

## **APPENDIX C**

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### **TRAFFIC AND SAFETY ANALYSIS**

**SPENARD ROAD: HILLCREST DRIVE TO MINNESOTA DRIVE**  
**Channelization and Pedestrian Facilities Improvement**  
**PROJECT No. HRO-0001(172)/53986**

**TRAFFIC AND SAFETY ANALYSIS**  
**FINAL**



Prepared for:

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June 2002

# STATE OF ALASKA

Department of Transportation and Public Facilities

## Spenard Road

Hillcrest Drive to Minnesota Drive

Channelization and Pedestrian Facilities Improvement

Project Number: HRO-0001(172)/53986

## TRAFFIC AND SAFETY ANALYSIS



Prepared By:

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Lounsbury & Associates, Inc.

## **Spenard Road, Hillcrest Drive to Minnesota Drive Channelization & Pedestrian Facilities Improvement**

### PROJECT

Spenard Road HRO-0001(172)/53986

### NOTICE TO USERS

This Report reflects the thinking and design decisions, as of June, 2002. Changes frequently occur during the evolution of the design process, so persons who may rely on the information contained in this document should check with the Alaska Department of Transportation for the most current design. Please contact Judy Dougherty, Project Manager at 269-0566 for this information.

## Spenard Road, Fireweed Lane to 36<sup>th</sup> Avenue Channelization & Pedestrian Facilities Improvement

### Table of Contents

<u>Page</u>	<u>Section</u>	<u>Description</u>
		Cover
i		Notice to Users
ii		Table of Contents
iii		List of Figures
iv		List of Tables
1	1.0	Introduction
1	2.0	Background
4	3.0	Collision Analysis
4	3.1	Spot Analysis
14	3.2	Segment Analysis
15	4.0	Traffic Projections
16	5.0	Capacity Analysis
16	5.1	Intersection Capacity
20	5.2	Roadway Capacity
20	6.0	Recommendation
21		References
	Appendix A	Collision Data
	Appendix B	Collision Diagrams
	Appendix C	Intersection Volume Diagrams
	Appendix D	Capacity Analysis Data
	Appendix E	Background Traffic Information

## Spenard Road, Fireweed Lane to 36<sup>th</sup> Avenue Channelization & Pedestrian Facilities Improvement

### List of Figures

<u>Page</u>	<u>Figure</u>	<u>Description</u>
2	2.1	Location and Vicinity Map
3	2.2	Existing Lane Configuration/ROW Widths
5	2.3	Corridor Zoning
17	5.1	Intersection Alternatives

## **Spenard Road, Fireweed Lane to 36<sup>th</sup> Avenue Channelization & Pedestrian Facilities Improvement**

### **List of Tables**

<u>Page</u>	<u>Table</u>	<u>Description</u>
6	3.1	Collision Rates
15	4.1	Historic Growth Rates
15	4.2	Traffic Projections
18	5.1	AM Peak Hour Intersection LOS
19	5.2	PM Peak Hour Intersection LOS

## **1.0 Introduction**

The purpose of this Traffic and Safety Analysis is to evaluate the current collision patterns along Spenard Road and identify safety improvement alternatives to the roadway from Fireweed Lane to 36<sup>th</sup> Avenue. This study will also evaluate existing pedestrian/bicycle and transit facilities along the corridor and make recommendations that can be incorporated into the traffic and safety improvements. The corridor experienced 392 recorded collisions specific to Spenard Road and cross streets between 1996 and 1998 and has been identified as a highway safety project.

This report is the formal documentation of the traffic and safety study effort portion of the Engineering Analysis Report. This document was prepared to record the evaluations and recommendations of the analysis and provide a reference for the Engineering Analysis Report and subsequent design tasks.

## **2.0 Background**

Spenard Road from Fireweed Lane to 36<sup>th</sup> Avenue is a four lane undivided two-way minor arterial as classified in the Official Streets and Highways Plan (1). Reference Figure 2.1 for the project location. Spenard Road between Fireweed Lane and 36<sup>th</sup> Avenue consists of a 48 foot wide roadway (face-of-curb to face-of-curb). There are 20 intersections with cross streets from Fireweed Lane to 36<sup>th</sup> Avenue. Four of these intersections are signalized: Fireweed Lane, Northern Lights Blvd., Benson Blvd. and 36<sup>th</sup> Avenue. Many of the minor side street intersections are offset 50-100 ft. In addition to the cross streets, numerous driveways of varying width serving adjoining business front Spenard Road.

Right-of-way (ROW) width ranges from 60 feet (ft.) to 120 ft. Figure 2.2 shows the existing roadway configuration and ROW widths. Right-of-way information is based on Municipality of Anchorage (MOA) grid maps.

Spenard Road from Minnesota Drive to Hillcrest Drive is owned by the MOA. The roadway has a posted speed limit of 35 mph. Spenard Road serves numerous abutting businesses and surrounding neighborhoods. Land use along Spenard Road is commercial, zoned B-3, General Business District.



PROJECT LOCATION: ANCHORAGE



Knik Arm

Glenn Hwy.

Merrill Field  
15th Ave.

Debarr

Boniface Pkwy

Boxter Rd.

Muldoon Rd.

Fireweed Ln.

Northern Lights Blvd.

Benson Blvd.

36th Ave.

Tudor Rd.

Tudor Rd.

Spenard Rd.

Arcata Blvd.

International

"C" Street

Minnesota Dr.

Dowling Rd.

Dimond Blvd.

Lake Otis Pkwy

Abbot Loop Rd.

Sand Lake Rd.

Jewel Lake Rd.

Dimond Blvd.

100th Ave.

Old Seward Hwy.

New Seward Hwy.

Abbott Rd.

O'Malley Rd.

Huffman Rd.

Turnagain Arm

Klatt Rd.

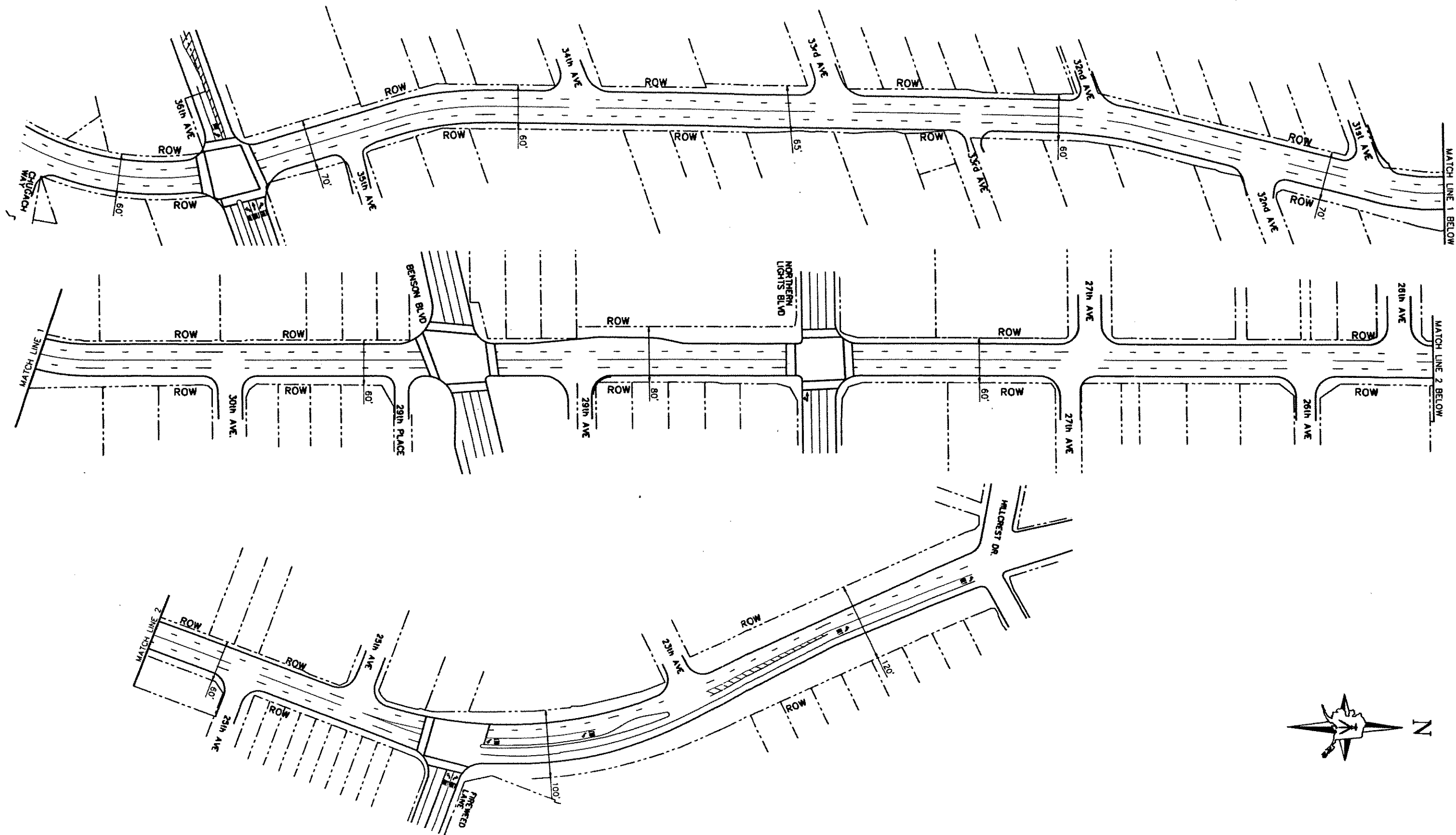
DeArman Rd.

RABBIT CREEK Rd

PROJECT VICINITY  
Spenard Rd; Hillcrest Dr.  
to Minnesota Dr.

SPENARD ROAD  
HILLCREST DR TO MINNESOTA DR  
LOCATION AND VICINITY MAP  
FIGURE 2.1





LEGEND:

STATE OF ALASKA  
 DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES  
 SPENARD ROAD - HILLCREST DR TO MINNESOTA DR  
 EXISTING LANE CONFIGURATION/ROW WIDTH

SCALE: N.T.S.	DATE: JULY 00
PROJECT# HRO-0001(172)/53986	

PREPARED BY:  
 LOUNSBURY & ASSOCIATES

FIGURE 2.2

In addition, there are areas near Spenard Road zoned R-2M, R-3 and R-4, all Multi-Family Residential. Figure 2.3 illustrates the corridor zoning.

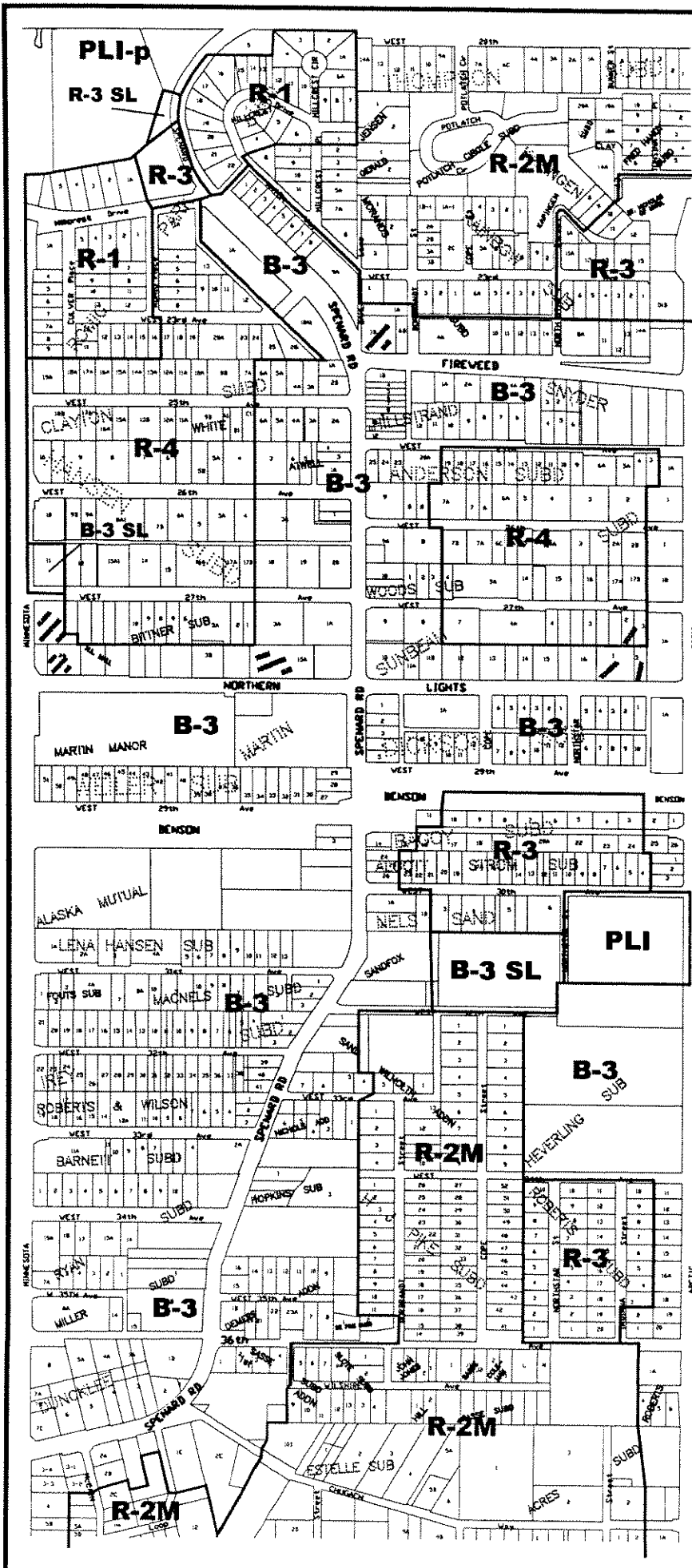
### **3.0 Collision Analysis**

A collision analysis was performed for Spenard Road between Chugach Way and Hillcrest Drive for the 3-year period 1996-1998. A total of 392 collisions were reported during this time frame. A summary of all reported collisions can be found in Appendix A. Collision diagrams for Spenard Road from Chugach Way to Hillcrest Drive can be found in Appendix B.

The collision analysis was divided into two categories, spot analysis and segment analysis. Spot locations are short sections of roadway or intersections. Segment locations are longer than spot locations and consist of sections of similar roadway characteristics.

#### **3.1 Spot Analysis**

The spot analysis revealed 19 locations with three or more collisions over the 3-year period. The spot locations were all roadway intersections or a combination of roadway intersections and driveways. Table 3.1 lists the location, calculated accident rate based on million vehicles entering (MVE), the statewide average accident rate for the location type, and the critical accident rate based on a 95.0% confidence level. The statewide average accident rate is based on the ADOT&PF Formulas and Factors for the fiscal year 1999 Highway Safety Improvement Program. The MVE was determined from Municipality of Anchorage Annual Traffic Reports for the years 1996-1998. Appendix A contains the formulas and factors along with accident rate calculations.



**Legend:**

- PLI-p Public Lands and Institution District-Park
- R-1 One-Family Residential District
- R-2M Multiple-Family Residential District
- R-3 Multiple-Family Residential District
- R-4 Multiple-Family Residential District
- B-3 General Business District
- SL Special Limitations by Ordinance

SPENARD ROAD  
 MINNESOTA DR TO HILLCREST DR  
 CORRIDOR ZONING  
 FIGURE 2.3

Location	Accident Rate per/MVE	Statewide Average Rate <sup>1</sup> per/MVE	Critical Accident Rate <sup>1,2</sup> per/MVE	Remarks
Chugach Way	0.96	0.62	0.94	Exceeds 95% Critical Rate
36 <sup>th</sup> Ave.	1.46	1.17	1.56	
34 <sup>th</sup> Ave.	0.96	0.62	0.97	Exceeds 90% Critical Rate
33 <sup>rd</sup> Ave. West	0.31	0.62	0.97	
33 <sup>rd</sup> Ave. East	0.37	0.62	0.97	
32 <sup>nd</sup> Ave. West	0.17	0.62	0.96	
32 <sup>nd</sup> Ave. East	0.17	0.62	0.96	
31 <sup>st</sup> Ave.	0.30	0.62	0.96	
30 <sup>th</sup> Ave.	0.96	0.62	0.97	Exceeds 90% Critical Rate
29 <sup>th</sup> Place	0.76	0.62	1.00	
Benson Blvd.	1.77	1.05	1.35	Exceeds 99.9% Critical Rate
29 <sup>th</sup> Ave.	0.25	0.62	0.98	
REI Driveway	0.95	0.62	0.98	Exceeds 90% Critical Rate
Northern Lights Blvd.	2.38	1.05	1.36	Exceeds 99.9% Critical Rate
27 <sup>th</sup> Ave.	1.22	0.85	1.24	Exceeds 90% Critical Rate
26 <sup>th</sup> Ave. East	0.65	0.62	0.97	
26 <sup>th</sup> Ave. West	0.12	0.62	0.97	
25 <sup>th</sup> Ave. East	0.64	0.62	0.98	
25 <sup>th</sup> Ave. West	0.45	0.62	0.98	
Fireweed Lane	1.09	1.05	1.52	
23 <sup>rd</sup> Ave.	0.34	0.62	1.24	
Hillcrest Drive	0.47	0.62	1.13	

<sup>1</sup> Source: ADOT High Accident Screening Process Factors and Formulas for the FY '99 HSIP.  
<sup>2</sup> Accident rate indicates 95.0% confidence that the rate cannot be attributed to a random occurrence.

**Table 3.1 Collision Rates**

Two locations, Benson and Northern Lights exceed the 99.9% confidence level, indicating that there is a 99.9% chance that the accident rate can be attributed to an accident problem as opposed to randomness. One location, Chugach Way exceeds the 95% confidence level. Four locations, 34<sup>th</sup> Avenue, 30<sup>th</sup> Avenue, the REI driveway and 27<sup>th</sup> Avenue exceed the 90% confidence level. The intersection of Chugach Way is not investigated further as it is part of the 36<sup>th</sup> Avenue study being conducted by the MOA, the remaining locations are discussed below.

### ***34<sup>th</sup> Avenue and Spenard Road***

#### ***Collision Summary***

This location had 16 recorded collisions during the 3-year period consisting of 7 angle (44%), 6 lane-change (38%), 2 rear-end (12%) and 1 pedestrian (6%). See collision diagram in Appendix B, page 3.

A contributing factor was identified for 11 collisions (69%). These include: 6 (38%) failure to yield, 3 (19%) driver inattention, 1 (6%) improper passing and 1 (6%) alcohol. Citations were issued for 9 (56%) of the collisions. There were 2 (13%) injury collisions at this location.

Eleven collisions (59%) occurred during daylight with 4 collisions (25%) occurring under streetlight conditions. Eight collisions (50%) occurred under snow/ice roadway conditions, 6 collisions (38%) occurred under dry roadway conditions and 2 collisions (13%) occurred under wet roadway conditions.

#### ***Collision Reduction Measures***

Angle collisions consisting of left-turns from Spenard and left-turns from 34<sup>th</sup> accounted for 7 collisions (44%). Sight distance problems associated with parked cars near the edge of the roadway may contribute to the left-turning collisions from 34<sup>th</sup>.

Rear-end and lane change collisions for northbound traffic accounted for 6 collisions (38%). A combination of several factors may contribute to this condition including limited sight distance due to the

curve preceding the intersection and slowing or stopped vehicles attempting to turn from Spenard.

According to published accident reduction factors (2), sight distance improvements at this location would provide for a 30% reduction in all collisions. Additionally, providing left-turn lanes would provide a 30% reduction in all collisions.

### ***30<sup>th</sup> Avenue and Spenard Road***

#### ***Collision Summary***

This location had 16 recorded collisions during the 3-year period consisting of 7 rear-end (44%), 5 angle (31%), 2 lane-change (13%) and 1 each fixed-object and pedestrian. See collision diagram in Appendix B, page 6.

A contributing factor was identified for 12 collisions (81%). These include: 5 (31%) failure to yield, 2 (13%) unsafe speed, 2 (13%) follow to close, 2 (13%) alcohol and 1 (6%) improper passing. Citations were issued for 11 (69%) of the collisions. There were 3 (19%) injury collisions at this location.

Thirteen collisions (81%) occurred during daylight with the remaining 3 collisions (19%) occurring under streetlight conditions. Eight collisions (50%) occurred under dry roadway conditions, 5 collisions (31%) occurred under snow/ice roadway conditions and 2 collisions (13%) occurred under wet roadway conditions.

#### ***Collision Reduction Measures***

Rear-end collisions consisting of 4 northbound and 3 southbound accounted for the majority of collisions at this location. A possible contributing factor for the southbound collisions could be slowing or stopped vehicles attempting to turn from Spenard. Additionally, these turning vehicles may have their access to the side street blocked from the northbound queue from the Benson intersection, approximately 175 feet north of 30<sup>th</sup>. These could also be factors for the 2 southbound lane-change

collisions. The northbound rear-end collisions can most likely be attributed to the signalized Benson intersection.

The 5 angle collisions all involved westbound and northbound traffic. The most probable contributing factor is inadequate sight distance resulting from the queue from the Benson intersection. Vehicles queued in the outside northbound lane obstruct the view of the inside northbound lane.

Prohibiting left turns from both Spenard and 30<sup>th</sup> Avenue could provide a 45% reduction in all collisions (2). Currently, left-turns are prohibited at 29<sup>th</sup> Avenue, which similar to 30<sup>th</sup>, is often blocked by queued vehicles.

### ***Benson Boulevard and Spenard Road***

#### ***Collision Summary***

This location had 62 recorded collisions during the 3-year period consisting of 30 angle (48%), 22 rear-end (35%), 8 lane-change (13%), and 1 each backing and pedestrian. See collision diagram in Appendix B, page 7.

A contributing factor was identified for 52 collisions (84%). These include: 12 (19%) driver inattention, 10 (16%) disregard traffic control device, 7 (11%) failure to yield, 7 (11%) alcohol, 5 (8%) follow too close, 4 (6%) unsafe speed, 4 (6%) improper turning, 1 (2%) improper passing, 1 (2%) unsafe backing, and 1 (2%) slippery pavement. Citations were issued for 44 (71%) of the collisions. There were 24 (39%) injury collisions at this location.

Thirty-two collisions (52%) occurred during daylight with 25 collisions (40%) occurring under streetlight conditions. Thirty-two collisions (52%) occurred under dry roadway conditions, 20 collisions (32%) occurred under snow/ice roadway conditions and 7 collisions (11%) occurred under wet roadway conditions.



### *Collision Reduction Measures*

Of the 30 angle collisions, 20 involved either a northbound or southbound vehicle disregarding the traffic signal and colliding with an eastbound vehicle. Signal visibility may be the leading contributing factor in these collisions. For southbound traffic, there are three signal heads. The far-right pole mounted signal head is obscured by buildings and the far-left pole mounted signal head is located approximately 45 feet east of the Spenard centerline. The remaining signal head consists of 5 sections and is centered over the 2 southbound lanes. For northbound traffic, there are 2 signal heads, a far-right pole mounted and an overhead centered over the two lanes. Due to intersection and side street clutter, the far-left and -right signal heads are not clearly visible. The addition of a second overhead signal head could reduce all intersection collisions by 20% (2). Additionally, the proximity of buildings to the right-of-way prevent eastbound traffic on Benson from seeing southbound Spenard traffic. Sight distance improvements could provide a 30% reduction in intersection collisions (2). The second most common angle collision involved southbound left-turns failing to yield to northbound through traffic. Installing a left-turn lane would improve this situation.

Driver inattention and following too close were the main contributing factors to the rear-end collisions. Signal visibility may also be a contributing factor to the southbound rear-end collisions.

### ***REI Driveway and Spenard Road***

#### *Collision Summary*

This location had 15 recorded collisions during the 3-year period consisting of 6 angle (40%), 6 rear-end (40%), and 1 each pedestrian, fixed-object and lane-change. See collision diagram in Appendix B, page 7.

A contributing factor was identified for 13 collisions (87%). These include: 4 (27%) unsafe speed, 3 (20%) failure to yield, 1 (7%) improper turning, 2 (13%) driver inattention, 1 (7%) follow too close and 2 (13%) alcohol. Citations were issued for 12 (80%) of the collisions. There were 7 (47%) injury collisions at this location.

Nine collisions (60%) occurred during daylight with the remaining 6 collisions (40%) occurring under streetlight conditions. Nine collisions (60%) occurred under dry roadway conditions and 5 collisions (33%) occurred under snow/ice roadway conditions.

#### *Collision Reduction Measures*

The most probable contributing factor for the 6 angle collisions is inadequate sight distance due to queues from both the Benson and Northern Lights intersections. This driveway is approximately 150 feet from each intersection. Three factors most likely contribute to the 6 rear-end collisions. The first being the proximity to the two signalized intersection, the second being vehicles slowing or stopping on Spenard to access the driveway and the third being the number of closely spaced driveways. Prohibiting left turns from both Spenard and the driveways could provide a 45% reduction in all collisions (2). Eliminating duplicate closely spaced driveways would reduce driver confusion as to which driveway they intend to use.

#### ***Northern Lights Boulevard and Spenard Road***

##### *Collision Summary*

This location had 82 recorded collisions during the 3-year period consisting of 27 rear-end (33%), 26 angle (32%), 22 lane-change (27%), 3 fixed-object (4%) and 2 each head-on and pedestrian. See collision diagram in Appendix B, page 8.

A contributing factor was identified for 64 collisions (78%). These include: 15 (18%) improper turning, 12 (15%) failure to yield, 12 (15%) unsafe speed, 8 (10%) driver inattention, 5 (6%) follow too close, 5 (6%) disregard traffic control device, 4 (5%) improper passing, 2 (2%) alcohol and 1 (1%) slippery pavement. Citations were issued for 58 (71%) of the collisions. There were 17 (21%) injury collisions at this location.

Fifty-one collisions (62%) occurred during daylight with 23 collisions (28%) occurring under streetlight conditions. Thirty-eight collisions (46%) occurred under snow/ice roadway conditions, 35 collisions

(43%) occurred under dry roadway conditions and 8 collisions (10%) occurred under wet roadway conditions.

### *Collision Reduction Measures*

Of the 26 angle collisions, 12 involved either a northbound or southbound vehicle disregarding the traffic signal and colliding with a westbound vehicle. Similar to the Benson intersection, signal visibility may be the leading contributing factor. Signal head arrangement is the same as the Benson intersection. The addition of a second overhead signal head could reduce all intersection collisions by 20% (2). Additionally, the proximity of landscaping to the right-of-way prevent westbound traffic on Northern Lights from seeing southbound Spenard traffic. Sight distance improvements could provide a 30% reduction in intersection collisions (2). The second most common angle collision involved northbound left-turns failing to yield to southbound through traffic. Installing a left-turn lane would improve this situation.

Driver inattention and following too close were the main contributing factors to the rear-end collisions. Signal visibility may also be a contributing factor to the southbound rear-end collisions.

The majority of lane-change collisions, 19 out of 22, occurred on Northern Lights. A combination of several factors most likely contribute to these collisions. The most probable factor is the number of through lanes on Northern Lights, 4, with people making multiple lane changes in one movement.

### *27<sup>th</sup> Avenue and Spenard Road*

#### *Collision Summary*

This location had 22 recorded collisions during the 3-year period consisting of 14 angle (64%), 5 rear-end (23%), and 1 each head-on, fixed-object and lane-change. See collision diagram in Appendix B, page 8.

A contributing factor was identified for 20 collisions (91%). These include: 9 (41%) failure to yield, 3

(14%) unsafe speed, 3 (14%) improper turning, 2 (9%) driver inattention, 1 (5%) improper passing and 1 (5%) alcohol. Citations were issued for 18 (82%) of the collisions. There were 2 (9%) injury collisions at this location.

Thirteen collisions (59%) occurred during daylight with the remaining 9 collisions (41%) occurring under streetlight conditions. Eleven collisions (50%) occurred under snow/ice roadway conditions, 6 collisions (27%) occurred under dry roadway conditions and 5 collisions (23%) occurred under wet roadway conditions.

#### *Collision Reduction Measures*

Angle collisions consisting of left-turns and through traffic from the side street accounted for 9 collisions (41%). Several factors may contribute to this situation. These include: the 30 foot offset intersection configuration; sight distance problems associated with parked vehicles or staggered vehicle lane use on Spenard; and increased through vehicle volumes on 27<sup>th</sup> due to people avoiding Northern Lights. Intersection realignment would provide a 40% reduction in all collisions and sight distance improvements would provide a 30% reduction in all collisions (2).

Left-turning traffic from Spenard accounted for 7 collisions (32%). Providing a left-turn lane would reduce these collisions by approximately 50% and reduce overall intersection collisions by 30% (2).

#### *Spot Collision Analysis Summary*

Several contributing factors were common to all spot locations. The proximity of buildings, signs and parked cars to the roadway and the narrow right-of-way reduce sight distance. To improve sight distance, additional right-of-way can be acquired or the roadway cross section can be reduced.

Left turns from Spenard to side streets and driveways are a common movement along Spenard and contribute to several collision types including lane-change, rear-end and angle. Providing left-turn channelization or lanes in the form of a two-way continuous left-turn lane will reduce the frequency of

these collisions. Reducing the number of through lanes will reduce the number of lane-change collisions. Other methods to reduce the number of these collisions include improving cross street alignment, improving driveway locations and combining or closing duplicate or unused driveways.

### **3.2 Segment Analysis**

Two segments were analyzed, 36<sup>th</sup> Avenue to Benson and Northern Lights to Fireweed. Collisions included in this analysis are those that are not considered to be intersection related. Collision rates for these 2 segments were found to be 0.77 for 36<sup>th</sup> to Benson and 1.68 for Northern Lights to Fireweed. Both segment's collision rates are below the statewide average of 1.80. The majority of segment collisions consisted of fixed-object, head-on and backing. The same measures identified in the Spot Collision Analysis Summary will reduce the frequency of segment collisions.

#### 4.0 Traffic Projections

Traffic projections of roadway segments and intersection turning movements were calculated for the years 2006 and 2016. The projections were based on historical traffic counts from 1986-1998. Appendix C contains graphs outlining traffic growth along the Spenard corridor since 1986.

Five roadway segments along Spenard Road were looked at. The following table shows the historic annual growth rate for each segment.

Segment	Year - AADT	Year - AADT	Annual Growth Rate %
Minnesota to 36 <sup>th</sup>	1986 - 21,000	1998 - 16,850	-1.8
36 <sup>th</sup> to Benson	1986 - 16,500	1998 - 14,070	-1.3
Benson to Northern Lights	1986 - 15,200	1998 - 17,066	1.0
Northern Lights to Fireweed	1992 - 15,235	1998 - 13,750	-1.7
Fireweed to Hillcrest	1992 - 6,363	1998 - 5,280	-3.1

**Table 4.1 Historic Growth Rates**

As noted, all segments with the exception of the Benson to Northern Lights segment have shown a negative growth. Due to the fact that this area is built-out, an annual growth rate of 0.5% for all segments except the Benson to Northern Lights segment is used. An annual growth rate of 1.0% is used for the Benson to Northern Lights segment. The following table presents projected average annual traffic volumes for each segment of Spenard.

Segment	Annual Growth Rate %	1998 AADT	2006 AADT	2016 AADT
Minnesota to 36 <sup>th</sup>	0.5	16,850	17,540	18,430
36 <sup>th</sup> to Benson	0.5	14,070	14,640	15,390
Benson to Northern Lights	1.0	17,066	18,480	20,410
Northern Lights to Fireweed	0.5	13,750	14,310	15,040
Fireweed to Hillcrest	0.5	5,280	5,500	5,780

**Table 4.2 Traffic Projections**

Similar to Spenard, annual growth rates for 36<sup>th</sup>, Benson, Northern Lights and Fireweed were

determined for use in projecting turning movement volumes. An annual growth rate of 0.5% was used for 36<sup>th</sup>, Benson and Northern Lights with a 1.0% rate for Fireweed. Projected AM and PM peak hour turning movement volumes for the years 2006 and 2016 for the intersections of Spenard with the above mentioned roadways can be found in Appendix C. Existing intersection counts can be found in Appendix E.

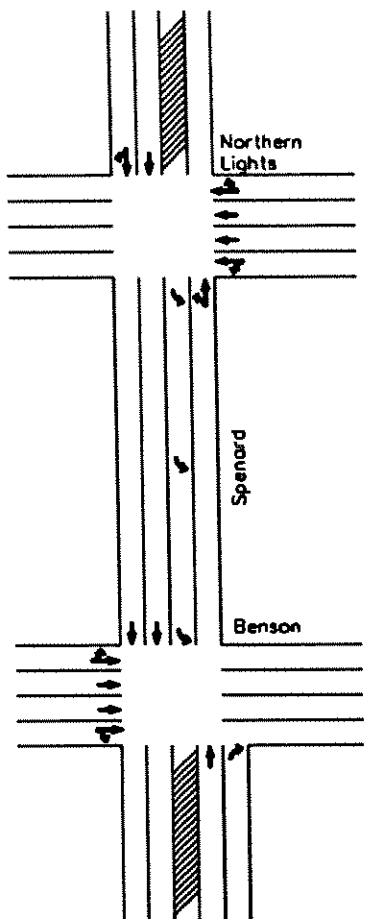
## **5.0 Capacity Analysis**

Intersection and roadway capacity analysis was performed to identify probable alternatives that incorporate measures identified in the Collision Analysis.

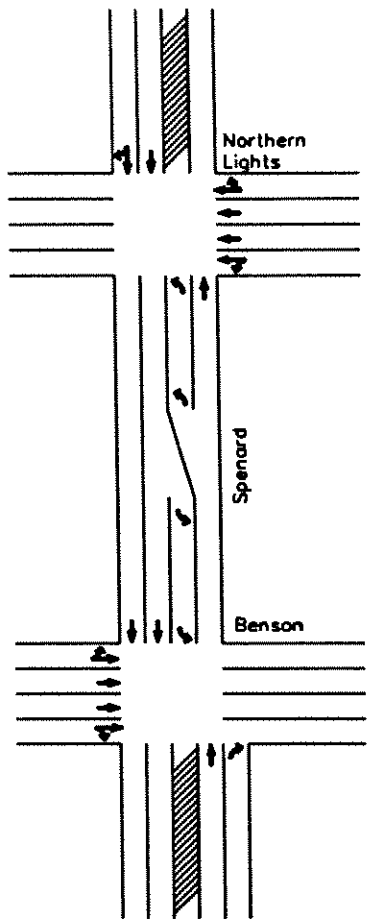
### **5.1 Intersection Capacity**

A signalized capacity analysis was performed for the four signalized intersections. The intersections were analyzed for the AM and PM peak conditions for the years 2006 and 2016 for each intersection configuration alternative and the existing intersection configuration. Analysis was performed based on the Highway Capacity Manual (HCM) (3) using Highway Capacity Software Version 3.1c (HCS), Synchro 4 Traffic Signal Coordination Software Version 4 and existing signal timing plans provided by the MOA.

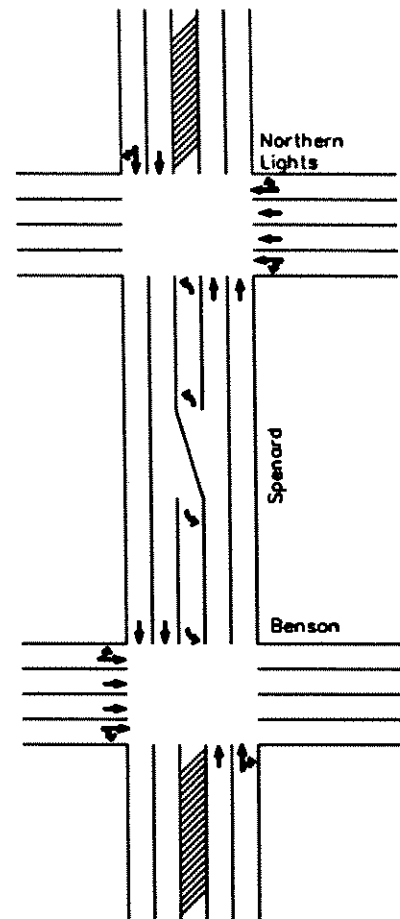
Five alternative intersection configurations were identified for the Benson/Northern Lights intersections, one alternative configuration was identified for the Fireweed intersection, and one alternative was identified for the 36<sup>th</sup> Avenue intersection. Figure 5.1 shows the alternative intersection configurations. The one Benson/Northern Lights alternative configuration not illustrated (BLN5) consists of the Benson signal operating in a split phase mode under the existing lane configuration. The following tables show the capacity analysis results. Estimated queue lengths for each alternative can be found in the LOS reports in Appendix D.



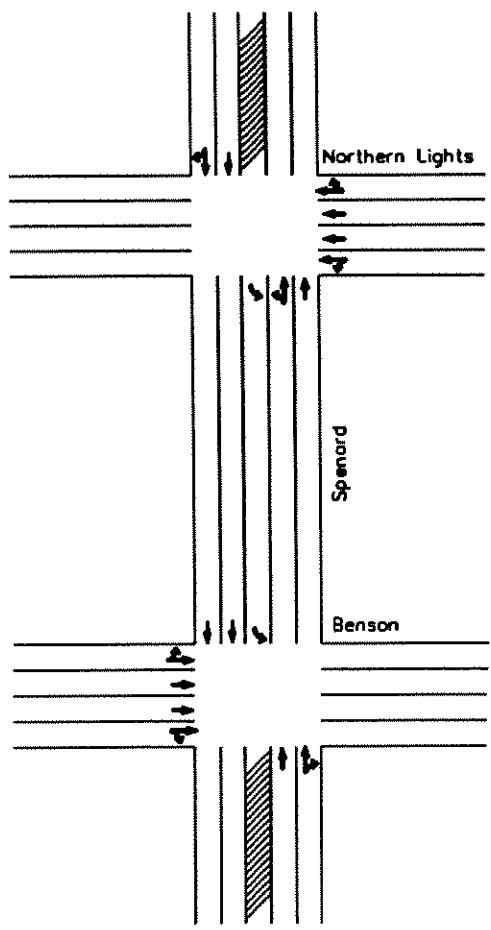
BNL1



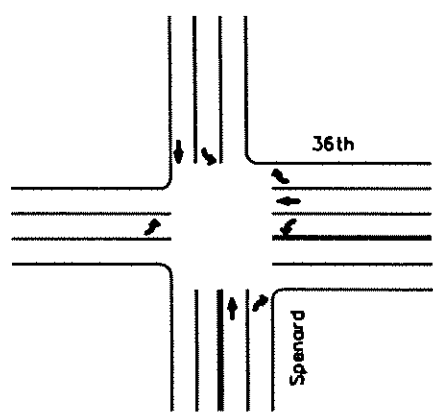
BNL2



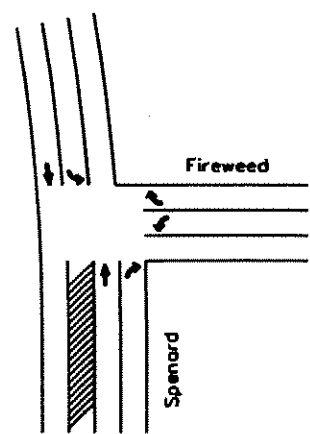
BNL3



BNL4



36th



Fireweed 1



SPENARD ROAD CHANNELIZATION AND  
 PEDESTRIAN FACILITIES IMPROVEMENT  
 HILLCREST DR. TO MINNESOTA DR.  
 53986/HRO-0001(175)

INTERSECTION CONFIGURATIONS  
 FIGURE 5.1



Alternative	Intersection of Spenard Road with:	2000		2006		2016		
		Delay	LOS	Delay	LOS	Delay	LOS	
AM Peak	Existing Lane Geometry	Fireweed	6.3	A	6.5	A	7.0	A
		Northern Lights	10.7	B	10.9	B	11.2	B
		Benson	14.7	B	16.0	B	17.6	B
		36 <sup>th</sup>	7.6	A	7.7	A	8.1	A
	BNL1	Northern Lights			13.0	B	14.3	B
		Benson			18.1	B	19.6	B
	BNL2	Northern Lights			12.2	B	12.7	B
		Benson			17.8	B	18.8	B
	BNL3	Northern Lights			8.4	A	11.3	B
		Benson			16.2	B	18.3	B
	BNL4	Northern Lights			11.0	B	11.4	B
		Benson			16.7	B	18.3	B
BNL5	Northern Lights			9.9	A	10.1	B	
	Benson			26.2	C	28.4	C	
Fireweed 1	Fireweed			6.8	A	7.2	A	
36 <sup>th</sup>	36 <sup>th</sup>			10.6	B	11.4	B	

**Table 5.1 AM Peak Hour Intersection LOS**

As can be seen, all alternative intersection configurations will operate at an acceptable LOS during the AM peak hour.

Alternative	Intersection of Spenard Road with:	2000		2006		2016	
		Delay	LOS	Delay	LOS	Delay	LOS
Existing Lane Geometry	Fireweed	6.0	A	6.2	A	7.3	A
	Northern Lights	25.5	C	28.0	C	36.1	D
	Benson	20.7	C	21.4	C	23.0	C
	36 <sup>th</sup>	18.5	B	21.7	C	34.5	C
BNL1	Northern Lights			52.2	D	75.4	E
	Benson			20.0	C	21.9	C
BNL2	Northern Lights			24.3	C	27.9	C
	Benson			20.1	C	21.9	C
BNL3	Northern Lights			22.7	C	24.4	C
	Benson			22.5	C	23.9	C
BNL4	Northern Lights			22.6	C	24.6	C
	Benson			22.5	C	23.9	C
BNL5	Northern Lights			21.1	C	22.9	C
	Benson			39.1	D	42.8	D
Fireweed 1	Fireweed			6.7	A	7.0	A
36 <sup>th</sup>	36 <sup>th</sup>			25.4	C	36.6	D

**Table 5.2 PM Peak Hour Intersection LOS**

As can be seen, all alternative intersection configurations with the exception of Alternatives BNL1 and BNL5 and 36<sup>th</sup> will operate at an acceptable LOS during the PM peak hour. However, the existing delay for 36<sup>th</sup> is 34.5 seconds and will be 36.6 seconds in 2016, only a 2 second increase in delay.

It should be noted that potential modifications to the existing signal timing is limited by the fact that both Northern Lights and Benson are part of a coordinated system which provides for a progressive movement along these two streets.

## **5.2 Roadway Capacity**

The Collision Analysis identified reducing the number of through lanes as a collision reduction measure. According to a recent study on lane reductions (4), a 3-lane roadway can operate at an acceptable level-of-service with roadway ADT's up to 18,000. Two segments of Spenard, 36<sup>th</sup> to Benson and Northern Lights to Fireweed, will have projected 2016 ADT's of around 15,000.

## **6.0 Recommendation**

As a method to reduce the frequency and number of vehicle collisions along the Spenard corridor, it is recommended that Spenard Road be converted to a 3-lane section between 36<sup>th</sup> Avenue and Hillcrest Drive using the proposed intersection configurations for Fireweed and 36<sup>th</sup> Avenue. Acceptable intersection configurations for Benson and Northern Lights include BNL2, BNL3 and BNL4. Further analysis and final recommendation for the Benson and Northern Lights intersections will be made in the Engineering Analysis Report.

***References***

1. *Official Streets and Highways Plan*, Municipality of Anchorage, Department of Community Planning and Development, December, 1996.
  2. *Development of Accident Reduction Factors, Research Report KTC-96-13*, Kentucky Transportation Center, College of Engineering, University of Kentucky, June 1996.
  3. *Highway Capacity Manual Special Report 209*, Transportation Research Board, National Research Council, Third Edition, Updated 1994, December 1997.
  4. Burden, D., and P. Lagerwey, "Road Diets, Fixing the Big Roads", Walkable Communities, Inc., March 1999.
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