alignment and possibly paving. Scheduling is dependent on the availability of funding. The safety audit will address low-cost improvements that could address several potential hazards along the alignment.

Detailed Daylight Review

On October 26th, a detailed review of Kasaan Road was conducted. Observers were Sam Thomas; Byron Bluehorse, Alaska Tribal Technical Assistance Program (TTAP); Dennis Nickerson, Klawock Community Association; Tom Llanos; and Tom McDonald. The weather was overcast with light rain and the temperature was in the 40s.

The review began at the southerly terminus, in the village of Kasaan, at approximate odometer reading 1189.1 and proceeded northerly.

Odometer reading 1189.5

A walkway is in place on the side and several vehicles and boat trailers were parked along both sides of the roadway, presumably by "fishermen" in adjacent Kasaan Bay. A Slow Children warning sign is in place for southbound traffic.

Odometer 1189.6

Beam guardrail is in place shielding a side hazard, although this installation should be reviewed for removal due to apparent minimal need. Two fire hydrants were also observed in this area without shielding.

Odometer 1189.7

Roadway top width was measured at about 33 ft, which is common throughout this area.

Odometer 1189.8

Beam guardrail installed on both sides, damaged in one location. Available traveled-way width is reduced to 24 ft between the installations.

Odometer 1190.2

Side road intersects with Kasaan Road from the left.

Odometer 1190.4

30 mph regulatory sign posted for northbound traffic, but sign is damaged. Road top width measured 23 ft in this location.

Odometer 1190.5

Slow Residential Area sign for southbound traffic, should be reviewed for replacement.

Odometer 1190.6

Beam guardrail installations on both sides, should be reviewed for need.

Odometer 1191.8

Beam guardrail on left side only, should be reviewed for replacement.

Odometer 1192.4

Beam guardrail installations on both sides, should be reviewed for need. All guardrail installations in this area significantly reduce available travel width for drivers.

Odometer 1192.8

Beam guardrail in place to shield high fill (10-12 ft).

Odometer 1193.5

Road Narrows sign for northbound traffic.

Odometer 1193.6

10 mph regulatory sign for northbound traffic, 30 mph regulatory sign for southbound traffic, steep slopes with no shielding.

Odometer 1193.7

Narrow-width (13.5 ft) bridge, Stop sign for southbound traffic, sign missing for northbound. No other warning signs are in place for this single-lane structure or for northbound roadway. Signing should be upgraded and guardrail replaced, one section has been impacted. Side-road approach from the right, no Stop sign. 17 ft wide measured roadway top width.

Odometer 1194.0

Turnout on right, should be reviewed for proper design standards.

Odometer 1194.4

Turnout on right, review for design-standard compliance.

Odometer 1194.5

Beam guardrail on both sides, damaged terminal section on the northbound side (right).
Guardrail on right side should be reviewed for need.

Odometer 1194.8

Beam guardrail on left side only (southbound).

Odometer 1194.9

Turn out on left for southbound traffic.

Odometer 1194.95

Turnouts on right and left sides.

Odometer 1195.0

Measured 18 ft wide roadway top width.

Odometer 1195.1

Down grade to sharp left curve, no warning signs in place. Should be reviewed for turnout need.

Odometer 1195.15

Narrow (13.8 ft wide) bridge with beam guardrail shielding approaches. Damaged terminal on right side (northbound). Bridge has steel deck. One-lane bridge warning sign northbound (orange sheeting). Signing and guardrail should be updated.

Odometer 1195.2

Missing sign for northbound traffic. Side-road approach from left between bridges.

Odometer 1195.25

Narrow (13.8 ft wide) bridge with damaged beam guardrail terminals. Guardrail does not connect to bridge.

Odometer 1195.3

One Lane Road with Turnouts warning sign for northbound traffic.

Odometer 1195.35

Regulatory 10 mph speed limit sign for southbound traffic. One Lane Bridge sign down in ditch. Occasional large, 2 ft diameter rock on edge of roadway and occasional large tree near roadway.

Odometer 1195.9

Tolstoi Bay on right; jurisdiction change from Kasaan to Thorne Bay.

Odometer 1196.0

Regulatory 10 mph speed sign southbound. Regulatory 20 mph speed sign northbound, badly shot up. Beam guardrail on right, northbound, review for replacement. 15 ft wide measured roadway top width.

Odometer 1196.3

Entrance to Tolstoi Bay Seaport on right. Measured roadway top width 20 ft, turnout needed.

Odometer 1196.6

Logging road approach from left.

Odometer 1196.7

One Lane Road with Turnouts sign for northbound traffic.

Odometer 1196.9

Measured roadway top width of 21 ft.

Odometer 1197.0

One Lane Road with Turnouts sign for southbound traffic (shot up).

Odometer 1197.2

Steep foreslopes on both sides, no guardrail in place.

Odometer 1197.4

One Lane Road with Turnouts, 26 in. size for northbound traffic.

Odometer 1197.8

One Lane Road with Turnouts for southbound traffic (shot-up), 24 in. size with high intensity sheeting. Side road approach from right.

Odometer 1197.9

Side road connection from the right side.

Odometer 1198.0

24 ft wide bridge with beam guardrail, Thrie beam through bridge, no warning signs or turnouts.

Odometer 1198.1

Logging road (gated), entrance from right.

Odometer 1198.7

Measured 25 ft wide roadway top width.

Odometer 1198.9

Steep side slopes on both sides, no guardrail. Should be reviewed for need of shielding.

Odometer 1199.3

Logging road connection from the right.

Odometer 1199.6

Steep side slopes on both sides at creek crossing, no guardrail. Should be reviewed for shielding needs. Measured roadway top width 25 ft.

Odometer 1199.9

One Lane Road with Turnouts warning sign, badly tipped, for northbound traffic.

Odometer 1200.1

Turnout on left side.

Odometer 1200.2

Beaver pond on right side with steep slope, no guardrail. Should be reviewed for shielding. Measured roadway top width 18 ft.

Odometer 1200.25

Turnout on the right side, review for compliance with design standards.

Odometer 1200.3

One Lane Road with Turnouts (shot) for southbound traffic.

Odometer 1200.8

Steep slopes both sides with no guardrail; site of recent property damage only (PDO) crash.

Odometer 1200.9

One Lane Road with Turnouts sign for northbound traffic, installed on backslope.

Odometer 1201.1

Power pole near roadway on right side.

Odometer 1201.2

Turnout on right side, possibly need shielding in this area.

Odometer 1201.3

Turnouts on left and right sides, review for design-standard compliance.

Odometer 1201.4

20 mph regulatory sign for southbound traffic.

Odometer 1201.5

One Lane Road with Turnouts sign for northbound traffic.

Odometer 1201.55

Side road connection from right, Ron's Road, with Stop sign.

Odometer 1201.6

20 mph regulatory sign for northbound traffic, badly worn and tipped.

Odometer 1201.65

15 mph curve advisory plaque installed without a warning sign. Posted No Shooting hunting sign mounted below on same support.

Odometer 1201.7

Power pole near roadway on right side. Steep slope on right side with no guardrail. Should be reviewed for need of shielding.

Odometer 1201.8

Several power poles near roadway on right side.

Odometer 1201.9

Turnout on right side, measured 18 ft wide roadway top width.

Odometer 1202.0

Steep slope on right side, no guardrail.

Odometer 1202.1

Turnout on right side. Steep slope on right with no guardrail. Should be reviewed for need of shielding and standard-designed turnout.

Odometer 1202.2 to Odometer 1202.5

Steep slopes on right side at three locations, no guardrail.

Odometer 1202.6

Need standard-designed turnouts on each side.

Odometer 1202.7

Steep slope on right side with no guardrail. Should be reviewed for need of shielding.

Odometer 1202.8

Large boulder in middle of road. Steep slope on right side extends to odometer 1202.9.

Odometer 1203.4

Steep slope on right side extends to odometer 1203.8, should be reviewed for shielding and need for standard-designed turnout. Measured 19 ft width roadway top width.

Odometer 1203.7-1203.8

Should be studied for need of shielding on right side for steep slopes.

Odometer 1203.9

Turnouts on both left and right sides, review for standard design compliance.

Odometer 1204.3

Rock cut on both sides. Intermittent steep slopes on right side just beyond. Need standard-designed turnouts in this area.

Odometer 1204.6

20 mph regulatory sign for northbound traffic.

Odometer 1204.9

Steep slope in curve on right side. 15 mph curve advisory plaque for southbound traffic, mounted alone.

Odometer 1205.0

Turnouts on both sides, review for standard design compliance.

Odometer 1205.4

Steep slope on right side in curve, review for need of shielding.

Odometer 1205.6

Truck Crossing warning sign, badly worn and tipped, for northbound traffic. Measured 23 ft roadway top width.

Odometer 1205.8

Steep slope to lake on right side, no guardrail. Study for need of shielding.

Odometer 1205.95

Study for need of standard-designed turnout.

Odometer 1206.2

Saw mill entrance on right.

Odometer 1206.4

Entrance to Thorne Bay Solid Waste site on right side. Measured 25 ft wide roadway top width.

Odometer 1206.5

Entrances to saw mill facilities on both sides.

Odometer 1206.6

Another saw mill on right side.

Odometer 1206.7

Intersection of Ellen Lake Road from left side. Yield sign for Kasaan Road traffic.

Odometer 1206.8

Power poles near roadway on left side.

Odometer 1207.1

Intersection with Thorne Bay Road (Forest Highway 20). Paved approach on Kasaan Road with single Stop sign.

(End of reviewed route)

HYDABURG HIGHWAY

General Observations

In response to safety concerns expressed by local residents, an RSA was conducted on this roadway October 27, 2010. Weather was partly cloudy and cool, with highs in the low 40s. Traffic was light on the day of the review. Observers were Sam Thomas, Thomas Llanos, Byron Bluehorse, and Tom McDonald.

Hydaburg Highway extends from the community of Hydaburg to Klawock/Hollis Highway and is the main access for the town, population approximately 500. The roadway is owned and maintained by the Alaska Department of Transportation (DOT) and is paved with a seal coat surface. Length of the reviewed section is about 22.9 miles.

The posted regulatory speed limit is 35 mph. According to 2009 Alaska DOT data, traffic volumes vary from 88 to 145 vehicles per day. Pavement condition was good with some distortion and very scattered potholes. Some evidence of subbase distress was observed and warning signs have been installed noting Dip or Dips. Centerline and edge line pavement markings appear in satisfactory condition in daylight conditions.

Due to the curvilinear alignment of the roadway, both horizontally and vertically, passing opportunities are limited in most areas. Road elevation varies from floodplain to mountainside.

Signs also appear in good condition and substantial compliance with the 2003 MUTCD. Delineators have been installed along the roadway through numerous, but not all, horizontal curves to provide guidance for nighttime travel. Spacing of these delineators varies at each location.

Beam guardrail is installed in several locations to shield potential hazards at high fills and at bridge approaches. Guardrail terminals are not of current design, but installations are connected to bridges. Bridges are all shoulder-width. Right-of-way appears open and wide in most areas, with a 20-30 ft area cleared of trees and brush adjacent to the shoulders.

Milepost markers are in place at one-mile intervals along the right side of the roadway. A power line extends along the roadway with poles primarily located near the right-of-way line.

Detailed Daylight Review

A detailed review began at Cedar Street Extension in Hydaburg and proceeded northerly.

Odometer 58.3

The Hydaburg Highway terminates at this location with a T intersection. No Double Arrow sign is in place across from the T.

Odometer 58.4

Stop Ahead sign and plaque for southbound traffic.

Odometer 58.5

Quarry Loop Road intersects from the left with a T intersection. No Double Arrow sign is in place across from the approach. Measured roadway width was 20 ft wide pavement with 2-4 ft granular shoulders.

Odometer 58.6

A guide sign with destinations, Deer warning sign, and 35 mph regulatory speed sign are in place for northbound traffic. A Hydaburg guide sign was in place for southbound traffic.

Odometer 58.8

A granular-surfaced road intersects from the left. A bridge over the Hydaburg River with beam guardrail was measured with a 27 ft wide deck. Bridge has no object markers at the corners and guardrail has minimal delineation. Should be reviewed for warning sign needs.

Odometer 59.2

Miijuu Way intersects from the left side. This is a T intersection with no Double Arrow or safety ramp across from the side road approach. A No Littering sign is in place for northbound traffic.

Odometer 59.3

A Buckle Up sign is in place for northbound traffic.

Odometer 59.5

A Dips warning sign is in place for northbound traffic, but with orange background sheeting. Pavement markings appear newly-placed, but with minimal beads for retroreflectivity.

Odometer 61.4

Beam guardrail is in place on both sides shielding steep slopes and high fills. Roadway exhibits a steady down grade to the north.

Odometer 61.8

35 mph regulatory speed signs are in place on both sides of roadway.

Odometer 61.9

Bridge with measured 27 ft wide deck and beam guardrail at approaches. No object markers and minimal delineation were in place. A double-yellow, no-passing zone was in place, but with no apparent sight restrictions, at least northbound. Should be reviewed for warning sign needs.

Odometer 62.6

Horizontal S curves with no delineators installed.

Odometer 62.7 to 62.8

Beam guardrail in place on left side, shielding steep slope to bay. Some sections may need replacement. Standard turnout may need rehabilitation.

Odometer 63.0

A granular-surfaced trail or spur road intersects from the right.

Odometer 63.2

A Dips warning sign is in place for southbound traffic.

Odometer 63.6

A shoulder-width (27 ft) bridge with beam guardrail at the approaches. No object markers are in place at the corners and minimal delineation has been placed with the guardrail. Should be reviewed for warning sign needs.

Odometer 63.8

A Dips sign is in place for southbound traffic.

Odometer 64.1 to 64.3

Beam guardrail is in place on the left, shielding a slope to the bay.

Odometer 64.5

A horizontal curve sign with delineators installed, but many horizontal curves do not have warning signs in advance. May need warning sign to reduce speed.

Odometer 65.0

Natzuhini River Bridge, shoulder-width with beam guardrail at the approaches, but no object markers at the bridge corners and minimal delineation with the guardrail. Several intersecting side roads to adjacent staging area and camp.

Odometer 65.1

Horizontal curve with no delineators or advance warning signs.

Odometer 65.3

Horizontal curve with delineators but no advance warning signs. A logging camp is located on the right side.

Odometer 65.4

35 mph regulatory signs in place on both sides of roadway.

Odometer 65.5

A Reverse Turn sign with 25 mph advisory speed plaque mounted on a breakaway support is in place for northbound traffic. Sign is in good condition with apparent high-intensity sheeting. Roadway is on an up grade northbound at this point. Curves in this area have delineators installed throughout.

Odometer 65.6

A Reverse Turn sign with 25 mph advisory speed plaque on a breakaway support is in place for southbound traffic. Sign is tipped, which may hamper nighttime visibility.

Odometer 65.8

Reverse curves with delineators. A northbound Reverse Curve warning sign with a 30 mph advisory speed plaque was in the ditch.

Odometer 66.0

A Curve warning sign with 25 mph advisory speed plaque in place for northbound traffic. A steep foreslope is located on the left side with no guardrail shielding. Delineators are in place through the horizontal curve. A Curve sign is missing, but 30 mph advisory speed plaque is in place for southbound traffic.

Odometer 66.2

Standard turnout may need rehabilitation.

Odometer 66.3

Soda Bay Road intersects from the left. Visibility to intersection is limited. Steep embankments on both sides in this area with no shielding. Need for guardrail should be reviewed.

Odometer 66.5

Horizontal curve with delineators in place, but no curve warning signs were observed.

Odometer 66.7

Horizontal curve with no delineators.

Odometer 66.9

Reverse Curve warning sign with a 25 mph advisory speed plaque on a breakaway support is in place for northbound traffic. The curves have delineators throughout, although several are damaged. Standard turnout in area should be reviewed for rehabilitation needs.

Odometer 67.1

Review left side for shielding needs.

Odometer 67.4

A Reverse Curve warning sign with 25 mph advisory speed plaque with a perforated steel support is in place for southbound traffic.

Odometer 67.6

A steep slope was observed on the left side with no guardrail shielding. Location should be reviewed for need of shielding.

Odometer 67.7

A Reverse Curve warning sign with 25 mph advisory speed plaque on a breakaway support is in place for northbound traffic. Delineators in place through curves.

Odometer 67.8

A Reverse Turn warning sign with 25 mph advisory speed plaque on a breakaway support is in place for southbound traffic, although sign is tipped. Steep embankment in this area, should be reviewed for shielding need.

Odometer 68.0

Curve delineators end.

Odometer 68.2

Study both sides for shielding needs along steep slopes.

Odometer 68.3

Pond on left, possible beaver activity.

Odometer 68.4

Several horizontal curves without delineators. Granular-surfaced side road approaches on the left side.

Odometer 68.6

Sata Creek Bridge, shoulder-width (27 ft) deck with approach beam guardrail. No object markers are in place at the bridge corners, minimal delineation for the guardrail. Review for need of warning signs.

Odometer 68.7

Soda Trail intersects from the left and recreational sign is in very poor condition. A slash pile entrance is located on the right side. May need pedestrian crossing signing and standard turnout for vehicles.

Odometer 68.9 to 70.4

Several curves with no delineators or advance warning signs. Also another pond on left with possible beaver activity.

Odometer 70.0

A shoulder-width (27 ft) bridge with beam guardrail. No object markers are in place on the bridge corners, minimal delineation with the guardrail. Should be reviewed for warning sign needs.

Odometer 71.0

Northbound Curve warning sign with a 30 mph advisory speed sign on a breakaway support, appears to be located too close to the curve. Delineators are installed through the curve. Pond on left side near toe of slope.

Odometer 71.1

Curve warning sign with a 30 mph advisory speed plaque on a breakaway support is in place for southbound traffic. Beaver Creek Bridge, shoulder-width (27 ft) with beam guardrail. No object markers are in place at the bridge corners, single delineators mark the ends of the guardrail. Review for warning sign needs.

Odometer 71.2

Guide sign with destinations for northbound traffic, mounted on two supports with breakaway bases. 35 mph regulatory speed sign for southbound traffic is tipped.

Odometer 71.25

Granular side road intersects from the right side, with a Stop sign. A guide sign with destinations is mounted across from the T approach. Another support was observed at this location, but with no sign.

Odometer 71.3

A guide sign with destinations for southbound traffic, with gunshot damages.

Odometer 71.4

A crushed rock pile is located on the left side.

Odometer 71.45

35 mph regulatory sign for northbound traffic (shot-up).

Odometer 71.5

A Reverse Turn sign with a 25 mph advisory speed plaque on a breakaway support for northbound traffic. Delineators are mounted throughout the curves, roadway was on a down grade to the north. Need standard-designed turnout in this area?

Odometer 71.7

A steep slope is located on the left side without guardrail shielding. Ditch on right has been obstructed by rock slide.

Odometer 71.8

A Reverse Turn sign with 25 mph advisory speed plaque on a breakaway support is in place for southbound traffic. Trocadero Trail intersects on the left side. Guide sign in advance.

Odometer 72.0

A Curve warning sign with a 30 mph advisory speed plaque mounted on a perforated steel support for northbound traffic. Steep slopes should be reviewed for shielding needs.

Odometer 72.1

Bridge over Cable Creek, shoulder-width (27 ft) with beam guardrail. No object markers are in place at the corners, single delineators are installed at the guardrail ends. Review for warning sign needs. Curve delineators end at this point.

Odometer 72.4

Curve delineators start again. Steep slopes should be reviewed for shielding needs.

Odometer 72.45

A Reverse Turn sign with 25 mph advisory speed plaque mounted on breakaway support is in place for northbound traffic. Delineators are in place through the curves. A power line extends northerly beyond the beginning of curvature, possibly creating a “visual trap.”

Odometer 72.7

A Reverse Turn warning sign with 25 mph advisory speed plaque mounted on a breakaway support for southbound traffic.

Odometer 72.8

Delineators end.

Odometer 72.9

Steep slopes on both sides with no guardrail. Should be reviewed for shielding needs.

Odometer 73.1

A side road or entrance intersects on the right side.

Odometer 73.2

Delineators start for curvature, but no warning signs are in place. Steep slope on left should be reviewed for shielding needs.

Odometer 73.3

A Turn warning sign with a 25 mph advisory speed plaque mounted on a breakaway support for northbound traffic.

Odometer 73.4

A Turn warning sign with a 25 mph advisory speed plaque mounted on a breakaway support for southbound traffic.

Odometer 73.5

Delineators end.

Odometer 73.6

Horizontal curve with no delineators or warning signs. Steep slope on left should be reviewed for shielding needs.

Odometer 73.7

A Reverse Curve warning sign with 30 mph advisory speed plaque mounted on breakaway support for northbound traffic. Delineators begin.

Odometer 74.0

A Reverse Curve warning sign with 30 mph advisory speed plaque on a breakaway support for southbound traffic. Delineators end.

Odometer 74.2

35 mph regulatory speed signs mounted on both sides. Steep slope on the left with no guardrail, should be reviewed for shielding needs.

Odometer 74.4

Delineators begin. A Turn warning sign with a 25 mph advisory speed plaque on breakaway support is in place for northbound traffic.

Odometer 74.5

Gulch Creek conveyed under the roadway in a corrugated metal pipe, shielded with beam guardrail with a single delineator mounted in each end. Turnout on right side.

Odometer 74.6

A Turn warning sign with a 25 mph speed plaque mounted on a breakaway support is in place for southbound traffic. Delineators end. A granular side road intersects from the right side. No Double Arrow warning sign is in place across from the T.

Odometer 74.7

Steep slope on left side, should be reviewed for shielding need.

Odometer 74.8

A Turn warning sign with a 25 mph advisory speed plaque is mounted on a breakaway support for northbound traffic. Delineators begin and roadway is on an up grade northbound at this point.

Odometer 75.0

A Turn warning sign with 25 mph advisory speed plaque on a breakaway support is in place for southbound traffic. Delineators end.

Odometer 75.1

Horizontal curve with no delineators or advance warning signs. Steep slope on the left side with no guardrail shielding.

Odometer 75.2

35 mph regulatory speed signs mounted on both sides. Existing turnout may need rehabilitation.

Odometer 75.4

Delineators begin. Steep slope on left side with no guardrail shielding.

Odometer 75.8

New beam guardrail has been installed with current design terminals on the left side.

Odometer 75.9

Delineators end.

Odometer 76.1

Delineators begin. No curve warning signs in place for northbound traffic.

Odometer 76.2

Delineators end. No curve warning sign is in place for southbound traffic.

Odometer 76.4

Delineators begin. A Reverse Turn warning sign with 25 mph advisory speed plaque mounted on a breakaway support for northbound traffic.

Odometer 76.5

Trocadero Creek Bridge, shoulder-width (about 27 ft) with beam guardrail at the approaches. No object markers are in place at the bridge corners, a single delineator is installed at each guardrail end. Should be reviewed for warning sign needs. Creek name sign has been damaged by gunshots.

Odometer 76.6

Delineators end. A Reverse Turn sign with 25 mph advisory speed plaque on a breakaway support is in place for southbound traffic.

Odometer 76.7

Reverse curves with no delineators or advance warning signs.

Odometer 76.9

Delineators begin. A Turn sign with 25 mph advisory speed plaque mounted on a perforated steel support for northbound traffic. Sign appears to be mounted too low.

Odometer 77.0

West Fork Trocadero Creek Bridge, shoulder-width (about 27 ft) with approach-beam guardrail. No object markers at the bridge corners, single delineator is in place at each guardrail end. Should be reviewed for warning sign needs. A Turn sign with 25 mph advisory speed plaque mounted on a breakaway support is in place for southbound traffic.

Odometer 77.1 to 77.5

Horizontal curves with no delineators or advance warning signs. Occasional steep slopes with no guardrail observed on the left side. This area should be reviewed for shielding needs on both left and right sides.

Odometer 77.4

Delineators begin, but no Curve warning sign is in place for northbound traffic.

Odometer 77.5

Winding Road horizontal alignment sign (W1-5) with 25 mph advisory speed plaque is in place for southbound traffic. Measured pavement width was 20 ft with 1-2 ft wide granular shoulders.

Odometer 77.7

Delineators end.

Odometer 77.9

A logging road intersects from the left.

Odometer 78.1

Indian Creek Road intersects from the right, no Double Arrow warning sign is in place across from the T approach.

Odometer 78.3

One Duck Trail sign in place for northbound traffic. Location should be reviewed for need of pedestrian crossing signing.

Odometer 78.4

A granular-surfaced side road intersects from the left with a Stop sign in place. Curves beyond with no delineators or advance warning signs.

Odometer 78.6

One Duck Trail intersects from the right. Location should be reviewed for pedestrian crossing sign needs.

Odometer 78.8

Roadway down grade to the north with curves at bottom of hill. No delineators or advance warning signs are in place.

Odometer 78.9

One Duck Trail sign in place for southbound traffic. Side road intersection and pit exist at this location.

Odometer 79.3

End down grade for a short distance. Some steep slopes on the left side with no guardrail shielding.

Odometer 79.6

Winding Road horizontal alignment warning sign (W1-5) with 30 mph advisory speed plaque on a breakaway support is in place for northbound traffic.

Odometer 79.7

Steep slope on the left side with no guardrail shielding.

Odometer 79.9

Delineators end. Winding Road alignment warning sign with 30 mph advisory speed plaque on a breakaway support for southbound traffic.

Odometer 80.2

Fubar Creek Bridge, shoulder-width (about 27 ft) with beam guardrail extending through the bridge. No object markers are in place at the bridge corners, minimal delineation for the guardrail. Should be reviewed for warning sign needs.

Odometer 80.3

Entrance intersects from the right side. Horizontal curves beyond with no advance warning signs or delineators. Forest Service construction area for Fubar Creek, but no warning signs in place.

Odometer 80.3 to 80.6

Steep slopes observed with no guardrail shielding. Area should be reviewed for shielding needs. Roadway downgrade to the north.

Odometer 80.8

Harris River Bridge, shoulder-width (about 27 ft) with beam guardrail at approaches. No object markers at bridge corners, minimal delineation for guardrail. Should be reviewed for warning sign needs.

Odometer 81.1

A Dips warning sign for southbound traffic with orange background sheeting. Also for southbound traffic, 35 mph regulatory speed sign, \$1000 Fine for Littering sign, and Deer warning sign (shot up). A Stop Ahead warning sign (shot) for northbound traffic.

Odometer 81.2

Chevrons in place around curve for northbound traffic. Stop sign at Klawock-Hollis Highway for northbound traffic is shot up. Guide sign with destinations mounted across from the T approach, also shot several times.

(End of this reviewed section)

NIGHTTIME REVIEWS

Due to scheduling limitations, no nighttime reviews were conducted for these two audited roadways. Local authorities should conduct these observations to assess visibility of signs and markings in dark conditions and address any identified deficiencies as warranted.

LAW ENFORCEMENT OBSERVATIONS

October 27, 2010, Sam Thomas, Thomas Llanos, Byron Bluehorse, and Tom McDonald met with Sgt. John Brown of the Alaska State Patrol to visit about recent (last three years) crash history on area roads.

According to Sgt. Brown, crashes are usually quite scattered, which is common for lower-volume roads. Fatal crashes have usually involved impaired drivers and excess speed. One recent fatal crash occurred on an icy road. More crashes generally occur at night (again, perhaps influenced by impaired drivers).

Due to a small staff, the Alaska State Patrol does not conduct routine patrols on area roads to monitor speeding, etc. Speed checks are made when responding to calls and traffic crashes. Sgt. Brown usually gathers crash data at the site and then enters it in the state database with a computer in the office.

Sgt. Brown stated that milepost markers would be helpful when investigating crashes and preparing reports, and that the markers in place may not be sufficiently accurate for crash reporting. The Prince of Wales Alaska State Troopers currently use global positioning technology to locate most, if not all, of the crashes on Island roads. Sgt. Brown also suggested that improved mile markers and logging road signing would help the Patrol in locating crashes and responding to emergency calls. The general public would also be benefited by this additional signing.

For Kasaan Road, Sgt. Brown thought the most-hazardous locations were the several narrow bridges and the large rock in the middle of the road that should be removed. Some roadway lighting would be effective at locations, such as the intersections of Ron's Road, Salt Chuck Road, and South Thorne Bay Road, the waste-disposal site, and the narrow bridges. Many areas should be reviewed for regulatory speed modifications.

Major crash causes on this road are impaired driving, excess speed, nighttime visibility, road-width deficiencies, and driver error. Specific problem areas have been noted from Kasaan to Tolstoi and from Tolstoi to the waste-disposal site.

The Hydaburg Highway is very curvilinear, but the roadway markers (delineators), recently installed by the Alaska DOT, have been very effective for guidance at night. Major crash causes are impaired driving, excess speed, nighttime visibility, road surface conditions in adverse weather, and driver error. The primary areas of concern for drivers are blind corners, switch backs, and reverse curvature.

Sgt. Brown suggested lighting be considered at bridges and the intersections of Natzuhini Camp, Miijuu Way, Indian Creek Road, Fubar Creek, 12 Mile Arm, and Polk Road. Problem areas have been noted in mile 1 and mile 20, mostly due to low friction in adverse weather, because of drainage and super-elevation needs.

CRASH DATA

While crash data were not available for the specific routes reviewed, general data obtained from the Alaska DOT are listed in Table 1 for Prince of Wales Island for the years 2004 through 2007.

The data indicate a steady increase in the number of crashes reported over this four-year period for the Island. While that may not be indicative of increased crash numbers on the reviewed roads, it points toward concern for safety on the Island roads in general.

Table 1. 2004-2007 Prince of Wales Island crashes by severity

Year	PDO	Minor Injury	Major Injury	Fatal	Total
2007	31	13	0	1	45
2006	35	11	1	0	47
2005	17	13	2	0	32
2004	6	8	1	1	16
Totals	89	45	4	2	140

PDO is Property Damage Only

In addition, audit team members and the Alaska State Patrol officer advised that numerous crashes occurring on these roads annually are not reported. An effort to track crashes on Kasaan Road and Hydaburg Highway would be beneficial in determining the most effective safety mitigation. Crash data for Prince of Wales Island is included in Appendix C.

TRAFFIC VOLUME DATA

A traffic map obtained from the Alaska DOT indicated the traffic using Hydaburg Highway on a daily basis ranged from an annual average of 88 to 145 vehicles for 2009. A copy of the map is contained in Appendix B.

SUGGESTED IMPROVEMENTS

Kasaan Road

Initial action should be taken to improve safety on the roadway, concentrating on lower-cost, rapid-deployment initiatives. Subsequent to those steps, longer-range, more-costly improvements could be planned and undertaken.

Short Term

Using the 2009 MUTCD Part 2-Signs as the major reference, upgrade all signing along the reviewed section, specifically considering these improvements:

1. Install Winding Road (W1-5) horizontal alignment warning signs with a next 17 miles plaque at each end of the section and install Winding Road warning signs without a distance plaque at approximate three-mile intervals, as well.
2. Perform a speed study to determine the appropriate safe operating speed and install Speed Limit signs (R2-1) at each end and at approximate three-mile intervals, as well. Consider oversized signs (30 x 36 in.) with red flags for added emphasis.

3. Even though the road may not meet functional classification or minimum traffic-volume requirements (1,000 vehicles per day), review and consider application of the guidance presented in Section 2C.06 and Table 2C-5 of the MUTCD regarding use of appropriate horizontal alignment signing, chevrons, and advisory speed plaques, concentrating on curves where the determined advisory speed differs by 10 mph or more from the posted speed limit. Also review Table 2C-4 for proper placement of advance warning signs. Where the use of chevrons is recommended, follow the guidance in Table 2C-6 for number and spacing of these devices.
4. At the narrow bridges, install Stop signs with 24 x 18 in. regulatory (black on white) Please Alternate plaques at each of the structures. Consider use of red flags on the Stop signs for added emphasis. Be sure to install Stop Ahead warning signs in compliance with Table 2C-4 in advance of the Stop signs. Install One Lane Bridge (W5-3) warning signs at the appropriate distance in advance of these bridges.
5. Refer to the 2009 MUTCD for appropriate sizes of all signs and plaques. Consider use of fluorescent yellow background for all warning signs to enhance visibility in low-light conditions.
6. Replace all One Lane Road with Turnouts warning signing, possibly with One Lane Road (W20-4) with yellow background and Use Turnouts on plaque mounted below the warning sign. Discuss the appropriate message and design with the Alaska DOT.
7. As much as possible, mount all signs following guidance in Section 2A.16 and Figure 2A-2 of the 2009 MUTCD for height and offset from roadway.
8. Be sure that all regulatory signs (Stop, Speed Limits, etc.) are supported by appropriate jurisdiction approval for proper enforcement.
9. Enhance roadside safety and improve nighttime guidance for drivers by providing additional delineation on existing utility poles and installation of supplemental delineation or guardrail shielding adjacent to steep slopes. If accumulated snow depth warrants, consider use of devices, such as “snow poles,” which are available from vendors for that purpose.
10. Review all guardrail installations and upgrade to current design standards as needed. Consider removal of existing installations where hazards do not warrant shielding. Review noted locations for installation of additional w-beam guardrail where hazards justify shielding. Enhance nighttime guidance at guardrail locations using delineation in or behind the rails.
11. Review and upgrade all turnouts to current design standards where needed. Install additional turnouts at locations listed in the field review notes.

12. Visit with the utility company to suggest placement of Type 2M2-2V Object Markers on the large utility poles for added guidance for drivers.
13. Install accurate milepost reference signs (D10-1 and D10-2) along the route to assist law enforcement in locating crashes.
14. Remove large rock from middle of road about 4 miles south of the Forest Highway 20 intersection.

Long Term

Planning is underway for reconstruction of Kasaan Road, but major improvements could be scheduled in phases to extend funding needs over several years. The initial emphasis could be focused on replacement of obvious potential hazards. The following priorities are suggested for consideration.

1. Replace all narrow bridges, possibly with reinforced concrete box or pipe culverts to reduce future maintenance needs. Realign roadway as needed at these sites to eliminate severe curvature of approaches.
2. Study existing intersections, especially Ellen Lake Road and Ron's Road, for realignment needs and sight distance improvement. Also study current visibility to and from higher-traffic intersections, such as the Thorne Bay Solid Waste Site, for needed improvements and undertake those upgrades.
3. Reconstruct all roadway sections with a top width less than 24 ft to a minimum of 28 ft or more as design standards dictate. Realign road through those areas as well.
4. Complete reconstruction of all remaining sections to a minimum of 28 ft wide or more, as design standards dictate. Realign where needed.
5. Pave road when traffic volumes warrant and funding becomes available.

Hydaburg Highway

Short term

Safety improvements for this roadway could be accomplished with mostly low-cost measures and the following are suggested for consideration. Using the 2009 MUTCD Part 2-Signs as the major reference, update all signing along the roadway specifically considering the following.

1. Review and apply the guidance presented in Sections 2C.06, 2C.07 and Table 2C-5 of the MUTCD regarding use of appropriate horizontal alignment signing, chevrons, and advisory speed plaques, concentrating on curves where the determined advisory speed differs by 10 mph or more from the posted speed limit. Also review Table 2C-4 for

proper placement of advance warning signs. Be sure to use Turn warning signs in lieu of Curve signs where the advisory speed is 30 mph or less. Where the use of chevrons is required or recommended, follow the guidance in Table 2C-6 for number and spacing of these devices. Follow the requirements and guidance in Section 2C.08 for determining appropriate advisory speeds and need for plaques. Replace any orange background warning signs with yellow sheeting. Consider use of fluorescent-yellow sheeting for warning signs throughout or at special concern locations, such as low radii horizontal curves. Assure all signs are mounted on breakaway supports if within the clear zone.

2. Installation of delineators through several curves appeared to be very effective in providing guidance for drivers, especially at night. However, these installations did not seem to be consistent throughout the section. Review and utilize the guidance in Section 3F.04 and Table 3F-1 of the 2009 MUTCD for a more-consistent application of this potentially-beneficial improvement for nighttime travel.
3. Review current w-beam guardrail installations, especially at bridge approaches, for need of delineation. Consider installation of standard delineators behind the rail or otherwise enhance the visibility with in-rail delineators or reflective devices. Install Type 3 Object Markers at each bridge corner.
4. Review all noted potentially-hazardous side hazards, especially steep slopes, for need of additional shielding with guardrail, either w-beam or high-tension cable rail.
5. Review all intersections with approaches of 75 degrees or flatter for need of realignment to improve visibility for stopped vehicles. Add intersection warning signs where visibility to the intersection is restricted on Hydaburg Highway.
6. Consider installation of additional milepost markers to designate 1/10 mile or 2/10 mile locations to assist law enforcement in locating crashes accurately and when responding to emergencies.
7. Consider installation of a Double Arrow warning sign (W1-7) across from all T intersections.
8. Review existing pavement markings during nighttime driving conditions to assure satisfactory visibility.
9. Perform a speed study to determine the appropriateness of the posted 35 mph regulatory speed limit.
10. Review designated no-passing areas for need of restrictions, particularly the section about three miles northerly from the Mijuu Way intersection.

11. Review the need for various Dips warning signs throughout the reviewed section and remove those not warranted.
12. Review the possible need for pedestrian crossing warning signs at locations, such as the Soda Trail intersection.
13. Review existing turnouts for need of rehabilitation.

Long term

Traffic volume and the current condition of Hydaburg Highway would not appear to justify major improvements at this time; however, consideration could be given to reconstructing the short sections where subbase deterioration has contributed to settlement in the pavement surface, resulting in dips. Elimination of these settlement areas would be beneficial to drivers.

APPENDIX A. IMAGES FROM FIELD REVIEWS

A.1 Kasaan Road Images



Figure A.1. Typical section on Kasaan Road



Figure A.2. Narrow bridge on Kasaan Road



Figure A.3. Signing and beam guardrail at narrow bridge on Kasaan Road



Figure A.4. Steep foreslope on Kasaan Road



Figure A.5. Warning Sign on Kasaan Road



Figure A.6. Damaged beam guardrail on Kasaan Road



Figure A.7. Vandalized regulatory sign on Kasaan Road



Figure A.8. Pipe culvert outlet on Kasaan Road



Figure A.9. Large rock in center of Kasaan Road



Figure A.10. Audit team members on Kasaan Road

A.2 Hydaburg Highway Images



Figure A.11. Roadway section on Hydaburg Highway

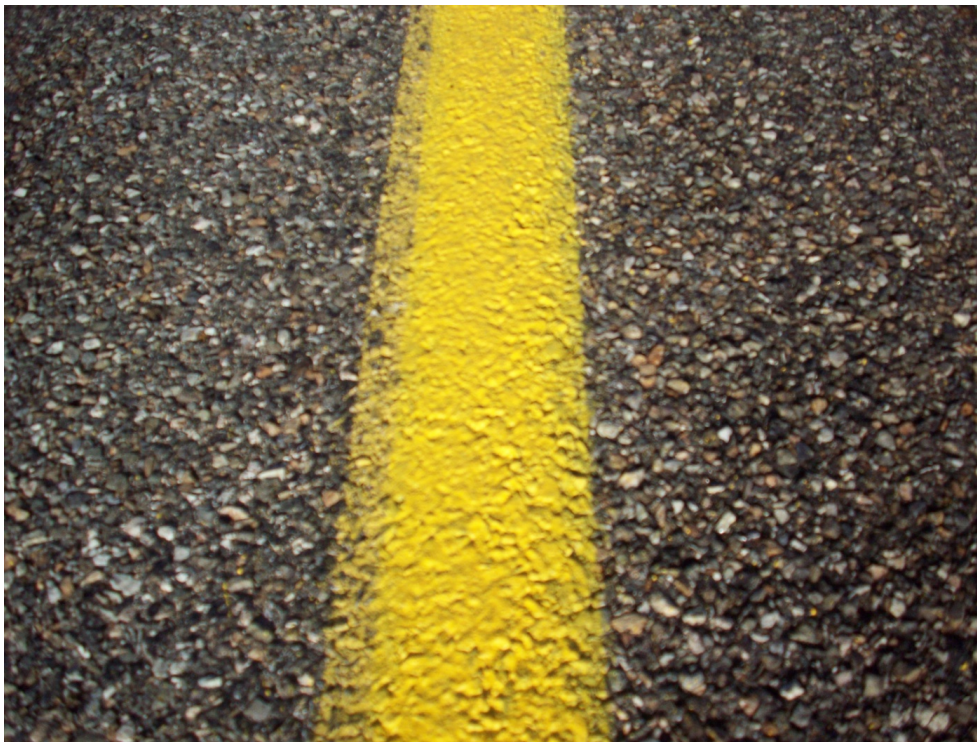


Figure A.12. Typical pavement marking on Hydaburg Highway



Figure A.13. Beam guardrail and bridge rail on Hydaburg Highway



Figure A.14. Beam guardrail terminal section on Hydaburg Highway



Figure A.15. Delineators at horizontal curve on Hydaburg Highway



Figure A.16. Damaged warning sign on Hydaburg Highway



Figure A.17. Breakaway sign support base on Hydaburg Highway



Figure A.18. Road cut backslope on Hydaburg Highway

APPENDIX B. TRAFFIC VOLUME DATA

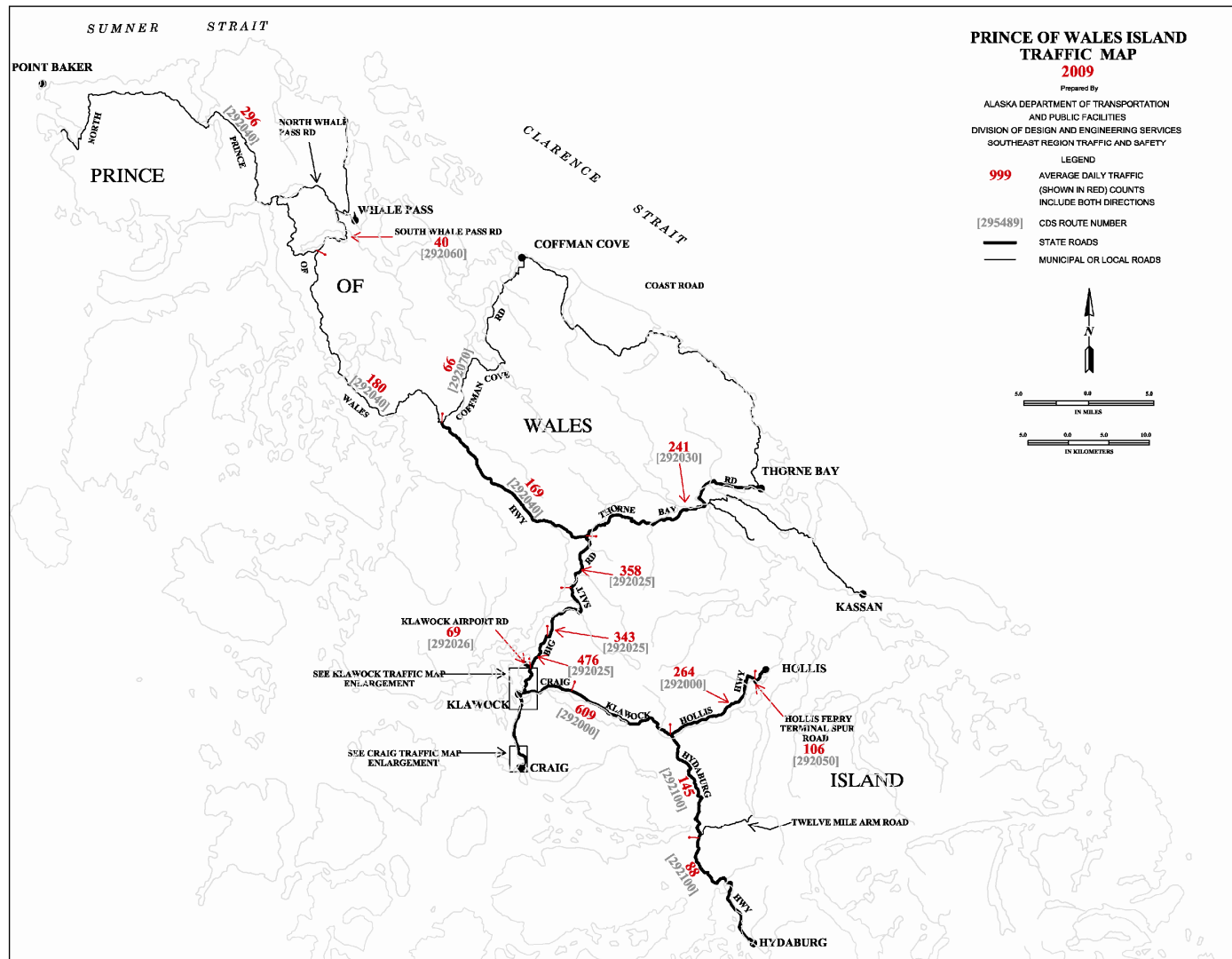


Figure B.1. 2009 Prince of Wales Island average daily traffic (in red)

APPENDIX C. CRASH DATA

Table C.1 2004 Alaska crashes by census area and severity

CENSUS AREA	NUMBER OF ACCIDENTS				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	22	3	2	2	29
NW Arctic	-	-	-	1	1
Nome	14	7	-	-	21
Yukon-Kuskokwim,Denali	27	17	1	3	48
Fairbanks NorthStar	1,494	447	49	10	2,000
SE Fairbanks	84	31	3	1	119
Matanuska Susitna	1,100	378	69	19	1,566
Valdez-Cordova	123	24	4	4	155
Municipality of Anchorage	5,950	2,241	261	29	8,481
Bethel	34	19	1	-	54
Wade Hampton	-	1	-	-	1
BristolBay, Dillingham, Lake&Peninsula	10	7	1	1	19
Kenai	891	295	49	15	1,250
Kodiak	79	27	4	-	110
Aleutians West	16	4	-	-	20
Aleutians East	1	1	-	-	2
Yakutat,Hoonah, Angoon	10	2	1	1	14
Skagway	2	1	-	-	3
Haines-Klukwan	13	3	-	1	17
Juneau	229	136	14	3	382
Sitka	55	17	3	1	76
Petersburg,Wrangell	20	6	2	1	29
Prince of Wales	6	8	1	1	16
Ketchikan Gateway	97	48	6	1	152
All Other	40	10	2	2	54
Statewide	10,317	3,733	473	96	14,619

Table C.2 2004 Alaska crash percentages by census area and severity

CENSUS AREA	PERCENTAGE OF ACCIDENTS				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	0.21	0.08	0.42	2.08	0.20
NW Arctic	0.00	0.00	0.00	1.04	0.01
Nome	0.14	0.19	0.00	0.00	0.14
Yukon-Kuskokwim,Denali	0.26	0.46	0.21	3.13	0.33
Fairbanks NorthStar	14.48	11.97	10.36	10.42	13.68
SE Fairbanks	0.81	0.83	0.63	1.04	0.81
Matanuska Susitna	10.66	10.13	14.59	19.79	10.71
Valdez-Cordova	1.19	0.64	0.85	4.17	1.06
Municipality of Anchorage	57.67	60.03	55.18	30.21	58.01
Bethel	0.33	0.51	0.21	0.00	0.37
Wade Hampton	0.00	0.03	0.00	0.00	0.01
BristolBay, Dillingham, Lake&Peninsula	0.10	0.19	0.21	1.04	0.13
Kenai	8.64	7.90	10.36	15.63	8.55
Kodiak	0.77	0.72	0.85	0.00	0.75
Aleutians West	0.16	0.11	0.00	0.00	0.14
Aleutians East	0.01	0.03	0.00	0.00	0.01
Yakutat,Hoonah, Angoon	0.10	0.05	0.21	1.04	0.10
Skagway	0.02	0.03	0.00	0.00	0.02
Haines-Klukwan	0.13	0.08	0.00	1.04	0.12
Juneau	2.22	3.64	2.96	3.13	2.61
Sitka	0.53	0.46	0.63	1.04	0.52
Petersburg,Wrangell	0.19	0.16	0.42	1.04	0.20
Prince of Wales	0.06	0.21	0.21	1.04	0.11
Ketchikan Gateway	0.94	1.29	1.27	1.04	1.04
All Other	0.39	0.27	0.42	2.08	0.37
Statewide	100.00	100.00	100.00	100.00	100.00

Table C.3 2004 Alaska census area crash percentages by severity

CENSUS AREA	PERCENTAGE OF ACCIDENTS				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	75.86	10.34	6.90	6.90	100.00
NW Arctic	0.00	0.00	0.00	100.00	100.00
Nome	66.67	33.33	0.00	0.00	100.00
Yukon-Kuskokwim, Denali	56.25	35.42	2.08	6.25	100.00
Fairbanks NorthStar	74.70	22.35	2.45	0.50	100.00
SE Fairbanks	70.59	26.05	2.52	0.84	100.00
Matanuska Susitna	70.24	24.14	4.41	1.21	100.00
Valdez-Cordova	79.35	15.48	2.58	2.58	100.00
Municipality of Anchorage	70.16	26.42	3.08	0.34	100.00
Bethel	62.96	35.19	1.85	0.00	100.00
Wade Hampton	0.00	100.00	0.00	0.00	100.00
Bristol Bay, Dillingham, Lake & Peninsula	52.63	36.84	5.26	5.26	100.00
Kenai	71.28	23.60	3.92	1.20	100.00
Kodiak	71.82	24.55	3.64	0.00	100.00
Aleutians West	80.00	20.00	0.00	0.00	100.00
Aleutians East	50.00	50.00	0.00	0.00	100.00
Yakutat, Hoonah, Angoon	71.43	14.29	7.14	7.14	100.00
Skagway	66.67	33.33	0.00	0.00	100.00
Haines-Klukwan	76.47	17.65	0.00	5.88	100.00
Juneau	59.95	35.60	3.66	0.79	100.00
Sitka	72.37	22.37	3.95	1.32	100.00
Petersburg, Wrangell	68.97	20.69	6.90	3.45	100.00
Prince of Wales	37.50	50.00	6.25	6.25	100.00
Ketchikan Gateway	63.82	31.58	3.95	0.66	100.00
All Other	74.07	18.52	3.70	3.70	100.00
Statewide	70.57	25.54	3.24	0.66	100.00

Table C.4 2005 Alaska crashes by census area and severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	22	7	2	-	31
NW Arctic	2	3	-	-	5
Nome	6	2	1	1	10
Yukon-Kuskokwim, Denali	25	12	6	2	45
Fairbanks North Star	1,373	406	48	10	1,837
SE Fairbanks	78	25	7	1	111
Matanuska Susitna	1,069	413	75	19	1,576
Valdez-Cordova	111	18	6	2	137
Municipality of Anchorage	4,870	2,128	245	17	7,260
Bethel	26	11	2	-	39
Bristol Bay, Dillingham, Lake & Peninsula	17	9	1	-	27
Kenai	768	249	30	10	1,057
Kodiak	83	33	6	1	123
Aleutians West	18	6	1	-	25
Aleutians East	1	3	1	1	6
Yakutat, Hoonah, Angoon	13	6	1	-	20
Skagway	9	2	-	-	11
Haines-Klukwan	15	6	1	-	22
Juneau	229	129	10	1	369
Sitka	86	12	1	-	99
Petersburg, Wrangell	19	5	-	1	25
Prince of Wales 	17	13	2	-	32
Ketchikan Gateway	107	64	11	-	182
All Other	48	21	10	1	80
Statewide	9,012	3,583	467	67	13,129

Table C.5 2005 Alaska crash percentages by census area and severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	0.24	0.20	0.43	0.00	0.24
NW Arctic	0.02	0.08	0.00	0.00	0.04
Nome	0.07	0.06	0.21	1.49	0.08
Yukon-Kuskokwim, Denali	0.28	0.33	1.28	2.99	0.34
Fairbanks North Star	15.24	11.33	10.28	14.93	13.99
SE Fairbanks	0.87	0.70	1.50	1.49	0.85
Matanuska Susitna	11.86	11.53	16.06	28.36	12.00
Valdez-Cordova	1.23	0.50	1.28	2.99	1.04
Municipality of Anchorage	54.04	59.39	52.46	25.37	55.30
Bethel	0.29	0.31	0.43	0.00	0.30
Bristol Bay, Dillingham, Lake & Peninsula	0.19	0.25	0.21	0.00	0.21
Kenai	8.52	6.95	6.42	14.93	8.05
Kodiak	0.92	0.92	1.28	1.49	0.94
Aleutians West	0.20	0.17	0.21	0.00	0.19
Aleutians East	0.01	0.08	0.21	1.49	0.05
Yakutat, Hoonah, Angoon	0.14	0.17	0.21	0.00	0.15
Skagway	0.10	0.06	0.00	0.00	0.08
Haines-Klukwan	0.17	0.17	0.21	0.00	0.17
Juneau	2.54	3.60	2.14	1.49	2.81
Sitka	0.95	0.33	0.21	0.00	0.75
Petersburg, Wrangell	0.21	0.14	0.00	1.49	0.19
Prince of Wales 	0.19	0.36	0.43	0.00	0.24
Ketchikan Gateway	1.19	1.79	2.36	0.00	1.39
All Other	0.53	0.59	2.14	1.49	0.61
Statewide	100.00	100.00	100.00	100.00	100.00

Table C.6 2005 Alaska census area crash percentages by severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	70.97	22.58	6.45	0.00	100.00
NW Arctic	40.00	60.00	0.00	0.00	100.00
Nome	60.00	20.00	10.00	10.00	100.00
Yukon-Kuskokwim, Denali	55.56	26.67	13.33	4.44	100.00
Fairbanks North Star	74.74	22.10	2.61	0.54	100.00
SE Fairbanks	70.27	22.52	6.31	0.90	100.00
Matanuska Susitna	67.83	26.21	4.76	1.21	100.00
Valdez-Cordova	81.02	13.14	4.38	1.46	100.00
Municipality of Anchorage	67.08	29.31	3.37	0.23	100.00
Bethel	66.67	28.21	5.13	0.00	100.00
Bristol Bay, Dillingham, Lake & Peninsula	62.96	33.33	3.70	0.00	100.00
Kenai	72.66	23.56	2.84	0.95	100.00
Kodiak	67.48	26.83	4.88	0.81	100.00
Aleutians West	72.00	24.00	4.00	0.00	100.00
Aleutians East	16.67	50.00	16.67	16.67	100.00
Yakutat, Hoonah, Angoon	65.00	30.00	5.00	0.00	100.00
Skagway	81.82	18.18	0.00	0.00	100.00
Haines-Klukwan	68.18	27.27	4.55	0.00	100.00
Juneau	62.06	34.96	2.71	0.27	100.00
Sitka	86.87	12.12	1.01	0.00	100.00
Petersburg, Wrangell	76.00	20.00	0.00	4.00	100.00
Prince of Wales 	53.13	40.63	6.25	0.00	100.00
Ketchikan Gateway	58.79	35.16	6.04	0.00	100.00
All Other	60.00	26.25	12.50	1.25	100.00
Statewide	68.64	27.29	3.56	0.51	100.00

Table C.7 2006 Alaska crashes by census area and severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	27	6	-	2	35
NW Arctic	1	-	-	-	1
Nome	6	5	1	1	13
Yukon-Kuskokwim, Denali	18	9	4	1	32
Fairbanks North Star	982	279	38	13	1,312
SE Fairbanks	78	30	3	1	112
Matanuska Susitna	1,047	334	49	13	1,443
Valdez-Cordova	83	36	3	2	124
Municipality of Anchorage	4,657	1,816	193	18	6,684
Bethel	24	7	2	-	33
Bristol Bay, Dillingham, Lake & Peninsula	15	3	2	2	22
Kenai	729	199	36	11	975
Kodiak	97	19	3	-	119
Aleutians West	11	4	1	1	17
Aleutians East	5	1	-	-	6
Yakutat, Hoonah, Angoon	7	3	-	-	10
Skagway	2	-	-	-	2
Haines-Klukwan	11	3	1	-	15
Juneau	226	122	10	2	360
Sitka	75	24	2	1	102
Petersburg, Wrangell	18	9	2	-	29
Prince of Wales 	35	11	1	-	47
Ketchikan Gateway	91	46	6	1	144
All Other	64	18	4	5	91
Statewide	8,309	2,984	361	74	11,728

Table C.8 2006 Alaska crash percentages by census area and severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	0.32	0.20	0.00	2.70	0.30
NW Arctic	0.01	0.00	0.00	0.00	0.01
Nome	0.07	0.17	0.28	1.35	0.11
Yukon-Kuskokwim, Denali	0.22	0.30	1.11	1.35	0.27
Fairbanks North Star	11.82	9.35	10.53	17.57	11.19
SE Fairbanks	0.94	1.01	0.83	1.35	0.95
Matanuska Susitna	12.60	11.19	13.57	17.57	12.30
Valdez-Cordova	1.00	1.21	0.83	2.70	1.06
Municipality of Anchorage	56.05	60.86	53.46	24.32	56.99
Bethel	0.29	0.23	0.55	0.00	0.28
Bristol Bay, Dillingham, Lake & Peninsula	0.18	0.10	0.55	2.70	0.19
Kenai	8.77	6.67	9.97	14.86	8.31
Kodiak	1.17	0.64	0.83	0.00	1.01
Aleutians West	0.13	0.13	0.28	1.35	0.14
Aleutians East	0.06	0.03	0.00	0.00	0.05
Yakutat, Hoonah, Angoon	0.08	0.10	0.00	0.00	0.09
Skagway	0.02	0.00	0.00	0.00	0.02
Haines-Klukwan	0.13	0.10	0.28	0.00	0.13
Juneau	2.72	4.09	2.77	2.70	3.07
Sitka	0.90	0.80	0.55	1.35	0.87
Petersburg, Wrangell	0.22	0.30	0.55	0.00	0.25
Prince of Wales 	0.42	0.37	0.28	0.00	0.40
Ketchikan Gateway	1.10	1.54	1.66	1.35	1.23
All Other	0.77	0.60	1.11	6.76	0.78
Statewide	100.00	100.00	100.00	100.00	100.00

Table C.9 2006 Alaska census area crash percentages by severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	77.14	17.14	0.00	5.71	100.00
NW Arctic	100.00	0.00	0.00	0.00	100.00
Nome	46.15	38.46	7.69	7.69	100.00
Yukon-Kuskokwim, Denali	56.25	28.13	12.50	3.13	100.00
Fairbanks North Star	74.85	21.27	2.90	0.99	100.00
SE Fairbanks	69.64	26.79	2.68	0.89	100.00
Matanuska Susitna	72.56	23.15	3.40	0.90	100.00
Valdez-Cordova	66.94	29.03	2.42	1.61	100.00
Municipality of Anchorage	69.67	27.17	2.89	0.27	100.00
Bethel	72.73	21.21	6.06	0.00	100.00
Bristol Bay, Dillingham, Lake & Peninsula	68.18	13.64	9.09	9.09	100.00
Kenai	74.77	20.41	3.69	1.13	100.00
Kodiak	81.51	15.97	2.52	0.00	100.00
Aleutians West	64.71	23.53	5.88	5.88	100.00
Aleutians East	83.33	16.67	0.00	0.00	100.00
Yakutat, Hoonah, Angoon	70.00	30.00	0.00	0.00	100.00
Skagway	100.00	0.00	0.00	0.00	100.00
Haines-Klukwan	73.33	20.00	6.67	0.00	100.00
Juneau	62.78	33.89	2.78	0.56	100.00
Sitka	73.53	23.53	1.96	0.98	100.00
Petersburg, Wrangell	62.07	31.03	6.90	0.00	100.00
Prince of Wales 	74.47	23.40	2.13	0.00	100.00
Ketchikan Gateway	63.19	31.94	4.17	0.69	100.00
All Other	70.33	19.78	4.40	5.49	100.00
Statewide	70.85	25.44	3.08	0.63	100.00

Table C.10 2007 Alaska crashes by census area and severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	18	21	6	-	45
NW Arctic	-	1	-	-	1
Nome	3	3	1	-	7
Yukon-Kuskokwim, Denali	19	13	-	3	35
Fairbanks North Star	1,093	327	47	19	1,486
SE Fairbanks	78	19	5	2	104
Matanuska Susitna	1,045	360	61	12	1,478
Valdez-Cordova	58	30	1	3	92
Municipality of Anchorage	3,807	1,435	143	27	5,412
Bethel	23	7	1	-	31
Wade Hampton	-	-	-	1	1
Bristol Bay, Dillingham, Lake & Peninsula	10	4	2	1	17
Kenai	636	250	39	8	933
Kodiak	67	25	1	-	93
Aleutians West	18	5	-	-	23
Aleutians East	-	4	1	1	6
Yakutat, Hoonah, Angoon	4	1	-	-	5
Skagway	7	5	-	-	12
Haines-Klukwan	18	6	-	-	24
Juneau	205	126	13	1	345
Sitka	90	12	3	-	105
Petersburg, Wrangell	20	8	1	-	29
Prince of Wales 	31	13	-	1	45
Ketchikan Gateway	111	30	11	2	154
All Other	64	23	7	1	95
Statewide	7,425	2,728	343	82	10,578

Table C.11 2007 Alaska crash percentages by census area and severity

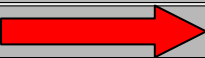
CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	0.24	0.77	1.75	0.00	0.43
NW Arctic	0.00	0.04	0.00	0.00	0.01
Nome	0.04	0.11	0.29	0.00	0.07
Yukon-Kuskokwim, Denali	0.26	0.48	0.00	3.66	0.33
Fairbanks North Star	14.72	11.99	13.70	23.17	14.05
SE Fairbanks	1.05	0.70	1.46	2.44	0.98
Matanuska Susitna	14.07	13.20	17.78	14.63	13.97
Valdez-Cordova	0.78	1.10	0.29	3.66	0.87
Municipality of Anchorage	51.27	52.60	41.69	32.93	51.16
Bethel	0.31	0.26	0.29	0.00	0.29
Wade Hampton	0.00	0.00	0.00	1.22	0.01
Bristol Bay, Dillingham, Lake & Peninsula	0.13	0.15	0.58	1.22	0.16
Kenai	8.57	9.16	11.37	9.76	8.82
Kodiak	0.90	0.92	0.29	0.00	0.88
Aleutians West	0.24	0.18	0.00	0.00	0.22
Aleutians East	0.00	0.15	0.29	1.22	0.06
Yakutat, Hoonah, Angoon	0.05	0.04	0.00	0.00	0.05
Skagway	0.09	0.18	0.00	0.00	0.11
Haines-Klukwan	0.24	0.22	0.00	0.00	0.23
Juneau	2.76	4.62	3.79	1.22	3.26
Sitka	1.21	0.44	0.87	0.00	0.99
Petersburg, Wrangell	0.27	0.29	0.29	0.00	0.27
Prince of Wales 	0.42	0.48	0.00	1.22	0.43
Ketchikan Gateway	1.49	1.10	3.21	2.44	1.46
All Other	0.86	0.84	2.04	1.22	0.90
Statewide	100.00	100.00	100.00	100.00	100.00

Table C.12 2007 Alaska census area crash percentages by severity

CENSUS AREA	NUMBER OF CRASHES				TOTAL
	Property Damage Only	Minor Injury	Major Injury	Fatal	
North Slope	40.00	46.67	13.33	0.00	100.00
NW Arctic	0.00	100.00	0.00	0.00	100.00
Nome	42.86	42.86	14.29	0.00	100.00
Yukon-Kuskokwim, Denali	54.29	37.14	0.00	8.57	100.00
Fairbanks North Star	73.55	22.01	3.16	1.28	100.00
SE Fairbanks	75.00	18.27	4.81	1.92	100.00
Matanuska Susitna	70.70	24.36	4.13	0.81	100.00
Valdez-Cordova	63.04	32.61	1.09	3.26	100.00
Municipality of Anchorage	70.34	26.52	2.64	0.50	100.00
Bethel	74.19	22.58	3.23	0.00	100.00
Wade Hampton	0.00	0.00	0.00	100.00	100.00
Bristol Bay, Dillingham, Lake & Peninsula	58.82	23.53	11.76	5.88	100.00
Kenai	68.17	26.80	4.18	0.86	100.00
Kodiak	72.04	26.88	1.08	0.00	100.00
Aleutians West	78.26	21.74	0.00	0.00	100.00
Aleutians East	0.00	66.67	16.67	16.67	100.00
Yakutat, Hoonah, Angoon	80.00	20.00	0.00	0.00	100.00
Skagway	58.33	41.67	0.00	0.00	100.00
Haines-Klukwan	75.00	25.00	0.00	0.00	100.00
Juneau	59.42	36.52	3.77	0.29	100.00
Sitka	85.71	11.43	2.86	0.00	100.00
Petersburg, Wrangell	68.97	27.59	3.45	0.00	100.00
Prince of Wales 	68.89	28.89	0.00	2.22	100.00
Ketchikan Gateway	72.08	19.48	7.14	1.30	100.00
All Other	67.37	24.21	7.37	1.05	100.00
Statewide	70.19	25.79	3.24	0.78	100.00