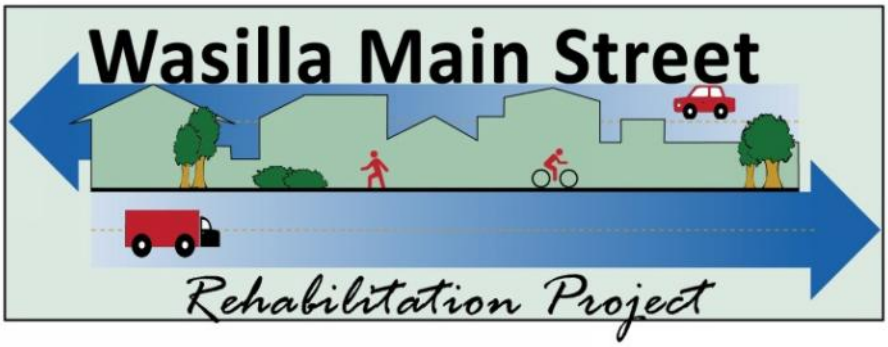

Appendix A

Traffic Study Update 2012

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Wasilla Main Street Traffic Study 2012 Update

Kinney Engineering, LLC

July, 2012

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Appendix D: AADT Volume Maps for Modified 2025 LRTP Model
Appendix E: Post-Processed 2035 AADTs
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Table of Common Abbreviations

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADOTPF	Alaska Department of Transportation and Public Facilities
APV	Accident Prediction Value
GDHS	Geometric Design of Highways and Streets
HCM2000	Highway Capacity Manual 2000
HSIP	Highway Safety Improvement Program
KE	Kinney Engineering
KELLC	Kinney Engineering, LLC
KGB	Knik-Goose Bay Road
LOS	Level of Service
LRTP	Long Range Transportation Plan
MUTCD	Manual on Uniform Traffic Control Devices
MEV	Million Entering Vehicles
MSB	Matanuska-Susitna Borough
NPW	Net Present Worth
TAZ	Traffic Analysis Zone
UCL	Upper Control Limit
USDOT	United States Department of Transportation
v/c	Volume-to-Capacity Ratio

Executive Summary

This 2012 update of the Wasilla Main Street Traffic Study has four main elements: an updated safety analysis using the most recent available crash data (1999 to 2008), an updated accident prediction value for the at-grade railroad crossing of Knik-Goose Bay Road (just south of the Parks Highway), updated design year traffic volumes and design hour turning movement volumes, and an updated capacity analysis.

Six alternatives were considered:

- No Action: No changes are made, including maintaining existing geometry and intersection control.
- Alternative A: Wasilla Main Street is converted to a three-lane section (one lane in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.
- Alternative B: Wasilla Main Street is converted to a five-lane section (two lanes in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.
- Alternative C: Both Main Street and Knik Street are converted to three-lane sections starting at Bogard Road and continuing to the south. Knik Street crosses over the Parks Highway and the railroad with a grade-separated crossing. To the south, the Knik Street corridor bends and connects into the Main Street corridor at Park Avenue.
- Alternative D, option 1: Main Street and Yenlo Street are converted to three-lane one-way roads, with Main Street traffic traveling southbound and Yenlo Street traffic traveling northbound. The one-way streets begin on the north end at approximately Aspen Avenue (requiring an extension of Yenlo Street) and continue through downtown Wasilla south to Enter Way. The intersection of Yenlo Street and the Parks Highway is at-grade, as is the Talkeetna Street railroad crossing.
- Alternative D, option 2: The same as option 1 except that the one-way streets begin at Bogard Road and continue through downtown Wasilla south to Enter Way.

The safety analysis indicates that each of the alternatives are expected to result in an overall decrease in crash frequency. The associated reductions in costs are shown in Table 1.

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Annual Crash Reduction & Crash Cost Savings for Alternatives A-D		10 Year Crash Cost (1999-2008)	Annual Crash Cost (1999-2008)	Crash Reduction for Alternative	Annual Crash Cost Savings*	NPW of 20-year Cost Savings**
Alternative A	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	3.83%	$54,339	$809,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	3.29%	$36,653	$546,000.00
Alternative B	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	5.34%	$75,750	$1,127,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative C	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	5.13%	$72,649	$1,081,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative D	Total Intersection Crashes (affected by roadway Imp.)	$14,175,500	$1,417,550	9.39%	$133,043	$1,980,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	9.14%	$101,864	$1,516,000.00

* Annual crash cost savings based on 2008 severity crash costs (KABCO)from Alaska DOT/PF(http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/2008_kabco_costs.pdf)
** Computed annual crash cost savings and a 3% compound interest rate were used to obtain net present worth (NPW) of 20 year cost savings.

Table 1: Annual Crash Reduction and Crash Cost Savings for Alternatives A, B, C, or D

The accident prediction value (APV) for railroad crossings is one criteria used to determine if crossing improvements are needed to reduce the potential for vehicle-train crashes at a rail crossing. Based on the updated APV of 0.1985 and a sensitivity analysis (considering future APV values if traffic volumes approach 13,000 to 20,000 annual average daily traffic (AADT) with 10 to 20 at-grade crossing crashes and 25 to 40 daily train movements), further crossing improvements are not required at the at-grade rail crossing of Knik-Goose Bay Road, just south of the Parks Highway.

Operationally, the existing at-grade crossing has issues relating to its proximity to the Parks Highway, including the inability to store vehicles between the crossing and the Parks Highway during train operations. Less than 70 feet exists between the eastbound through lane of the Parks Highway and the tracks. Also, this crossing lacks full gate closure on the roadway approach to the crossing due to the lack of a median and the length of gate that would be required. The gate arms here are either struck by vehicles or snapped off by high winds when in the upright position.

Alternatives A and B provide an opportunity to install additional shorter gate arms in the Main Street median to prevent drivers from going around the gate arm. Alternative D (option 1 or 2) would allow full control of traffic at the crossing by providing complete gate arm coverage with a relatively short gate.

Design year traffic volumes and design hour turning movement volumes were developed using a 2025 TransCAD model of the Matanuska-Susitna Borough that was modified to provide detailed volumes within the study area. These model outputs were post-processed and a 1.5% annual growth rate was applied to obtain 2035 design year AADT volumes (see Appendix E). Existing turning movement counts and NCHRP 255 (*Highway Traffic Data for Urbanized Area Project Planning and Design*, December 1982) methodology was then used to determine design hour turning movement volumes for the study intersections (see Appendix F).

Future signalization conditions for each alternative were recommended based on future signal warrant analysis and access control considerations. In addition to maintaining the existing signals at Main Street/Wasilla Fishhook Road and Bogard Road/Nelson Avenue and at Main Street/Knik-Goose Bay Road and the Parks Highway, the following intersections were recommended for signalization under the different scenarios:

For Alternatives A and B, signalize:

- Swanson Avenue at Main Street
- Susitna Avenue at Knik-Goose Bay Road

For Alternative C, signalize:

- Swanson Avenue at Main Street
- Nelson Avenue at Knik Street
- Swanson Avenue at Knik Street
- Park Avenue at Knik-Goose Bay Road

For Alternative D (all options), signalize:

- Swanson Avenue at Main Street
- Lake View Avenue at Knik-Goose Bay Road
- Bogard Road at Yenlo Street
- Swanson Avenue at Yenlo Street
- Parks Highway at Yenlo Street/Talkeetna Street

The resulting level of service (LOS) for each intersection in the study area under each alternative is shown in the following table.

	2005 Existing			No Action (2035)						Alt A (2035)						Alt B (2035)					
				No bypass			Bypass			No bypass			Bypass			No bypass			Bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.47	25	C	0.61	29	C	0.59	28	C	0.76	29	C	0.73	27	C	0.70	18	B	0.60	18	B
Paulson Ave and Main St		24/45	C/E		64/76	F		30/37	D/E		11/16	B/C		11/14	B		28/29	D		19/23	C
Swanson Ave and Main St		24	C		55	F		39	E	0.47	12	B	0.48	13	B	0.39	12	B	0.37	12	B
Herning Ave and Main St		20/28	C/D		78/169	F		48/176	E/F		21/25	C		19/25	C/D		22/30	C/D		18/33	C/D
Parks Highway and Main St/ Knik-Goose Bay Rd	0.76	41	D	1.09	87	F	1.10	105	F	1.08	70	E	1.11	85	F	0.99	58	E	0.99	73	E
Railroad Ave and Knik-Goose Bay Rd		13/10	B		16/11	C/B		21/14	C/B		20/12	C/B		29/13	D/B		11	B		12	B
Susitna Ave and Knik-Goose Bay Rd		36/23	E/C		170/46	F/E		>500	F	0.57	7	A	0.71	10	B	0.44	5	A	0.52	6	A

	Alt C (2035)						Alt D, option 1 (2035)						Alt D, option 2 (2035)						Refined Alt D, option 2		
	No bypass			Bypass			No bypass			Bypass			No bypass			Bypass			No bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.49	16	B	0.52	17	B	0.61	16	B	0.58	18	B	0.48	12	B	0.50	14	B	0.48	13	B
Paulson Ave and Main St		15/20	B/C		16/23	C		12/20	B/C		12/16	B/C		11/17	B/C		11/16	B/C		11/17	B/C
Swanson Ave and Main St	0.44	10	B	0.57	13	B	0.83	20	C	0.77	18	B	0.75	20	C	0.58	16	C	0.72	20	B
Herning Ave and Main St		23/29	C/D		50	F		17/33	C/D		23/45	C/E		25/38	C/E		23/48	C/E		24/37	C/E
Parks Highway and Main St/ Knik-Goose Bay Rd	0.97	54	D	1.00	65	E	0.83	28	C	0.81	27	C	0.77	29	C	0.77	31	C	0.90	34	C
Railroad Ave and Knik-Goose Bay Rd		16/11	C/B		18/11	C/B		10/14	B		11/15	B		10/14	B		11/15	B/C		16/29	C/D
Susitna Ave and Knik-Goose Bay Rd		26/12	D/B		31/32	D/D		11/15	B		11/15	B		11/14	B		12/16	B/C		14/21	B/C
Lake View Ave and Knik-Goose Bay Rd							0.50	9	A	0.55	10	A	0.49	10	A	0.57	9	A	0.49	9	A
Nelson Ave and Knik St	0.53	11	B	0.51	11	B															
Paulson Ave and Knik St		12/11	B		13/11	B															
Swanson Ave and Knik St	0.32	14	B	0.35	15	B															
Herning Ave and Knik St		16/13	C/B		18/16	C															
Susitna Ave and Knik St		11/10	B		12/10	B															
Park Ave and Knik-Goose Bay Rd	0.45	8	A	0.58	11	B															
Bogard Rd and Yenlo St							0.53	9	A	0.56	11	B	0.55	11	B	0.58	13	B	0.81	17	B
Swanson Ave and Yenlo St							0.79	24	C	0.66	21	B	0.61	18	B	0.57	20	B	0.64	19	B
Herning Ave and Yenlo St								43/24	E/C		45/23	E/C		48/16	E/C		62/24	F/C		48/16	E/C
Parks Highway and Yenlo St/ Talkeetna St							0.87	23	C	0.85	23	C	0.89	26	C	0.85	29	C	0.91	30	C
Railroad Ave and Talkeetna								18/12	C/B		18/12	C/B		18/12	C/B		19/12	C/B		18/12	C/B
Susitna Ave and Talkeetna								14/11	B		14/11	B		13/11	B		14/11	B		17/12	C/B
Lake View Ave and Talkeetna								16	C		16	C		15	C		17	C		17	C
Signalized Intersections																					

For two-way stop controlled intersections, two values are given for both delay and LOS, reflecting movement values, rather than full intersection values. The form is “eastbound/westbound.” Where the value is the same for both directions, only one value is given.

Table 2: Intersection Level of Service by Alternative (2035)

The 2006 Traffic Study for the Wasilla Main Street project found that either Alternative C or Alternative D would provide acceptable levels of service through the 2025 design year for that study. At that time, Alternative A and B were dropped from further consideration because they did not provide acceptable levels of service. Further consideration of Alternative C found that it would require property acquisitions that were deemed unacceptable to the City of Wasilla and the public. Thus, Alternative C has since been dismissed from consideration.

This 2012 update report finds that only Alternative D will provide an acceptable level of service for the study area through the updated design year of 2035, regardless of whether or not a Parks Highway bypass lane has been built, and verifies that Alternative D should remain a preferred alternative. The recommended alternative is Refined Alternative D, option 2, which is represented by the following figures.

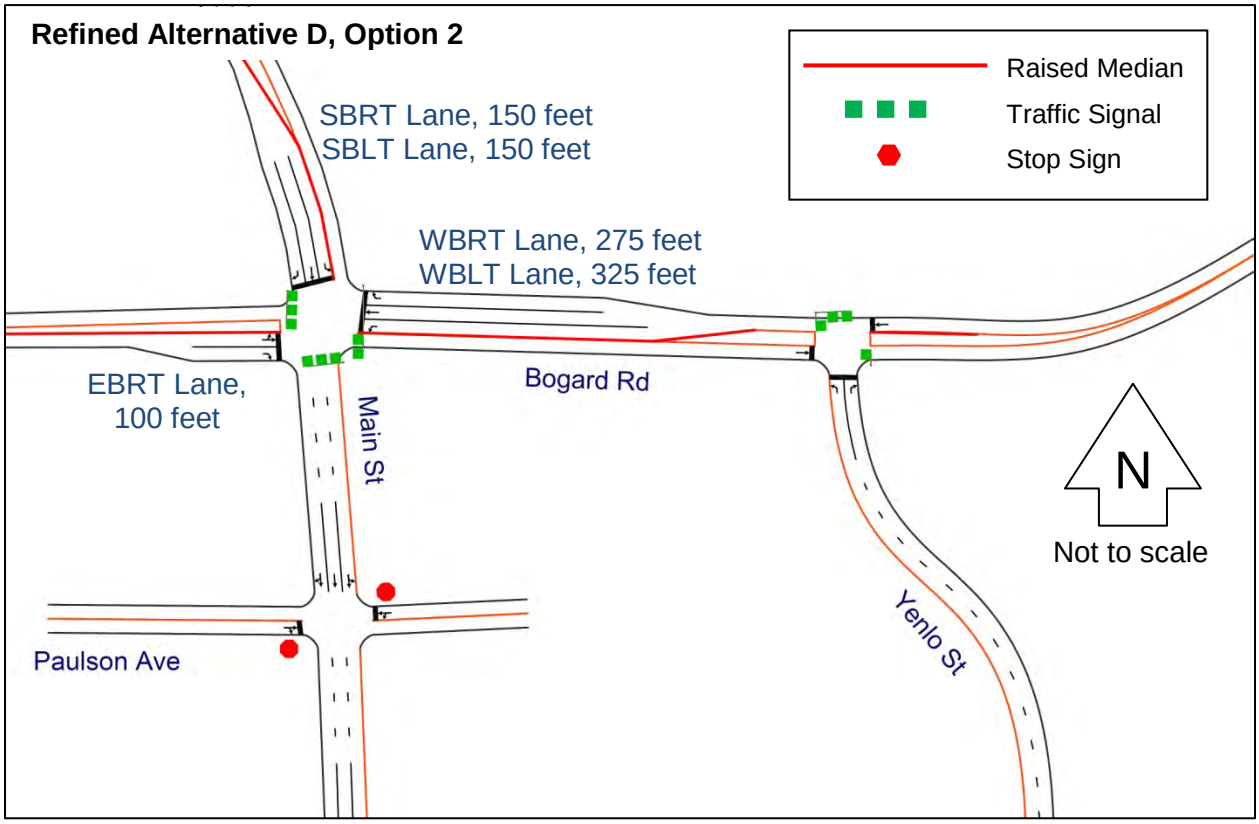


Figure 1: Recommended Alternatives for Bogard Road/Nelson Avenue Intersections, Refined Alternative D, Option 2

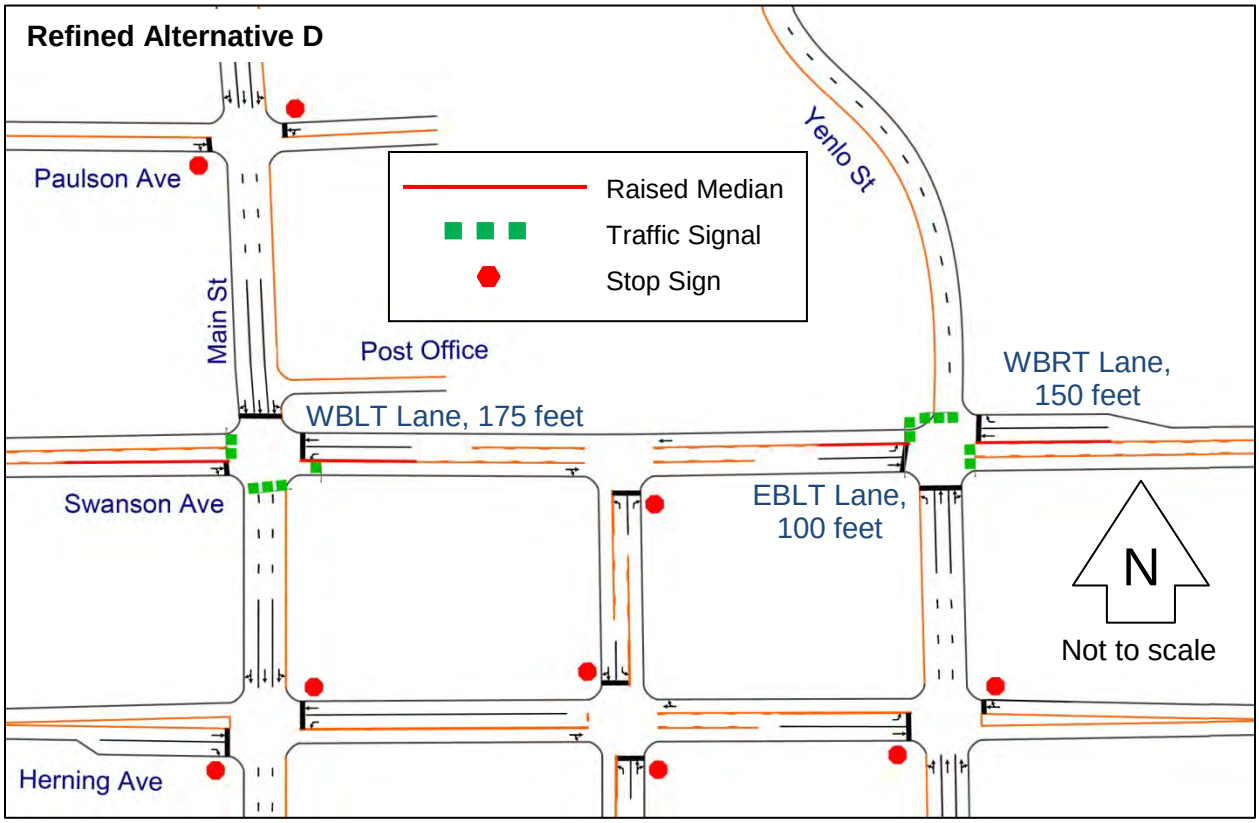


Figure 2: Recommended Alternatives for Swanson Avenue Intersections, Refined Alternative D, Option 2

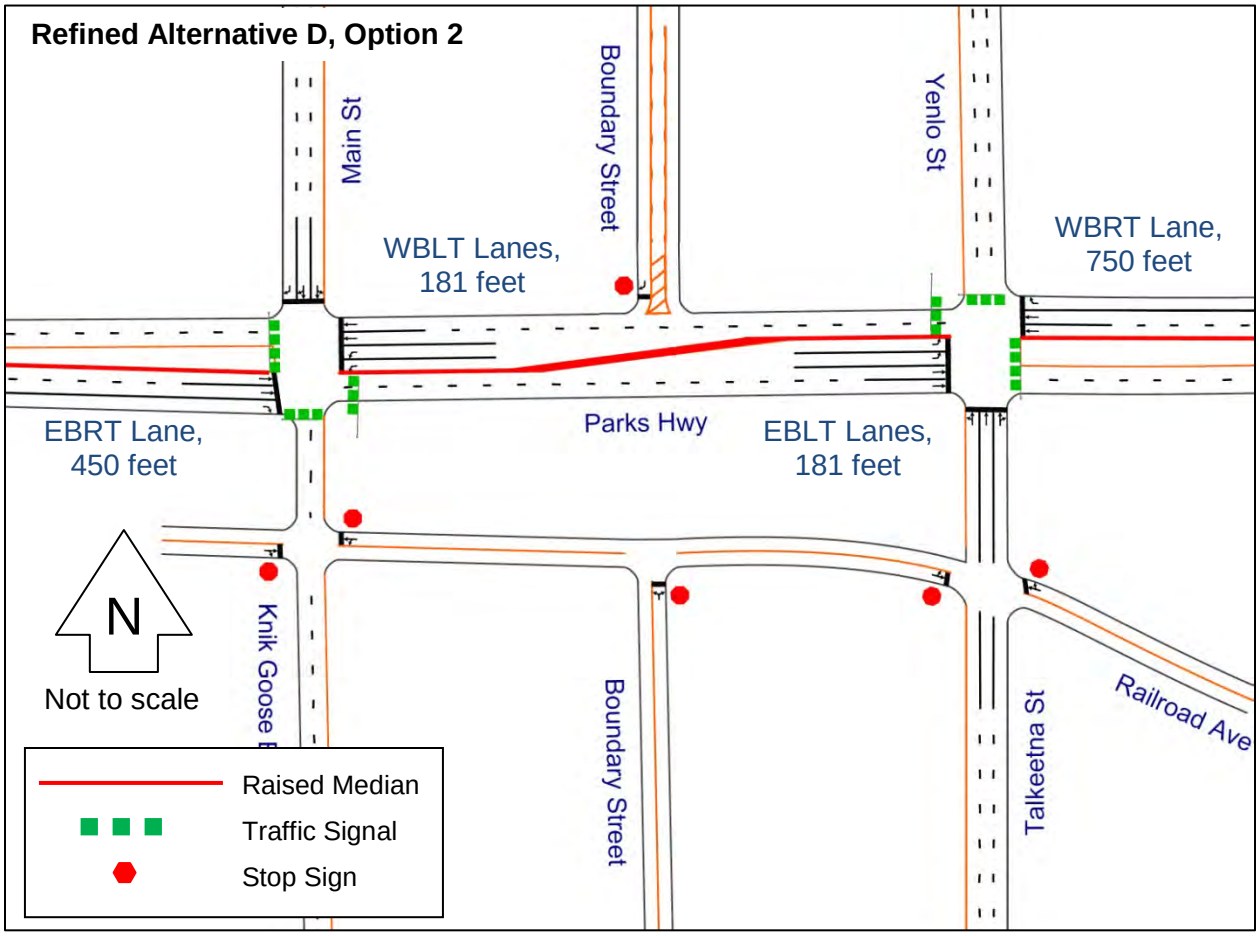


Figure 3: Recommended Alternatives for Parks Highway Intersections, Refined Alternative D, Option 2

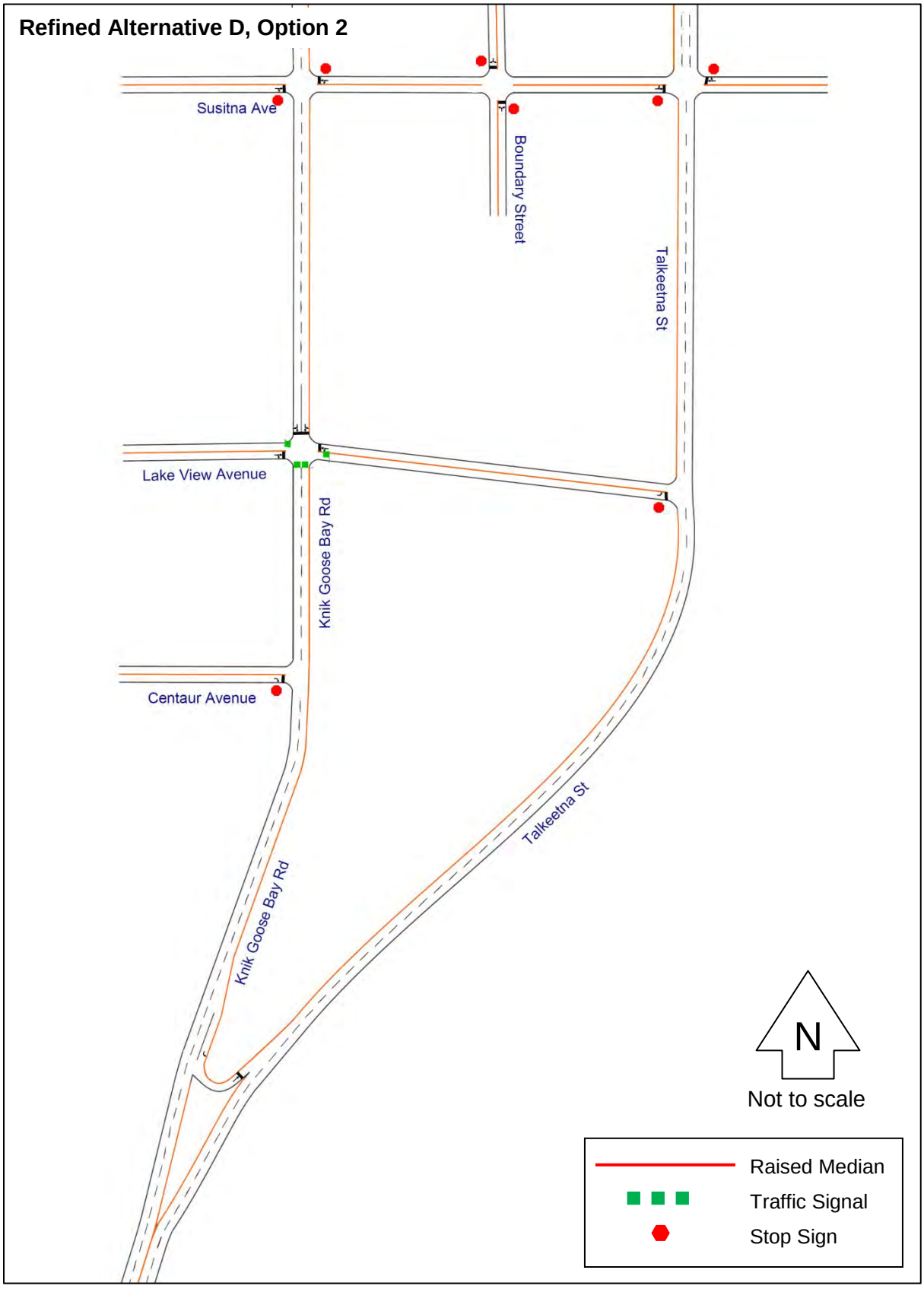


Figure 4: Recommended Alternatives for Southern Portion of Study Area, Refined Alternative D, Option 2

1 Introduction

In 2006, Tryck Nyman Hayes, Inc. prepared a Traffic Study for the Wasilla Main Street project (Project Number STP-0525(12) / 54302) for the State of Alaska Department of Transportation and Public Facilities (ADOTPF). For that report, Kinney Engineering (KE), since reorganized as Kinney Engineering, LLC (KELLC), performed safety analyses of key intersections and traffic volume forecasts and capacity analyses. KE prepared the traffic volume estimates using a QRSII traffic demand model to forecast traffic volumes on key streets in the network for the year 2025. KE also forecasted turning movements at major intersections and performed capacity analyses at these intersections. The study area for the traffic study is shown in Figure 5. 2010 annual average daily traffic (AADT) volumes for the study area are shown in Figure 6.

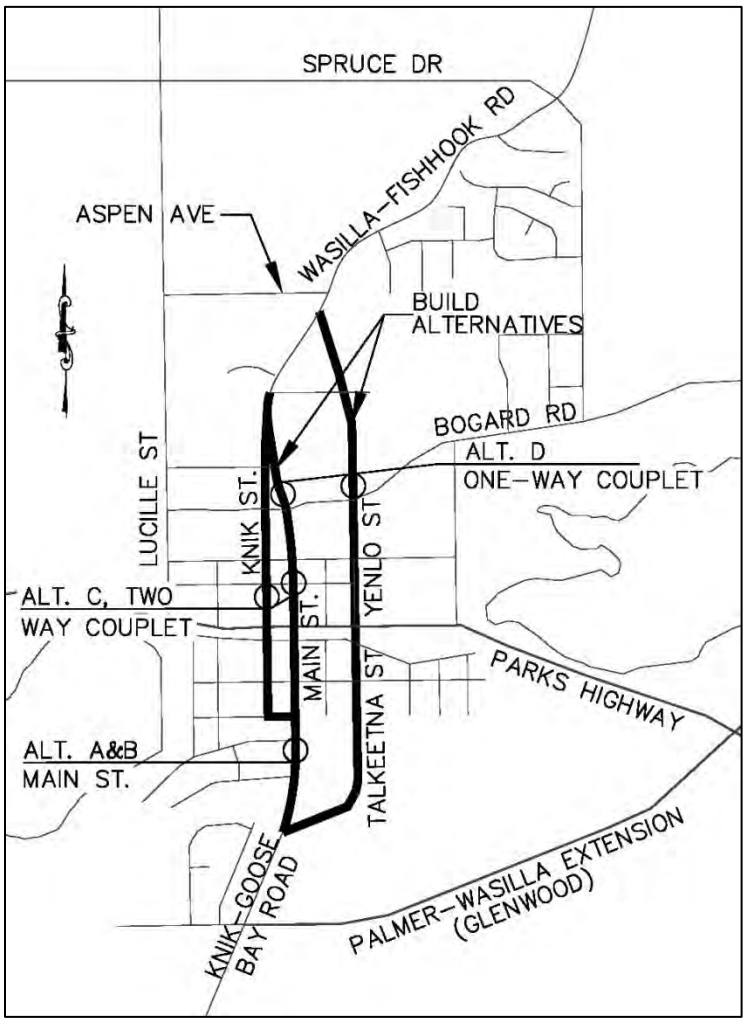
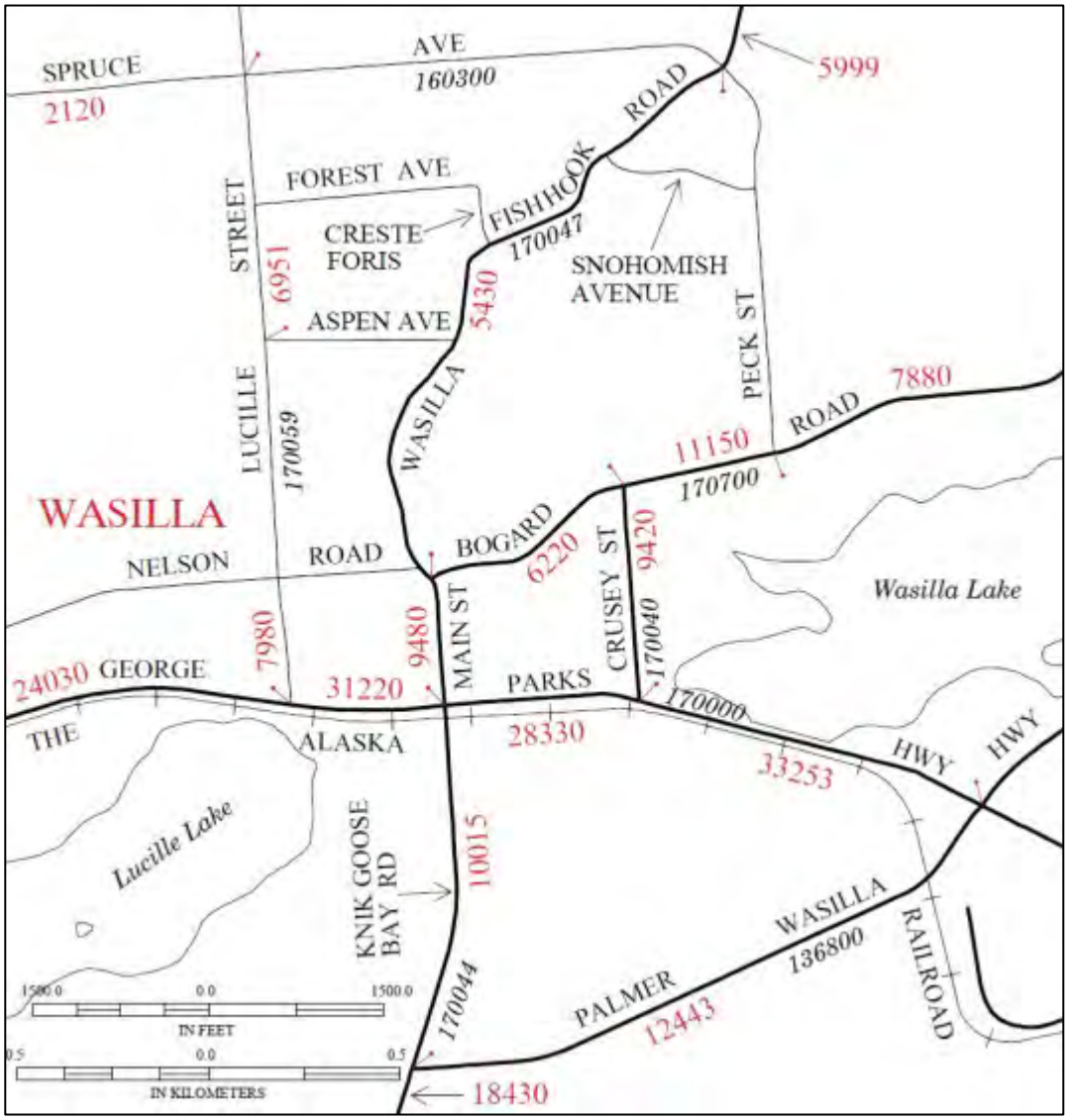


Figure 5: Wasilla Main Street Study Area



(Source: ADOTPF Mat-Su Valley Traffic Map 2010)

Figure 6: 2010 Annual Average Daily Traffic in Wasilla

This report updates the elements that KE prepared for the 2006 report. The safety analysis is updated using the most recent available (1999 to 2008) crash data. In addition, the traffic volume forecasts are extended to 2035 using a TransCAD model that was initially developed for the 2007 Matanuska-Susitna Borough (MSB) Long Range Transportation Plan (LRTP). The model has been modified by KELLC to facilitate forecasting traffic volumes on lower volume streets that are important to the Wasilla Main Street project but were not included in the original 2007 LRTP model scope.

Traffic volumes and intersection capacity were evaluated in the year 2035 for six alternatives:

- No Action: Wasilla Main Street remains a two-lane road south of the Parks Highway and a three-lane road (one lane in each direction with a center-two-way-left-turn lane) north of the Parks Highway, with existing intersection control.
- Alternative A: Wasilla Main Street is converted to a three-lane section (one lane in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.
- Alternative B: Wasilla Main Street is converted to a five-lane section (two lanes in each direction with a center-two-way-left-turn lane) between Bogard Road and Susitna Avenue.
- Alternative C: Both Main Street and Knik Street are converted to three-lane sections starting at Bogard Road and continuing to the south. Knik Street crosses over the Parks Highway and the railroad with a grade-separated crossing. To the south, the Knik Street corridor bends and connects into the Main Street corridor at Park Avenue.
- Alternative D, option 1: Main Street and Yenlo Street are converted to three-lane one-way roads, with Main Street traffic traveling southbound and Yenlo Street traffic traveling northbound. The one-way streets begin on the north end at approximately Aspen Avenue (requiring an extension of Yenlo Street) and continue through downtown Wasilla south to Enter Way. The intersection of Yenlo Street and the Parks Highway is at-grade, as is the Yenlo Street railroad crossing.
- Alternative D, option 2: Similar to option 1 except that the one-way streets begin at Bogard Road and continue through downtown Wasilla south to Enter Way.

The Wasilla Comprehensive Plan adopted June 13, 2011 identifies the intersection of Wasilla Main Street and the Parks Highway as a “critical bottleneck.” The report describes the road network in Wasilla as “the form of a hub with spokes” where the Parks Highway passes through the center of the hub and carries long distance, regional, and local travelers. Wasilla Main Street and Knik-Goose Bay Road are also “spokes” in this system. The 2007 LRTP TransCAD model does not include the Parks Highway Bypass and therefore assumes land development patterns into 2035 that continue to emphasize the Parks Highway as a major route for local and regional travelers. The Knik Arm Bridge is similarly not reflected in the land development patterns used in the 2007 LRTP TransCAD model.

Each model for the six alternatives was developed for two cases: with and without the Parks Highway bypass. The Knik Arm Bridge was not included as a variable in the analysis, as study area volumes were found to be independent of this roadway link.

2 Crash Study Update

2.1 Intersection Crash Rates and Crash Significance for Study Intersections

Thirty-three intersections were evaluated as part of the 2006 Traffic Study using 1992-2001 crash data. Fifteen intersections were on the Knik-Goose Bay Road/Main Street corridor, 8 intersections were directly affected by Alternatives C (Main Street/Knik Street two-way roads) and D (Knik-Goose Bay/Main & Talkeetna/Yenlo one-way couplet) and 10 other intersections were adjacent to affected roadways. For the traffic study update, KELLC utilized 1999-2008 crash data and expanded the analysis to include 27 intersections which would be modified by alternatives A, B, C or D. The 27 intersections modified by Alternatives A, B, C or D include:

- Knik-Goose Bay Road & Enter Way
- Knik-Goose Bay Road & Centaur Street
- Knik-Goose Bay Road & Lakeview Drive
- Knik-Goose Bay Road & Park Avenue
- Knik-Goose Bay Road & Susitna Avenue
- Knik-Goose Bay Road & Railroad Avenue
- Parks Highway & Main Street/Knik-Goose Bay Road
- Main Street & Herning Avenue
- Main Street & Swanson Avenue
- Main Street & Paulson Avenue
- Main Street/Wasilla Fishhook Road & Bogard Road/Nelson Avenue (signal 9/2003)
- Wasilla Fishhook Road & Danna Avenue
- Wasilla Fishhook Road & Iditarod Elementary
- Wasilla Fishhook Road & Carpenter Circle
- Parks Highway & Knik Street
- Knik Street & Herning Avenue
- Knik Street & Swanson Avenue
- Knik Street & Paulson Avenue
- Knik Street & Nelson Avenue
- Talkeetna Street & Susitna Avenue
- Talkeetna Street & Railroad Avenue
- Parks Highway at Yenlo Street
- Yenlo Street & Herning Avenue
- Yenlo Street & Swanson Avenue
- Bogard Road at Lang Street (Yenlo Extension)
- Knik Street at Railroad Avenue
- Knik Street at Susitna Avenue

Three additional intersections within the Alternative D project limits, but not modified by the proposed improvements, are also included in the crash rate tables. They are Boundary Street at the Parks Highway, Herning Avenue, and Swanson Avenue intersections. The following tables summarize the crash totals, intersection crash rates, and crashes per million entering vehicles (Crash/MEV) for the original 2006 study intersections, the additional 18 adjacent intersections and the Boundary Street intersections discussed above during the 1999-2008 study period. The table also shows which intersections would be modified by alternatives A, B, C or D and indicates those intersections that have crash rates that exceed the average rates for similar intersections. The table lists the upper control limit (UCL) rate that is computed using the Rate Quality Control Method, which expresses the degree of certainty that a location has a high crash rate. The 95% confidence level for the upper control limit is usually a threshold used to determine if an intersection has a crash rate that is truly higher than other similar intersections.

Table 3 on page 9 contains updated crash rates for the intersections listed above. A map depicting 1999-2008 average crash rates and number of crashes for all evaluated intersections is shown in Appendix A.

Intersection	Intersection Crashes 1999 to 2008	Million Entering Vehicles (MEV)	Crashes / MEV	State Populations (1999-2008)	UCL @ 95.00% Confidence	Roadway Modified by Altrnative A-D?	Above Average?	Is Rate >UCL (Significant)?
Knik Goose Bay Road & Enter Way	5	37.759	0.132	0.535	0.744	Yes (D)	no	no
Knik Goose Bay Road & Centaur Street	5	37.759	0.132	0.535	0.744	Yes (D)	no	no
Knik Goose Bay Road & Lakeview Drive	1	37.759	0.026	0.669	0.901	Yes (D)	no	no
Knik Goose Bay Road & Park Avenue	2	37.759	0.053	0.535	0.744	Yes (A,B,C,D)	no	no
Knik Goose Bay Road & Susitna Avenue	9	39.331	0.229	0.669	0.896	Yes (A,B,C,D)	no	no
Knik Goose Bay Road & Railroad Avenue	30	37.759	0.795	0.669	0.901	Yes (A,B,C,D)	yes	no
Parks Highway & Main Street/Knik Goose Bay Road	224	136.645	1.639	1.395	1.565	Yes (A,B,C,D)	yes	yes
Main Street & Herning Avenue	41	37.204	1.102	0.669	0.903	Yes (A,B,C,D)	yes	yes
Main Street & Swanson Avenue	27	50.673	0.533	0.643	0.838	Yes (A,B,C,D)	no	no
Main Street & Paulson Avenue	2	37.653	0.053	0.535	0.744	Yes (A,B,C,D)	no	no
Main Street/Wasilla Fishhook Road & Bogard Road/Nelson Avenue (signal 9/2003)	21	29.640	0.708	1.395	1.769	Yes (A,B,C,D)	no	no
Wasilla Fishhook Road & Danna Avenue	2	18.158	0.110	0.535	0.845	Yes (C,D)	no	no
Wasilla Fishhook Road & Iditarod Elementary	6	18.607	0.322	0.535	0.841	Yes (D)	no	no
Wasilla Fishhook Road & Carpenter Circle	4	17.485	0.229	0.535	0.851	Yes (D)	no	no
Parks Highway & Knik Street	10	93.374	0.107	0.535	0.665	Yes (C)	no	no
Knik Street & Herning Avenue	7	4.490	1.559	0.669	1.415	Yes (C)	yes	yes
Knik Street & Swanson Avenue	3	18.856	0.159	0.669	1.005	Yes (C)	no	no
Knik Street & Paulson Avenue*	0	4.490	0.000	0.669	1.415	Yes (C)	no	no
Knik Street & Nelson Avenue	4	9.877	0.405	0.535	0.968	Yes (C)	no	no
Talkeetna Street & Susitna Avenue	1	5.387	0.186	0.669	1.341	Yes (D)	no	no
Talkeetna Street & Railroad Avenue	1	4.490	0.223	0.535	1.214	Yes (D)	no	no
Parks Highway @ Yenlo Street	63	113.481	0.555	0.535	0.652	Yes (D)	yes	no
Yenlo Street & Herning Avenue	8	21.550	0.371	0.669	0.982	Yes (D)	no	no
Yenlo Street & Swanson Avenue	3	21.550	0.139	0.669	0.982	Yes (D)	no	no
Bogard Road @ Lang Street (Yenlo Extension)**	1	26.083	0.038	0.535	0.790	Yes (D)	no	no
Knik Street @ Railroad Avenue*	0	1.796	0.000	0.535	1.711	Yes (C)	no	no
Knik Street @ Susitna Avenue*	0	2.020	0.000	0.669	1.863	Yes (C)	no	no
Boundary Street & Herning Avenue	18	15.264	1.179	0.669	1.046	No	yes	yes
Boundary Street & Swanson Avenue	2	17.509	0.114	0.535	0.851	No	no	no
Parks Highway @ Boundary Ave	74	112.022	0.661	0.535	0.653	No	yes	yes
Adjusted for New Signal during analysis period	Rate Above Critical			Intersections within Alternative "D" Couplet but not altered by proposed improvements.				

Table 3: Intersection Crash Rates for Intersections Included in the 2006 Traffic Study

2.2 Crash Mitigation Estimates for Alternatives A, B, C and D

Intersections that would be modified under Alternatives A, B, C or D were evaluated to determine whether crashes would be mitigated at these locations under any of the proposed alternatives.

The following assumptions were used to conduct the analysis:

- A Crash Reduction Factor of 15% was selected for an additional through lane and was derived by averaging Highway Safety Improvement Program (HSIP) Handbook right turn lane reduction factors for signalized and unsignalized urban intersections.
- For Alternative C, crashes were not reassigned to the proposed Knik Street two-way roadway from Main Street/Knik-Goose Bay Road. Crash reductions were measured for all crashes on both Main Street and Knik Street as appropriate for signalization and grade separation options.
- For Alternative D, northbound and southbound through crashes were reassigned to the proposed one-way roadways to account for the conversion of the formerly two-way streets into a one-way couplet.
- For Alternative D, only eliminated conflicting movements (mostly through vs. opposing left turn) were counted for crash reduction other than at proposed traffic signal locations where right angle and rear-end crashes were considered.
- For all alternatives, a 60% crash reduction factor (HSIP Handbook) for right angle crashes was applied where new traffic signals were proposed and corresponding rear-end crashes were increased by 25%.

Table 4 includes an estimate of the total crash reductions for each modified intersection as well as only those intersections with a greater than average crash rate and the unmodified Boundary Street intersections discussed above. Maps depicting crash reductions under Alternatives A, B, C, and D are shown in Appendix B.

Intersections Affected by Alternatives A-D						Modified to reassign crashes on Main/KGB and Yenlo/Talkeetna for Alt D one-way street network.			
Intersection	Intersection Crashes 1999 to 2008	Alt A Crash Reduction (# of crashes)	Alt B Crash Reduction (# of crashes)	Alt C Crash Reduction (# of Crashes)	Alt D Crash Reduction (# of Crashes inc. 1-Way Adj)	Alt A Crash Reduction (% of TOTAL crashes)	Alt B Crash Reduction (% of TOTAL crashes)	Alt C Crash Reduction (% of TOTAL crashes)	Alt D Crash Reduction (% of TOTAL crashes)***
Knik-Goose Bay Road & Enter Way	5	0.0	0.0	0.0	1.0	0%	0%	0%	20%
Knik-Goose Bay Road & Centaur Street	5	0.0	0.0	0.0	2.0	0%	0%	0%	40%
Knik-Goose Bay Road & Lakeview Drive	1	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik-Goose Bay Road & Park Avenue	2	0.0	0.0	-0.25	0.0	0%	0%	-13%	0%
Knik-Goose Bay Road & Susitna Avenue	9	1.9	1.9	0.0	6.0	21%	21%	0%	67%
Knik-Goose Bay Road & Railroad Avenue	30	12.0	12.9	12.9	24.0	40%	43%	43%	80%
Parks Highway & Main Street/Knik-Goose Bay Road	224	0.0	6.3	6.3	58.0	0%	3%	3%	26%
Main Street & Herning Avenue	41	0.0	0.8	0.8	11.0	0%	2%	2%	27%
Main Street & Swanson Avenue	27	3.5	3.5	3.5	13.5	13%	13%	13%	50%
Main Street & Paulson Avenue	2	1.0	0.0	0.0	0.0	50%	0%	0%	0%
Main Street/Wasilla Fishhook Road & Bogard Road/Nelson Avenue (signal 9/2003)	21	0.0	0.3	0.3	8.0	0%	1%	1%	38%
Wasilla Fishhook Road & Danna Avenue	2	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Wasilla Fishhook Road & Iditarod Elementary	6	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Wasilla Fishhook Road & Carpenter Circle	4	0.0	0.0	0.0	2.0	0%	0%	0%	50%
Parks Highway & Knik Street	10	0.0	0.0	1.0	0.0	0%	0%	10%	0%
Knik Street & Herning Avenue	7	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik Street & Swanson Avenue	3	0.0	0.0	0.6	0.0	0%	0%	20%	0%
Knik Street & Paulson Avenue*	0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik Street & Nelson Avenue	4	0.0	0.0	-0.5	0.0	0%	0%	-12.5%	0%
Talkeetna Street & Susitna Avenue	1	0.0	0.0	0.0	-5.0	0%	0%	0%	-500.0%
Talkeetna Street & Railroad Avenue	1	0.0	0.0	0.0	-18.0	0%	0%	0%	-1800.0%
Parks Highway @ Yenlo Street	63	0.0	0.0	0.0	-35.7	0%	0%	0%	-56.6%
Yenlo Street & Herning Avenue	8	0.0	0.0	0.0	-6.0	0%	0%	0%	-75.0%
Yenlo Street & Swanson Avenue	3	0.0	0.0	0.0	-8.8	0%	0%	0%	-293.3%
Bogard Road @ Lang Street (Yenlo Extension)**	1	0.0	0.0	0.0	-7.0	0.0	0.0	0.0	-700.0%

Intersections Affected by Alternatives A-D						Modified to reassign crashes on Main/KGB and Yenlo/Talkeetna for Alt D one-way street network.			
Intersection	Intersection Crashes 1999 to 2008	Alt A Crash Reduction (# of crashes)	Alt B Crash Reduction (# of crashes)	Alt C Crash Reduction (# of Crashes)	Alt D Crash Reduction (# of Crashes inc. 1-Way Adj)	Alt A Crash Reduction (% of TOTAL crashes)	Alt B Crash Reduction (% of TOTAL crashes)	Alt C Crash Reduction (% of TOTAL crashes)	Alt D Crash Reduction (% of TOTAL crashes)***
Knik Street @ Railroad Avenue*	0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Knik Street @ Susitna Avenue*	0	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Boundary Street & Herning Avenue	18	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Boundary Street & Swanson Avenue	2	0.0	0.0	0.0	0.0	0%	0%	0%	0%
Parks Highway @ Boundary Ave	74	0.0	0.0	0.0	0.0	0%	0%	0%	0%
ALL Affected Intersections	480	18.4	25.7	24.6	45.1	3.83%	5.34%	5.13%	9.39%
Affected Intersections with Crash Rates Greater Than the Average for Statewide Population	365	12.0	19.95	19.95	33.35	3.29%	5.47%	5.47%	9.14%
Crash Increase	Adjusted for New Signal during analysis period					Intersections within Alternative "D" Couplet but not altered by proposed improvements.			

* No recorded crashes at this intersection from 1999-2008.
** Crashes for Alternative D reassigned from Main Street @ Bogard/Nelson. (New intersection)
*** An increase in crashes for Alternative D is generally the result of Main Street crashes for southbound reassigned to northbound Yenlo Street.
NOTE: Increases in crashes for intersections under Alternative D is due to northbound related crashes that were reassigned from Main Street/KGB to Talkeetna/Yenlo Streets to account for the one-way couplet.

Table 4: Intersection Crash Rates for Additional Intersections Evaluated in the Traffic Study Update

2.3 Summary of Crash Reduction at Affected Intersections under Each Alternative

The total number of crashes by severity was tallied for the 27 intersections modified by alternatives A, B, C or D. Table 5 below displays crash costs by crash severity and summarizes the number of crashes for ALL modified intersections as well as only those affected intersections with a greater than average crash rate.

An annual crash cost (based on 1999-2008 crash data and KABCO crash costs) and 20 year crash cost savings were computed for intersections which would be modified by Alternatives A, B, C or D. A separate analysis was performed for ALL modified intersections as well as only those intersections with a greater than average crash rate. The results are summarized in Table 6 below.

KABCO Crash Cost*	$ 5,800,000	$ 400,000	$ 80,000	$ 4,500	
	Fatality	Major Injury	Minor Injury	Property Damage Only (PDO)	TOTAL
Total Intersection Crashes (for intersections affected by Alternatives A-D)	0	9	112	354	480
Affected Intersections with >Average Crash Rates Only	0	8	84	273	365

* Current KABCO crash costs taken from ADOTPF Design and Construction Standards, Cost Effectiveness Analysis website. http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/2008_kabco_costs.pdf

Table 5: 1999-2008 TOTAL Crashes at Affected Intersections by Severity

Annual Crash Reduction & Crash Cost Savings for Alternatives A-D		10 Year Crash Cost (1999-2008)	Annual Crash Cost (1999-2008)	Crash Reduction for Alternative	Annual Crash Cost Savings*	NPW of 20-year Cost Savings**
Alternative A	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	3.83%	$54,339	$809,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	3.29%	$36,653	$546,000.00
Alternative B	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	5.34%	$75,750	$1,127,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative C	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	5.13%	$72,649	$1,081,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	5.47%	$60,935	$907,000.00
Alternative D	Total Intersection Crashes (affected by roadway imp.)	$14,175,500	$1,417,550	9.39%	$133,043	$1,980,000.00
	Intersections with >Average Crash Rates	$11,148,500	$1,114,850	9.14%	$101,864	$1,516,000.00

* Annual crash cost savings based on 2009 KABCO crash costs by crash severity from ADOTPF http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/2008_kabco_costs.pdf
** Computed annual crash cost savings and a 3% compound interest rate were used to obtain net present worth (NPW) of 20 year cost savings.

Table 6: Annual Crash Reduction & Crash Cost Savings for Alternatives A-D

3 Rail Elements – Updated Accident Prediction Value (APV)

As part of this traffic study update, the USDOT APV calculated by ADOTPF for the Knik-Goose Bay Road railroad/highway at-grade crossing between the Parks Highway and Railroad Avenue was updated from the 2006 study to reflect current railroad and highway traffic conditions. The 2006 study, using data from 2002, calculated an APV for the Knik-Goose Bay Road crossing of **0.3586** accidents per year, making this crossing the fourth highest of public railroad/highway at-grade crossings in the state. The 2002 APV value indicated that the crossing treatment would not require changes based on the Alaska Policy on Railroad/Highway Crossings adopted by the Alaska Railroad and the ADOTPF in 1988.

KELLC computed APV for crossing based upon most recent available traffic and train data. The updated APV using train movement and vehicle movement data as of 2009 was calculated to be **0.1985**, making it the ninth highest in the state. Table 7 below summarizes traffic data for the 2002 APV versus the 2009 APV update:

APV Year	AADT-Vehicles	5 Yr. Vehicle-train or Vehicle-Vehicle Crashes	Highway Speed	Track Speed	Day Through Train Movements	Night Through Train Movements	Calculated APV	Statewide Rank
2002	10060	7*	35	25	11	7	0.3586	4th
2009	9250	3**	35	25	12	7	0.1985	9th

* 2002 APV included all crashes, including vehicle-vehicle crashes not necessarily related to the crossing. New APV calculations currently used by ADOTPF only include vehicle-train or vehicle-railroad device crashes.
** 2009 APV included 1 vehicle-train crash and 2 vehicle-gate arm crashes. 4 other vehicle-vehicle crashes in the vicinity of the crossing were not included.

Table 7: Accident Prediction Value Computations for Knik-Goose Bay Road Railroad/Highway Grade Crossing, 2002 and 2009

3.1 Alaska Policy on Railroad/Highway Crossings and APV Values

The Alaska Policy on Railroad/Highway Crossings, September 1988, forms the basis for determining crossing protection at railroad/highway at-grade crossings in Alaska. This policy describes the APV as:

> *"The computed "DOT Accident Prediction Value" (APV) of a crossing is the product of a series of factors representing the various characteristics of the*

> *crossing, and is equivalent to the expected number of accidents per year at that crossing."*

The policy goes on to explain how the APV is used to determine the level of crossing protection at existing or new railroad/highway at-grade crossings.

> *"The DOT Accident Prevention Value (APV) should be used as one factor in classifying and prioritizing crossings for improvements"*

> *"The DOT Accident Prediction Values will be used as a factor in determining protection at new crossings. The new crossing will also be compared to existing crossings of similar geometric characteristics and rail and highway traffic densities. The comparison will also consider accident history and the effect of accidents on the DOT Accident Prediction Value.*

Since the Knik-Goose Bay Road railroad/highway at-grade crossing is an existing signalized and gated crossing with a train movement, vehicle movement, and crash information history, a comparison to other similar crossings is not necessary.

Appendix B of the policy contains the following table to determine crossing protection based on existing traffic control devices in place.

ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS
APPENDIX B
Changes in Level of Protection
Revised September 1 ,1988

Existing traffic control device	Calculated Accident Prediction Value (APV)	Recommended Action for Improvement
Passive	0.08 to 0.12	*See note below.
	0.12 to 0.15	Flashing lights.
	0.15 to 0.23	Flashing lights or gates and flashing lights.
	0.23 to 12.4	Gates and flashing lights.
	12.4 to 18.5	Gates and flashing lights or grade separation.
	Greater than 18.5	Grade separation.
Flashing lights	0.12 to 0.18	*See note below.
	0.18 to 3.7	Gate and flashing lights.
	3.7 to 5.6	Gates and flashing lights or grade separation.
	Greater than 5.6	Grade separation.
Gates	1.32 to 1.98	*See note below.
	Greater than 1.98	Grade separation.

• NOTE - When the calculated hazard index falls within this range the decision may be to do nothing, improve the existing traffic control system, install a different type of traffic control system, or make some other improvement at the crossing.

Table 8: Recommended Changes in Level of Protection from the 1988 Alaska Policy on Railroad/Highway Crossings

3.2 Operational Concerns and Advantages of Upgrade Alternatives

Operationally, the existing at-grade crossing has issues relating to its proximity to the Parks Highway, including the inability to store vehicles between the crossing and the Parks Highway during train operations. Less than 70 feet exists between the eastbound through lane of the Parks Highway and the tracks. Also, this crossing lacks full gate closure on the roadway approach to the crossing due to the lack of a median and the length of gate that would be required. The gate arms here are either struck by vehicles or snapped off by high winds when in the upright position.

Alternatives A and B provide an opportunity to install additional shorter gate arms in the Main Street median to prevent drivers from going around the gate arm. Alternative D (option 1 or 2) would allow full control of traffic at the crossing by providing complete gate arm coverage with a relatively short gate.

3.3 Knik-Goose Bay Road APV using Alaska Policy on Railroad/Highway At-grade Crossings Crossing Protection Guidelines

The existing Knik-Goose Bay Road railroad/highway at-grade crossing is equipped with cantilevered flashing lights, automatic gates, signs, markings and railroad preemption connected to the nearby traffic signal at the Knik-Goose Bay Road/Parks Highway intersection. In 2008, a black-out "NO LEFT TURN" symbol sign was added on the westbound left turn lane of the Parks Highway to preempt the westbound permissive left turn when a train was occupying the crossing parallel to the Parks Highway. A sketch depicting the existing railroad/highway crossing configuration is contained in Appendix C.

In accordance with the 1988 at-grade crossing policy, the existing crossing, equipped as it is, would require an APV of at least 1.32 before additional improvements would normally be considered and greater than 1.98 before grade separation is considered.

A sensitivity analysis was performed to determine conditions where additional crossing protection beyond the flashing signals and gates might be warranted. Two scenarios were evaluated which increased the vehicle AADT to 13,000 (2025 projection) and 20,000; increased the 5 year crash frequency to 10 and 20 crashes; and increased the train movements to 25 and 40 per day. Results of these scenarios are shown in Table 9 below:

APV Year	AADT-Vehicles	5 Year Vehicle-train or Vehicle-RR Equipment Crashes	Highway Speed	Track Speed	Day Through Train Movements	Night Through Train Movements	Calculated APV
2025	13000	10	35	25	15	10	0.6134
2025	20000	20	35	25	25	15	1.3013

Table 9: Sensitivity Analysis for 2025 Accident Prediction Value for Knik-Goose Bay Road Railroad/Highway At-grade Crossing with Increased Vehicle and Train Movements and Crashes

As shown, further crossing improvements are not required based on the current APV of 0.1985 and projected APV values with 13,000-20,000 AADT, 10-20 at-grade crossing crashes, and 25-40 daily train movements.

4 Design Year (2035) Traffic Volumes

4.1 Wasilla Main Street Traffic Study 2006 Model

The traffic demand model constructed for the 2006 Wasilla Main Street Traffic Study was a micro-level QRSII model with a 2025 design year. The 2025 QRSII model was produced in 2005 using the available planning documents published at that time. The model included the central business district of Wasilla with separate Traffic Analysis Zones (TAZs) per block and road segments for each major road *and* minor cross street. The model was constructed in the four alternative Main Street configurations, as follows:

- Alternative A: 3-Lane Main Street
- Alternative B: 5-Lane Main Street
- Alternative C: Knik Street-Main Street two-way couplet
- Alternative D: Main Street/Knik-Goose Bay Road-Yenlo Street/Talkeetna Street one-way couplet

Each of the four configurations was analyzed with and without a Parks Highway bypass. The Parks Highway bypass is recommended in the 2025 Long Range Transportation Plan and is a two-lane expressway, in a separate corridor, that more or less parallels the Parks Highway, from the Seward Meridian Parkway to just beyond Big Lake Road. However, because the limits of the QRSII model did not extend beyond the vicinity of the central business district, the model did not include the impact of the Parks Highway bypass directly, but rather assumed a reduction in traffic volumes to and from the external nodes for the cases where the Parks Highway bypass was constructed.

Figure 7 on page 19 presents a screen shot of the 2025 QRSII model showing the model limits and the node and segment detail within the central business district.

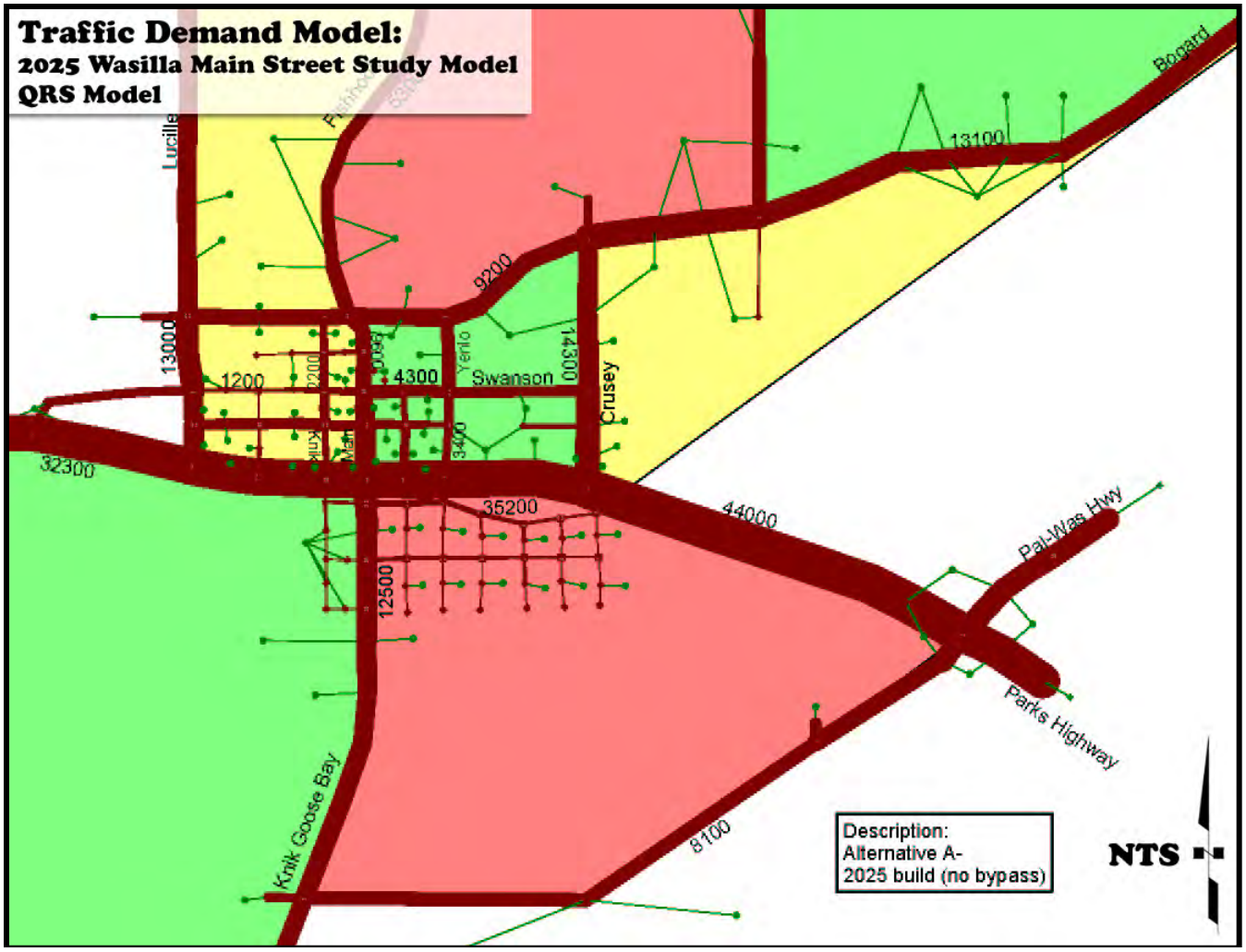


Figure 7 - 2025 Wasilla Main Street Model (QRSII)

The green nodes represent individual traffic generators, or TAZs.

4.2 Original 2007 LRTP Model

The current (August 2011) MSB traffic demand model was developed in 2007 as part of the MSB's 2025 LRTP. The LRTP model is a macro-level TransCAD model which includes every major road functionally classified as a collector or above within the entire borough, with a component of the Anchorage traffic demand model included to accurately depict commuter trips. The emphasis of the model as originally crafted precludes good results on many of the minor system streets, including local streets and some collectors. To be useful in design projects, KELLC will typically modify the model within the project area, which would include adjusting TAZ density and connections to the street system, creating additional links, and validating existing or committed projects presented in planning documents.

Figure 8 below presents a view of the unmodified 2025 LRTP demand model in the area of Wasilla Main Street.

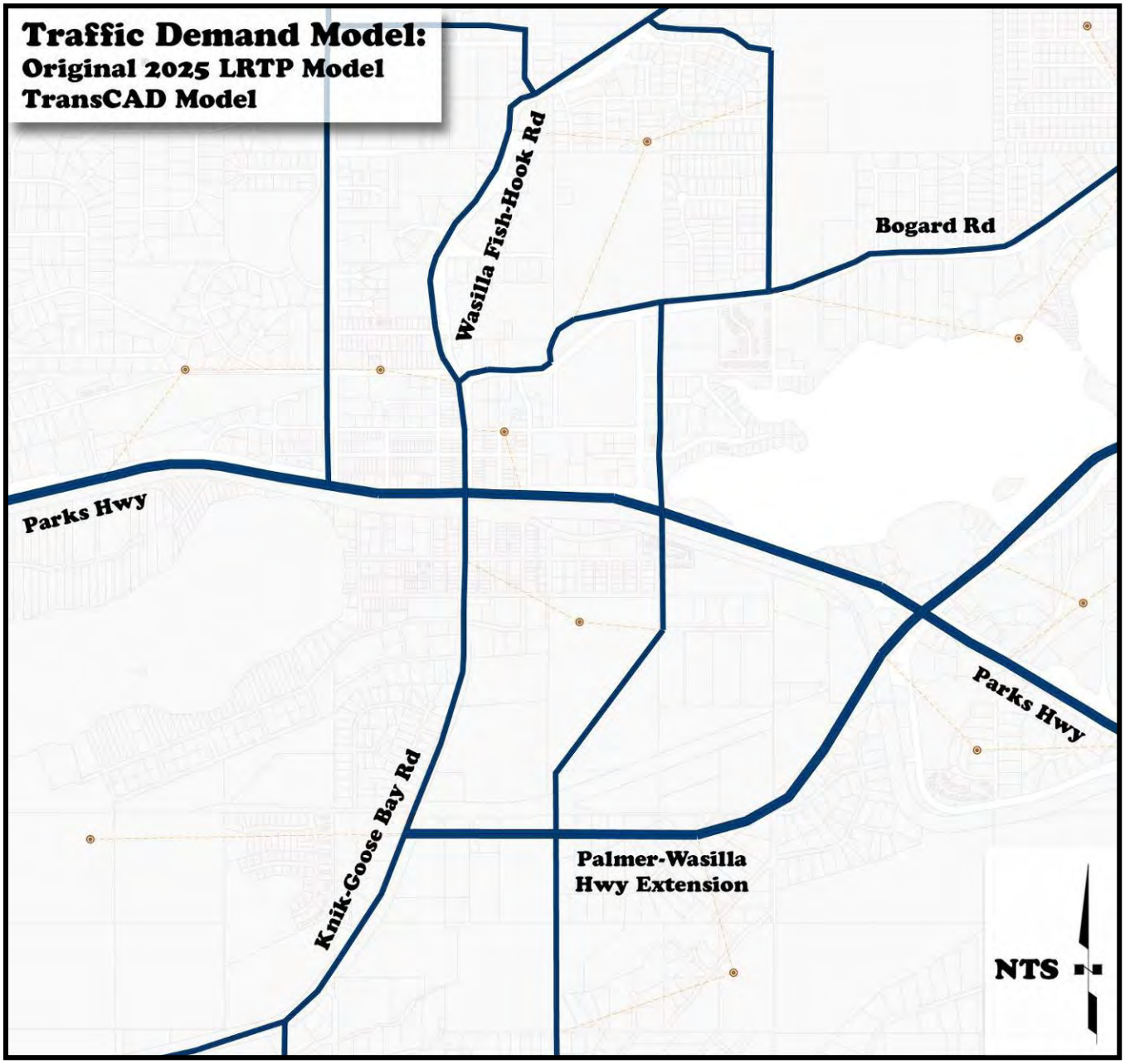


Figure 8 - Original 2025 LRTP Model

Note that traffic is generated at the node points and then distributed to the surrounding network through connector links. The 2025 LRTP model includes approximately 10 nodes in the vicinity of the project study area, whereas the QRSII model discussed previously included nearly 9 times that amount of node definition. However, the aggregate traffic generation volumes from the QRSII model TAZs are basically the same as the volumes generated by the corresponding LRTP TAZ regions.

4.3 Modified 2025 LRTP Model

KELLC regularly updates the 2025 LRTP model to provide more detailed network volumes in areas of interest by breaking large TAZs into smaller zones and adding or modifying road segments to better represent future conditions or alignments. When TAZ regions are divided into smaller sections, the socioeconomic data from the larger zone is distributed to the smaller zones. Because detailed socioeconomic data can be difficult to obtain, judgments must be made in determining where to distribute the data. Since the original QRSII model made researched judgments about the distribution of socioeconomic data surrounding Wasilla Main Street, the node data for the QRSII model was used as a basis to proportion the LRTP model data to similar zones. In such a way, the overall socioeconomic data for the LRTP zones was retained, but proportioned out to a more detailed TAZ structure which matches the QRSII model. The original TAZs and the modified TAZ regions are shown in Figure 9 on page 22.

Likewise, the LRTP model's road network was modified to include the minor cross streets which were a part of the QRSII model. Additionally, the model was updated to more accurately depict the LRTP committed road network alignments, travel speeds, and segment capacities. Figure 10 on page 23 presents the original LRTP model network and the modified road segments.

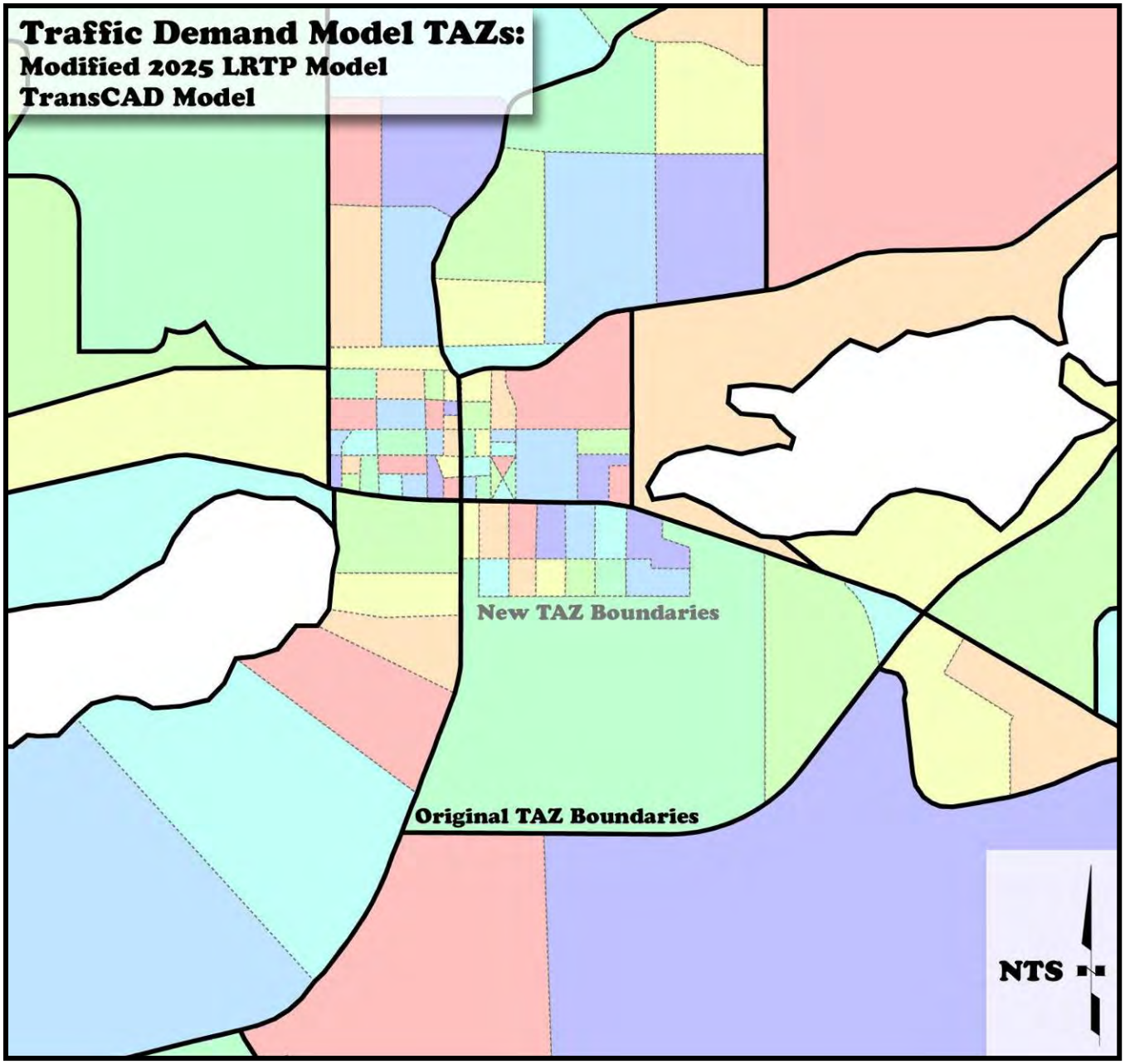


Figure 9 - 2025 LRTP Model: TAZ Region Modifications

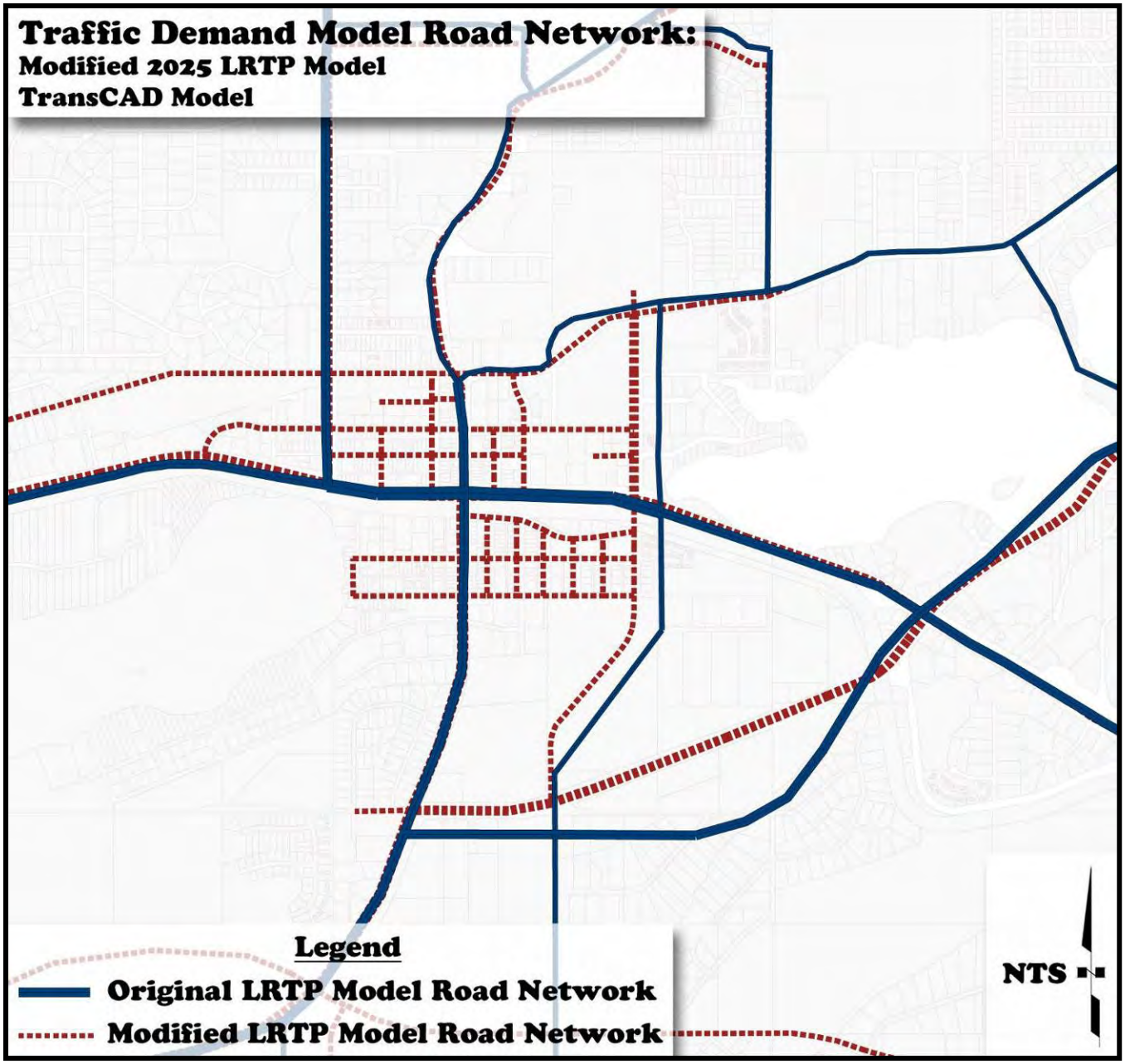


Figure 10 - 2025 LRTP Model: Road Modifications

Figure 11 below presents the resulting traffic model with the TAZ and road network modifications.

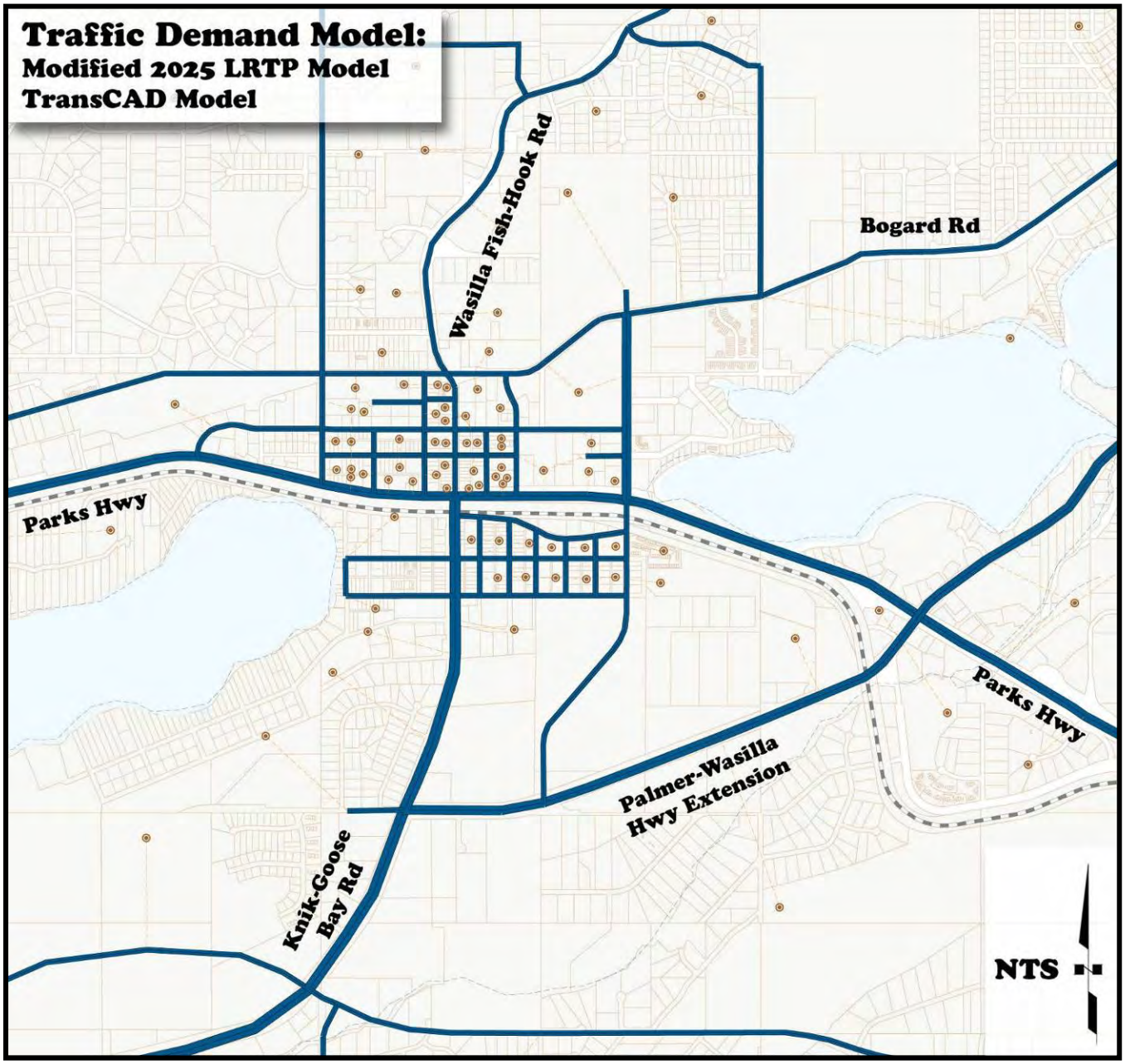


Figure 11 - 2025 LRTP Model: Modified Model Network

The 2025 AADT results are shown in Figure 12 and Figure 13, with and without a Parks Highway bypass, respectively.

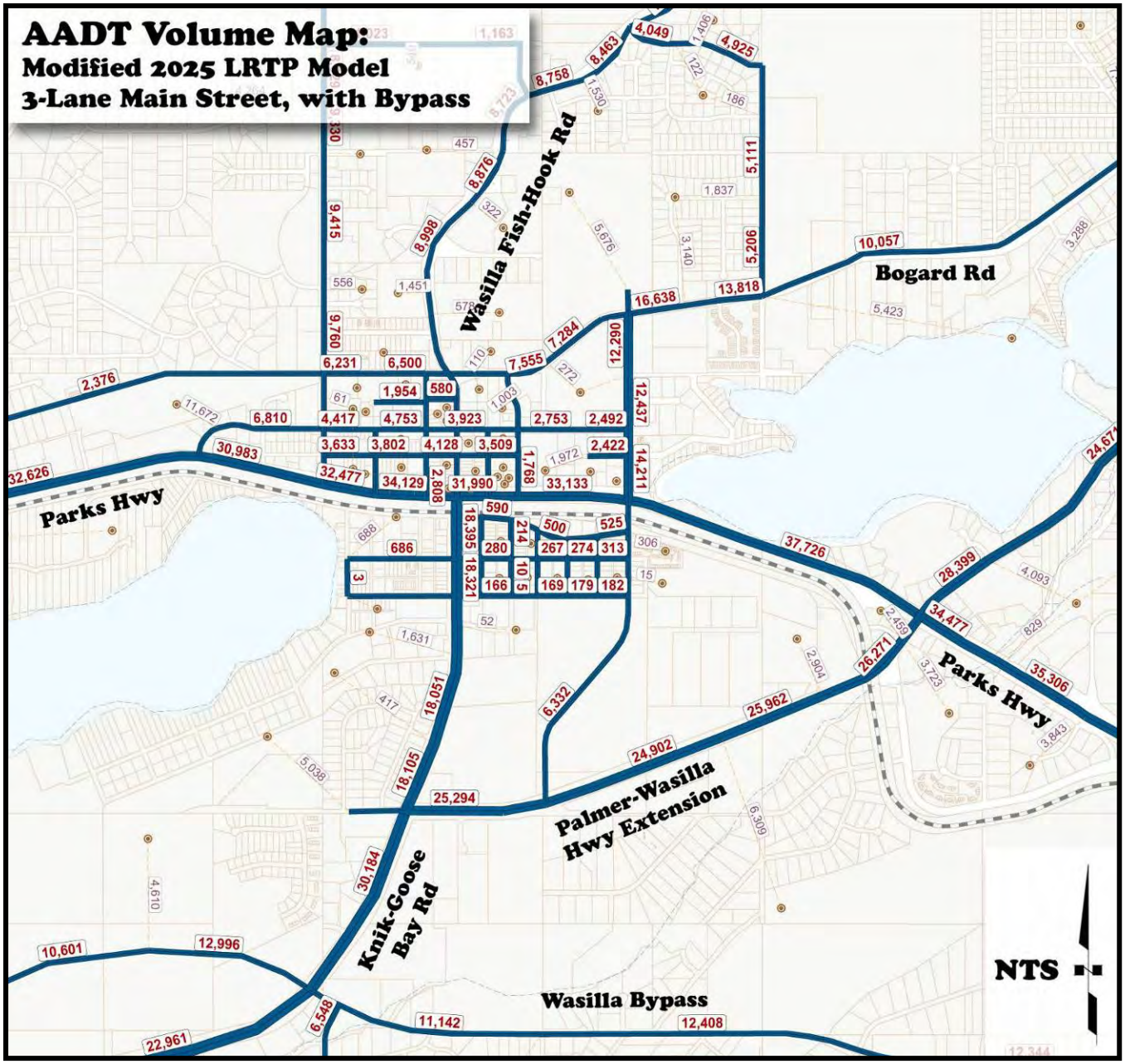


Figure 12 - 2025 AADT Volumes: 3-Lane Main Street with Bypass

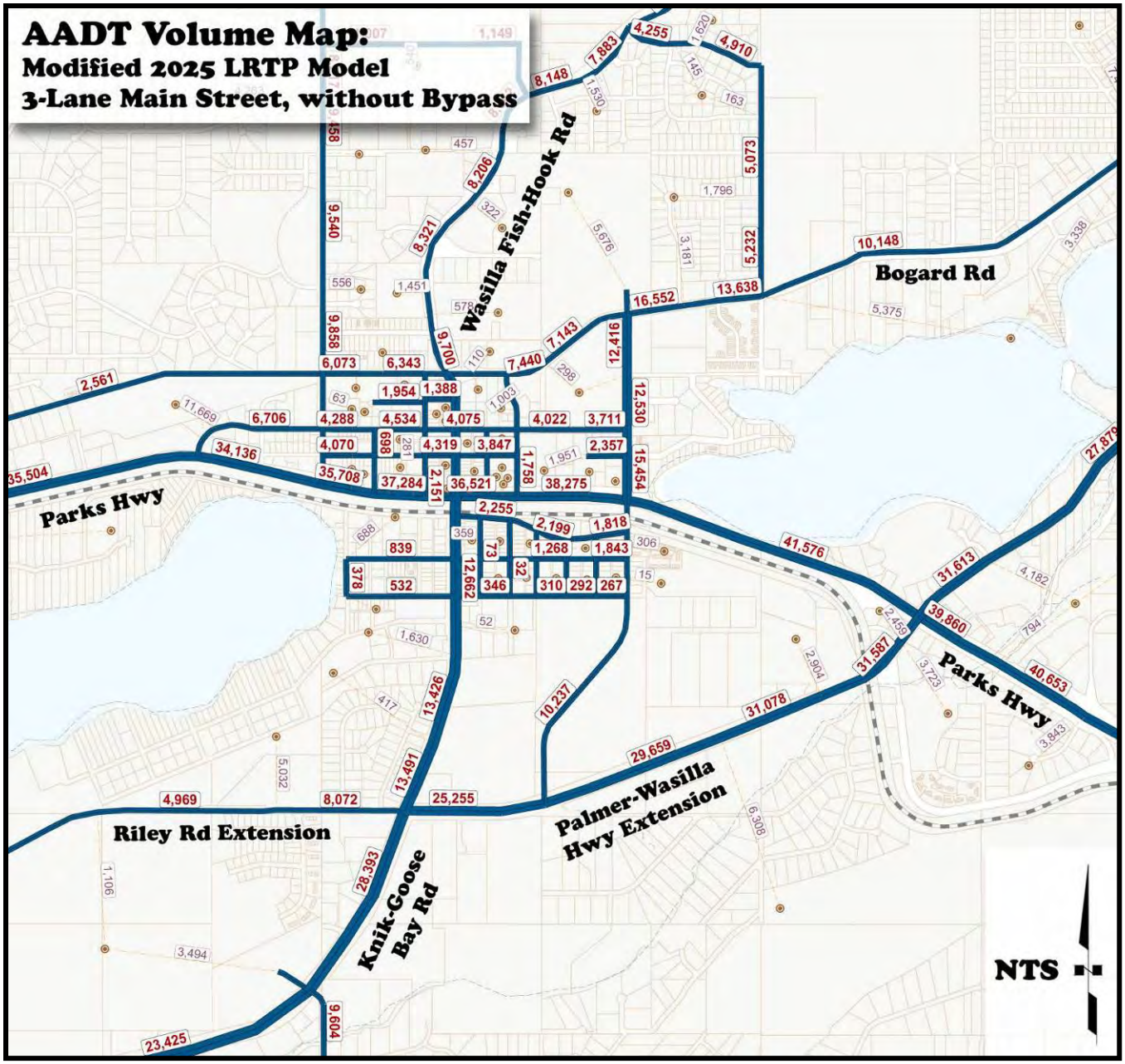


Figure 13 - 2025 AADT Volumes: 3-Lane Main Street without Bypass

Note that in the model without the Parks Highway bypass, a Riley Road extension project is modeled. This project is not mentioned in the 2025 LRTP, but is included in the Wasilla Official Streets and Highways Plan. The project would extend from the T-intersection of the Palmer-Wasilla Highway extension and Knik-Goose Bay Road, to the future Mack Drive corridor. It is assumed that if a full Parks Highway bypass were to be constructed, the Riley Road Extension would be a redundant parallel street and would be less likely to be built.

Ten separate TransCAD models were developed: a non-bypass model and a bypass model for each alternative (A through D), with separate models for options 1 and 2 of Alternative D. The 2025 model outputs for each of these alternatives are shown in Appendix D. Note that at this level of detail the No Action alternative is essentially the same as Alternative A, therefore, separate models were not created for these alternatives.

4.4 Annual Growth Rate

The annual growth rate was required to extrapolate 2025 volume results to the design year of 2035. It was determined by examining historical AADT volumes on major roads carrying traffic into and out of the Wasilla downtown area (Parks Highway, Bogard Road, Knik-Goose Bay Road, Wasilla Fishhook Road, and Lucille Street) and comparing it to historical annual population values for Wasilla. A regression equation relating traffic volume to population was developed. Using this equation, and using population forecasts for the MSB as the independent regression variable (from *Economic and Demographic Projections for Alaska and Greater Anchorage 2010-2035* published by the Institute of Social and Economic Research in December 2009), 2035 traffic volumes were predicted and a growth rate was developed between 2025 and 2035. The annual traffic growth rate developed using this methodology is 1.5% per year.

4.5 Post-Processing

Traffic demands modeled in TransCAD favor routes with higher segment capacity (more lanes) and shorter travel distance regardless of the number of signalized intersections or other elements that might limit roadway capacity or otherwise influence traveler route choice. To more accurately depict these effects on traveler route choice, the TransCAD results for each alternative were subjected to post-processing analysis in accordance with NCHRP 255 (*Highway Traffic Data for Urbanized Area Project Planning and Design*, December 1982). This methodology uses screen lines to better model traveler route choice by taking into account existing travel patterns. Under this methodology, traffic that exceeds the roadway capacity is moved to an under capacity roadway or removed from the model entirely (assuming that drivers desiring to use an over-capacity roadway would choose to travel at different times of the day).

The post-processing analysis used two screen lines crossing east-west roads (to balance the distribution of traffic on Seldon Road, Bogard Road, the Parks Highway, and either the Palmer-Wasilla Highway Extension or the Parks Highway Bypass) and three screen lines crossing north-south roads (to balance the distribution of traffic on Lucille Road, Wasilla Main Street, and Crusey Street). Using

these screen lines, 2035 AADT was computed for each of the roadways of interest. The resulting 2035 AADTs for each alternative and option are shown in Appendix E.

It should be noted that the 2007 LRTP TransCAD model forecasts very heavy volumes on the Parks Highway – such that the demand exceeds the capacity of the roadway. This report assumes that other projects will deal with this overcapacity demand, either by relocating the traffic or through expansion of the Parks Highway. If no additional projects are built and the travel demand grows as forecasted by the model, in future years the Parks Highway traffic can be expected to experience more congestion and delay than that shown in this report.

4.6 Design Hour Volume

The design hour volume reflects the portion of the AADT that is expected in the 30th highest peak traffic hour of the year. The American Association of State Highway and Transportation Officials (AASHTO) recommends that in urban areas, the design hour volume should be considered to be between 8% and 10% of the AADT. In the 2006 report, the design hour volume was assumed to be 9.22%, based on averaging the actual percentage for the 30th highest hour recorded at the permanent traffic recorder on the Parks Highway for the years 1999 to 2003. For this updated report, the design hour volume was assumed to be 10%, based on data from the permanent traffic recorder on the Parks Highway at Broadview, where the design hour volume was between 10.3% and 10.5% from 2007 to 2009.

4.7 Turning Movement Counts

Based on the design hour volumes, turning movement counts at intersections were generated using a methodology from NCHRP 255. This methodology uses existing turning movement counts and future design hour volumes to forecast future turning movement counts. For the 2006 report, KE manually counted turning movements at the following intersections:

- Main Street/Wasilla Fishhook Road at Bogard Road/Nelson Avenue
- Main Street at Paulson Avenue
- Main Street at Swanson Avenue
- Main Street at Herning Avenue
- Main Street/Knik-Goose Bay Road at the Parks Highway

These field counts were used as the existing turning movement counts in this report for the analysis of these intersections in future years. For parallel intersections along Knik Street or Yenlo Street, turning movement counts from the matching Main Street intersection were used. For intersections south of the

Parks Highway, KELLC substituted observed generic turning movement count proportions of several other similar intersections around the State because actual intersection counts were unavailable.

After the future turning movement counts were developed for each intersection, the balance of volumes between intersections was examined. In instances where there will be little or no opportunity for vehicles to turn on or off of the road between intersections, the turning movement volumes were adjusted so that the volume of traffic leaving one intersection and arriving at the next was balanced. Final turning movement counts for each intersection under each alternative and option are shown in Appendix F.

5 Capacity Analysis

Intersection capacity analysis was performed to determine the level of service (LOS) for each intersection under each alternative, option, and scenario. Signalized LOS is determined using average control delay (in seconds). Table 10 shows the threshold values for each LOS level.

Average Control Delay (sec)	Level of Service
≤ 10	A
> 10 to 20	B
> 20 to 35	C
> 35 to 55	D
> 55 to 80	E
> 80	F

Table 10: Signalized Intersection Level of Service Thresholds

Unsignalized LOS is also determined using average control delay (in seconds), with a different set of threshold values, as shown in Table 11.

Average Control Delay (sec)	Level of Service
≤ 10	A
> 10 to 15	B
> 15 to 25	C
> 25 to 35	D
> 35 to 50	E
> 50	F

Table 11: Unsignalized Intersection Level of Service Thresholds

The AASHTO *Policy on the Geometric Design of Highways and Streets (GDHS)* provides LOS guidelines based upon functional classification of the facility, rural or urban setting, and terrain. Figure 14 on page 31 presents the table, extracted from the GDHS, concerning AASHTO's recommendations for appropriate LOS thresholds for different functional classifications and area/terrain types.

Functional class	Appropriate level of service for specified combinations of area and terrain type			
	Rural level	Rural rolling	Rural mountainous	Urban and suburban
Freeway	B	B	C	C
Arterial (Including Interstate)	B	B	C	C
Collector	C	C	D	D
Local	D	D	D	D

Note: Modified from AASHTO GDHS 2001 Exhibit 2-32

Figure 14 - AASHTO Level of Service Recommendations

Both the ADOTPF Functional Classification Update Project and the MSB Official Streets and Highways Plan identify the functional classification of roads in the study area, with slight variations.

	ADOTPF Functional Classification Update Project	MSB Official Streets & Highways Plan
Wasilla Fishhook Road	Urban Minor Arterial	Minor Arterial
Main Street	Urban Other Principal Arterial	Major Arterial
Knik-Goose Bay Road	Urban Other Principal Arterial	Major Arterial
Nelson Avenue	Urban Collector	Minor Collector
Bogard Road	Urban Minor Arterial	Major Arterial
Railroad Avenue	Urban Collector	Local Street
Crusey Street	Urban Collector	Minor Arterial
Lucille Street	Urban Minor Arterial	Major Collector
Lake View Avenue	Local Street	Minor Collector

Table 12 – Functional Classification of Area Streets

Other cross streets in the study area are functionally classified as local streets.

Based on these functional classifications, and AASHTO's guidelines, the design LOS for Main Street intersections is C.

5.1 Intersection Control

Each intersection was analyzed to determine if signalization should be considered by 2035. For a future condition, the best method for this analysis is the Caltrans method, which uses the forecast AADTs for each approach to the intersection and evaluates them based on the Manual on Uniform Traffic Control Devices (MUTCD) signal warrants. Table 13 shows which intersections are considered for a signal in the design year, according to this analysis.

The decision of whether or not to install a signal depends on more than simply whether or not the intersection meets one or more of the MUTCD signal warrants. In addition to these warrants, safety and operations should also be considered. Signals currently exist at the intersection of Bogard

Road/Nelson Avenue and Main Street and at the intersection of the Parks Highway and Main Street. These signals are about ¼ mile apart. If all of the intersections that warrant signals in Table 13 were signalized, many of the signals would be 1/16 of a mile apart or closer. The intersections suggested for signalization in the 2006 traffic study report would create a network of signals at 1/8 mile spacing.

As signals are placed closer together in a two-way street network, operating speeds tend to drop. Table 9-2 of the Transportation Research Board Access Management Manual indicates that progressing traffic at 25 mph (the speed limit on Main Street) requires at least ¼ mile spacing between signalized intersections. According to the Access Management Manual, the spacing suggested in the 2006 traffic study report (one signal every two blocks) would reduce travel speed along the corridor to 15 mph or less. As such, signal spacing closer than one signal every two blocks should not be considered for two-way streets. Additionally, an examination of the overall traffic network for the two-way street alternatives indicates that the network is sufficiently well-connected to allow drivers to choose a signalized intersection during heavy traffic periods when an unsignalized intersection becomes unusable. Thus, it is unnecessary to signalize all of the intersections for which signals are warranted by the Caltrans method and the two-block spacing of signals was used as a minimum spacing.

For a one-way street network, operations are less impacted by signals that are spaced closer together. Thus, for Alternative D, signals can be spaced more closely without affecting travel speed and segment capacity. Travel speed on one-way streets with close signals (one signal every block, for instance) can be as high as 25 to 30 mph and can be controlled by signal coordination.

Based on signal warrant and spacing considerations, this updated traffic report promotes the installation of traffic signals at most of the same locations that were promoted in the 2006 report.

	One or more signal criteria met in 2035 using Caltrans Method?									
	Alt A		Alt B		Alt C		Alt D, option 1		Alt D, option 2	
	No bypass	Bypass	No bypass	Bypass	No bypass	Bypass	No bypass	Bypass	No bypass	Bypass
Bogard Road/Nelson Avenue and Main Street	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Paulson Avenue and Main Street	No	No	No	No	No	No	No	No	No	No
Swanson Avenue and Main Street	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Herning Avenue and Main Street	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parks Highway and Main Street/Knik-Goose Bay Road	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Railroad Avenue and Knik-Goose Bay Road	No	Yes	No	No	No	No	No	No	No	No
Susitna Avenue and Knik-Goose Bay Road	No	No	No	No	No	No	No	No	No	No
Lakeview Avenue and Knik-Goose Bay Road							Yes	Yes	No	Yes
Nelson Avenue and Knik Street					Yes	Yes				
Paulson Avenue and Knik Street					No	No				
Swanson Avenue and Knik Street					Yes	Yes				
Herning Avenue and Knik Street					No	Yes				
Susitna Avenue and Knik Street					No	No				
Park Avenue and Knik-Goose Bay Road					Yes	Yes				
Bogard Road and Yenlo Street							Yes	Yes	Yes	Yes
Swanson Avenue and Yenlo Street							Yes	Yes	Yes	Yes
Herning Avenue and Yenlo Street							Yes	Yes	Yes	Yes
Parks Highway and Yenlo Street/Talkeetna Street							Yes	Yes	Yes	Yes
Railroad Avenue and Talkeetna Street							No	No	No	No
Susitna Avenue and Talkeetna Street							No	No	No	No
Lakeview Avenue and Talkeetna Street							Yes	Yes	No	Yes

Table 13: Results of Signal Warrant Analysis (2035 volumes)

For Alternatives A and B, signalize:

- Swanson Avenue at Main Street
- Susitna Avenue at Knik-Goose Bay Road

For Alternative C, signalize:

- Swanson Avenue at Main Street
- Nelson Avenue at Knik Street
- Swanson Avenue at Knik Street
- Park Avenue at Knik-Goose Bay Road

For Alternative D (all options), signalize:

- Swanson Avenue at Main Street
- Lake View Avenue at Knik-Goose Bay Road
- Bogard Road at Yenlo Street
- Swanson Avenue at Yenlo Street
- Parks Highway at Yenlo Street/Talkeetna Street

5.2 Auxiliary Lane Configurations

Synchro models were developed for each alternative, option, and scenario using the turning movements and intersection control types described above. Using Synchro (version 8), signal timings (cycle lengths, phasing, phase splits, offsets etc.) were developed. The 140 second cycle length used in the 2006 report was found to work adequately in each situation, therefore it was retained for the updated models, with some intersections being half-cycled (operating at 70-second cycles), as appropriate. Where acceptable LOS (C or better) could not be met, adjustments to signal timings were performed, or auxiliary lanes were added. In addition to LOS, the volume-to-capacity (v/c) ratio and queue lengths were also considered in the selection of appropriate auxiliary lane configurations. In some cases, it was found that additional auxiliary lanes suggested in the 2006 report are not necessary given the updated traffic volume forecasts. In these instances, the excess auxiliary lanes were removed from the proposed configuration.

NCHRP 279: *Intersection Channelization Design Guide* presents a minimum turn lane length and a desired turn lane length. The calculation of these lengths is as follows:

- **Minimum turn lane length** includes length for queue storage and provides additional deceleration length to allow a turning vehicle to enter the bay taper at 10 mph less than the approach speed and then immediately decelerate while in the bay taper in time to stop behind the queue. For approach speeds less than 40 mph, only queue storage length is provided.
- **Desired turn lane length** includes length for queue storage and provides additional deceleration length to allow a turning vehicle to enter the bay taper at the approach speed and begin deceleration upon entering the auxiliary lane. The length of the adjacent queue is also considered and length is added if necessary so that turning vehicles can access the turn lane behind the adjacent queue. Table 14 summarizes elements of these calculations.

<table>
<tr><td></td><td>Minimum Turn Lane Length Calculation</td><td colspan="2">Desirable Turn Lane Length Calculation</td></tr>
<tr><td>Queue</td><td>95th percentile (2035)</td><td>95th percentile (2035)</td><td rowspan="2">Adjacent Queue Length</td></tr>
<tr><td>Deceleration</td><td>10 mph reduction prior to entering bay taper, deceleration begins in bay taper</td><td>All deceleration in auxiliary lane
Choose Maximum</td></tr>
<tr><td>Minimum Auxiliary Turn Lane Length</td><td colspan="3">100 feet (Highway Preconstruction Manual, 1150)</td></tr>
<tr><td>Maximum Auxiliary Turn Lane Length</td><td colspan="3">No Standard or Guideline</td></tr>
<tr><td>Approach Speeds (Deceleration Distance)</td><td colspan="3">• Main Street- 25 mph
• Knik-Goose Bay Road- 35 mph
• Knik Street- 25 mph
• Yenlo Street- 25 mph
• Talkeetna Street- 35 mph
• Bogard Road- 40 mph
• Nelson Avenue- 25 mph
• Swanson Avenue- 25 mph
• Parks Highway- 45 mph
• Park Avenue- 25 mph
• Wasilla-Fishhook Road – 35 mph
• Lake View Avenue- 25 mph</td></tr>
<tr><td>Deceleration Rate</td><td colspan="3">6.9 feet per second (Transportation and Land Development, ITE- 85% decelerate in turn lanes at 6.9 fps or higher)</td></tr>
<tr><td>Bay Taper</td><td colspan="3">6:1 to 15:1, distributed over speed ranges of 25 to 50 mph (AASHTO, GDHS)</td></tr>
</table>

Table 14: Turn Lane Length Calculation Parameters

For unsignalized intersections, NCHRP 457: *Evaluating Intersection Improvements – An Engineering Study Guide* is used to determine auxiliary lane length. For all unsignalized intersections in this study area, the left turn lane length should be 150 feet long, unless it must be shortened due to geometric constraints.

At signalized intersections, it is necessary to install a raised median for 100 to 150 feet from the stop bar to aid with signal detection. In addition, where there will be long queues or back-to-back left turn auxiliary lanes at adjacent signals, raised medians should be installed to separate opposite direction left turn vehicles.

It should be noted that turn lane lengths recommended in this report are conceptual level designs and may need to be adjusted during the design process.

5.2.1 Alternative A

Table 15 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative A. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

5.2.1.1 Bogard Road/Nelson Avenue Intersection

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road, the recommended auxiliary lane lengths are constrained somewhat by the surrounding access points. Figure 15 and Table 16 present the recommended auxiliary lane lengths and taper rates. Note in the figure that the eastbound left turn lane is shortened from desirable due to the intersection of Nelson Avenue with Knik Street. The 2006 study shows this segment of roadway being redesigned with the left turn lane running the entire length from Knik Street to Main Street. This configuration would give the full desirable length for the left turn lane, but would not provide the transition taper. Under both configurations, left turning vehicles will be blocked from the left turn lane by the adjacent through vehicle queue in the peak hour.

As can be seen in Figure 15, the proposed northbound left turn lane and taper extend past Paulson Avenue, requiring that Paulson Avenue and the driveway across from it be converted to right-in/right-out with a median barrier on Main Street. This is consistent with the design proposed in the 2006 study.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	**EB L**	**EB T**	**EB R**	**WB L**	**WB T**	**WB R**	**NB L**	**NB T**	**NB R**	**SB L**	**SB T**	**SB R**
Main St & Nelson Ave/ Bogard Rd	36	342		59	382		43	241		120	116	22
Main St & Swanson Ave	59	79		106	117		17	150		6	98	
Main St & Parks Hwy	245	749		474	951	41	427	303	58	156	528	155
Main St & Susitna Ave		50			34		6	268		1	104	
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd	100			100			100			125		100
Main St & Swanson Ave	100			100			100			100		
Main St & Parks Hwy	400			475		100	425		100	150		150
Main St & Susitna Ave							100			100		
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd	350			300			250			125		125
Main St & Swanson Ave	100			125			150			100		
Main St & Parks Hwy	550			800		350	425		300	525		525
Main St & Susitna Ave							275			100		

Table 15: Queues and Lane Length Calculations for Alternative A Intersections (2035)

	EBL	WBL	NBL	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	168 (>M, <D)	300 (D)	250 (D)	125 (D)	125 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 16: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative A

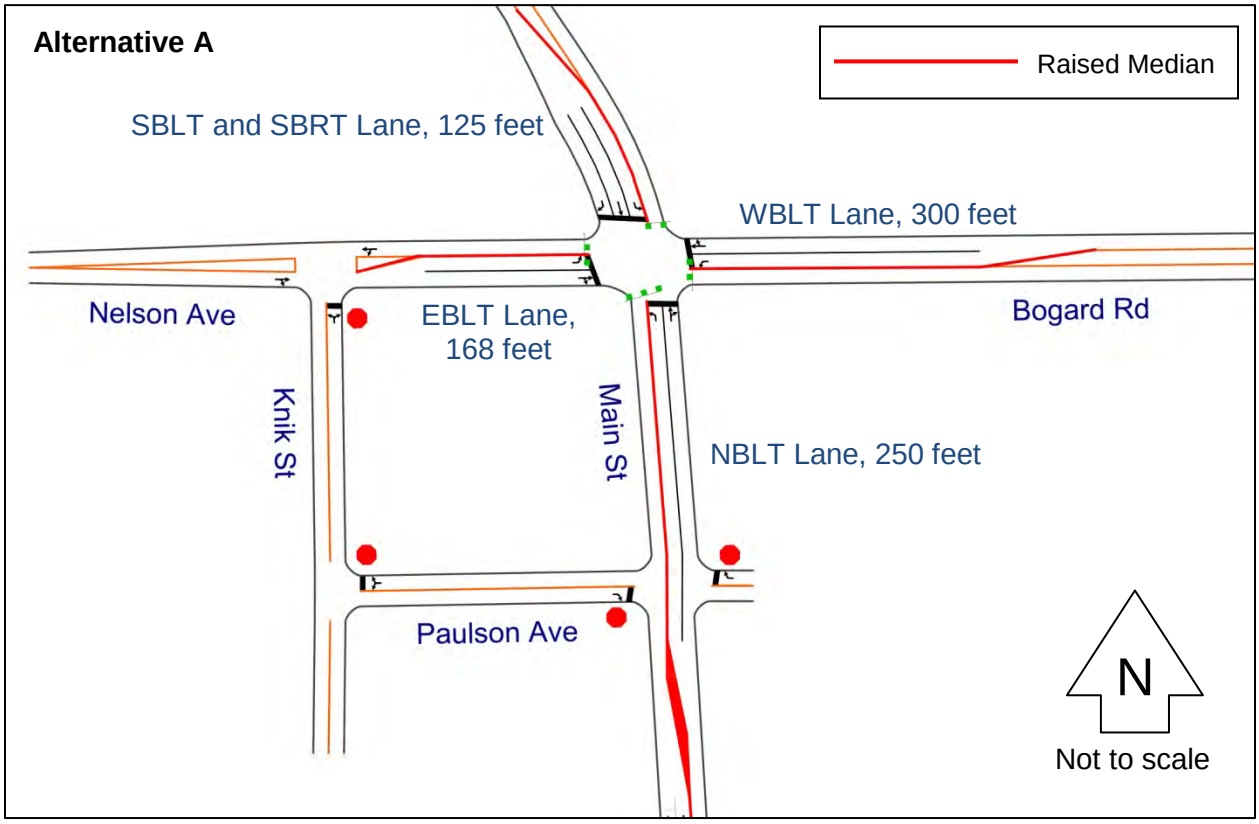


Figure 15: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative A

5.2.1.2 Swanson Avenue Intersection

At the intersection of Swanson Avenue with Main Street, there are also some physical constraints on the turn lane lengths. For the southbound left turn lane, the desirable turn lane length can be met, but it extends past the Post Office driveway and almost to Paulson Avenue, resulting in a median barrier being installed on Main Street from Swanson Avenue to Bogard Road/Nelson Avenue. For the northbound left turn lane, the desirable turn lane length of 125 feet cannot be met, due to the close proximity with Herning Avenue and the need to provide a southbound left turn lane and taper at that intersection. According to NCHRP 457, *Evaluating Intersection Improvements: An Engineering Study Guide* (which is referenced by the Highway Preconstruction Manual), the southbound bay at Herning Avenue should be 120 feet. Since adequate space is unavailable to fit both of these turn lanes in between the two intersections, the recommended turn lane length for both intersections was reduced to 90 feet, with 72 foot tapers. Another option would be to convert Herning Avenue to right-in/right-out only; however, Herning Avenue is a fairly high volume road, making this option less desirable.

For the eastbound and westbound left turn lanes, the desirable left turn lane length can be met. Note that the eastbound right turn lane recommended in the 2006 study is no longer recommended in this study.

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	125 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 17: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative A

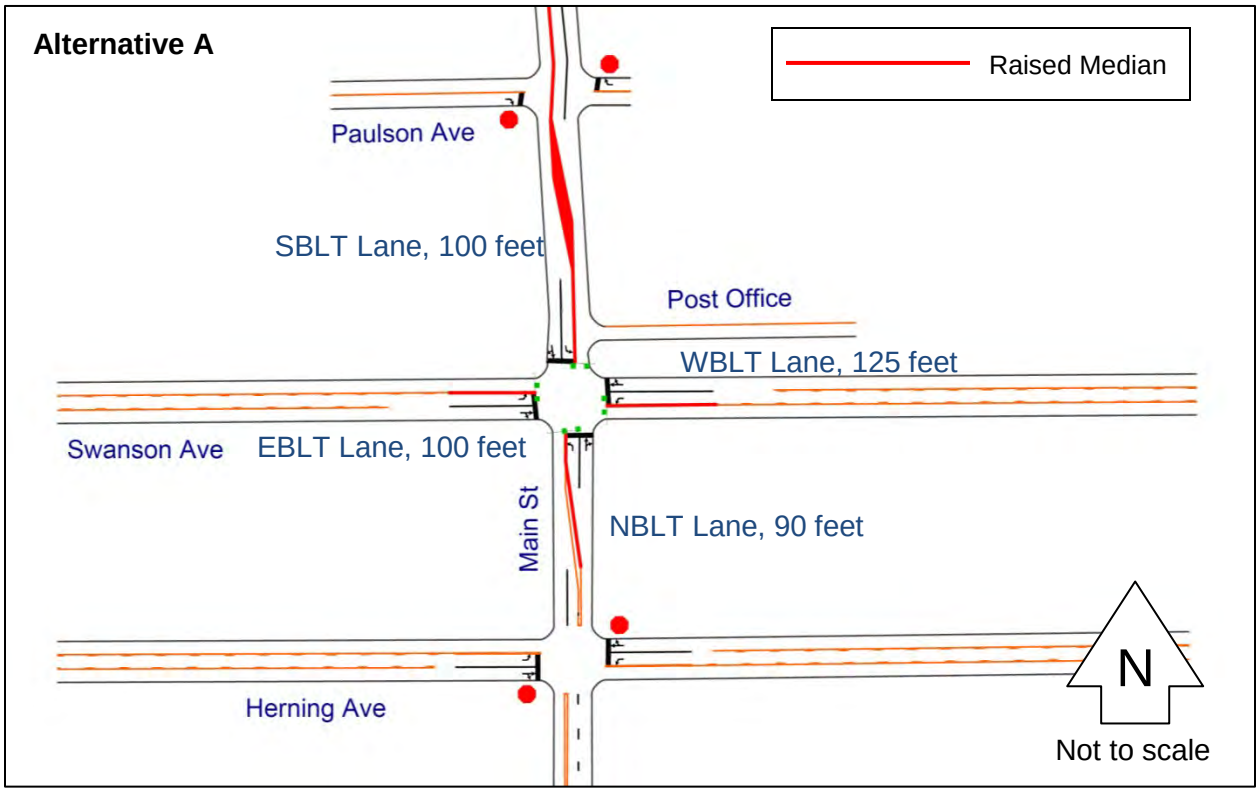


Figure 16: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative A

5.2.1.3 Parks Highway Intersection

For the Parks Highway intersection, the southbound through queue is very long and extends through the Herning Avenue intersection. The desirable turn lane lengths would extend far enough back to allow left and right turning vehicles to enter the turn lanes without being blocked by the extensive through queue; however, the actual left turn and right turn queues are quite short. Another consideration in making an auxiliary lane recommendation is the need to provide for queue storage and deceleration in the northbound left turn lane at Herning Avenue. As a result, the southbound auxiliary lane recommended length is 150 feet for both turn lanes.

The northbound left turn and through queues are both very long, extending through the Railroad Avenue intersection, but not fully reaching the Susitna Avenue intersection. Because of its proximity to the Parks Highway intersection, it is recommended that Railroad Avenue be restricted to right-in/right-out out movements. The recommended Parks Highway northbound left turn lane length is shortened somewhat to allow room for the Susitna Avenue southbound left turn lane.

The eastbound and westbound through movement queues on the Parks Highway are quite lengthy, but the desired left turn lane lengths can be accommodated because there is enough spacing between signals on the Parks Highway. It is recommended that the westbound right turn lane be shortened from desirable so that it does not extend through the intersection with Boundary Street, to the east of Main Street.

	EBL	WBL	WBR	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	550 (D)	800 (D)	300 (>M, <D)	410 (>M, <D)	300 (D)	150 (M)	150 (M)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	10:1 (120 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 18: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative A

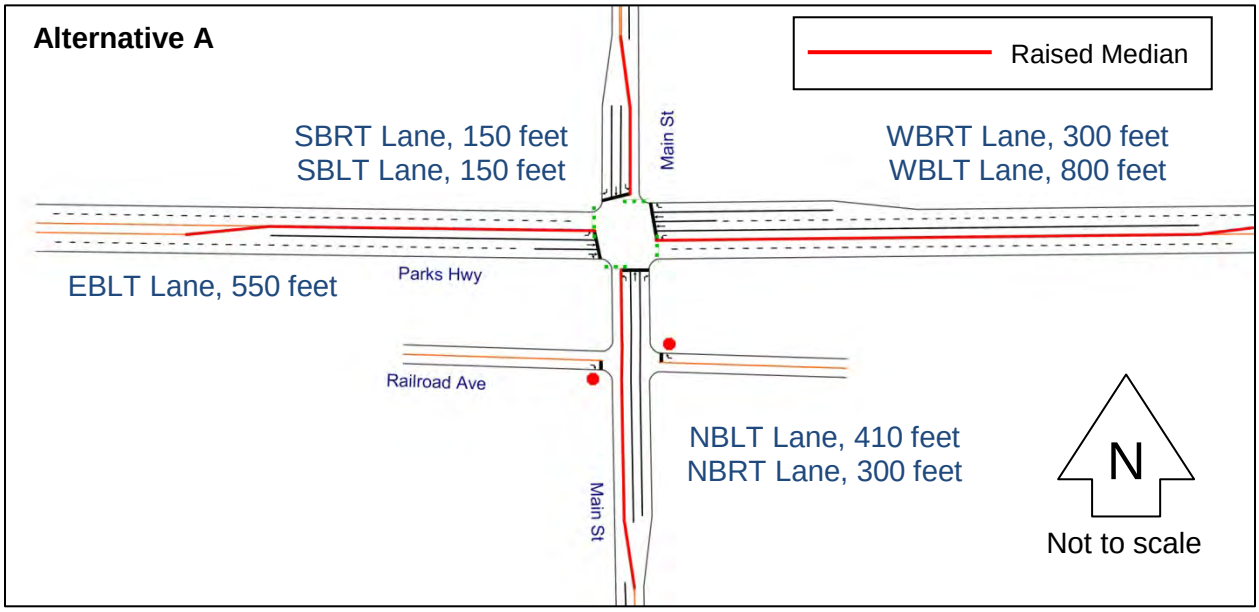


Figure 17: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative A

5.2.1.4 *Susitna Avenue Intersection*

The southbound left turn lane at Susitna Avenue is reduced to the minimum length to accommodate the northbound left turn lane length for the Parks Highway. The northbound left turn lane extends to Park Avenue so that left turning vehicles will be able to enter the turn lane in spite of the lengthy northbound through queue.

	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	275 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 19: Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative A

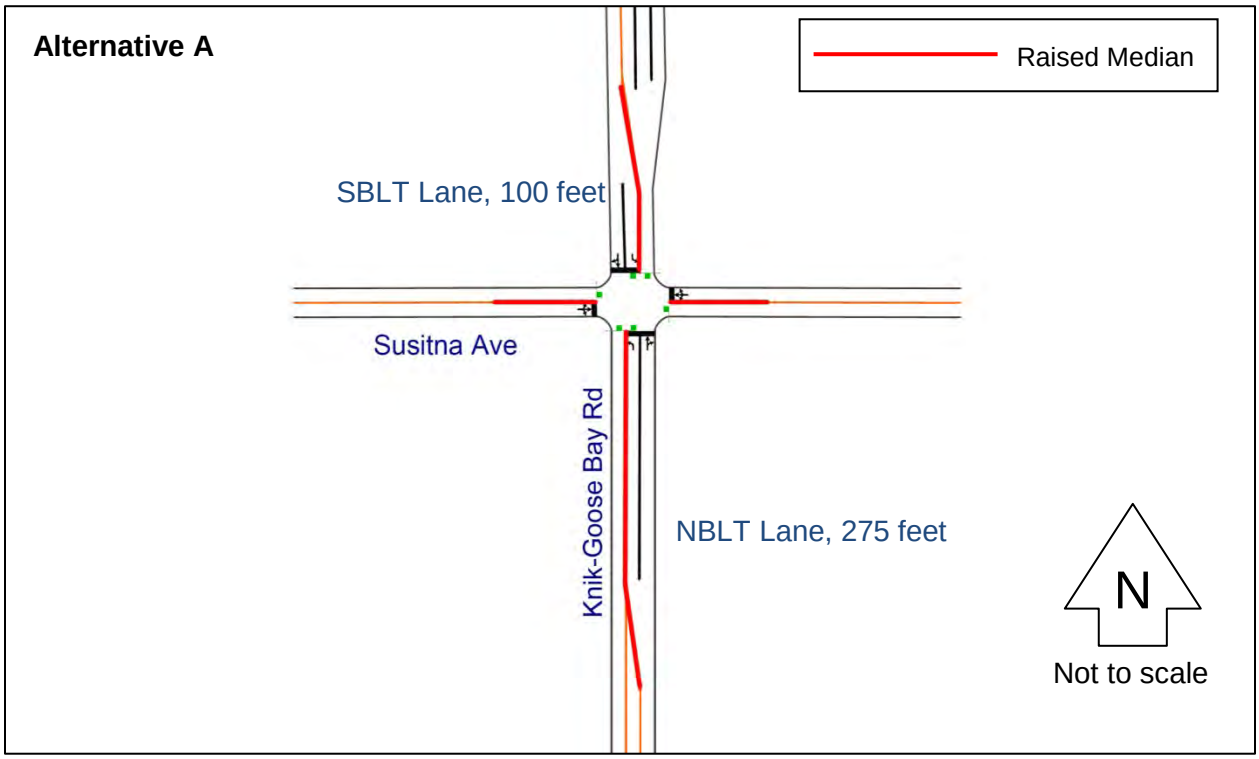


Figure 18: Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative A

5.2.2 Alternative B

Table 20 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative B. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	**EB L**	**EB T**	**EB R**	**WB L**	**WB T**	**WB R**	**NB L**	**NB T**	**NB R**	**SB L**	**SB T**	**SB R**
Main St & Nelson Ave/ Bogard Rd	22	326		83	240		62	66		64	67	
Main St & Swanson Ave	55	65		102	128		15	81		8	73	
Main St & Parks Hwy	301	545	156	576	849	62	263	185	60	100	263	207
Main St & Susitna Ave		53			32		3	100		1	39	
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd	100			175			100			100		
Main St & Swanson Ave	100			100			100			100		
Main St & Parks Hwy	450		300	725		200	275		100	100		200
Main St & Susitna Ave							100			100		
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd	325			325			100			100		
Main St & Swanson Ave	100			125			100			100		
Main St & Parks Hwy	625		475	900		375	275		175	275		275
Main St & Susitna Ave							100			100		

Table 20: Queues and Lane Length Calculations for Alternative B Intersections (2035)

5.2.2.1 Bogard Road/Nelson Avenue Intersection

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road, the recommended auxiliary lane lengths are constrained somewhat by the surrounding access points. Figure 19 and Table 21 present the recommended auxiliary lane lengths and taper rates. Note in the figure that the eastbound left turn lane is shortened from desirable due to the intersection of Nelson Avenue with Knik Street. The 2006 study shows this segment of roadway being redesigned with the left turn lane running the entire length from Knik Street to Main Street. This configuration would give the full desirable length for the left turn lane, but would not provide the transition taper. Under both configurations, left turning vehicles will be blocked from the left turn lane by the adjacent through vehicle queue in the peak hour.

The desired northbound left turn lane for this alternative is much shorter because the northbound through queue is shorter, therefore with this alternative, there is a median opening at Paulson Avenue. This is consistent with the design proposed in the 2006 study.

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	168 (>M, <D)	325 (D)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	6:1 (72 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 21: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative B

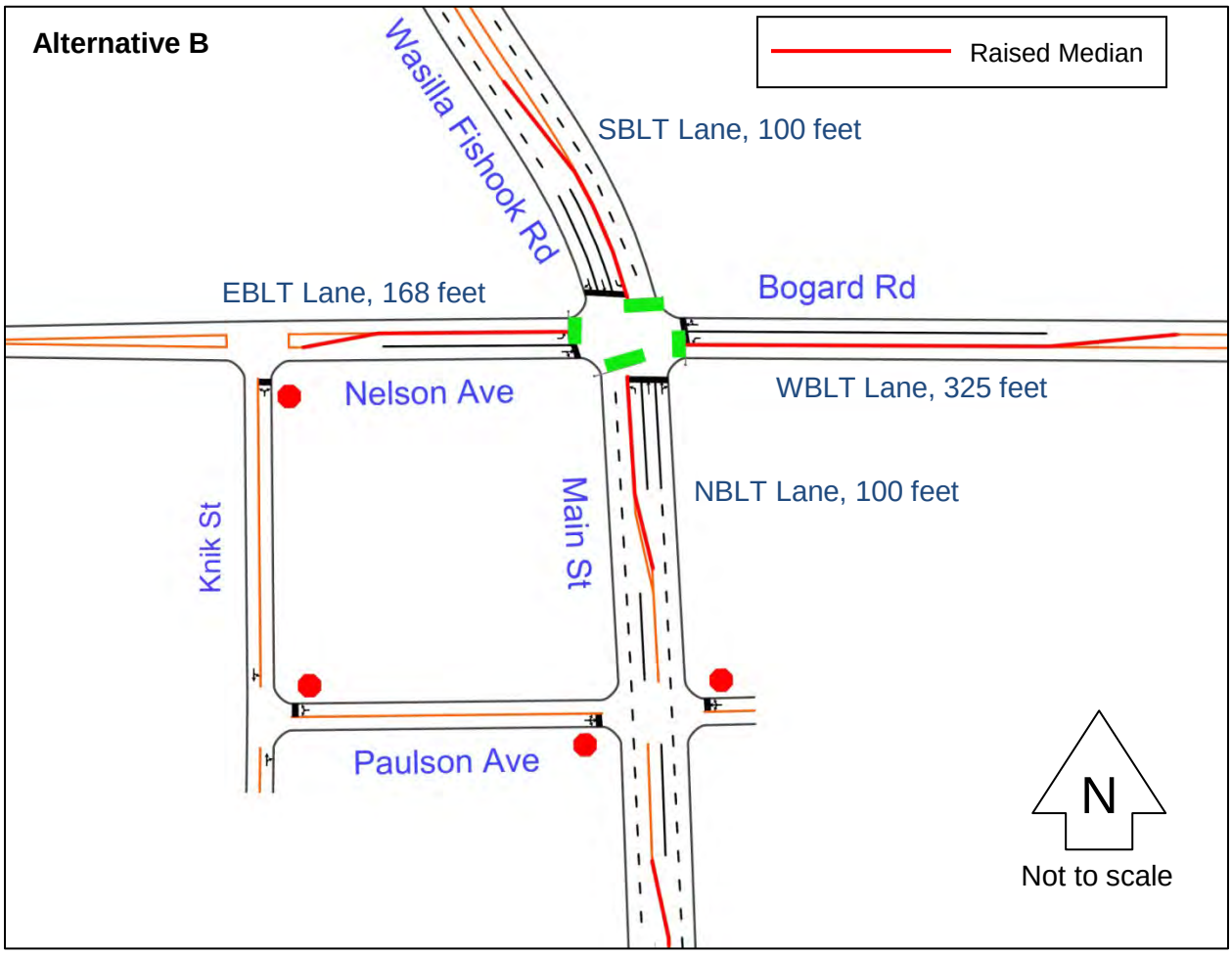


Figure 19: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersection, Alternative B

5.2.2.2 Swanson Avenue Intersection

At the intersection of Swanson Avenue with Main Street, there are also some physical constraints on the turn lane lengths. For the southbound left turn lane, the desirable turn lane length can be met, but it extends past the Post Office driveway and meets the left turn lane for Paulson Avenue. For the northbound left turn lane, the desirable turn lane length of 125 feet cannot be met, just like with Alternative A, due to the close proximity with Herning Avenue and

the need to provide a southbound left turn lane and taper at that intersection. Since adequate space is unavailable to fit both of these turn lanes in between the two intersections, the recommended turn lane length for both intersections was reduced to 90 feet, with 72 foot tapers. Another option would be to convert Herning Avenue to right-in/right-out only; however, Herning Avenue is a fairly high volume road, making this option less desirable.

For the eastbound and westbound left turn lanes, the desirable left turn lane length can be met. Note that the eastbound right turn lane and eastbound dual left turn lanes recommended in the 2006 study are no longer recommended in this study.

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	125 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 22: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative B

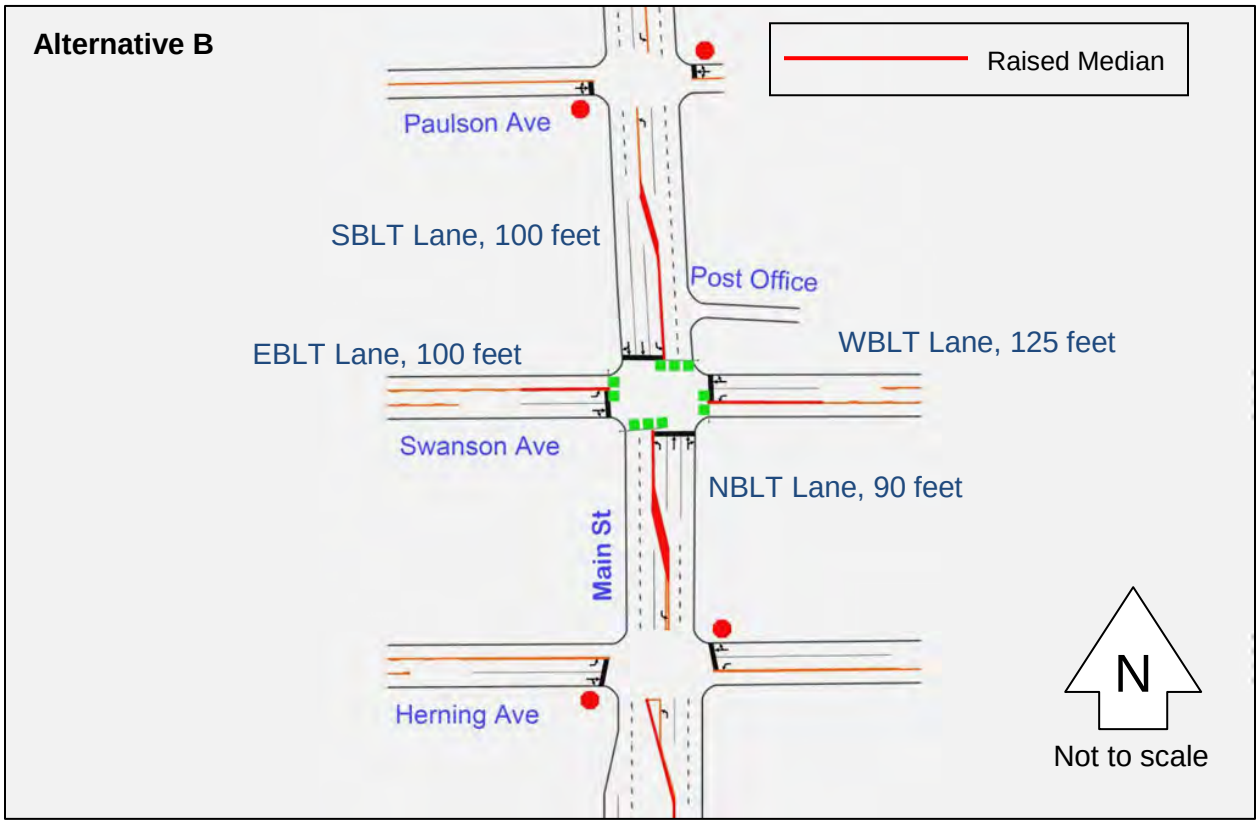


Figure 20: Auxiliary Lane Recommendations for Swanson Avenue Intersection, Alternative B

5.2.2.3 Parks Highway Intersection

For the Parks Highway intersection, the southbound through queue is very long and extends through the Herning Avenue intersection. The desirable turn lane lengths would extend far enough back to allow left and right turning vehicles to enter the turn lanes without being blocked by the extensive through queue; however, the actual left turn and right turn queues are quite short. Another consideration in making an auxiliary lane recommendation is the need to provide for queue storage and deceleration in the northbound left turn lane at Herning Avenue. As a result, the southbound auxiliary lane recommended length is 150 feet for both turn lanes.

The northbound left turn and through queues are both very long, extending through the Railroad Avenue intersection, but not fully reaching the Susitna Avenue intersection. Because of its proximity to the Parks Highway intersection, it is recommended that Railroad Avenue is restricted to right-in/right-out movements. The recommended Parks Highway northbound left turn lane length is shortened somewhat to allow room for the Susitna Avenue southbound left turn lane.

The eastbound and westbound through movement queues on the Parks Highway are quite lengthy, but the desired left turn lane lengths can be accommodated because there is enough spacing between signals on the Parks Highway. It is recommended that the westbound right turn lane be shortened from desirable so that it does not extend through the intersection with Boundary Street, to the east of Main Street. Also note that extending the eastbound and westbound left turn lanes as recommended will necessitate converting Yenlo Street and Knik Street to right-in-right-out movements only.

	EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	625 (D)	475 (D)	900 (D)	300 (>M, <D)	275 (D)	175 (D)	275 (D)	275 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	10:1 (120 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 23: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative B

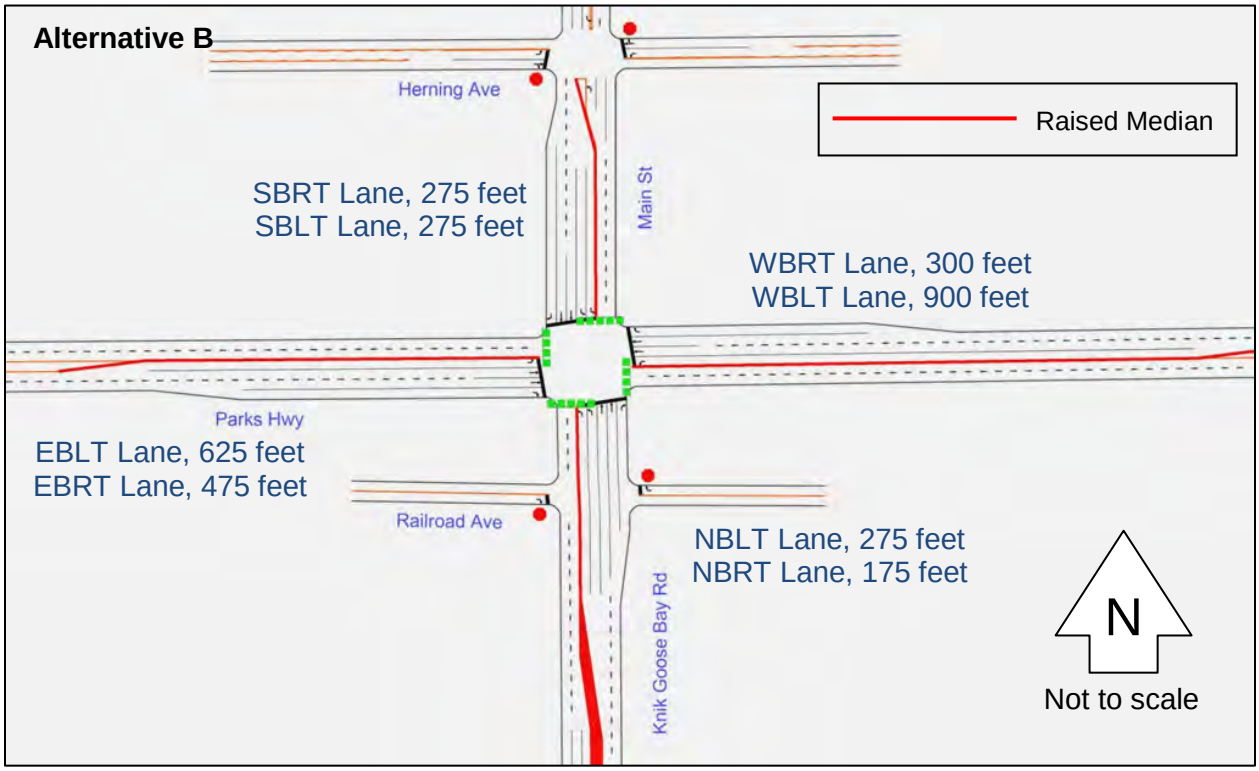


Figure 21: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative B

5.2.2.4 Susitna Avenue Intersection

Both the southbound and northbound left turn lanes at Susitna Avenue can be built to the desirable length.

	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 24: Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative B

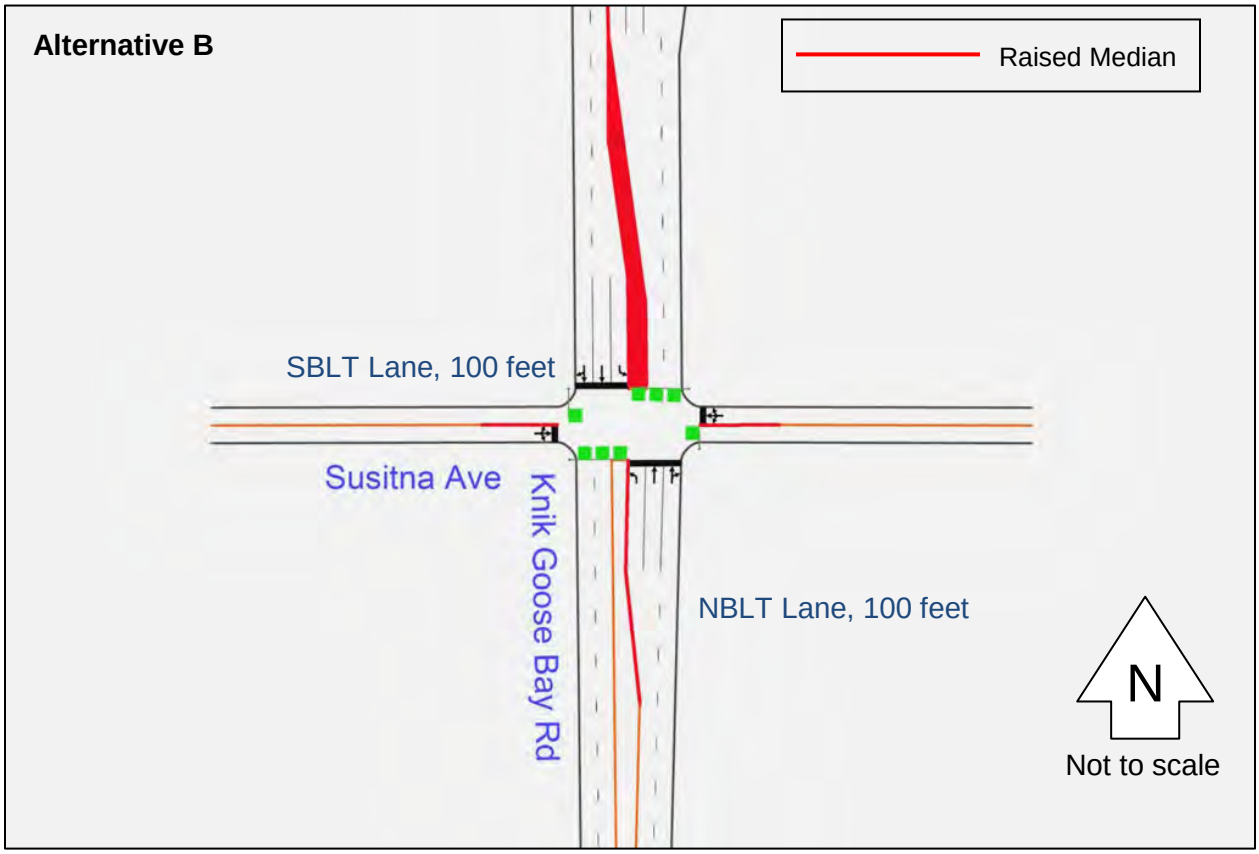


Figure 22: Auxiliary Lane Recommendations for Susitna Avenue Intersection, Alternative B

5.2.3 Alternative C

Table 25 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative C. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	**EB L**	**EB T**	**EB R**	**WB L**	**WB T**	**WB R**	**NB L**	**NB T**	**NB R**	**SB L**	**SB T**	**SB R**
Main Street & Nelson Ave/ Bogard Rd	15	148		62	143		49	95	34	26	32	6
Main Street & Swanson Ave	11	6		91	107		11	90		6	105	
Main Street & Parks Hwy	273	645		339	951	66	301	284	42	162	404	182
Main Street & Park Ave	26		32				54	106			129	
Knik St & Nelson Ave		184		10	50		50	90		34	82	
Knik St & Swanson Ave	78	139		30	63		10	54		7	47	
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main Street & Nelson Ave/ Bogard Rd	100			175			100		100	100		100
Main Street & Swanson Ave	100			100			100			100		
Main Street & Parks Hwy	425			475		200	300		100	150		175
Main Street & Park Ave	100		100				100					
Knik St & Nelson Ave				100			100			100		
Knik St & Swanson Ave	100			100			100			100		
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main Street & Nelson Ave/ Bogard Rd	150			325			100		100	100		100
Main Street & Swanson Ave	100			125			100			100		
Main Street & Parks Hwy	600			650		375	300		275	400		400
Main Street & Park Ave	100		100				100					
Knik St & Nelson Ave				100			100			100		
Knik St & Swanson Ave	150			100			100			100		

Table 25: Queues and Lane Length Calculations for Alternative C Intersections (2035)

5.2.3.1 Bogard Road/Nelson Avenue Intersections

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road and with Knik Street, the recommended auxiliary lane lengths are constrained somewhat by the surrounding access points. Figure 23 and Table 26 present the recommended auxiliary lane lengths and taper rates. Note in the figure that the eastbound and westbound left turn lanes are shortened from desirable due to the close proximity of the two intersections.

The desired northbound left turn lanes at both intersections are met, with a median opening at Paulson Avenue on Main Street and a two-way-left-turn lane running between Nelson Avenue

and Swanson Avenue on Knik Street. This is consistent with the design proposed in the 2006 study.

Main Street

	EBL	WBL	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	84 (<M)	325 (D)	100 (D)	100 (D)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)

Knik Street

	EBL	WBL	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	None	84 (<M)	100 (D)	None	100 (D)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	6:1 (72 feet)	None	6:1 (72 feet)	None

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 26: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative C

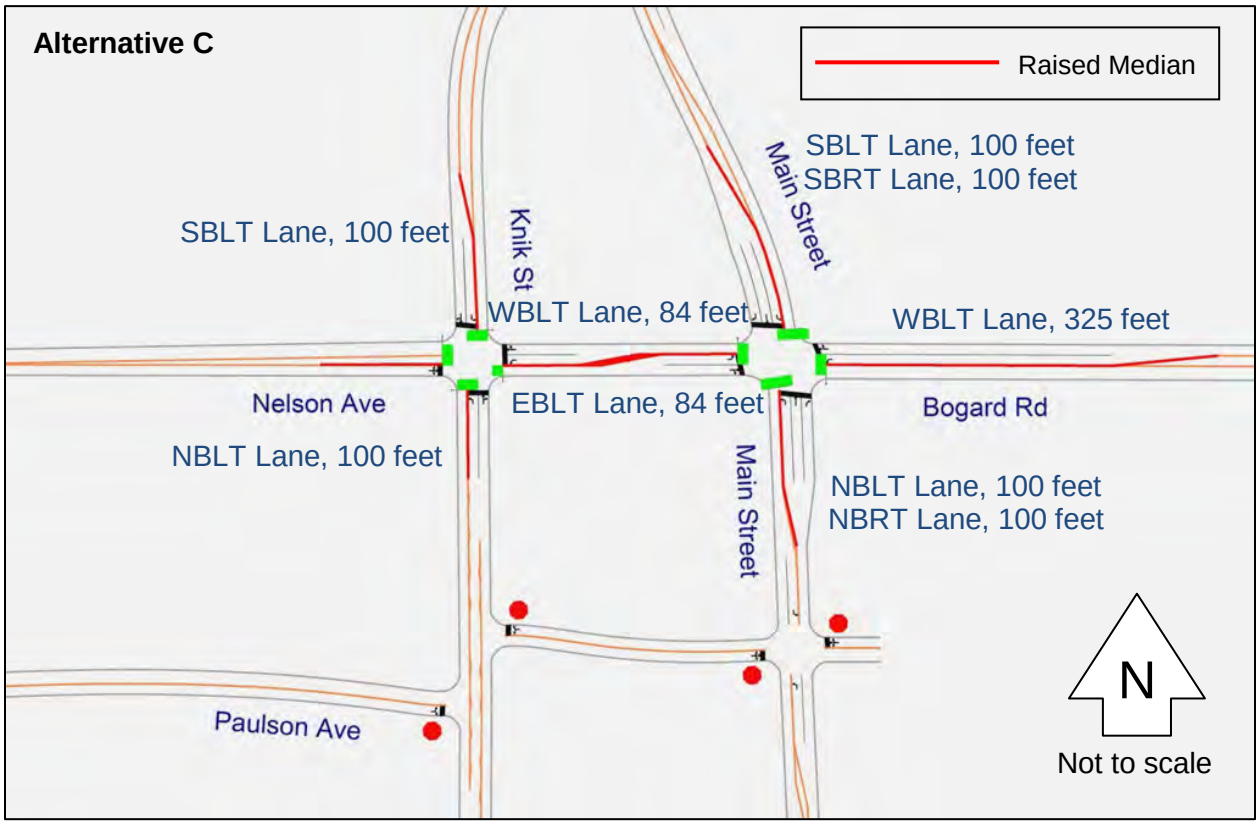


Figure 23: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative C

5.2.3.2 Swanson Avenue Intersections

At the intersections of Swanson Avenue with Main Street and with Knik Street, there are some physical constraints on the turn lane lengths. For the southbound left turn lane on Main Street, the desirable turn lane length can be met, but it extends past the Post Office driveway and meets the left turn lane for Paulson Avenue. For the northbound left turn lanes at both intersections, the desirable turn lane length of 100 feet cannot be met, just like with Alternatives A and B, due to the close proximity with Herning Avenue and the need to provide a southbound left turn lane and taper at that intersection. Since adequate space is unavailable to fit both of these turn lanes in between the two intersections, the recommended turn lane length for both intersections was reduced to 90 feet, with 72 foot tapers.

For the eastbound and westbound left turn lanes at Knik Street and at Main Street, the desirable left turn lane lengths can be met. Note that the dual westbound left turn lanes recommended at Main Street in the 2006 study are no longer recommended in this study. Between Knik Street and Main Street, the turn lanes are back-to-back, so that all driveways on this segment will need to be converted to right-in/right-out.

Main Street

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	125 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

Knik Street

	EBL	WBL	NBL	SBL
Auxiliary Lane Group Length Recommendations (feet)	150 (D)	100 (D)	90 (<M)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 27: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative C

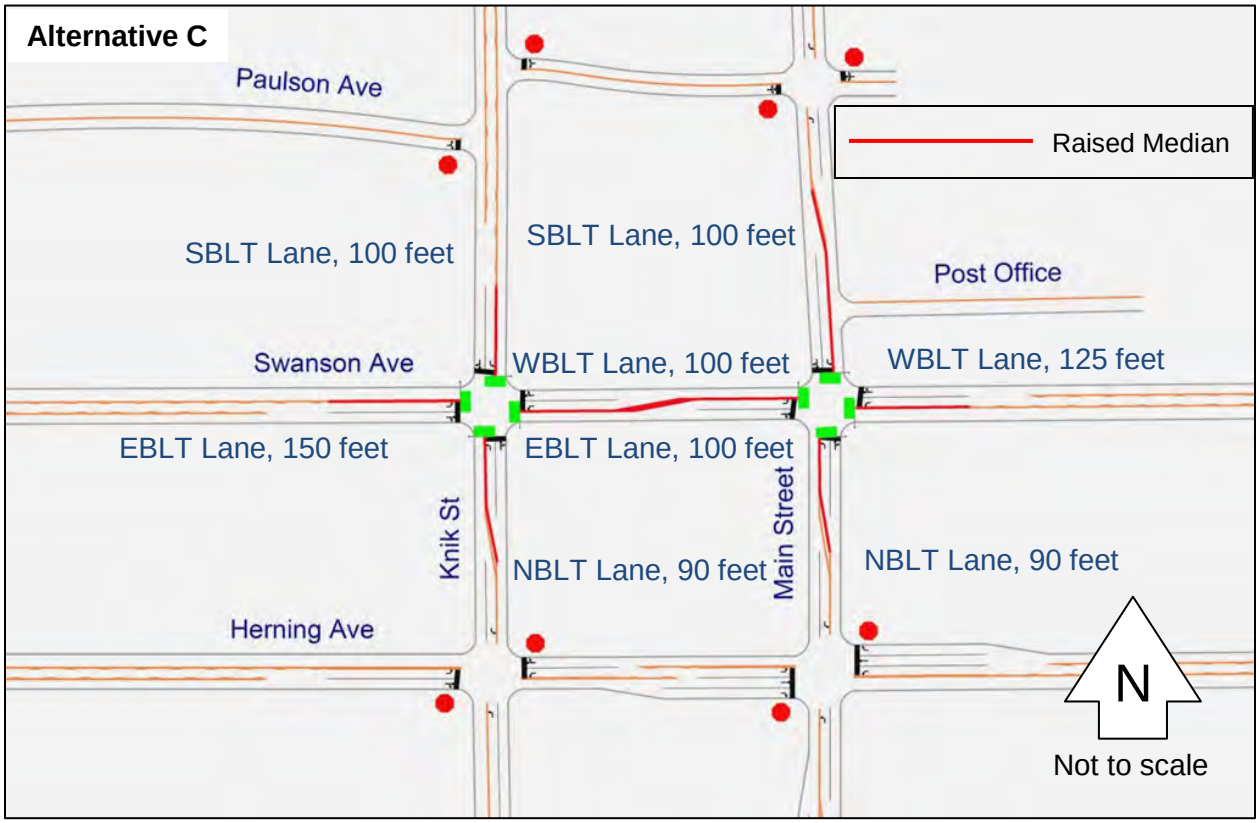


Figure 24: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative C

5.2.3.3 Parks Highway Intersection

Under Alternative C, Knik Street is grade separated from the Parks Highway, Railroad Avenue, and the railroad tracks. Thus, the Parks Highway intersects only with Main Street. At this intersection, the southbound through queue is very long, extending back to the Herning Avenue intersection. To accommodate a northbound left turn lane at Herning Avenue, therefore, the southbound left turn lane is shortened from desirable. The southbound right turn lane is also shortened from desirable, to allow the lane and taper to fit within the road segment between the intersections.

The northbound left turn and through queues both extend through the Railroad Avenue intersection. Because of its proximity to the Parks Highway intersection, it is recommended that Railroad Avenue be restricted to right-in/right-out movements. The recommended Parks Highway northbound left turn and right turn lane lengths are equivalent to the desirable lane lengths.

The eastbound and westbound through movement queues on the Parks Highway are quite lengthy, but the desired left turn lane lengths can be accommodated because there is enough

spacing between signals on the Parks Highway. It is recommended that the westbound right turn lane be shortened from desirable so that it does not extend through the intersection with Boundary Street, to the east of Main Street. Also note that extending the westbound left turn lane as recommended will necessitate converting Yenlo Street to right-in/right-out movements only.

Main Street

	EBL	WBL	WBR	NBL	NBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	600 (D)	650 (D)	300 (>M, <D)	300 (D)	275 (D)	200 (>M, <D)	275 (>M, <D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (144 feet)	12:1 (144 feet)	12:1 (144 feet)	10:1 (120 feet)	10:1 (120 feet)	6:1 (72 feet)	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 28: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative C

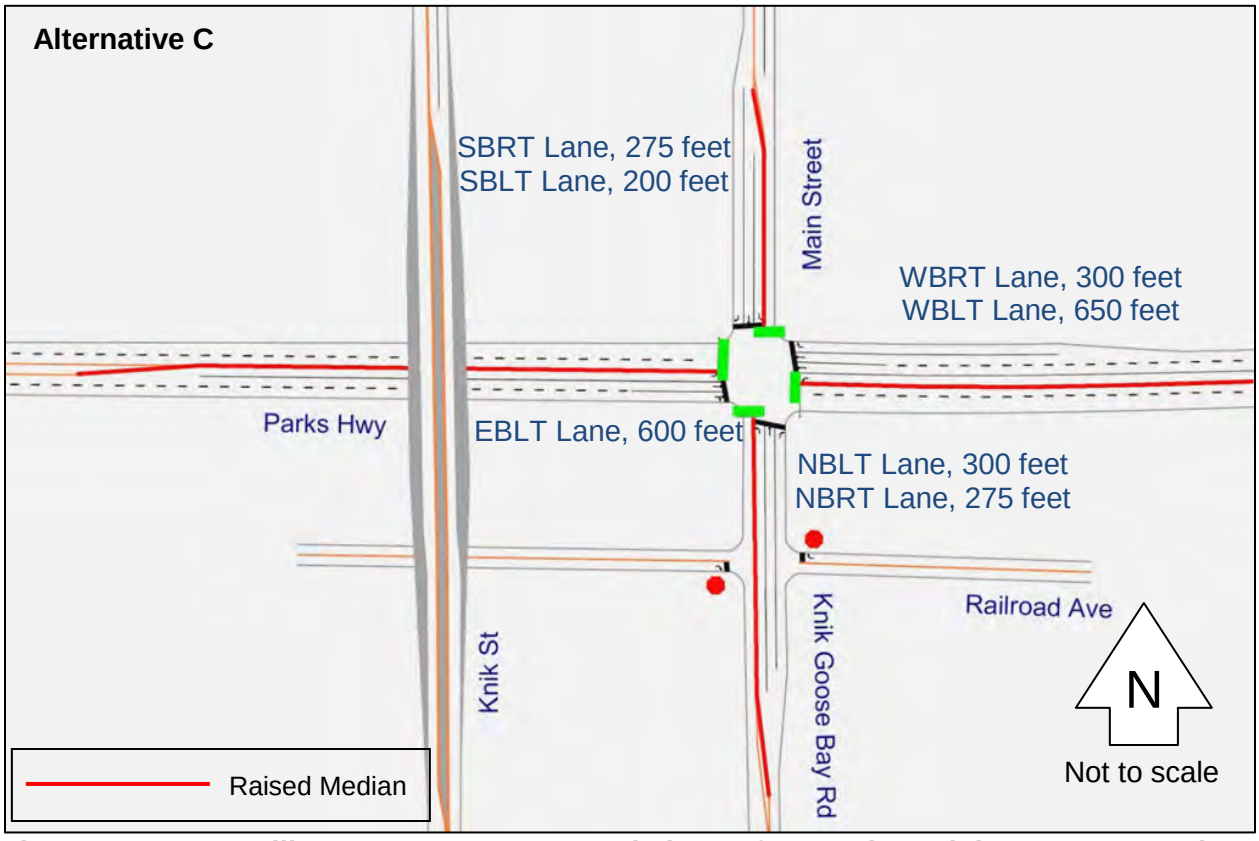


Figure 25: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative C

5.2.3.4 Park Avenue Intersection

The left turn lanes at Park Avenue and Knik-Goose Bay Road can be built to the desirable length.

	EBL	NBL
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	100 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 29: Auxiliary Lane Recommendations for Park Avenue Intersection, Alternative C

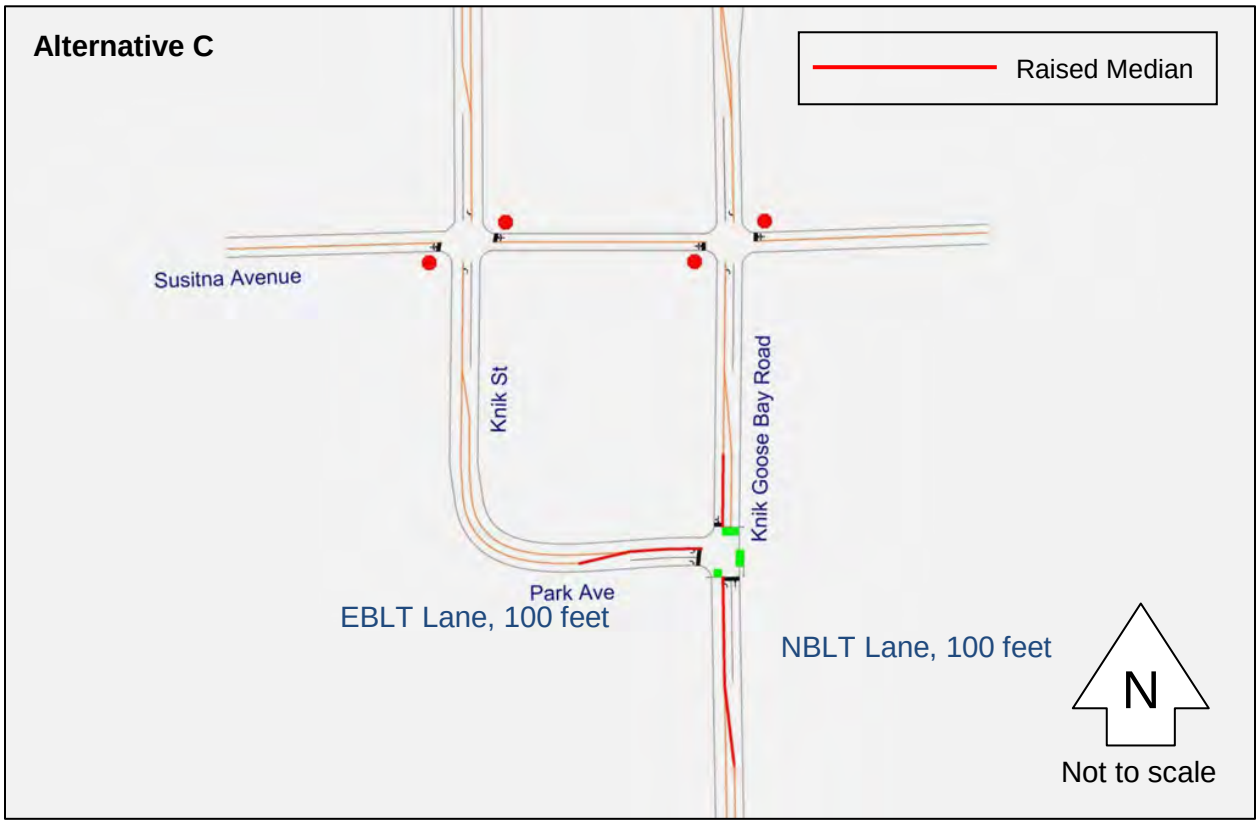


Figure 26: Auxiliary Lane Recommendations for Park Avenue Intersection, Alternative C

5.2.4 Alternative D

Table 30 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for Alternative D, option 1 and Table 31 gives values for Alternative D, option 2. The recommended auxiliary lane lengths and bay tapers for each intersection are discussed in the following subsections.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	**EB L**	**EB T**	**EB R**	**WB L**	**WB T**	**WB R**	**NB L**	**NB T**	**NB R**	**SB L**	**SB T**	**SB R**
Main St & Nelson Ave/ Bogard Rd		194	162	129	75						84	
Main St & Swanson Ave		87		271	18						159	
Main St & Parks Hwy		570	88	137	170					412	293	376
Knik-Goose Bay Rd & Lake View Ave		68			83						145	
Yenlo St & Bogard Rd	14	48			164	30	60	34				
Yenlo St & Swanson Ave	211	39			84	226		250				
Talkeetna St/Yenlo St & Parks Hwy	256	159			408	205	433	241				
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd			150	200								
Main St & Swanson Ave				275								
Main St & Parks Hwy			250	150						400		375
Knik-Goose Bay Rd & Lake View Ave												
Yenlo St & Bogard Rd	125					100	100					
Yenlo St & Swanson Ave	200					225						
Talkeetna St/Yenlo St & Parks Hwy	400					225	425					
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd			200	375								
Main St & Swanson Ave				275								
Main St & Parks Hwy			575	450						400		375
Knik-Goose Bay Rd & Lake View Ave												
Yenlo St & Bogard Rd	275					275	100					
Yenlo St & Swanson Ave	200					225						
Talkeetna St/Yenlo St & Parks Hwy	575					525	400					

Table 30: Queues and Lane Length Calculations for Alternative D, Option 1 Intersections (2035)

95th Percentile Queues, Feet, Design Year 2035												
Intersection	**EB L**	**EB T**	**EB R**	**WB L**	**WB T**	**WB R**	**NB L**	**NB T**	**NB R**	**SB L**	**SB T**	**SB R**
Main St & Nelson Ave/ Bogard Rd		91	83	75	100	15				77	146	27
Yenlo St & Bogard Rd		93			222		94		2			
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd			100	175		125				150		150
Yenlo St & Bogard Rd							100					
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd			100	325		275				150		150
Yenlo St & Bogard Rd							100					

Table 31: Queues and Lane Length Calculations for Alternative D, Option 2 Intersections (2035)

5.2.4.1 Bogard Road/Nelson Avenue Intersections

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road and with Yenlo Street, the recommended auxiliary lane lengths are constrained somewhat between the two intersections for Option 1. Figure 27 and Table 33 present the recommended auxiliary lane lengths and taper rates. For Option 2, the auxiliary lanes do not conflict with each other, so desirable lane lengths are recommended (see Figure 28 and Table 33).

Main Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	200 (D)	280 (>M, <D)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	10:1 (120 feet)	None

Yenlo Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	150 (>M, <D)	None	None	275 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	10:1 (120 feet)	None	None	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 32: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 1

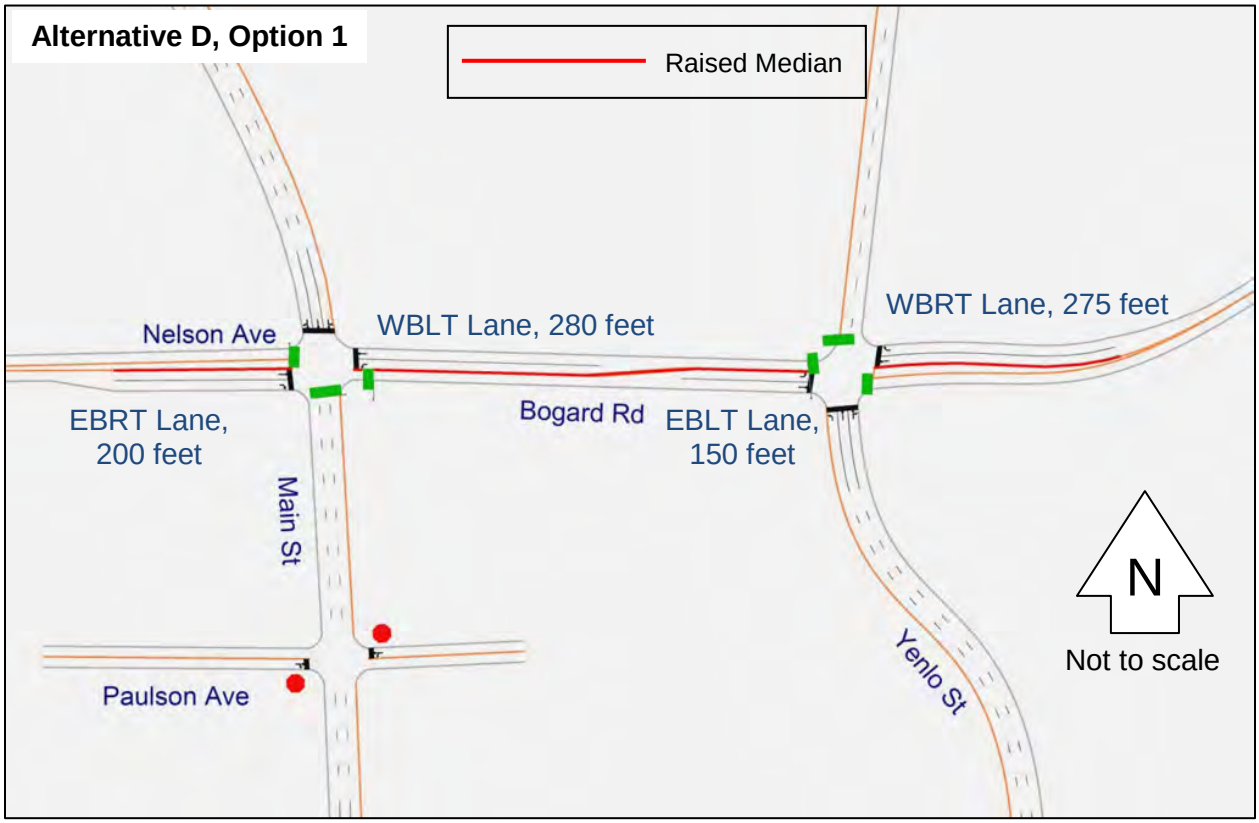


Figure 27: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 1

Main Street

	EBR	WBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	275 (D)	150 (D)	150 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 33: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 2

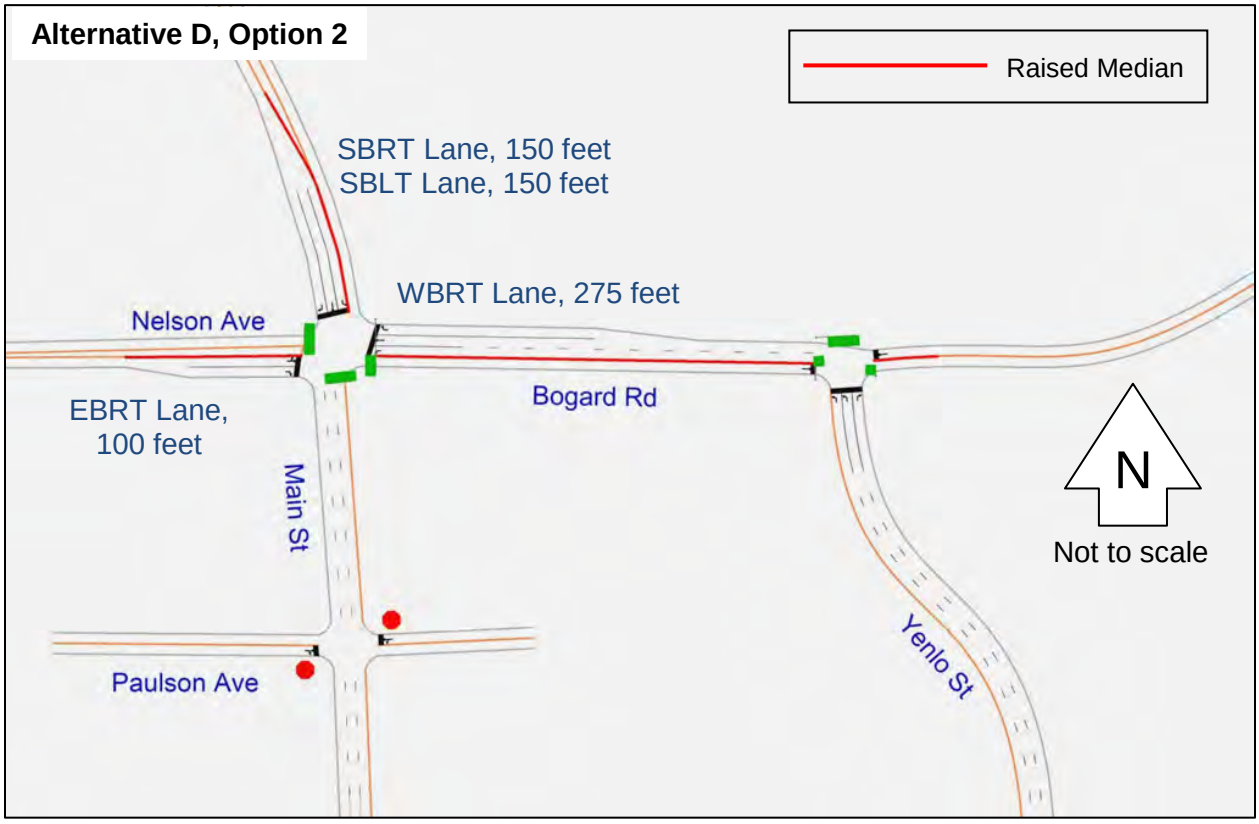


Figure 28: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Alternative D, Option 2

5.2.4.2 Swanson Avenue Intersections

At the intersections of Swanson Avenue with Main Street and with Yenlo Street, there is essentially no difference between the auxiliary lanes for Option 1 compared to Option 2. No northbound or southbound auxiliary lanes are recommended. Eastbound and westbound left turn lanes transition into two-way-left-turn lanes between the signalized intersections.

Main Street

	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	200 (<M)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	None

Yenlo Street

Yenlo Street			
	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	200 (D)	None	225 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	None	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 34: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative D

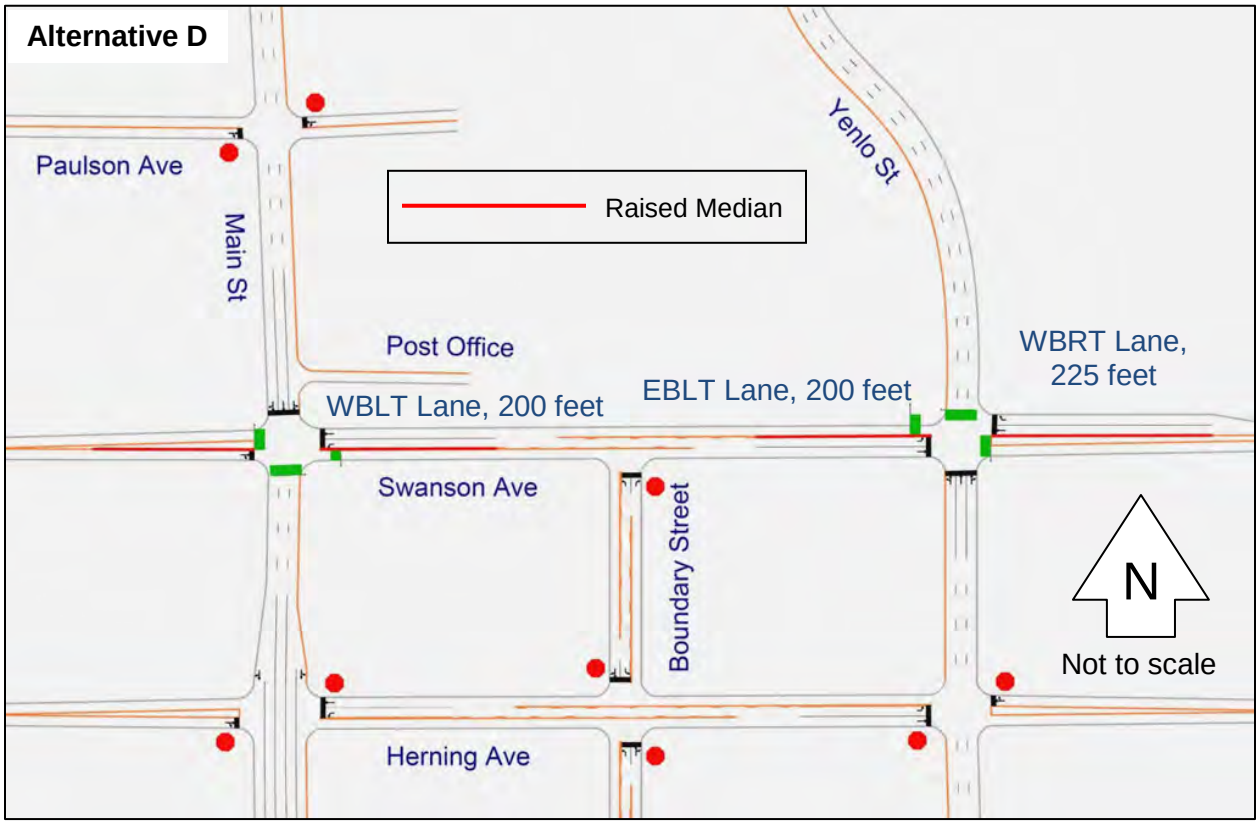


Figure 29: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Alternative D

5.2.4.3 Parks Highway Intersection

Eastbound and westbound left turn queues on the Parks Highway are very long and are not accommodated between the Main Street/Knik-Goose Bay Road and Yenlo Street/Talkeetna Street intersections if eastbound and westbound single left turn lanes are used. Although it is not necessary for capacity, dual left turn lanes are recommended at these intersections to better accommodate the queues. With dual eastbound and westbound left turn lanes, the minimum lane length cannot be achieved, but queues can be accommodated within the lane and bay taper.

At the intersection of Parks Highway with Main Street/Knik-Goose Bay Road, the desirable southbound auxiliary lanes are accommodated by extending the lane past the Herning Avenue intersection. At the intersection of Parks Highway with Yenlo Street/Talkeetna Street, the desirable northbound auxiliary lane length is accommodated by extending the lane past the Railroad Avenue intersection.

Main Street

	EBL	EBR	WBL	WBR	NBL	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	None	575 (D)	181 (<M)	None	None	400 (D)	375 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	12:1 (144 feet)	12:1 (288 feet)	None	None	6:1 (72 feet)	6:1 (72 feet)

Yenlo Street

	EBL	EBR	WBL	WBR	NBL	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	181 (<M)	None	None	525 (D)	400 (D)	None	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (288 feet)	None	None	12:1 (144 feet)	6:1 (72 feet)	None	None

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 35: Auxiliary Lane Recommendations for Parks Highway Intersection, Alternative D

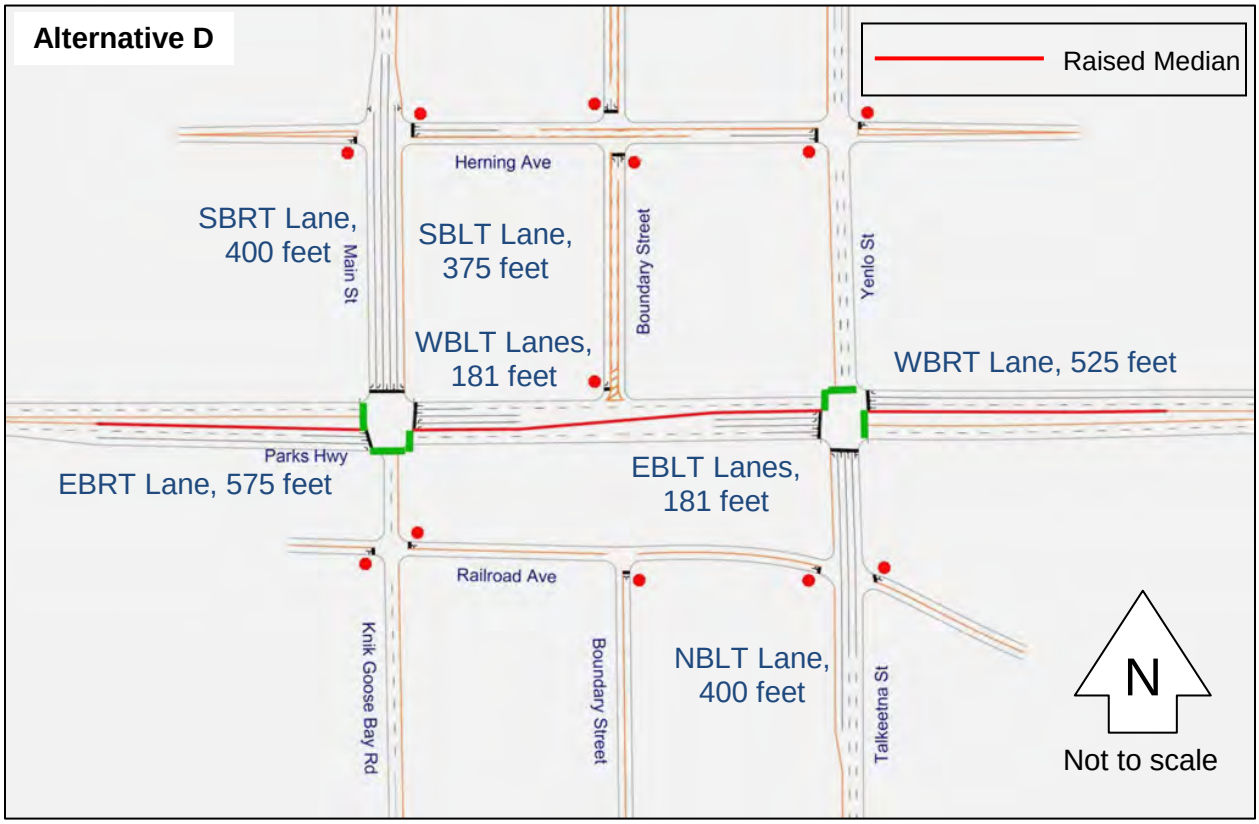


Figure 30: Auxiliary Lane Recommendations for Parks Highway Intersections, Alternative D

5.2.4.4 Lake View Avenue Intersection

No auxiliary lanes are proposed for the signalized intersection of Lake View Avenue with Knik-Goose Bay Road.

5.2.5 Refined Alternative D, Option 2

A refined Alternative D, option 2 model was developed to take into consideration design constraints such as right-of-way. There are three major changes to this alternative:

- Yenlo Street is reduced to two lanes between Swanson Avenue and Bogard Road
- Talkeetna Street is reduced to two lanes from Entry Way to Susitna Avenue
- Northbound and southbound auxiliary lanes have been reduced at the two Parks Highway intersections

Table 36 shows the 95th percentile queue length, the minimum lane length, and the desired lane length for the signalized intersections in the study area for the refined alternative. The refined auxiliary lane recommendations for the signalized intersections are presented in the following subsections.

95th Percentile Queues, Feet, Design Year 2035												
Intersection	**EB L**	**EB T**	**EB R**	**WB L**	**WB T**	**WB R**	**NB L**	**NB T**	**NB R**	**SB L**	**SB T**	**SB R**
Main St & Nelson Ave/ Bogard Rd		91	83	73	103	15				77	146	27
Main St & Swanson Ave		144		190	27						126	
Main St & Parks Hwy		589	116	209	242						607	683
Knik-Goose Bay Rd and Lake View Ave		68			83						176	
Yenlo St & Bogard Rd		106			309		157		12			
Yenlo St & Swanson Ave	105	38			89	141	66	251				
Talkeetna St/Yenlo St & Parks Hwy	266	132			813	606		396				
Minimum Auxiliary Lane Length, Feet: Queue Storage and Minimum Deceleration Length (Enter bay taper at 10 mph less than approach speed, deceleration begins in bay taper)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd			100	150		100				150		100
Main St & Swanson Ave				175								
Main St & Parks Hwy			275	225								675
Knik-Goose Bay Rd and Lake View Ave												
Yenlo St & Bogard Rd							150		100			
Yenlo St & Swanson Ave	100					150	100					
Talkeetna St/Yenlo St & Parks Hwy	425					625						
Desirable Auxiliary Lane Length, Feet: Queue Storage and Desirable Deceleration Length (Enter bay taper at approach speed, delay deceleration until vehicle enters lane)												
Intersection	**EB L**		**EB R**	**WB L**		**WB R**	**NB L**		**NB R**	**SB L**		**SB R**
Main St & Nelson Ave/ Bogard Rd			100	325		275				150		150
Main St & Swanson Ave				175								
Main St & Parks Hwy			575	525								400
Knik-Goose Bay Rd and Lake View Ave												
Yenlo St & Bogard Rd							150		100			
Yenlo St & Swanson Ave	100					150	250					
Talkeetna St/Yenlo St & Parks Hwy	575					925						

Table 36: Queues and Lane Length Calculations for Refined Alternative D, Option 2 Intersections (2035 PM Peak)

5.2.5.1 Bogard Road/Nelson Avenue Intersections

At the intersection of Bogard Road/Nelson Avenue with Main Street/Wasilla Fishhook Road and with Yenlo Street, the auxiliary lanes do not conflict with each other, so desirable lane lengths are recommended (see Figure 28 and Table 33).

Main Street

	EBR	WBL	WBR	SBL	SBR
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	325 (D)	275 (D)	150 (D)	150 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)	10:1 (120 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 37: Auxiliary Lane Recommendations for Bogard Road/Nelson Avenue Intersections, Refined Alternative D, Option 2

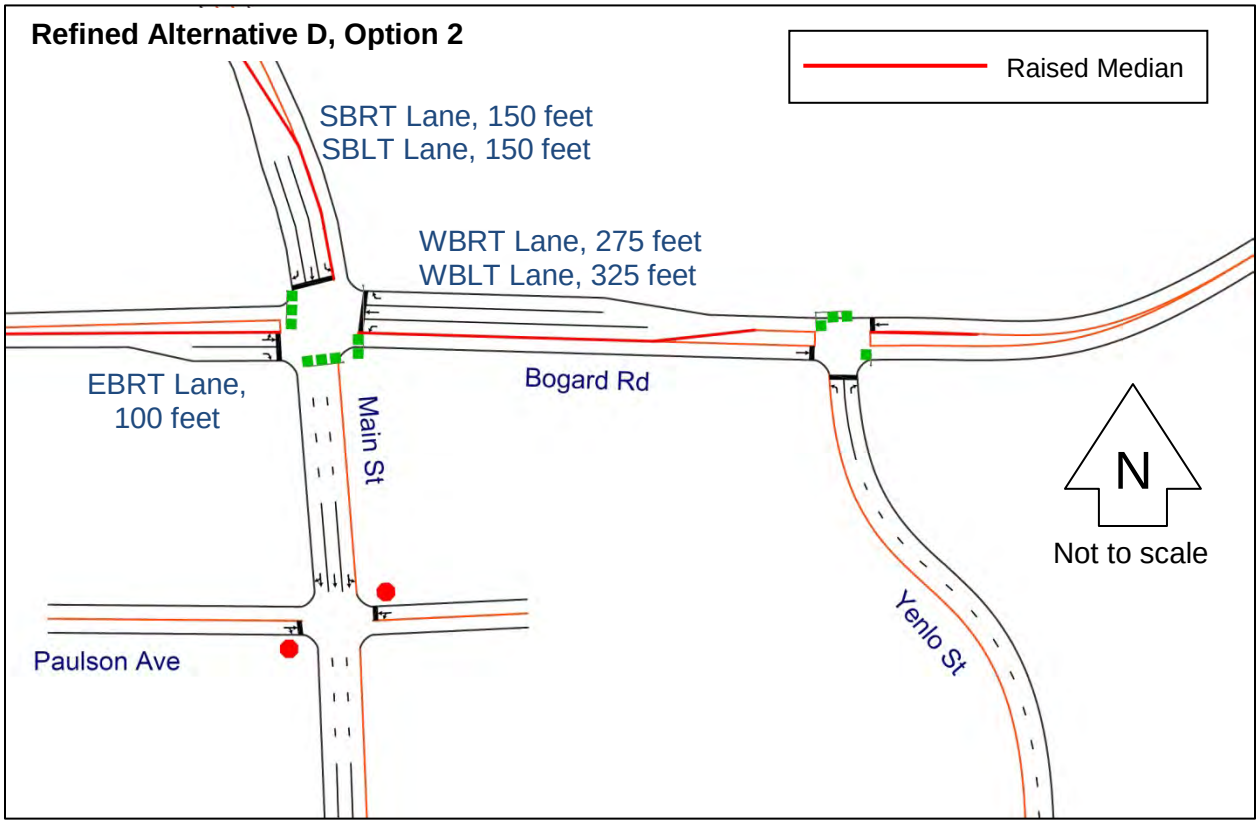


Figure 31: Auxiliary Lane Length Recommendations for Bogard Road/Nelson Avenue Intersections, Refined Alternative D, Option 2

5.2.5.2 Swanson Avenue Intersections

At the intersections of Swanson Avenue with Main Street and with Yenlo Street, there is essentially no difference between the auxiliary lanes for Option 1 compared to Option 2. No northbound or southbound auxiliary lanes are recommended. Eastbound and westbound left turn lanes transition into two-way-left-turn lanes between the signalized intersections.

Main Street

	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	175 (D)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	6:1 (72 feet)	None

Yenlo Street

Yenlo Street			
	EBL	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	100 (D)	None	150 (D)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	6:1 (72 feet)	None	6:1 (72 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 38: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Refined Alternative D, Option 2

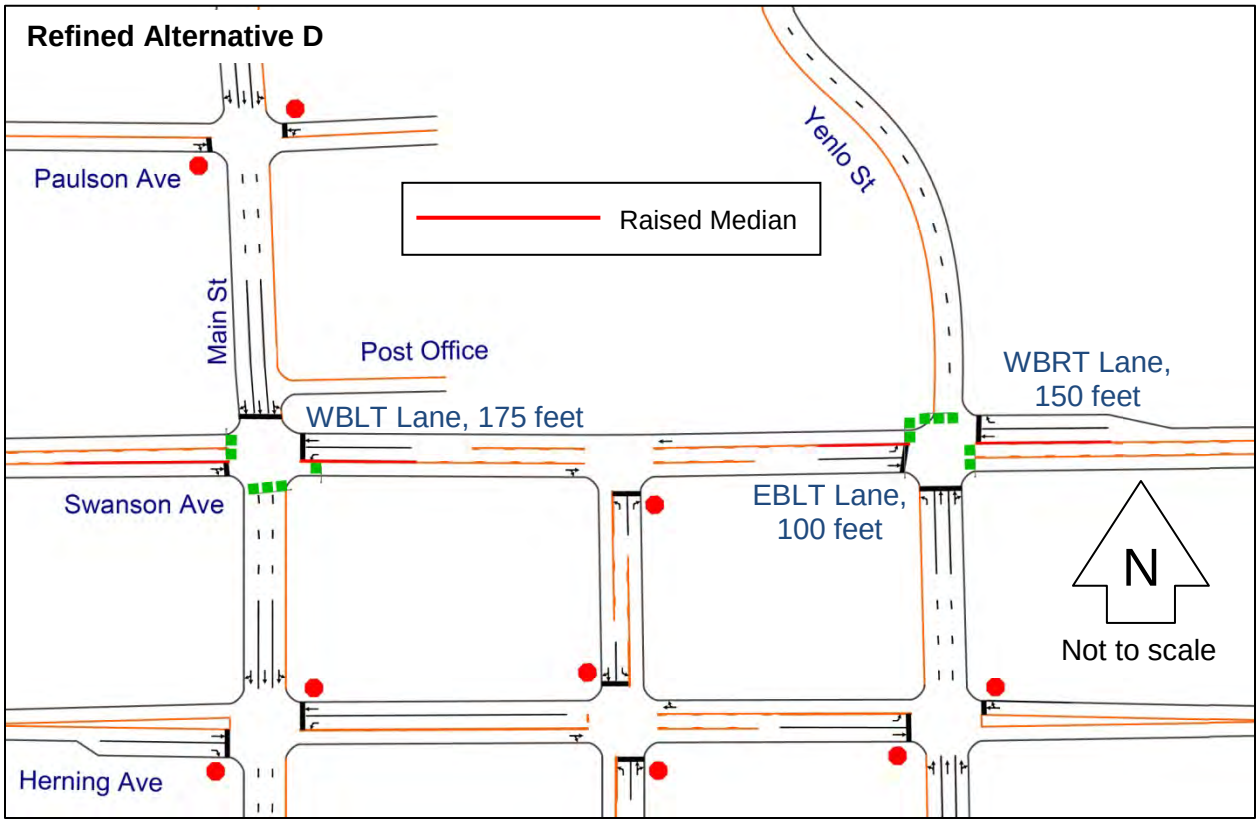


Figure 32: Auxiliary Lane Recommendations for Swanson Avenue Intersections, Refined Alternative D, Option 2

5.2.5.3 Parks Highway Intersection

The need for northbound and southbound auxiliary lanes was reexamined. With eastbound and westbound dual left turn lanes (at Talkeetna/Yenlo), the number of northbound and southbound lanes can be reduced, while maintaining reasonable level of service at the intersection. As

before, the minimum lane length for the eastbound and westbound lefts cannot be achieved, but queues can be accommodated within the lane and bay taper.

With the reduced number of southbound auxiliary lanes at the intersection of Parks Highway with Main Street, the 95th percentile queues in the PM peak hour are expected to extend past the Herning Avenue intersection, but to not extend into the Swanson Avenue intersection. At the intersection of Parks Highway with Yenlo Street/Talkeetna Street, the 95th percentile northbound queues in the PM peak hour are expected to extend past the Railroad Avenue intersection, but will not reach the Susitna Avenue intersection.

Note that the eastbound and westbound Parks Highway queues and lane length recommendations are based on the assumption that the Main Street and Yenlo Street signals are coordinated with each other, but are not coordinated with other signals along the Parks Highway (at Crusey Street and at Lucille Street, for instance). Under this scenario, the eastbound and westbound through queues are very long and the corresponding auxiliary lane must be extended to allow turning vehicles to enter the turn lane behind the through queue. If the signals along the Parks Highway are coordinated in the future, both the through and the turning queues will be reduced, and shorter auxiliary lane lengths could accommodate these queues.

Main Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	None	450 (D)	181 (<M)	None
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	None	12:1 (144 feet)	12:1 (288 feet)	None

Yenlo Street

	EBL	EBR	WBL	WBR
Auxiliary Lane Group Length Recommendations (feet)	181 (<M)	None	None	750 (M)
Auxiliary Lane Bay Tapers (Minimum Taper Rates)	12:1 (288 feet)	None	None	12:1 (144 feet)

(M) – Minimum Lane Length; (D) – Desirable Lane Length

Table 39: Auxiliary Lane Recommendations for Parks Highway Intersections, Refined Alternative D, Option 2

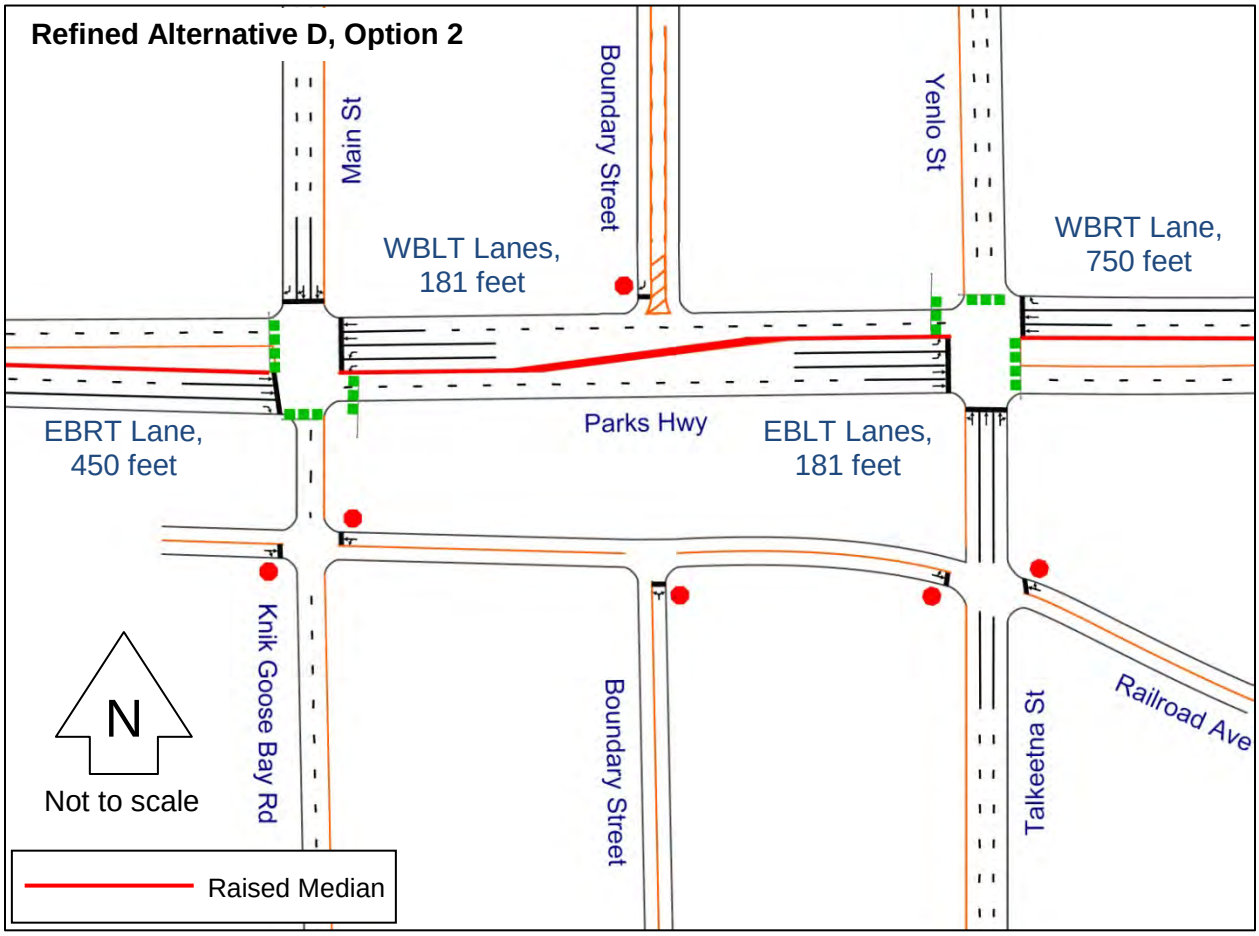


Figure 33: Auxiliary Lane Recommendations for Parks Highway Intersections, Refined Alternative D, Option 2

For reference, the assumed geometry for the remaining intersections in the study area are shown in Figure 34.

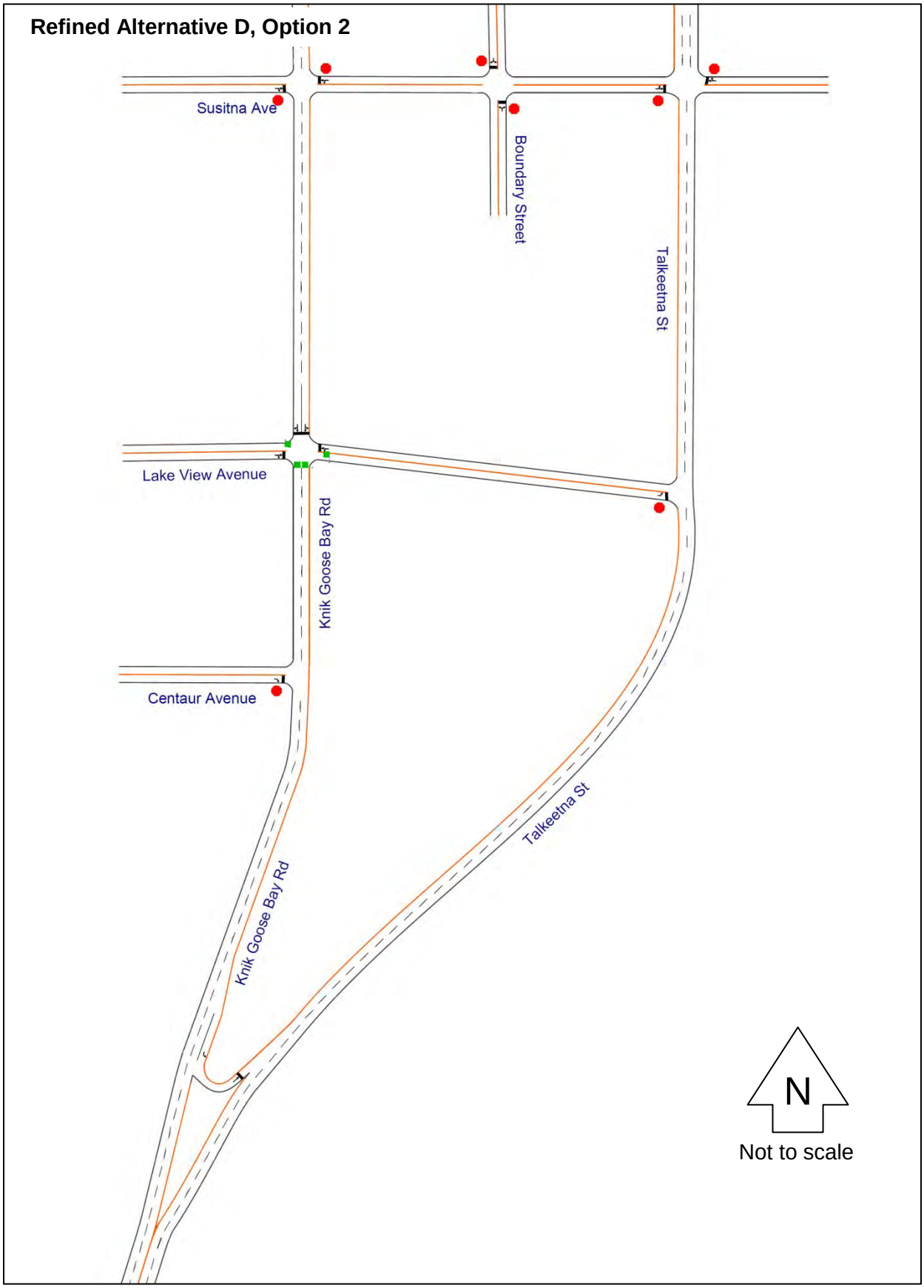


Figure 34: Southern Portion of Study Area, Refined Alternative D, Option 2

5.3 Level of Service Analysis

The Highway Capacity Manual 2000 (HCM2000) method was used to determine the LOS at each intersection for each alternative, as shown in Table 40. For two-way stop controlled intersections where the main road has three through lanes, HCM2010 methodology was used to determine LOS, as the HCM2000 methodology is not applicable to these geometries.

For Alternative D, it was assumed that the signalized intersections in the couplet are coordinated. This is especially important for the Parks Highway intersections, as coordination will help to manage the left turn queues along the Parks Highway between the two legs of the couplet. Some additional operational benefit would be gained by coordinating the Parks Highway signals with those at Crusey Street and at Lucille Street; however, the results shown here represent the scenario where the Parks Highway signals at Crusey Street and at Lucille Street are not coordinated with the signals at Yenlo Street and Main Street.

Under Alternative D, the Herning Avenue intersections with Main Street and with Yenlo Street warrant a traffic signal, but a traffic signal is not recommended due to the close proximity of other signals and the well-connected network. It is expected that during peak hours, drivers will avoid delay at the Herning Avenue two-way stop controlled intersections and will use the Swanson Avenue signalized intersections for eastbound and westbound left turns or through movements. This reapportionment of traffic from Herning Avenue to Swanson Avenue is reflected in the LOS values shown in Table 40. It should be noted that while vehicle delay remains high at the Herning Avenue intersections, this delay is generally experienced by very few vehicles.

For all alternatives except Alternative D, the intersection of Main Street with the Parks Highway has more delay when the bypass is in place than when there is no bypass. Two factors contribute to this:

- With the bypass, the model shows more traffic on Wasilla Main Street and Knik-Goose Bay Road, as these roadways are expected to serve trips that will utilize the bypass to travel between the north side of Wasilla and the Knik-Fairview area.
- With or without the bypass, this report assumes that traffic on the Parks Highway beyond the capacity of the roadway is either relocated to other roadways or is expanded to hold more capacity. This helps to focus the analysis on the north-south streets that are within the project scope. As noted in section 4.5 on page 27, if other projects do not address the capacity restraints on the Parks Highway, the congestion on the Parks Highway will be greater than that shown in this study.

	2005 Existing			No Action (2035)						Alt A (2035)						Alt B (2035)					
				No bypass			Bypass			No bypass			Bypass			No bypass			Bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.47	25	C	0.61	29	C	0.59	28	C	0.76	29	C	0.73	27	C	0.70	18	B	0.60	18	B
Paulson Ave and Main St		24/45	C/E		64/76	F		30/37	D/E		11/16	B/C		11/14	B		28/29	D		19/23	C
Swanson Ave and Main St		24	C		55	F		39	E	0.47	12	B	0.48	13	B	0.39	12	B	0.37	12	B
Herning Ave and Main St		20/28	C/D		78/169	F		48/176	E/F		21/25	C		19/25	C/D		22/30	C/D		18/33	C/D
Parks Highway and Main St/ Knik-Goose Bay Rd	0.76	41	D	1.09	87	F	1.10	105	F	1.08	70	E	1.11	85	F	0.99	58	E	0.99	73	E
Railroad Ave and Knik-Goose Bay Rd		13/10	B		16/11	C/B		21/14	C/B		20/12	C/B		29/13	D/B		11	B		12	B
Susitna Ave and Knik-Goose Bay Rd		36/23	E/C		170/46	F/E		>500	F	0.57	7	A	0.71	10	B	0.44	5	A	0.52	6	A

•

	Alt C (2035)						Alt D, option 1 (2035)						Alt D, option 2 (2035)						Refined Alt D, option 2		
	No bypass			Bypass			No bypass			Bypass			No bypass			Bypass			No bypass		
	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Bogard Rd/Nelson Ave and Main St	0.49	16	B	0.52	17	B	0.61	16	B	0.58	18	B	0.48	12	B	0.50	14	B	0.48	13	B
Paulson Ave and Main St		15/20	B/C		16/23	C		12/20	B/C		12/16	B/C		11/17	B/C		11/16	B/C		11/17	B/C
Swanson Ave and Main St	0.44	10	B	0.57	13	B	0.83	20	C	0.77	18	B	0.75	20	C	0.58	16	C	0.72	20	B
Herning Ave and Main St		23/29	C/D		50	F		17/33	C/D		23/45	C/E		25/38	C/E		23/48	C/E		24/37	C/E
Parks Highway and Main St/ Knik-Goose Bay Rd	0.97	54	D	1.00	65	E	0.83	28	C	0.81	27	C	0.77	29	C	0.77	31	C	0.90	34	C
Railroad Ave and Knik-Goose Bay Rd		16/11	C/B		18/11	C/B		10/14	B		11/15	B		10/14	B		11/15	B/C		16/29	C/D
Susitna Ave and Knik-Goose Bay Rd		26/12	D/B		31/32	D/D		11/15	B		11/15	B		11/14	B		12/16	B/C		14/21	B/C
Lake View Ave and Knik-Goose Bay Rd							0.50	9	A	0.55	10	A	0.49	10	A	0.57	9	A	0.49	9	A
Nelson Ave and Knik St	0.53	11	B	0.51	11	B															
Paulson Ave and Knik St		12/11	B		13/11	B															
Swanson Ave and Knik St	0.32	14	B	0.35	15	B															
Herning Ave and Knik St		16/13	C/B		18/16	C															
Susitna Ave and Knik St		11/10	B		12/10	B															
Park Ave and Knik-Goose Bay Rd	0.45	8	A	0.58	11	B															
Bogard Rd and Yenlo St							0.53	9	A	0.56	11	B	0.55	11	B	0.58	13	B	0.81	17	B
Swanson Ave and Yenlo St							0.79	24	C	0.66	21	B	0.61	18	B	0.57	20	B	0.64	19	B
Herning Ave and Yenlo St								43/24	E/C		45/23	E/C		48/16	E/C		62/24	F/C		48/16	E/C
Parks Highway and Yenlo St/ Talkeetna St							0.87	23	C	0.85	23	C	0.89	26	C	0.85	29	C	0.91	30	C
Railroad Ave and Talkeetna								18/12	C/B		18/12	C/B		18/12	C/B		19/12	C/B		18/12	C/B
Susitna Ave and Talkeetna								14/11	B		14/11	B		13/11	B		14/11	B		17/12	C/B
Lake View Ave and Talkeetna								16	C		16	C		15	C		17	C		17	C
Signalized Intersections																					

For two-way stop controlled intersections, two values are given for both delay and LOS, reflecting movement values, rather than full intersection values. The form is “eastbound/westbound.” Where the value is the same for both directions, only one value is given.

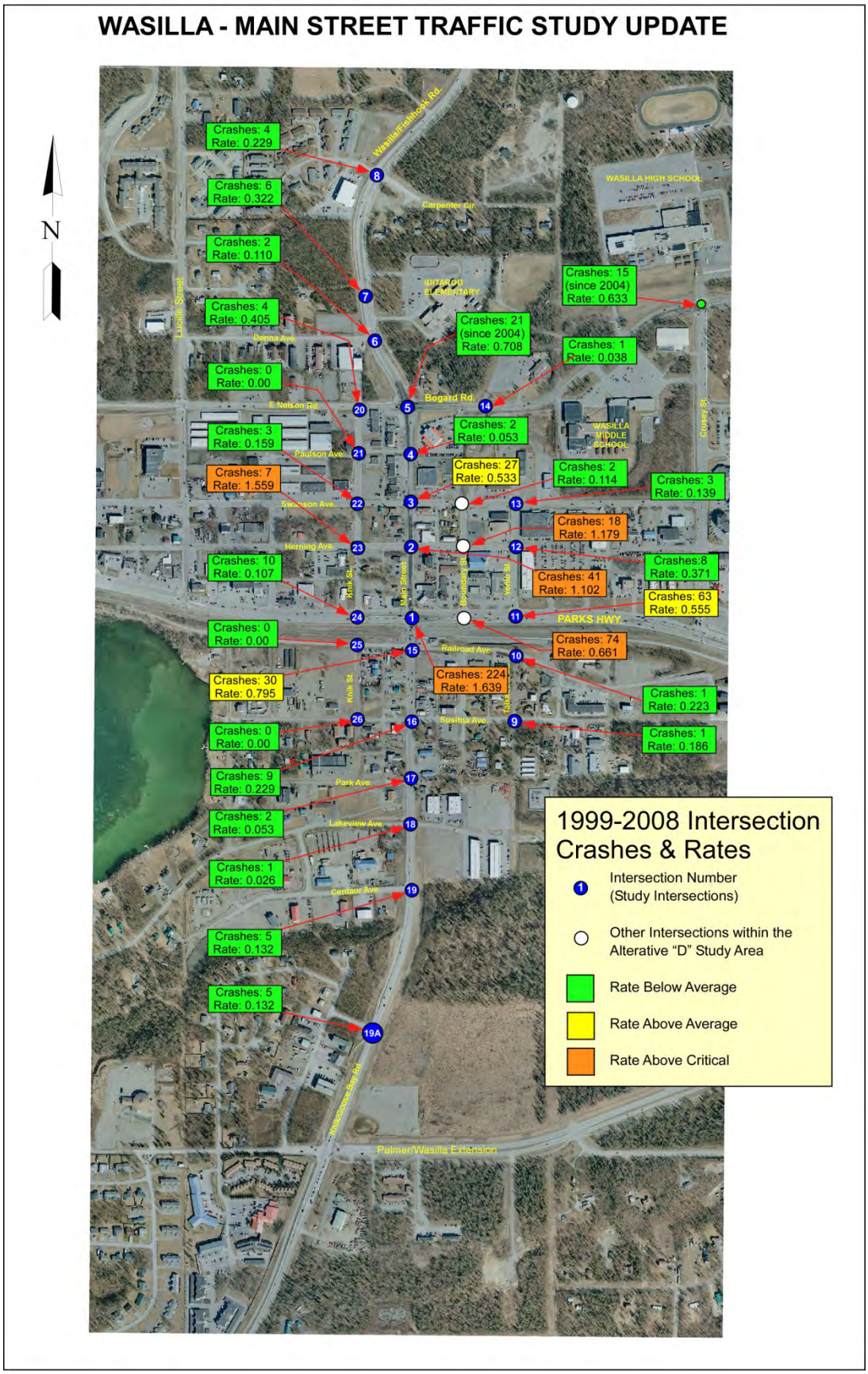
Table 40: Intersection Level of Service by Alternative (2035)

6 Conclusions

Although the 2006 Traffic Study found that either Alternative C or Alternative D would provide acceptable levels of service through the design year (originally 2025), subsequent analyses have determined that Alternative C would require property acquisitions that are unacceptable to the City of Wasilla and the public. This report confirms that Alternative D is the only alternative that provides acceptable level of service through the updated 2035 design year. As the design work has begun, refinements have been made to Alternative D, option 2 to meet external exigencies, such as right-of-way constraints. These refinements have been evaluated in this report and have been shown to also provide acceptable levels of service through the 2035 design year.

Appendix A

1999-2008 Average Crash Rates and Number of Crashes for all Evaluated Intersections


WASILLA - MAIN STREET TRAFFIC STUDY UPDATE
N
Crashes: 4
Rate: 0.229
Crashes: 6
Rate: 0.322
Crashes: 2
Rate: 0.110
Crashes: 4
Rate: 0.405
Crashes: 0
Rate: 0.00
Crashes: 3
Rate: 0.159
Crashes: 7
Rate: 1.559
Crashes: 10
Rate: 0.107
Crashes: 0
Rate: 0.00
Crashes: 30
Rate: 0.795
Crashes: 0
Rate: 0.00
Crashes: 9
Rate: 0.229
Crashes: 2
Rate: 0.053
Crashes: 1
Rate: 0.026
Crashes: 5
Rate: 0.132
Crashes: 5
Rate: 0.132
Crashes: 15
(since 2004)
Rate: 0.633
Crashes: 21
(since 2004)
Rate: 0.708
Crashes: 1
Rate: 0.038
Crashes: 2
Rate: 0.053
Crashes: 27
Rate: 0.533
Crashes: 2
Rate: 0.114
Crashes: 3
Rate: 0.139
Crashes: 18
Rate: 1.179
Crashes: 41
Rate: 1.102
Crashes:8
Rate: 0.371
Crashes: 63
Rate: 0.555
Crashes: 74
Rate: 0.661
Crashes: 224
Rate: 1.639
Crashes: 1
Rate: 0.223
Crashes: 1
Rate: 0.186
Wasilla/Fishhook Rd.
Carpenter Cir.
WASILLA HIGH SCHOOL
IDITAROD ELEMENTARY
Lucille Street
Denna Ave.
E Nelson Rd.
Bogard Rd.
WASILLA MIDDLE SCHOOL
Crusey St.
Paulson Ave.
Swanson Ave.
Herring Ave.
Main Street
Knik St.
Yenlo St.
PARKS HWY
Railroad Ave.
Susitna Ave.
Park Ave.
Lakeview Ave.
Cantwell Ave.
Palmer/Wasilla Extension
1999-2008 Intersection Crashes & Rates
Intersection Number (Study Intersections)
Other Intersections within the Alterative "D" Study Area
Rate Below Average
Rate Above Average
Rate Above Critical

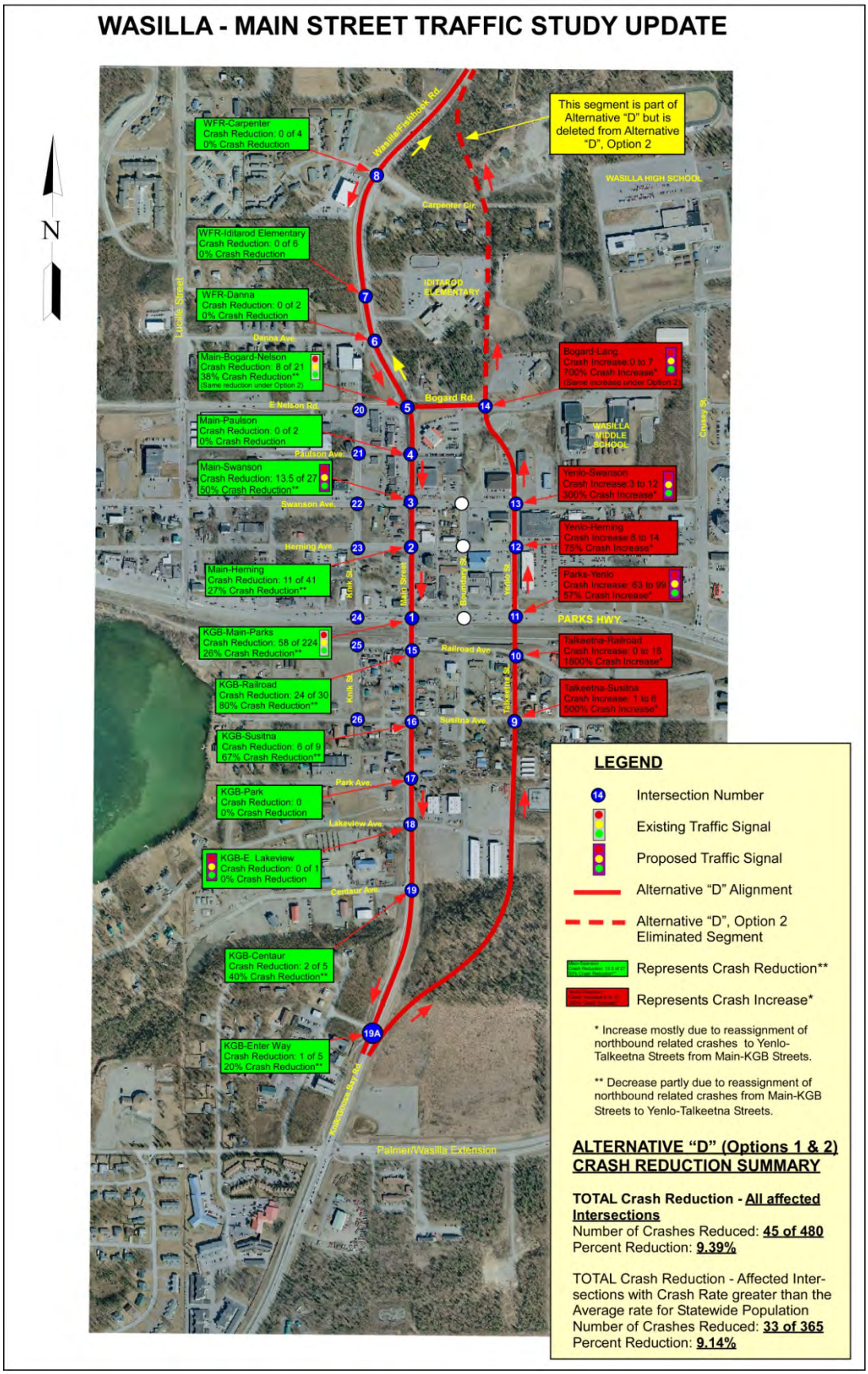
Appendix B

Crash Reduction Maps for Alternatives A, B, C and D

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE

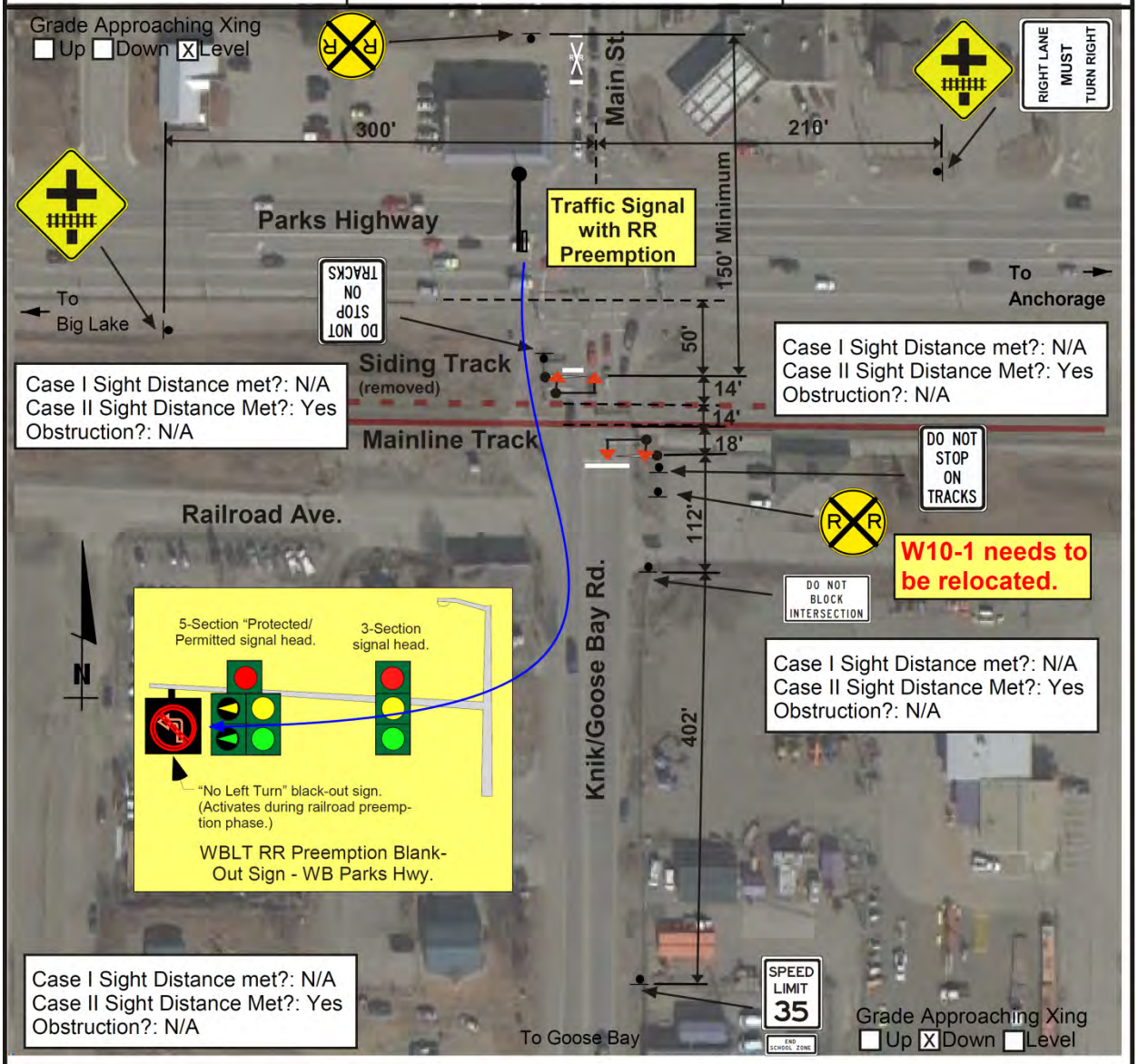

WASILLA - MAIN STREET TRAFFIC STUDY UPDATE
N
This segment is part of Alternative "D" but is deleted from Alternative "D", Option 2
WFR-Carpenter
Crash Reduction: 0 of 4
0% Crash Reduction
WFR-Iditarod Elementary
Crash Reduction: 0 of 6
0% Crash Reduction
WFR-Danna
Crash Reduction: 0 of 2
0% Crash Reduction
Main-Bogard-Nelson
Crash Reduction: 8 of 21
38% Crash Reduction**
(Same reduction under Option 2)
Main-Paulson
Crash Reduction: 0 of 2
0% Crash Reduction
Main-Swanson
Crash Reduction: 13.5 of 27
50% Crash Reduction**
Main-Herning
Crash Reduction: 11 of 41
27% Crash Reduction**
KGB-Main-Parks
Crash Reduction: 58 of 224
26% Crash Reduction**
KGB-Railroad
Crash Reduction: 24 of 30
80% Crash Reduction**
KGB-Susitna
Crash Reduction: 6 of 9
67% Crash Reduction**
KGB-Park
Crash Reduction: 0
0% Crash Reduction
KGB-E. Lakeview
Crash Reduction: 0 of 1
0% Crash Reduction
KGB-Centaur
Crash Reduction: 2 of 5
40% Crash Reduction**
KGB-Enter Way
Crash Reduction: 1 of 5
20% Crash Reduction**
Bogard-Lang
Crash Increase: 0 to 7
700% Crash Increase*
(Same increase under Option 2)
Yenlo-Swanson
Crash Increase: 3 to 12
300% Crash Increase*
Yenlo-Herning
Crash Increase: 8 to 14
75% Crash Increase*
Parks-Yenlo
Crash Increase: 63 to 99
57% Crash Increase*
Talkeetna-Railroad
Crash Increase: 0 to 18
1800% Crash Increase*
Talkeetna-Susitna
Crash Increase: 1 to 6
500% Crash Increase*
Wasilla/Fishhook Rd.
Carpenter Cir.
WASILLA HIGH SCHOOL
IDITAROD ELEMENTARY
Lucille Street
Danna Ave.
Bogard Rd.
E Nelson Rd.
Paulson Ave.
Swanson Ave.
Herning Ave.
Main Street
Knik St.
Boundary Ave.
Yenlo St.
PARKS HWY
Railroad Ave.
Susitna Ave.
Park Ave.
Lakeview Ave.
Centaur Ave.
WASILLA MIDDLE SCHOOL
Crusey St.
Knik-Fairview Loop Rd.
Palmer/Wasilla Extension
LEGEND
Intersection Number
Existing Traffic Signal
Proposed Traffic Signal
Alternative "D" Alignment
Alternative "D", Option 2 Eliminated Segment
Represents Crash Reduction**
Represents Crash Increase*
* Increase mostly due to reassignment of northbound related crashes to Yenlo-Talkeetna Streets from Main-KGB Streets.
** Decrease partly due to reassignment of northbound related crashes from Main-KGB Streets to Yenlo-Talkeetna Streets.
ALTERNATIVE "D" (Options 1 & 2) CRASH REDUCTION SUMMARY
TOTAL Crash Reduction - All affected Intersections
Number of Crashes Reduced: 45 of 480
Percent Reduction: 9.39%
TOTAL Crash Reduction - Affected Intersections with Crash Rate greater than the Average rate for Statewide Population
Number of Crashes Reduced: 33 of 365
Percent Reduction: 9.14%

Appendix C

Knik-Goose Bay Road Railroad Crossing Configuration and Traffic Control

State of Alaska DOT/PF Central Region
#44 Railroad Crossing Inventory Form

Crossing ID #: **868318Y**	Road Name: **Knik/Goose Bay Road**	Date of Last Inventory: **3/3/2010**
RR Milepoint: **159.50**	CDS Route #: **170044**	Inventory By: **RM/BF**
Maximum Train Speed: **25 MPH**	CDS Milepoint: **0.03**	Highway Surface: **Paved**
Crossing Surface; **Concrete**	Posted Highway Speed: **35 MPH**	State Highway System: **Yes**



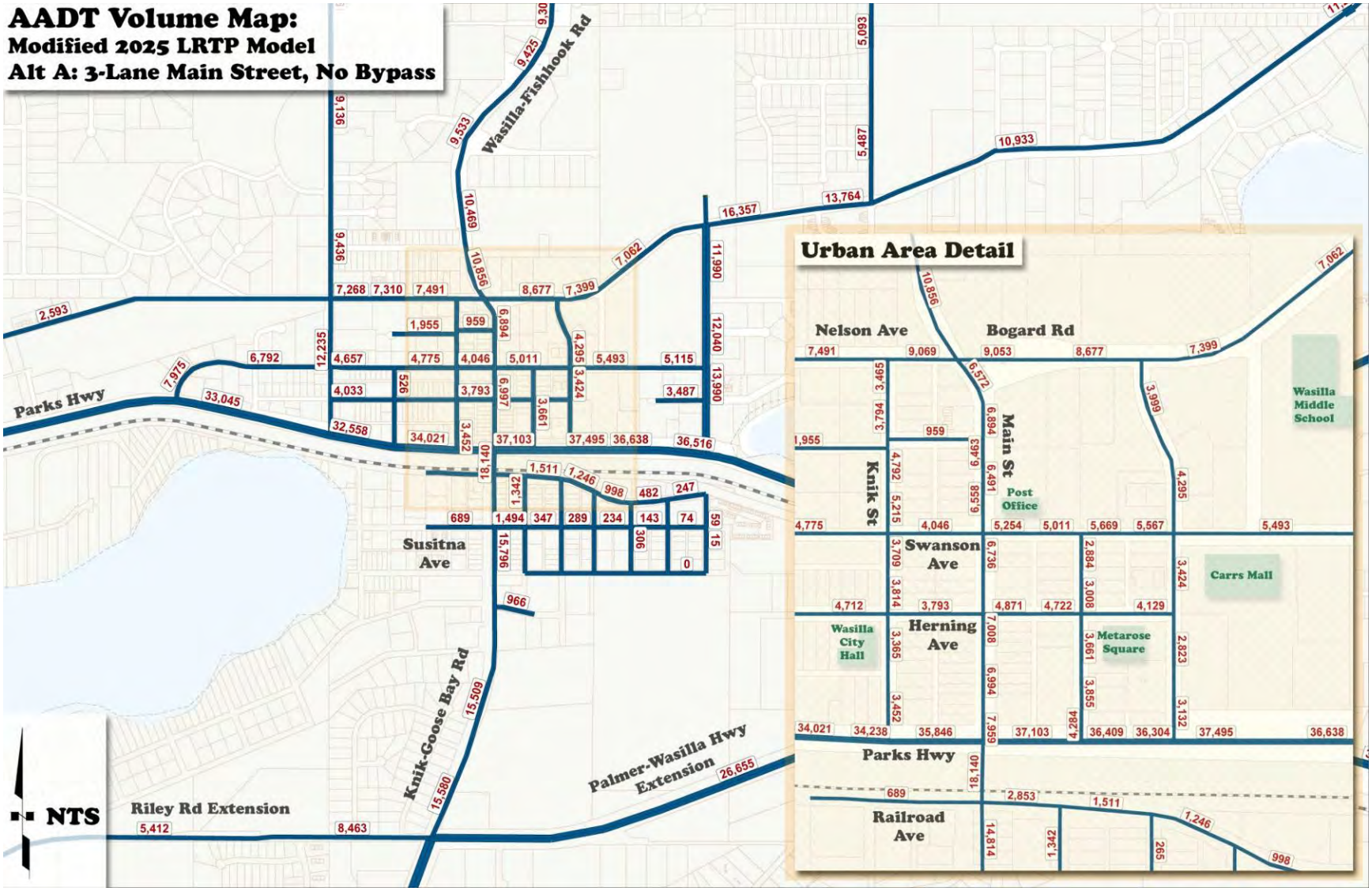
Case I Moving Vehicle Sight Distance	
Highway	**N/A**
Tracks	**N/A**
Case II Stopped Vehicle Sight Distance	
Highway	**25'**
Tracks	**600'**

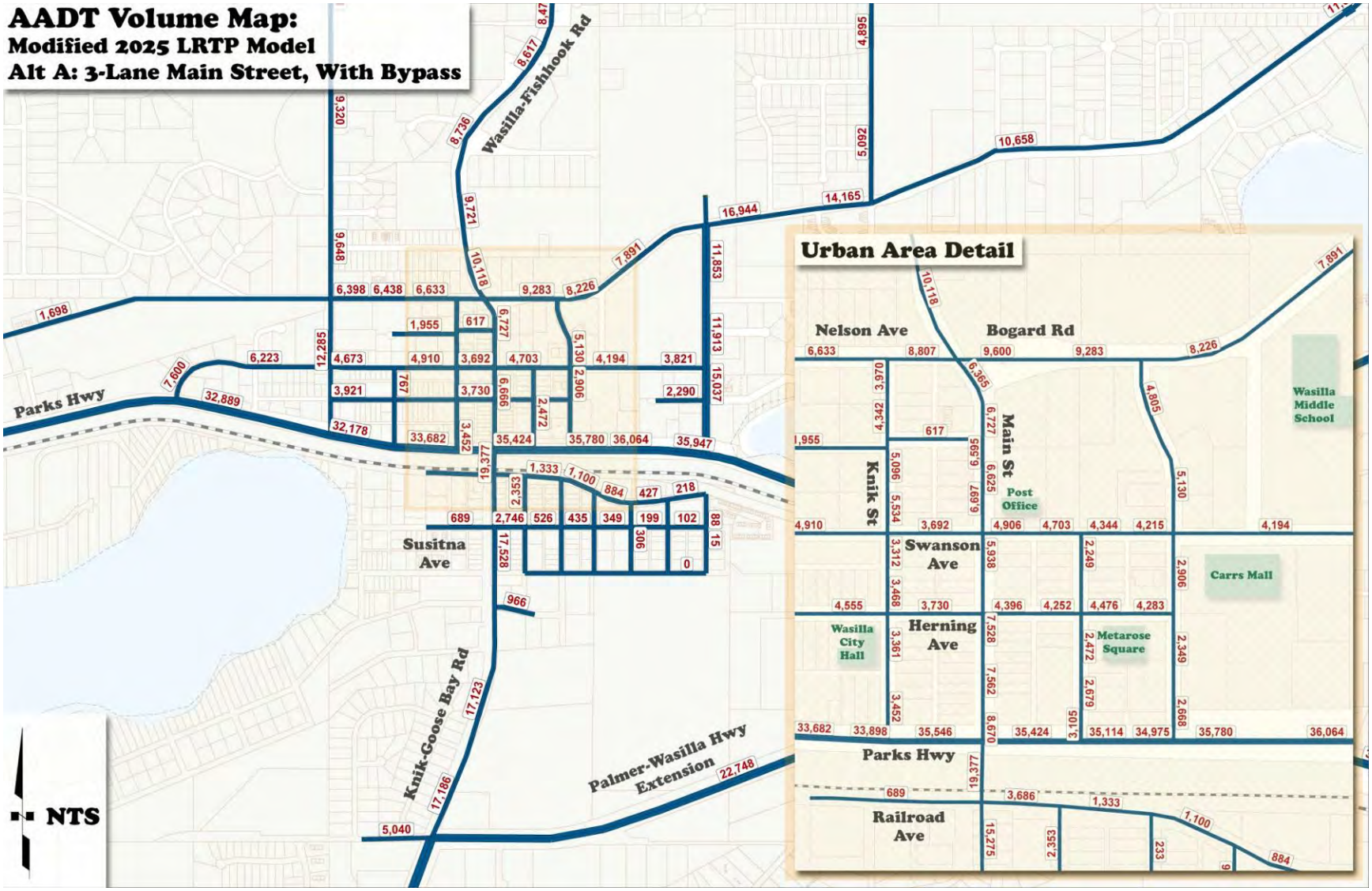
Traffic Control Device Key

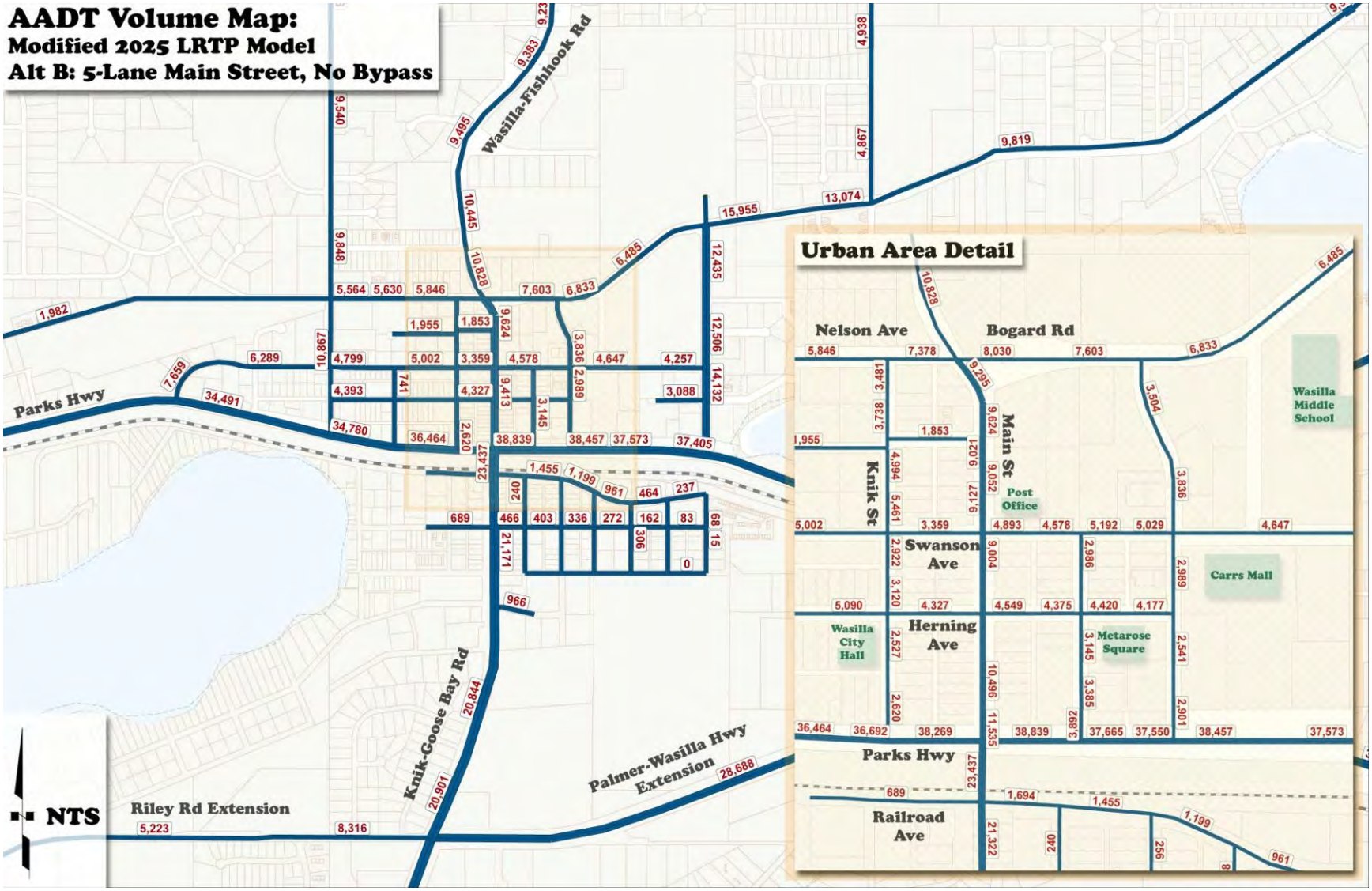
- Cantilever Railroad Signal
- Cantilever Railroad Signal with Gate
- Post-Mounted Railroad Signal
- Post-Mounted Railroad Signal with Gate
- Advance Flasher with Sign
- Highway Sign
- Rubberized Crossing Surface
- Asphalt Crossing Surface
- Wood Plank Crossing Surface

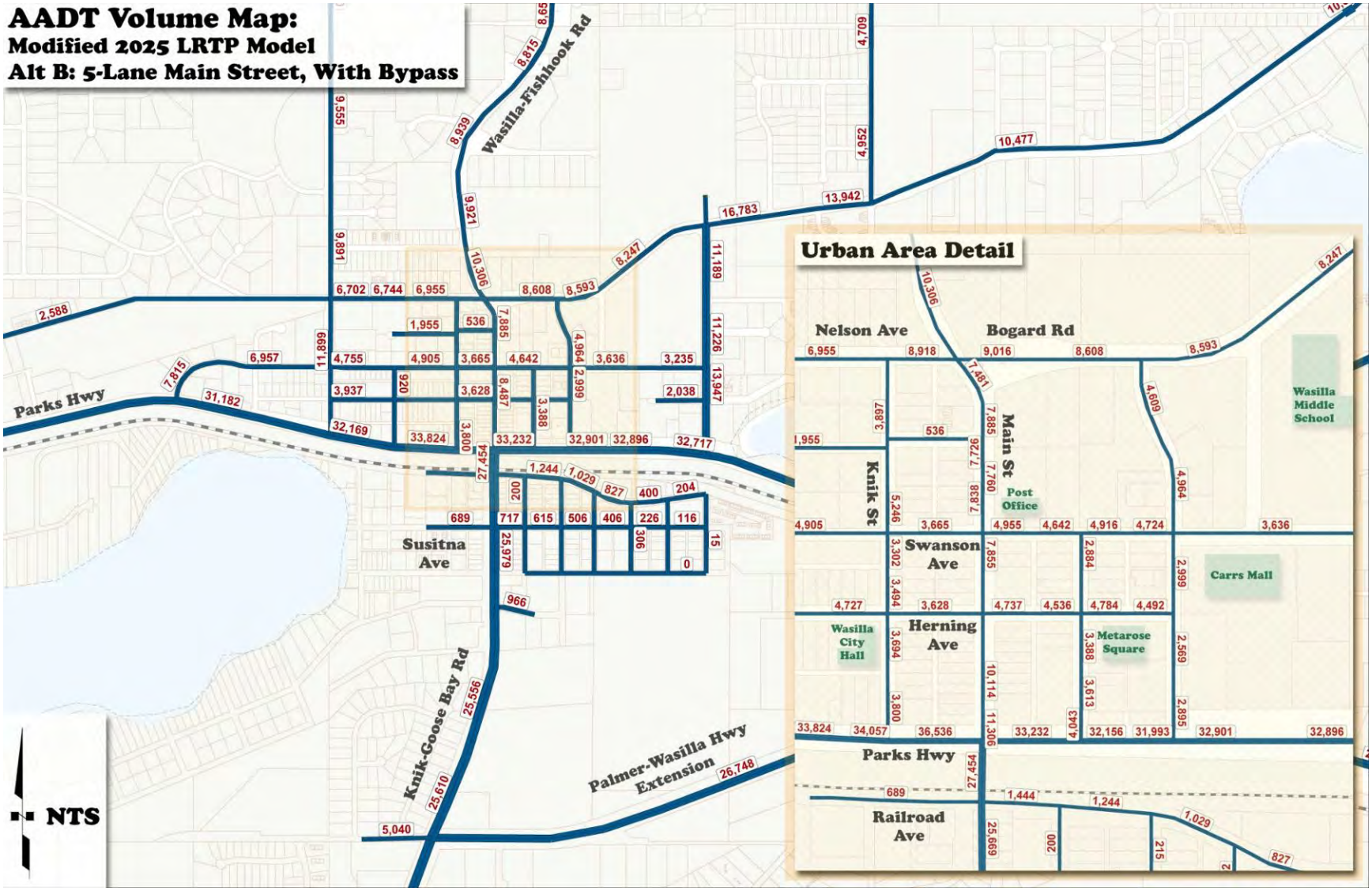
Appendix D

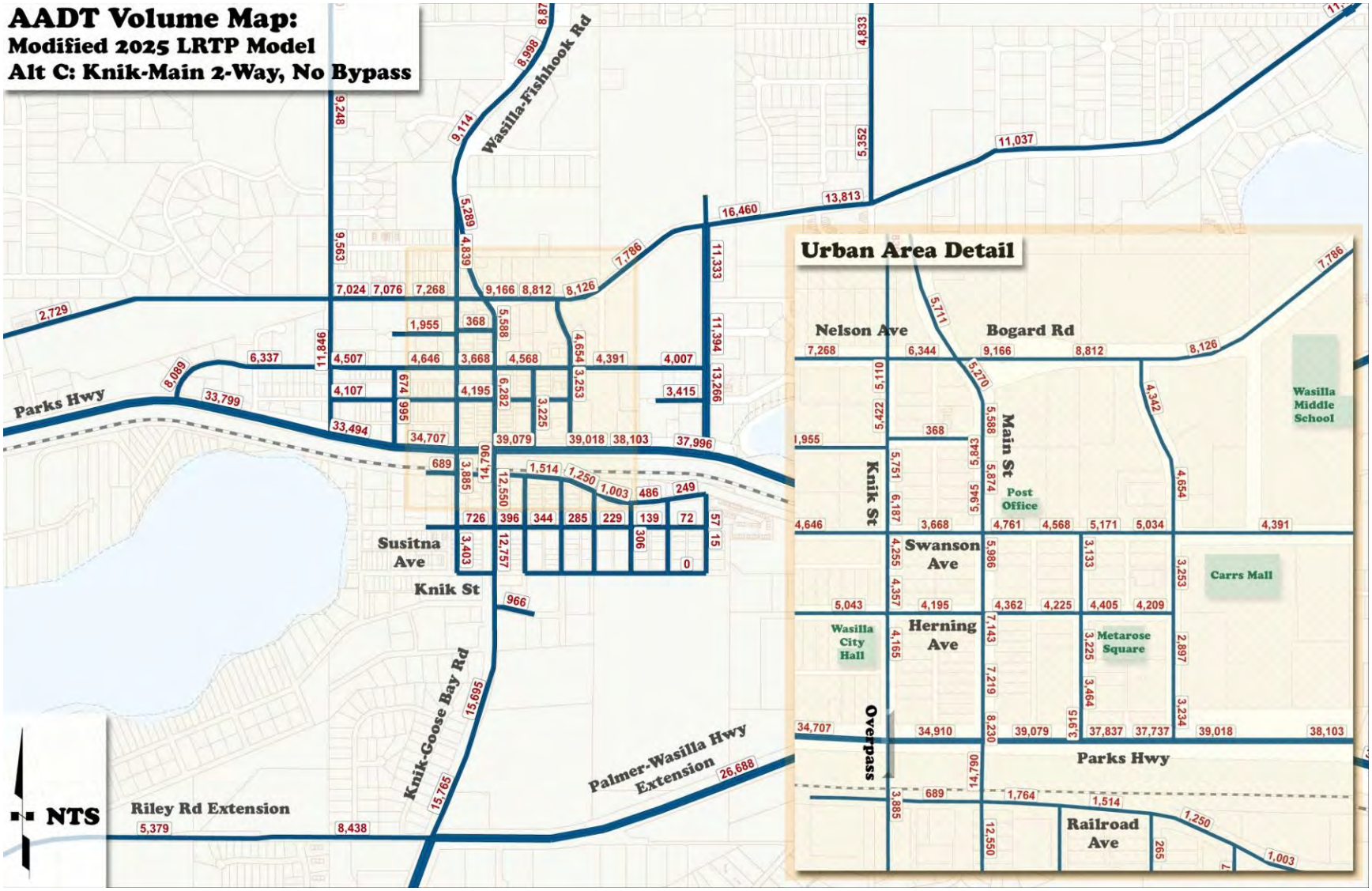
AADT Volume Maps for Modified 2025 LRTP Model

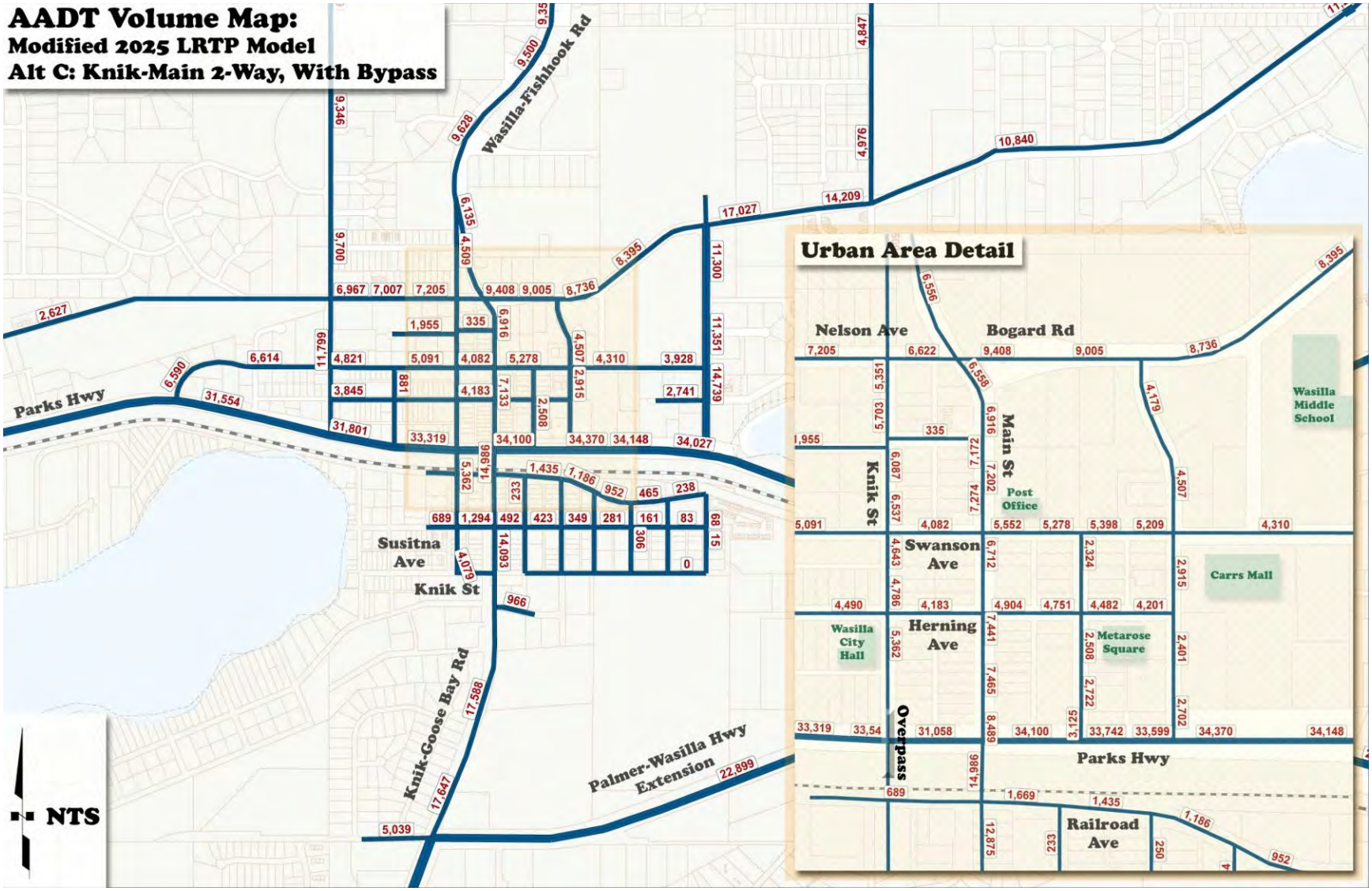

AADT Volume Map:
Modified 2025 LRTP Model
Alt A: 3-Lane Main Street, No Bypass
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Riley Rd Extension
NTS
Nelson Ave
Bogard Rd
Main St
Knik St
Swanson Ave
Herning Ave
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall

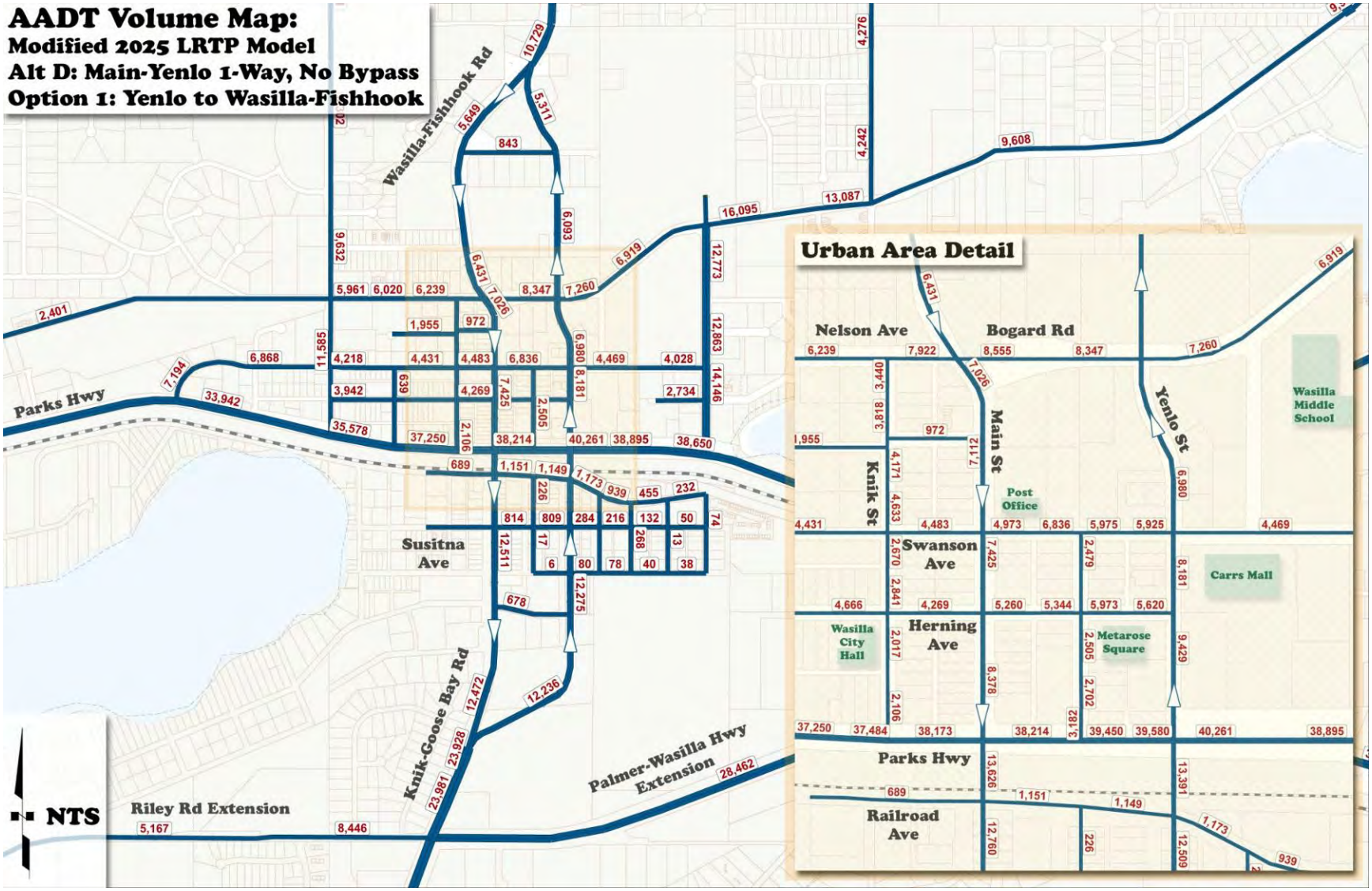

AADT Volume Map:
Modified 2025 LRTP Model
Alt A: 3-Lane Main Street, With Bypass
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Nelson Ave
Bogard Rd
Main St
Knik St
Swanson Ave
Herning Ave
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Wasilla City Hall
Metarose Square
NTS

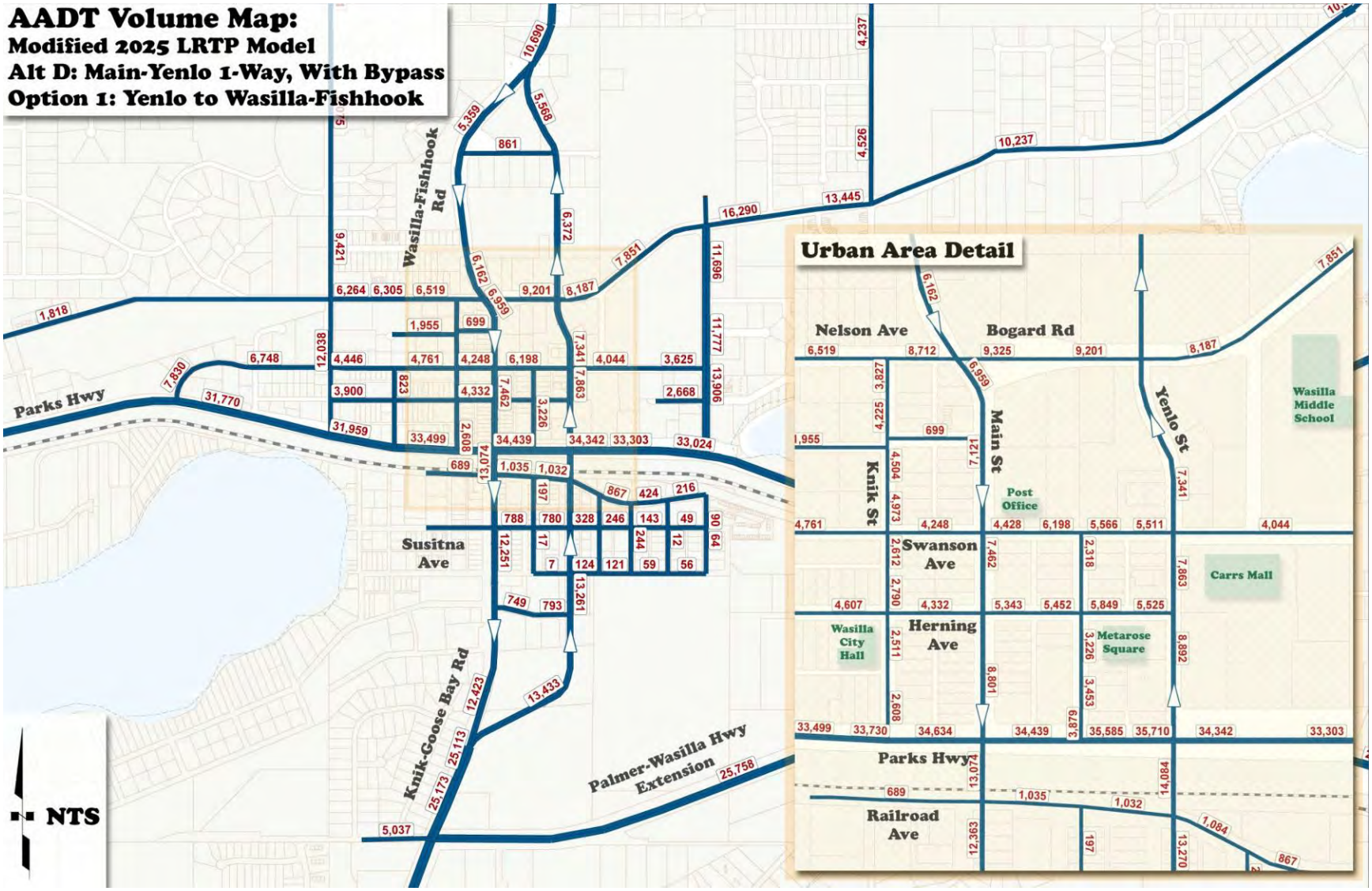

AADT Volume Map:
Modified 2025 LRTP Model
Alt B: 5-Lane Main Street, No Bypass
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Riley Rd Extension
Nelson Ave
Bogard Rd
Main St
Knik St
Swanson Ave
Herning Ave
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall
NTS

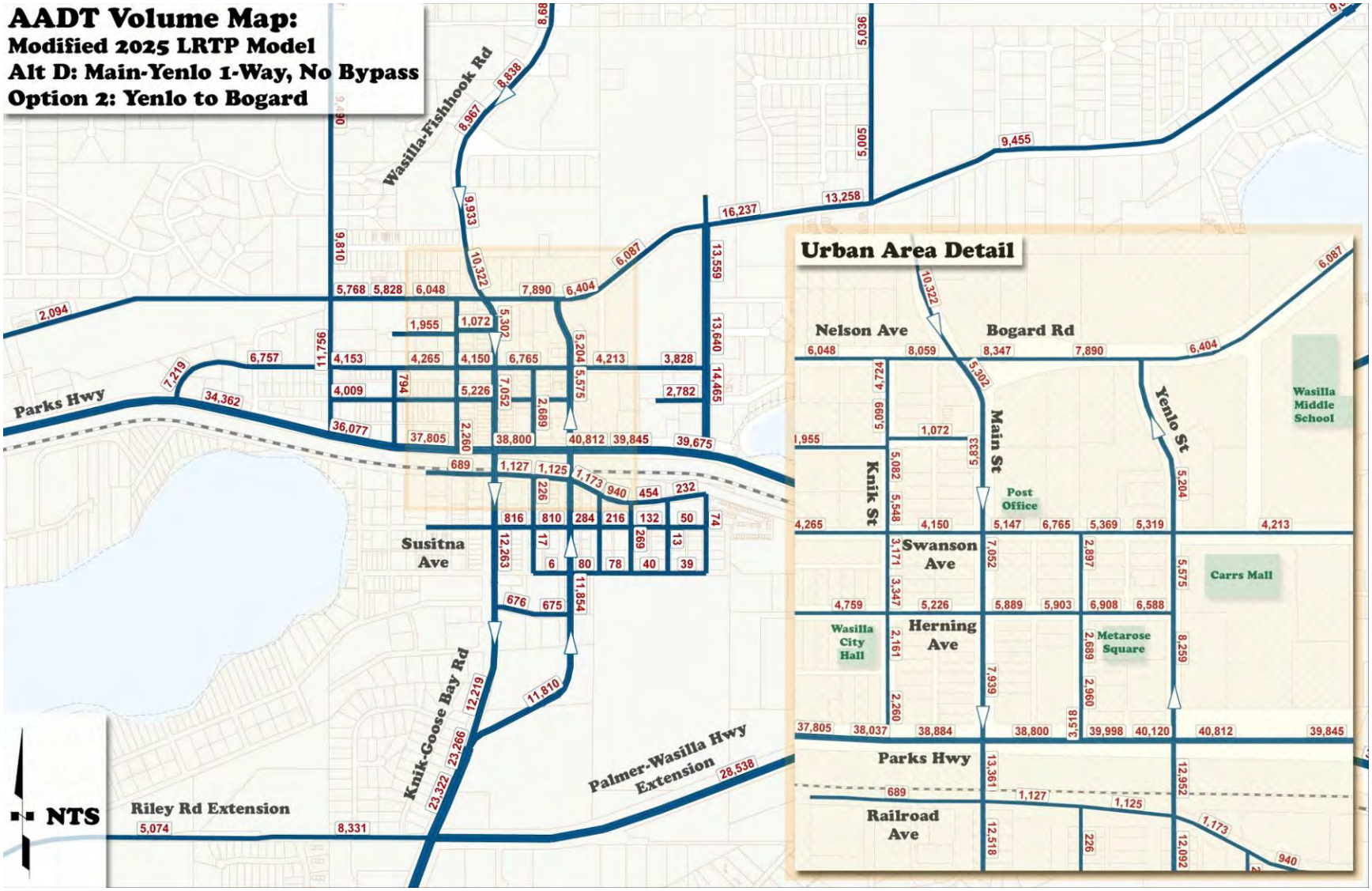

AADT Volume Map:
Modified 2025 LRTP Model
Alt B: 5-Lane Main Street, With Bypass
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Nelson Ave
Bogard Rd
Main St
Knik St
Swanson Ave
Herning Ave
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Wasilla City Hall
Metarose Square
NTS

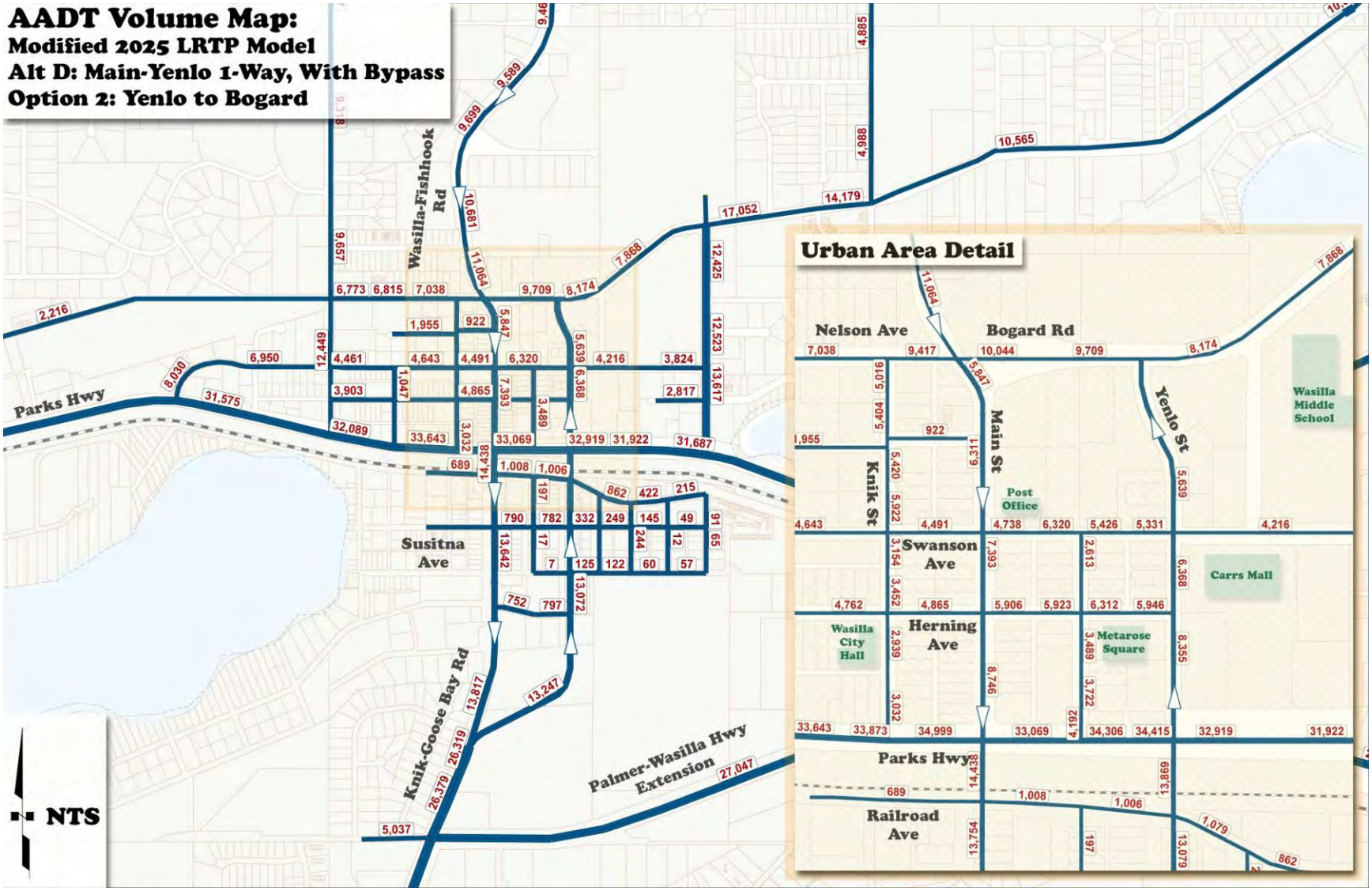

AADT Volume Map:
Modified 2025 LRTP Model
Alt C: Knik-Main 2-Way, No Bypass
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik St
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Riley Rd Extension
NTS
Nelson Ave
Bogard Rd
Main St
Knik St
Swanson Ave
Herning Ave
Overpass
Railroad Ave
Parks Hwy
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall


AADT Volume Map:
Modified 2025 LRTP Model
Alt C: Knik-Main 2-Way, With Bypass
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik St
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Nelson Ave
Bogard Rd
Main St
Swanson Ave
Herning Ave
Railroad Ave
Overpass
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall
NTS


AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, No Bypass
Option 1: Yenlo to Wasilla-Fishhook
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Riley Rd Extension
NTS
Nelson Ave
Bogard Rd
Main St
Yenlo St
Knik St
Swanson Ave
Herning Ave
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Wasilla City Hall
Metarose Square


AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, With Bypass
Option 1: Yenlo to Wasilla-Fishhook
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Nelson Ave
Bogard Rd
Main St
Yenlo St
Knik St
Swanson Ave
Herning Ave
Railroad Ave
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall
NTS


AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, No Bypass
Option 2: Yenlo to Bogard
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Riley Rd Extension
NTS
Nelson Ave
Bogard Rd
Main St
Yenlo St
Knik St
Swanson Ave
Herning Ave
Post Office
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall
Railroad Ave


AADT Volume Map:
Modified 2025 LRTP Model
Alt D: Main-Yenlo 1-Way, With Bypass
Option 2: Yenlo to Bogard
Urban Area Detail
Wasilla-Fishhook Rd
Parks Hwy
Susitna Ave
Knik-Goose Bay Rd
Palmer-Wasilla Hwy Extension
Nelson Ave
Bogard Rd
Knik St
Main St
Yenlo St
Post Office
Swanson Ave
Herning Ave
Railroad Ave
Wasilla Middle School
Carrs Mall
Metarose Square
Wasilla City Hall
NTS

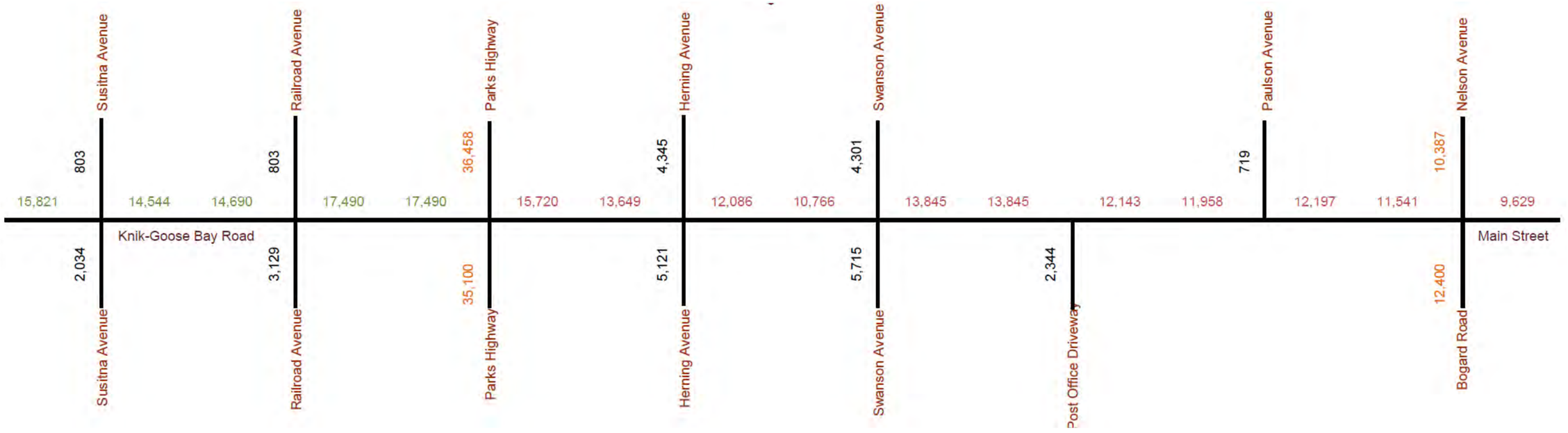
Appendix E

Post-Processed 2035 AADTs

Alternative A: Main Street 3-Lane Section

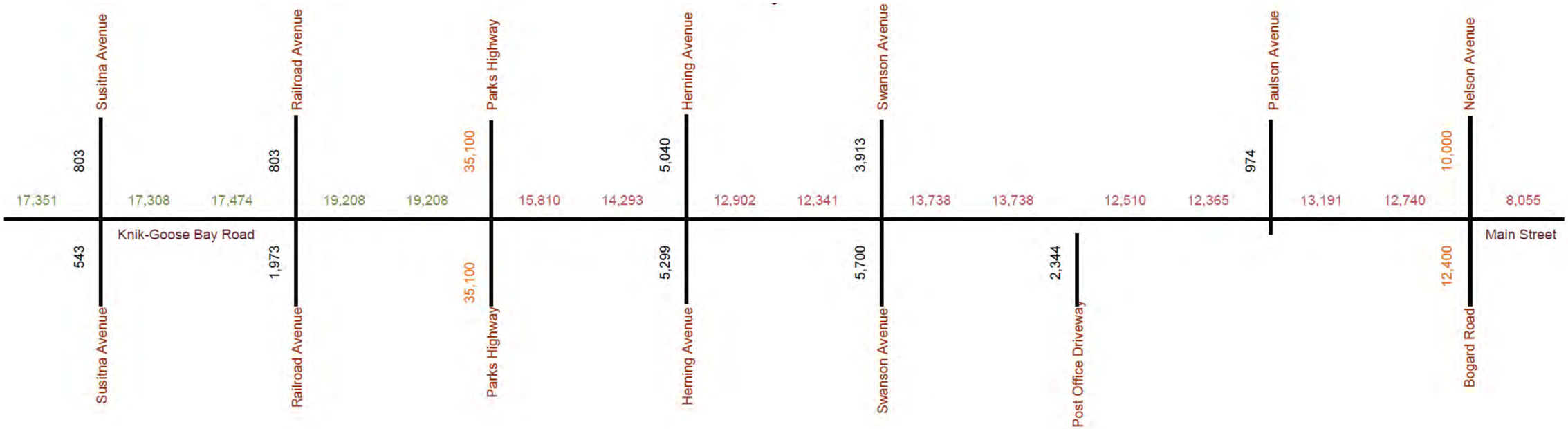
Without Parks Highway bypass

With Parks Highway bypass

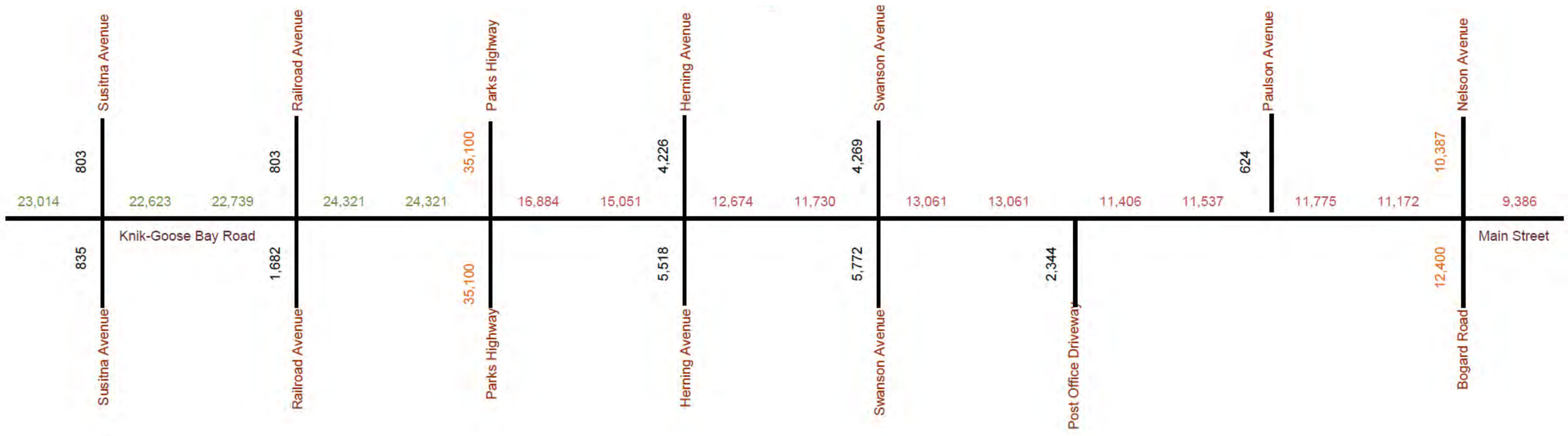


Alternative B: Main Street 5-Lane Section

Without Parks Highway bypass

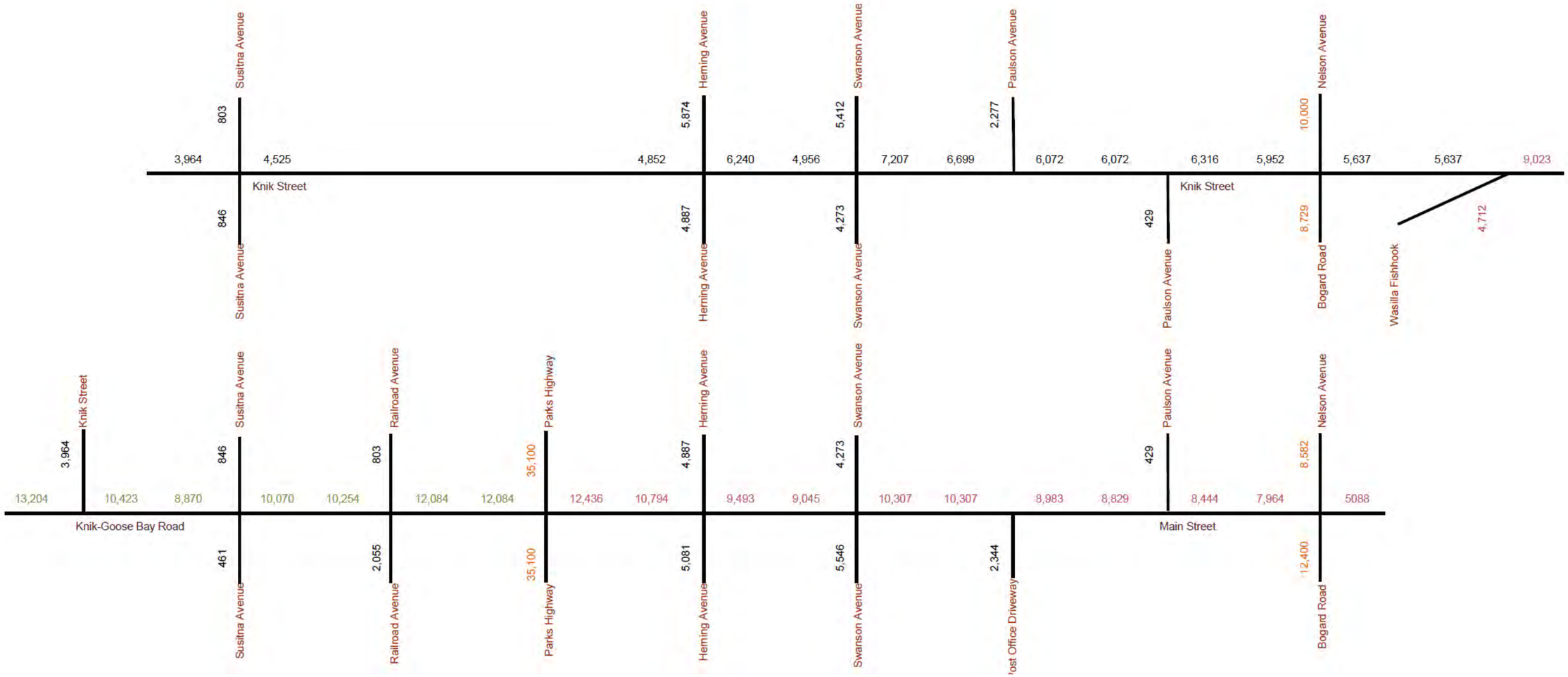


With Parks Highway bypass

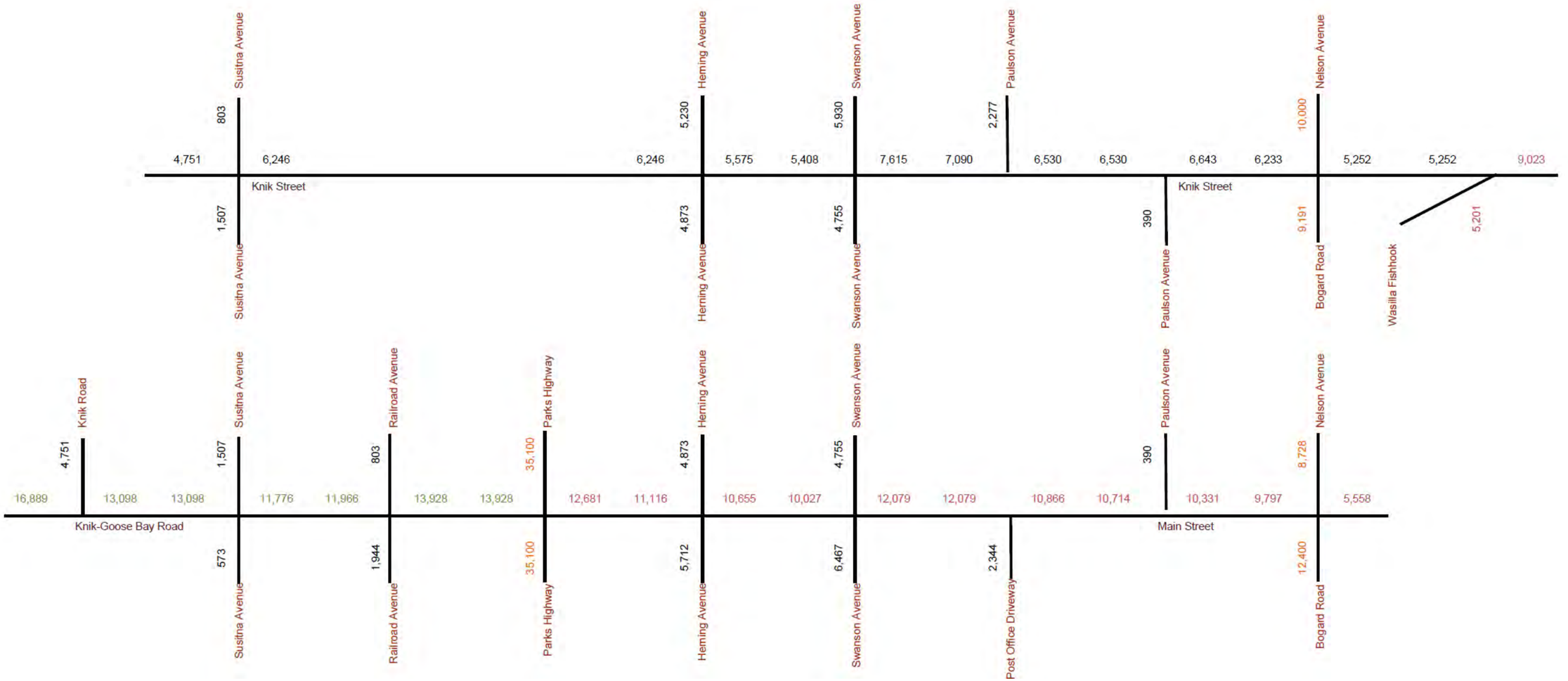


Alternative C: Two-way Couplet (Main Street and Knik Street)

Without Parks Highway bypass



With Parks Highway bypass



Alternative D, Option 1: One-way Couplet (Main Street and Yenlo Street), including extension of Yenlo Street past Bogard Road

Without Parks Highway Bypass

With Parks Highway Bypass

Alternative D, Option 2: One-way Couplet (Main Street and Yenlo Street), with Yenlo Street ending at Bogard Road

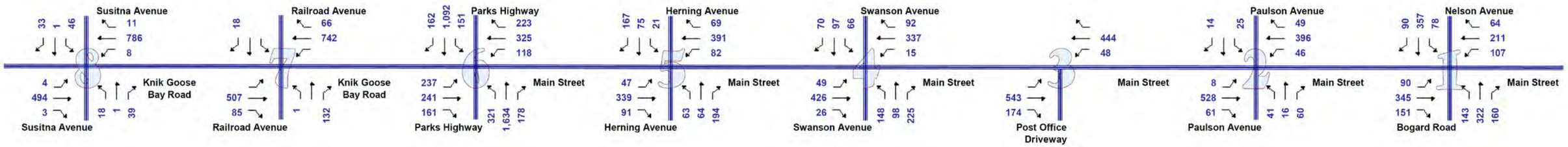
Without Parks Highway Bypass

With Parks Highway Bypass

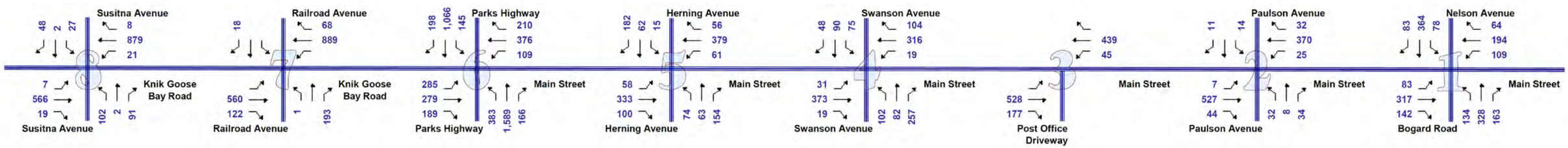
Appendix F

2035 Turning Movement Counts

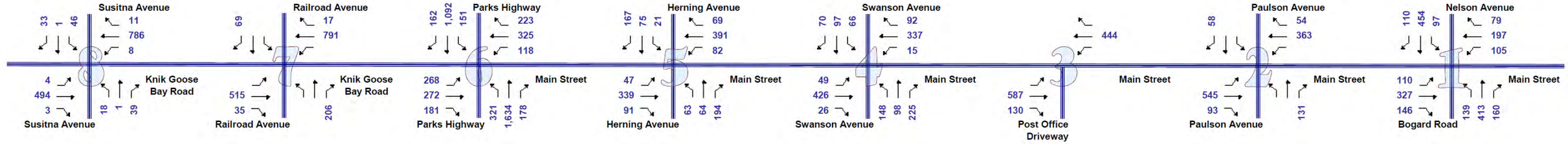
No Action Alternative, no Parks Highway bypass: 3 lanes Main Street



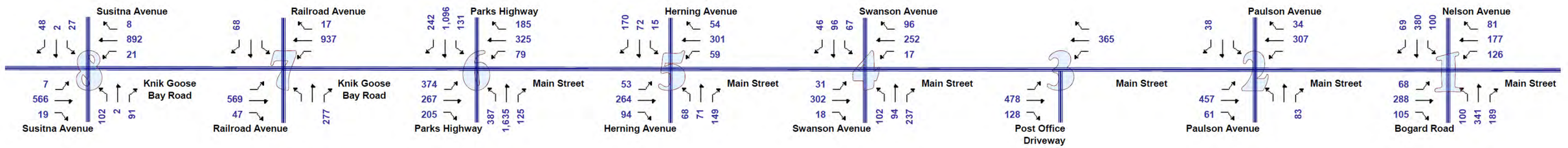
No Action Alternative, with Parks Highway bypass: 3 lanes Main Street



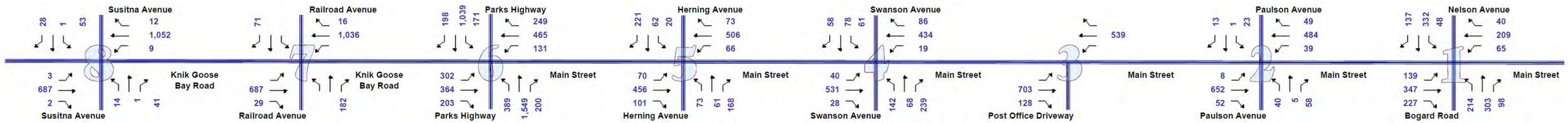
Alternative A, no Parks Highway bypass: 3 lanes Main Street



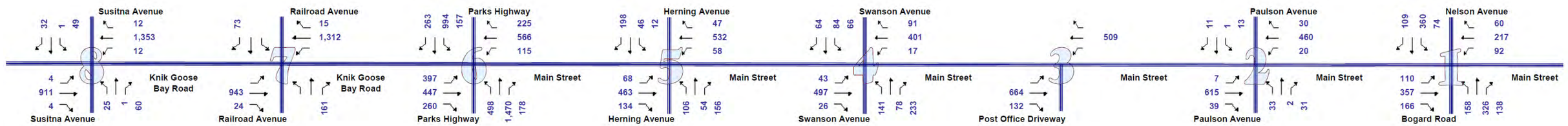
Alternative A, with Parks Highway bypass: 3 lanes Main Street



Alternative B, no Parks Highway bypass: 5 lanes Main Street

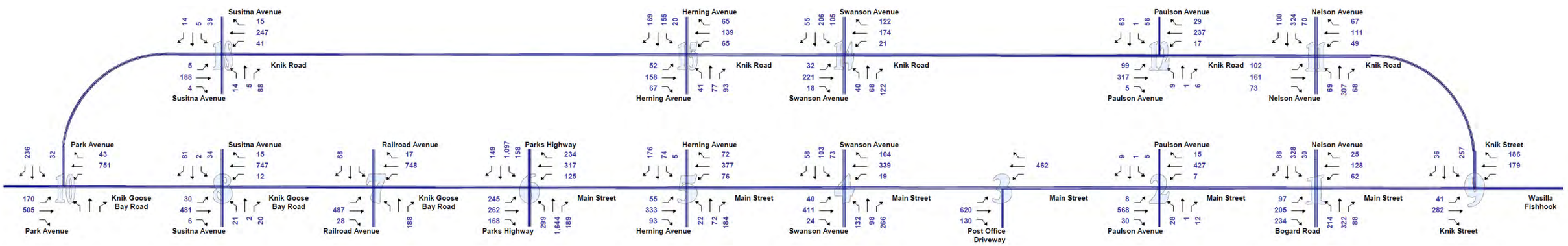


Alternative B, with Parks Highway bypass: 5 lanes Main Street

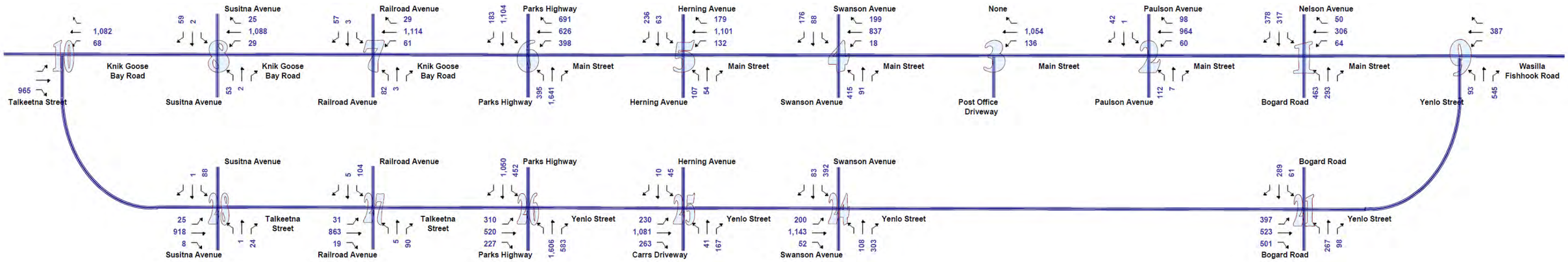


Alternative C, no Parks Highway bypass: Knik Street/Main Street Two-way Couplet

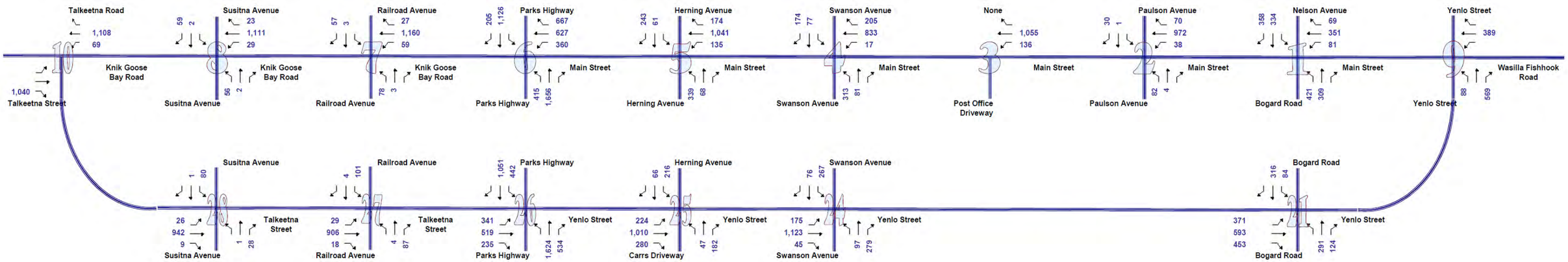
Alternative C, with Parks Highway bypass: Knik Street/Main Street Two-way Couplet



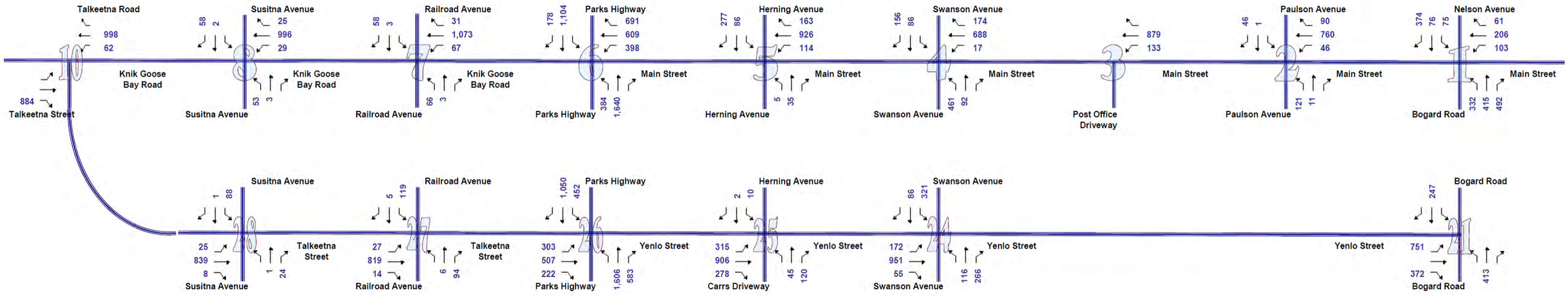
Alternative D, no Parks Highway bypass: Yenlo Street/Main Street One-way Couplet



Alternative D, with Parks Highway bypass: Yenlo Street/Main Street One-way Couplet



Alternative E, no Parks Highway bypass: Yenlo Street/Main Street One-way Couplet (ends at Bogard Road)



Alternative E, with Parks Highway bypass: Yenlo Street/Main Street One-way Couplet (ends at Bogard Road)