Niven Lake Phase V Traffic Impact Study

Prepared for

City of Yellowknife











Prepared by



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NIVEN LAKE PHASE V TRAFFIC IMPACT STUDY

Prepared for:

CITY OF YELLOWKNIFE

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PERMIT TO PRACTICE
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TABLE OF CONTENTS

E	XEC	CUTIVE SUMMARY	٠١
1		BACKGROUND	1
	1.1	The Site	1
2		EXISTING CONDITIONS	3
	2.1	Study Area	3
	2.2	The Road Network	3
3		BASE TRAFFIC VOLUMES	4
	3.1	2012 Base Traffic Volumes	4
	3.2	2017 Future Base Traffic Volumes	4
	3.3	2022 Future Base Traffic Volumes	7
4		SITE TRAFFIC VOLUMES	12
	4.1	Traffic Generation	12
	4.2	Trip Distribution	13
5		TOTAL PROJECTED TRAFFIC VOLUMES	16
6		TRAFFIC ENGINEERING ANALYSIS	21
	6.1	Intersection Capacity Analysis	21
	6.2	Intersection Laning	28
	6.3	Pavement Marking and Signage Plan	30
	6.4	Truck Access and Circulation Plan	30
	6.5	Emergency Vehicle Access and Circulation Plan	30
	6.6	Pedestrian Circulation Plan	30
	6.7	Bicycle Circulation Plan	30
7		CONCLUSIONS & RECOMMENDATIONS	36
	7.1	Conclusions	36
	7.2	Recommendations	36

LIST OF TABLES

TABLE 1
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2017)4
TABLE 2
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2022)7
TABLE 3
SUMMARY OF SITE GENERATED TRAFFIC
TABLE 4
TRIP DISTRIBUTION PERCENTAGES FOR SITE GENERATED TRAFFIC
TABLE 5
TRIP DISTRIBUTION VEHICLE VOLUMES FOR SITE GENERATED TRAFFIC13
TABLE 6
VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR UNSIGNALIZED INTERSECTIONS22

LIST OF FIGURES

IGURE 1	
STUDY AREA & ROAD NETWORK	2
IGURE 2	
012 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES	5
IGURE 3	
012 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES	6
IGURE 4	
017 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES IGURE 5	8
017 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES	9
IGURE 6	
022 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES	.10
IGURE 7	
022 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES	.11
IGURE 8	
SITE TRAFFIC VOLUMES FOR THE WEEKDAY MORNING PEAK HOUR	.14
IGURE 9	
SITE TRAFFIC VOLUMES FOR THE WEEKDAY AFTERNOON PEAK HOUR	.15
IGURE 10	
017 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES	.17
IGURE 11	
017 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES	.18
IGURE 12	
022 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES	.19
IGURE 13	00
022 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES	20
FIGURE 14	00
RECOMMENDED LANING CONFIGURATION FOR FULL BUILDOUT	.∠9
GURE 15 PAVEMENT MARKING AND SIGNAGE PLAN - PARCEL E	24
AVENIEN I MAKKING AND SIGNAGE PLAN - PAKCELE	.31

FIGURE 16	
TRUCK ACCESS AND CIRCULATION PLAN - PARCEL E	32
FIGURE 17	
EMERGENCY VEHICLE ACCESS CIRCULATION PLAN - PARCEL E	33
FIGURE 18	
PEDESTRIAN CIRCULATION PLAN - PARCEL E	34
FIGURE 19	
BICYCLE CIRCULATION PLAN - PARCEL E	35

EXECUTIVE SUMMARY

Creative Transportation Solutions Ltd. (CTS) was retained by the City of Yellowknife on 23 April 2012 to conduct a traffic impact study of a proposed residential development known as Niven Lake Phase V near Niven Lake in Yellowknife. Currently, Niven Lake Phase V contains five parcels of development sites, which is proposed to consist of up to 156 residential dwelling units (Parcel A - 64 units, Parcel B – 14 units, Parcel C – 14 units, Parcel D – 48 units, and Parcel E – 16 units). For the purposes of this study, it was assumed that the five parcels would be constructed and fully occupied by the year 2017.

A Scope Development Meeting with City of Yellowknife officials was held on Tuesday, 1 May 2012 to discuss and confirm the study parameters for this project. As well, CTS staff conducted a detailed site visit and collected traffic volume data to document existing conditions.

The site is estimated to generate a total of 73 vehicle trips during the weekday morning in peak hour (i.e. 12 inbound and 61 outbound) and 84 vehicle trips during the weekday afternoon in peak hour (i.e. 56 inbound and 28 outbound). This is equivalent to an average of 1.4 vehicle movements per minute during the busier afternoon peak hour, which from a traffic engineering point of view is not considered significant.

The traffic impact assessment determined that by the year 2022 (i.e. 5 years post build out), separate left and right turning lanes will be warranted on Niven Gate at Highway 4 due to the increase in projected traffic volumes. As well, the west approach of the intersection of Franklin Avenue & 43rd Street will need to be restriped to provide for separate eastbound left and right turn lanes by the year 2022.

Based on the findings of this study, the following is recommended:

- 1) That the City of Yellowknife monitor traffic volumes at the intersection of Franklin Avenue & 43rd Street to determine when restriping of the east approach is required to provide for separate left and right turn lanes on 43rd Street.
- 2) That the Northwest Territorial Department of Transportation and the City of Yellowknife monitor the intersection of Highway 4 & Niven Gate to determine when Niven Gate should be widened and/or restriped to provide for separate westbound left and right turn lanes.



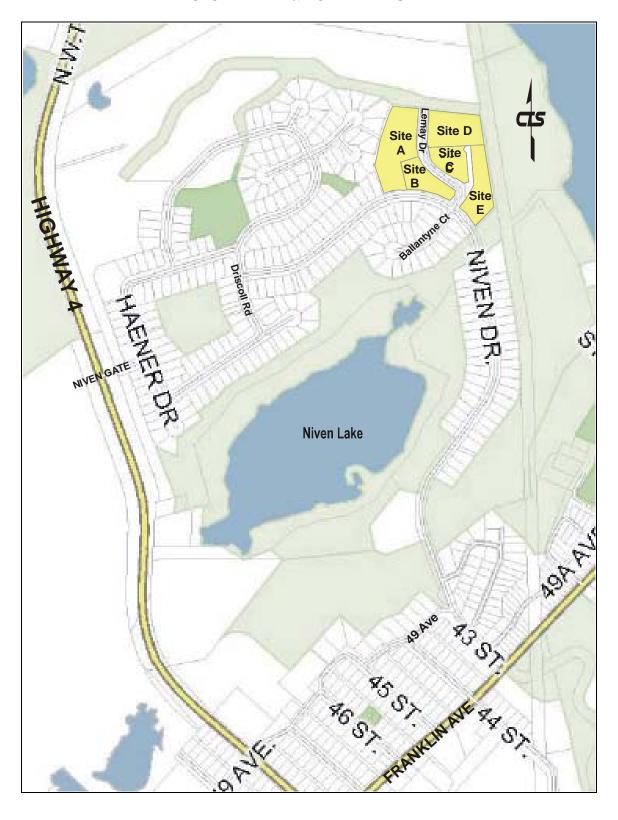
Creative Transportation Solutions Ltd. (CTS) was retained by the City of Yellowknife on 23 April 2012 to conduct a traffic impact study of a proposed residential development known as Niven Lake Phase V near Niven Lake in Yellowknife.

1.1 The Site

The proposed housing development is located in the Niven Lake Phase V subdivision on the north side of Niven Drive in the City of Yellowknife as illustrated in **FIGURE 1**. Currently, there are five proposed parcel sites for the whole development, which is proposed to consist of up to 156 residential dwelling units (Parcel A - 64 units, Parcel B - 14 units, Parcel C - 14 units, Parcel D - 48 units, and Parcel E - 16 units).

A copy of the available site plans used for this traffic impact assessment are included in **APPENDIX A**. The proposed five parcels are anticipated to be constructed and fully occupied by the year 2017.

FIGURE 1 STUDY AREA & ROAD NETWORK



2.1 Study Area

A Scope Development Meeting with City of Yellowknife officials was held on Tuesday, 1 May 2012 to discuss the study parameters for this project. At this meeting, CTS presented a draft study terms of reference which have been included in **APPENDIX B**. The weekday morning and afternoon peak hour was selected as the design hour for the traffic impact assessment.

The study area is bounded by Niven Drive to the east, Franklin Avenue to the south, Highway 4 to the west and site boundary to the north. The following intersections were included in the traffic impact assessment:

- 1. Highway 4 & Niven Gate (unsignalized);
- 2. Haener Drive & Niven Gate (unsignalized);
- 3. Driscoll Road & Niven Drive (unsignalized);
- 4. Ballantyne Court & Niven Drive (unsignalized);
- 5. 49th Avenue & Niven Drive/43rd Street (unsignalized);
- 6. Franklin Avenue & 43rd Street (unsignalized); and
- 7. All site accesses.

2.2 The Road Network

Franklin Avenue is an arterial roadway (ranked priority #1) connecting downtown to the south area with Old Town to the north. Within the study area, a two lane urban cross section is provided. The speed limit is 45 km/h southbound and 30km/h northbound.

Highway 4 is a major roadway (ranked priority #1) connecting downtown to the south with Highway 3 to the north. Within the study area, a two lane cross section is provided. At the intersection with Niven Gate, auxiliary lanes are provided to facilitate turning movements. The posted speed limit is 45km/h in both directions.

43rd Street is a two lane municipal local street with curb, gutter and sidewalk on both sides. The speed limit is 45 km/hr in both directions.

Niven Drive is a two lane municipal local street with curb, gutter and sidewalk on both sides. The speed limit is 45 km/hr in both directions.

3.1 2012 Base Traffic Volumes

In conjunction with a site visit that was undertaken by CTS staff from Tuesday, 1 May 2012 to Thursday, 3 May 2012, CTS undertook intersection traffic counts at six (6) key locations in order to document existing conditions during peak times. The traffic count data was tabulated and reviewed to ensure data integrity and validity. The tabulated traffic movement count data sheets are included in **APPENDIX C**. The traffic volumes are illustrated in **FIGURE 2** and **FIGURE 3** for the weekday morning and afternoon peak hours respectively.

3.2 2017 Future Base Traffic Volumes

For the future base traffic volumes, the 2012 base traffic volumes were factored up by an approved traffic volume growth rate of 2% per annum (simple straight line) to develop the <u>initial</u> base year 2017 volumes. Then, traffic volumes were estimated from the following two nearby potential developments which municipal staff anticipate being completed by the year 2017:

- Niven Heights development is located in the Niven Lake Phase 7 subdivision on the north side of Moyle Drive (illustrated as #1 on **FIGURES 2-14**).
- Other developments in the Niven Lake Phase 7 along on Moyle Drive (illustrated as #2, #3 & #4 on **FIGURES 2-14**)

TABLE 1 summarizes the forecast site generation traffic for the above developments which are projected to be completed by the year 2017.

TABLE 1
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2017)

Land Use	Peak Hour	Trip Generation	Horizon Year	Trip Rate Source	Peak Ho	our Volum	es (vph)
		Variable	Teal	Source	in	out	total
Niven Heights Development	Weekday Morning	Dwelling Units	2017	Recent CTS	12	47	59
(Site 1)	Weekday Afternoon	Dwelling Office	2017	Study	45	24	69
Niven Lake Phase 7	Weekday Morning	Dwelling Units	2017	Provided by city	11	38	49
(Site 2,3 & 4)	Weekday Afternoon	Dwelling Office	2017	staff	42	23	65
		NING PEAK HOUR	33	85	108		
		87	47	134			

Phase VIII Lemay Parcel D , Parcel A Parcel C Parcel E 1 Parcel B 4 HWY 4 Niven Dr Niven Dr 40 Driscoll Rd Niven Gate Niven Lake 56,9 Haener Dr **Trails End Cr LEGEND** Existing Main Road Existing Local Road ASTO ST Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments 1 - 118 units (Niven Heights) 2 - 30 units Condos
3 - 15 single family houses
4 - 33 single family houses Twin Pine Hill Development AGIN SI NOTE: NETWORK IS NOT TO SCALE Note: Individual Peak Hour

FIGURE 2 2012 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES

Phase VIII Lemay Parcel D . Parcel A Parcel C Parcel E 1 Parcel B 4 HWY 4 Niven Dr ×31/0 Niven Dr Driscoll Rd Niven Gate Niven Lake Haener Dr **Trails End Cr LEGEND** Existing Main Road Existing Local Road Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments - 118 units (Niven Heights) 2 - 30 units Condos
3 - 15 single family houses
4 - 33 single family houses 46th St Twin Pine Hill Development NOTE: NETWORK IS NOT TO SCALE Note: Individual Peak Hour

FIGURE 3
2012 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES

The traffic volumes from the above two developments were then superimposed on the initial base volumes to estimate the total 2017 future base traffic volumes. **FIGURE 4** and **FIGURE 5** illustrate the projected 2017 weekday morning and weekday afternoon peak hour volumes for base conditions.

3.3 2022 Future Base Traffic Volumes

The 2022 future base traffic volumes were factored up by an approved traffic volume growth rate of 2% per annum (simple straight line) to develop the <u>initial</u> base year 2022 volumes. Then, traffic volumes were estimated from the following other developments potential which municipal staff anticipate being completed by the year 2022:

- Future Phase 8 of Niven Lake development → 250 units (illustrated as Phase 8 on FIGURES 2-14).
- Twin Pine Hill development → 120 rooms hotel and two commercial buildings located off 44th Street east of Franklin Avenue

TABLE 2 summarizes the forecast site generation traffic for the above two developments.

TABLE 2
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2022)

Land Use	Peak Hour	Trip Generation	Horizon Year	Trip Rate	Peak Ho	our Volum	es (vph)			
		Variable	rear	Source	in out 161 68					
Twin Pine Hill	Weekday Morning	Dwelling Units	2022	Recent CTS	161	68	229			
Development	Weekday Afternoon	Dweiling Onlis	2022	Study	118	91	209			
Niven Lake	Weekday Morning	Dwelling Units	2022	Provided by city	31	112	143			
Phase 8	Weekday Afternoon	Dwelling Office	2022	118	64	182				
		RNING PEAK HOUR	192	180	372					
		237	155	392						

The traffic volumes from both **TABLE 1** and **TABLE 2** were then superimposed on the <u>initial</u> 2022 base volumes to estimate the total 2022 future base traffic volumes. **FIGURE 6** and **FIGURE 7** illustrate the projected 2022 weekday morning and weekday afternoon peak hour volumes for base conditions including the traffic from the other nearby five developments.

Phase VIII Lemay Parcel D , Parcel A Parcel C Parcel E 1 Parcel B 4 HWY 4 Niven Dr Niven Dr Driscoll Rd Niven Gate Niven Lake € 50 131 Haener Dr **Trails End Cr LEGEND** Existing Main Road Existing Local Road ASTO ST Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments 1 - 118 units (Niven Heights) 2 - 30 units Condos
3 - 15 single family houses
4 - 33 single family houses Twin Pine Hill Development AGIN SI NOTE: NETWORK IS NOT TO SCALE Note: 2017 Background Traffic = 2012 Base x 1.1 (i.e. 2.0% annual growth rate) + Other Developments Traffic (Site 1, 2, 3, and 4)

FIGURE 4
2017 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES

Phase VIII Lemay + Parcel D , Parcel A Parcel C 1 Parcel E Parcel B 4 HWY Niven Dr Niven Dr Niven Gate Niven Lake Haener Dr Trails End Cr **LEGEND** Existing Main Road Existing Local Road Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments
1 - 118 units (Niven Heights) - 30 units Condos Twin Pine Hill Development AGIH SI - 15 single family houses - 33 single family houses NOTE: NETWORK IS NOT TO SCALE

FIGURE 5 2017 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES

Note: 2017 Background Traffic = 2012 Base x 1.1 (i.e. 2.0% annual growth rate) + Other Developments Traffic (Site 1, 2, 3, and 4)

Phase VIII Lemay Parcel D ō Parcel A Parcel C 1 Parcel E Parcel B 4 HWY Niven Dr Niven Dr 30 Niven Gate Niven Lake 11/85 Haener Dr **Trails End Cr LEGEND** Existing Main Road Existing Local Road Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments
1 - 118 units (Niven Heights) - 30 units Condos Twin Pine Hill Development 46th St. - 15 single family houses - 33 single family houses NOTE: NETWORK IS NOT TO SCALE Note: 2022 Background Traffic = 2012 Base x 1.2 (i.e. 2.0% annual growth rate) + Other Developm

FIGURE 6
2022 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES

Phase VIII Lemay Parcel D Ō Parcel A Parcel C Parcel E 1 Parcel B 4 HWY 4 Miven Dr Niven Dr 61/2 Driscoll Rd Niven Gate Niven Lake Haener Di **Trails End Cr LEGEND** Existing Main Road Existing Local Road A3FO/SF Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments - 118 units (Niven Heights) 2 - 30 units Condos
3 - 15 single family houses
4 - 33 single family houses AGIN SI Twin Pine Hill Development NOTE: NETWORK IS NOT TO SCALE Note: 2022 Background Traffic = 2012 Base x 1.2 (i.e. 2.0% annual growth rate) + Other Developments Traffic (Site 1, 2, 3, 4, Twin Pine Hill Development, and Phase 8)

FIGURE 7
2022 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES



4.1 Traffic Generation

The published vehicle trip generation rates (8th edition) from the Institute of Transportation Engineers (ITE) were used to forecast the site generated traffic volumes in accordance with the agreed to scope of work. Of note, use of these rates constitutes the "worst case scenario" for the generated traffic as it assumes that the majority of person trips to or from the site use an automobile. **TABLE 3** summarizes the forecast site generated traffic for full buildout which is projected to be completed by the year 2017.

TABLE 3
SUMMARY OF SITE GENERATED TRAFFIC

Land Use	Peak Hour	Trip Generation	Horizon	Scope of	Vehicle Trip Generation	Trip Rate	Directio	nal Split	Peak H	our Volum	es (vph)
		Variable	Year	Development*	Rate	Source	% in	% out	in	out	total
Parcel A -	Weekday Morning	Dwelling Units	2017	64	0.44	ITE 8th Edition -	17%	83%	5	24	29
Condominium	Weekday Afternoon	Dwelling Office	2017	04	0.52	Code 230	67%	33%	23	11	34
Parcel B -	Weekday Morning	Dwelling Units	2017	14	0.44	ITE 8th Edition -	17%	83%	1	6	7
Condominium	Weekday Afternoon	Dwelling Office	2017	14	0.52	Code 230	67%	33%	5	3	8
Parcel C -	Weekday Morning	Dwelling Units	2017	14	0.44	ITE 8th Edition -	17%	83%	1	6	7
Condominium	Weekday Afternoon	Dwelling Office	2017	14	0.52	Code 230	67%	33%	5	3	8
Parcel D -	Weekday Morning	Dwelling Units	2017	48	0.44	ITE 8th Edition -	17%	83%	4	18	22
Condominium	Weekday Afternoon	Dwelling Office	2017	40	0.52	Code 230	67%	33%	17	8	25
Parcel E -	Weekday Morning	Dwelling Units	2017	16	0.44	ITE 8th Edition -	17%	83%	1	7	8
Condominium	Weekday Afternoon Dwelling Units 2017 16 Code 230						67%	33%	6	3	9
	TOTAL WEEKDAY MORNING PEAK HOUR		12	61	73						
	TOTAL WEEKDAY AFTERNOON PEAK HOUR									28	84

From **TABLE 3**, all sites are estimated to generate a total of 73 vehicle trips during the weekday morning in peak hour (i.e. 12 inbound and 61 outbound) and 84 vehicle trips during the weekday afternoon in peak hour (i.e. 56 inbound and 28 outbound). This is equivalent to an average of 1.4 vehicle movements per minute during the busier afternoon peak hour, which from a traffic engineering point of view is not considered significant.

4.2 Trip Distribution

Trip distribution parameters to distribute the site generated vehicle trips to/from the site were developed from existing traffic patterns entering and exiting the study area for the morning and afternoon peak hour. The trip distribution parameters used in this study are summarized in **TABLE 4** while the associated traffic volumes assignment is summarized in **TABLE 5**.

TABLE 4
TRIP DISTRIBUTION PERCENTAGES
FOR SITE GENERATED TRAFFIC

FROM / TO	WEEKDAY MORN	IING PEAK HOUR	WEEKDAY AFTERI	NOON PEAK HOUR		
TROWIT TO	INBOUND	OUTBOUND	INBOUND	OUTBOUND		
West - Niven Gate	69.4%	55.0%	73.7%	56.1%		
South - Niven Drive	30.6%	45.0%	26.3%	43.9%		

TABLE 5
TRIP DISTRIBUTION VEHICLE VOLUMES
FOR SITE GENERATED TRAFFIC

FROM/TO	WEEKDAY MORN	NING PEAK HOUR	WEEKDAY AFTER	NOON PEAK HOUR			
TROW/TO	INBOUND	OUTBOUND	INBOUND	OUTBOUND			
West - Niven Gate	8	34	41	16			
South - Niven Drive	4	27	15	12			
TOTAL	12	61	56	28			
TOTAL	7	' 3	84				

FIGURE 8 and **FIGURE 9** illustrate the projected site generated volumes on the road network for Buildout (Year 2017) weekday morning peak hour and weekday afternoon peak hours respectively.

Phase VIII Parcel D Parcel A IN 5 vph OUT 24 vph 1 Parcel B Parcel E IN 1 vph OUT 6 vph TOTAL 7 vph IN 1 vph OUT 7 vph HWY 4 5.4 11 0 Niven Gate Niven Lake Haener Dr Trails End Cr **LEGEND** Existing Main Road Existing Local Road Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments
1 - 118 units (Niven Heights) - 30 units Condos 46th St Twin Pine Hill Development - 15 single family houses - 33 single family houses NOTE: NETWORK IS NOT TO SCALE Note: Individual Peak Hour

FIGURE 8
SITE TRAFFIC VOLUMES FOR THE WEEKDAY MORNING PEAK HOUR

Phase VIII Parcel D Parcel A TOTAL 8 vph IN 23 vph OUT 11 vph TOTAL 34 vph 1 Parcel B IN 5 vph OUT 3 vph IN 6 vph OUT 3 vph TOTAL 8 vp 4 HWY 24 A 5 T Niven Dr Niven Gate Niven Lake Haener Dr Trails End Cr **LEGEND** Existing Main Road Existing Local Road A3FO/SF Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments
1 - 118 units (Niven Heights) - 30 units Condos 46th St Twin Pine Hill Development - 15 single family houses - 33 single family houses NOTE: NETWORK IS NOT TO SCALE Note: Individual Peak Hour

FIGURE 9
SITE TRAFFIC VOLUMES FOR THE WEEKDAY AFTERNOON PEAK HOUR

TOTAL PROJECTED TRAFFIC VOLUMES

FIGURE 10 illustrates the total projected traffic for the year <u>2017</u> weekday morning peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 4** onto **FIGURE 8**.

FIGURE 11 illustrates the total projected traffic for the year <u>2017</u> weekday afternoon peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 5** onto **FIGURE 9**.

FIGURE 12 illustrates the total projected traffic for the year <u>2022</u> weekday morning peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 6** onto **FIGURE 8**.

FIGURE 13 illustrates the total projected traffic for the year <u>2022</u> weekday afternoon peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 7** onto **FIGURE 9**.

Phase VIII Parcel D Parcel C Parcel A 1 Parcel E HWY 4 Niven Gate Niven Lake Haener Dr Trails End Cr **LEGEND** Existing Main Road Existing Local Road Proposed Site Access ←100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments
1 - 118 units (Niven Heights) - 30 units Condos Twin Pine Hill Development 46th St - 15 single family houses - 33 single family houses NOTE: NETWORK IS NOT TO SCALE Note: 2017 Background + Site Traffic = 2012 Base x 1.1 (i.e. 2.0% annual growth rate) + Other Dev

FIGURE 10 2017 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES

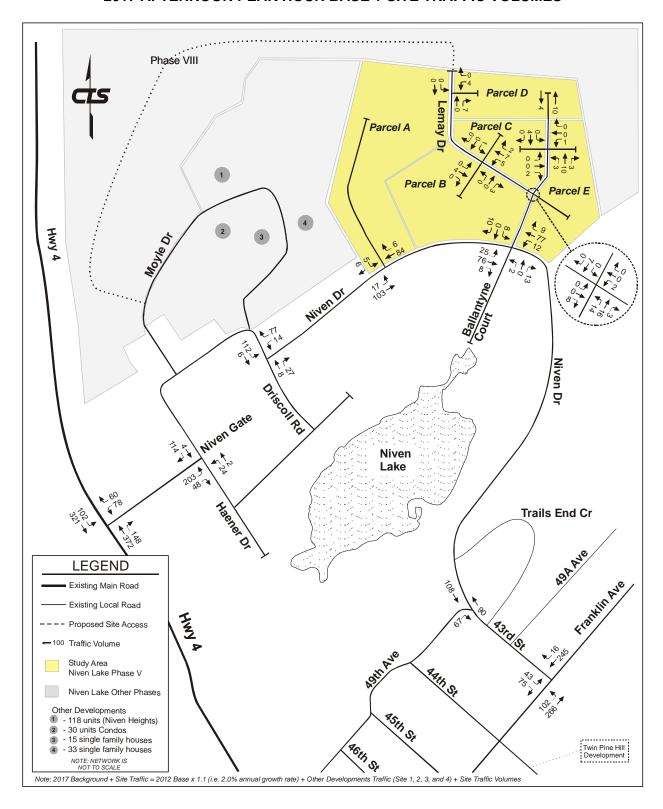


FIGURE 11 2017 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES

Phase VIII Parcel D Lemay D Parcel C Parcel A 1 Parcel E HWY 4 Niven Dr Niven Gate Niven Lake Haener Dr Trails End Cr **LEGEND** Existing Main Road Existing Local Road Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments
1 - 118 units (Niven Heights) - 30 units Condos Twin Pine Hill Development AGIN SI - 15 single family houses - 33 single family houses NOTE: NETWORK IS NOT TO SCALE Note: 2022 Background + Site Traffic = 2012 Base x 1.2 (i.e. 2.0% annual growth rate) + Other Dev

FIGURE 12 2022 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES

Phase VIII Parcel D Lemay Parcel A 1 Parcel B Parcel E 4 HWY 4 25 A 80 A 87 Niven Dr Driscoll Rd Niven Gate Niven Lake ×80 Haener Di Trails End Cr **LEGEND** Existing Main Road Existing Local Road - Proposed Site Access ← 100 Traffic Volume Study Area Niven Lake Phase V Niven Lake Other Phases Other Developments - 118 units (Niven Heights) 2 - 30 units Condos
3 - 15 single family houses
4 - 33 single family houses AGIN SI Twin Pine Hill NOTE: NETWORK IS NOT TO SCALE Note: 2022 Background + Site Traffic = 2012 Base x 1.2 (i.e. 2.0% annual growth rate) + Other Developments Traffic (Site 1, 2, 3, 4, Twin Pine Hill, and Nevin Lake Phase 8)+ Site Traffic Volumes

FIGURE 13 2022 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES

6.1 Intersection Capacity Analysis

Capacity analysis was performed at each of the locations in order to determine the intersection levels of service (LOS) that is provided to motorists. LOS for intersections is defined in terms of delay (seconds per vehicle), which is a measure of driver discomfort and frustration, fuel consumption and lost travel time.

An intersection or movement LOS can range from "A" (which is excellent) to "E" (which is capacity). A LOS of "F" indicates that an intersection or movement capacity is failing because vehicle delays are excessive. A LOS of "D" during the critical peak hours is considered acceptable by many public agencies in large urban areas for overall intersection operation and a LOS of "E" or better is considered acceptable for left turn movements as it recognizes that the intersections normally perform much better the remaining 90% of the day. However, for a community like the City of Yellowknife where motorists typically have a lower level of tolerance to traffic congestion, a LOS of "C" or better during the critical peak hours is considered acceptable for overall intersection operation and a LOS of "D" or better is considered acceptable for left turn movements at signalized intersections.

The volume to capacity (v/c) ratio typically ranges from 0.25 to 1.20 with a v/c ratio of 1.0 indicating the movement, approach or intersection is at capacity.

Highway Capacity Software (HCS2010) was used for the unsignalized intersection analysis and Synchro (version 8) was used to analyze the signalized intersections. The following assumptions were made with respect to the intersection capacity analysis:

- Saturation flow rate = 1,800 passenger cars/hour of green time/lane (pcphgpl)
- Heavy vehicle percentage for roads = 2%
- Peak hour factor (PHF) = 0.65 for the morning and 0.78 for the afternoon which are the average PHF from the surveyed intersections.

TABLE 6 summarizes and compares the main performance parameters including the Level of Service and the delay per vehicle (in seconds) of the intersection capacity analysis for unsignalized intersections. Wherever necessary, attempts at improvements have been made to maintain intersection and approach movement level of service standards for each of the post-development scenarios. The capacity analysis worksheets are included in **APPENDIX D**.

TABLE 6 VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR UNSIGNALIZED INTERSECTIONS

INTERSECTION	TIME OF	SCENARIO	PERFORMANCE	EA	STBOU	ND	WE	STBOU	ND	so	итнвоі	JND	NO	NORTHBOUND		LOS	NOTES
INTERCECTION	DAY	OOLIVAINO	MEASURE	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		NOTES
		2042 P	Volumes				88		34	37	304			205	38	_	01
		2012 Base	Delay				16.9		16.9	7.9	7.9			0.0	0.0	Α	Okay.
		2017 Base	Volumes				131		50	52	334			226	52	С	Okay. Westbound
	Weekday	2017 Base	Delay				76.6		76.6	8.4	8.4			0.0	0.0	٦	movements are over capacity
	Morning Peak Hour	2047 P : Cit-	Volumes				155		59	56	334			226	56	_	Westbound movements are
		2017 Base + Site	Delay				133.2		133.2	8.5	8.5			0.0	0.0	E	over capacity. Overall is approaching capacity
		2022 Base + Site	Volumes				209		80	70	365			246	70	F	Westbound movements are
Highway 4 (NB/SB)		2022 Base + Site	Delay				418.9		418.9	8.7	8.7			0.0	0.0	,	over capacity. Overall is ove capacity
and Niven Gate (WB)		2012 Base	Volumes				49		38	54	292			338	78	_	Okov
		2012 Base	Delay				21.1		21.1	8.8	8.8			0.0	0.0	Α	Okay.
		2017 Base	Volumes				69		53	85	321			372	124	А	Okay. Westbound movements are approaching
	Weekday Afternoon	2017 base	Delay				31.2		31.2	9.3	9.3			0.0	0.0	^	capacity
	Peak Hour	2017 Base + Site	Volumes				78		60	102	321			372	148	Α	Okay. Westbound movements are approaching
		2017 Base 1 Oile	Delay				41.2		41.2	9.5	9.5			0.0	0.0		capacity
		2022 Base + Site	Volumes				103		80	114	350			406	207	D	Westbound movements are over capacity. Overall is
		2022 Base 1 One	Delay				170.6		170.6	10.6	10.6			0.0	0.0		approaching capacity
		2012 Base	Volumes	56		19					3	89	33	3		А	Okay.
		2012 Base	Delay	7.9		7.9					7.2	7.2	7.8	7.8			onay.
		2017 Base	Volumes	85		21					2	145	36	3		А	Okay.
	Weekday Morning Peak Hour	2011 2000	Delay	8.8		8.8					8.0	8.0	8.2	8.2			onay.
		2017 Base + Site	Volumes	90		24					2	174	40	4		А	Okay.
			Delay	9.0		9.0					8.4	8.4	8.3	8.3			,
		2022 Base + Site	Volumes	117		26					2	245	44	4		А	Okay.
Haener Drive (NB/SB) and			Delay	10.1		10.1					10.0	10.0	8.7	8.7			,
Niven Gate (EB)		2012 Base	Volumes	97		35					4	68	19	2		А	Okay.
			Delay	8.0		8.0					7.0	7.0	7.6	7.6			,
		2017 Base	Volumes	171		39					4	101	21	2		А	Okay.
	Weekday Afternoon		Delay	9.4 9.4 7.7 7.7 8.1 8.1	8.1		<u> </u>	J									
	Peak Hour	2017 Base + Site	Volumes	203		48					4	114	24	2		А	Okay.
			Delay	10.2		10.2					8.0	8.0	8.3	8.3			,
		2022 Base + Site	Volumes	299		51					5	157	26	2		В	Okay.
			Delay	13.6		13.6					9.1	9.1	8.9	8.9			
		2012 Base	Volumes				6		40	16	6			8	12	Α	Okay.
			Delay				8.6		8.6	7.3	7.3			0.0	0.0		
		2017 Base	Volumes				7		54	56	7			9	13	Α	Okay.
	Weekday Morning		Delay				8.9		8.9	7.4	7.4			0.0	0.0		
	Peak Hour	2017 Base + Site	Volumes				11		83	61	7			9	16	Α	Okay.
			Delay				9.2		9.2	7.4	7.4			0.0	0.0		
		2022 Base + Site	Volumes				11		87	62	7			10	17	Α	Okay.
Driscoll Road (NB/SB) and			Delay				9.2		9.2	7.4	7.4			0.0	0.0		
Niven Gate (WB)		2012 Base	Volumes				10		37	54	5			7	16	Α	Okay.
			Delay				9.1		9.1	7.4	7.4			0.0	0.0	<u> </u>	
	Wookdov	2017 Base	Volumes				11		64	80	6			8	18	Α	Okay.
	Weekday Afternoon		Delay				9.1		9.1	7.5	7.5			0.0	0.0	<u> </u>	
	Peak Hour	2017 Base + Site	Volumes				14		77	112	6			8	27	Α	Okay.
			Delay				9.4		9.4	7.6	7.6			0.0	0.0		
		2022 Base + Site	Volumes				15		80	116	6			8	28	Α	Okay.
	Dalari Averege Dele		Delay				9.5		9.5	7.6	7.6			0.0	0.0		

Delay = Average Delay (seconds/vehicle)
Intersection approaching capacity (LOS 'D' or 'E'); ; or medium approach delays (25sec to <50sec)

TABLE 6 (con't) VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR <u>UNSIGNALIZED</u> INTERSECTIONS

INTERSECTION	TIME OF	COENADIO	PERFORMANCE	E/	STBOU	ND	WE	STBOU	ND	so	UTHBO	JND	NO	NORTHBOUND		1.00	NOTES
INTERSECTION	DAY	SCENARIO	MEASURE	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	LOS	NOTES
			Volumes	1	32	1	2	26	0	0	0	0	4	0	14		
		2012 Base	Delay	7.3	7.3	7.3	7.3	7.3	7.3	0.0	0.0	0.0	8.7	8.7	8.7	Α	Okay.
	ĺ	0047.5	Volumes	1	73	1	2	39	0	0	0	0	4	0	15		
	Weekday	2017 Base	Delay	7.3	7.3	7.3	7.5	7.5	7.5	0.0	0.0	0.0	9.1	9.1	9.1	Α	Okay.
	Morning Peak Hour	2047 D : Cit-	Volumes	6	84	1	2	41	2	17	0	20	4	0	15		Oliveria
		2017 Base + Site	Delay	7.4	7.4	7.4	7.5	7.5	7.5	9.6	9.6	9.6	9.3	9.3	9.3	Α	Okay.
		2022 Boss I Site	Volumes	6	87	1	2	43	11	67	0	20	5	0	17	^	Okov
Ballantyne Court (NB/SB) and Niven		2022 Base + Site	Delay	7.4	7.4	7.4	7.5	7.5	7.5	11.0	11.0	11.0	9.4	9.4	9.4	Α	Okay.
Gate (EB/WB)		2012 Base	Volumes	1	45	7	11	44	0	1	0	0	2	0	12	Α	Okov
		2012 Base	Delay	7.4	7.4	7.4	7.4	7.4	7.4	10.0	10.0	10.0	8.9	8.9	8.9	Α	Okay.
		2017 Base	Volumes	1	71	8	12	71	0	1	0	0	2	0	13	Α	Okov
	Weekday Afternoon	2017 Base	Delay	7.4	7.4	7.4	7.4	7.4	7.4	10.3	10.3	10.3	9.0	9.0	9.0	Α	Okay.
	Peak Hour	2017 Base + Site	Volumes	25	76	8	12	77	9	8	0	10	2	0	13	А	Okay.
		2017 Base + Site	Delay	7.5	7.5	7.5	7.5	7.5	7.5	10.0	10.0	10.0	9.2	9.2	9.2	^	Okay.
		2022 Base + Site	Volumes	25	80	8	13	82	40	36	0	10	2	0	14	Α	Okay.
		2022 base + Site	Delay	7.6	7.6	7.6	7.5	7.5	7.5	11.5	11.5	11.5	9.2	9.2	9.2	^	Okay.
		2012 Base	Volumes		100			33							21	Α	Okay.
		2012 Dase	Delay		0.0			0.0							9.0	^	Okay.
		2017 Base	Volumes		148			46							23	Α	Okay.
	Weekday Morning	2011 2000	Delay		0.0			0.0							9.7		Onay.
	Peak Hour	2017 Base + Site	Volumes		176			50							23	А	Okay.
		2011 2000 1 0110	Delay		0.0			0.0							9.9		
49th Avenue (NB)		2022 Base + Site	Volumes		236			63							56	Α	Okay.
and Niven			Delay		0.0			0.0							11.0		,
Drive/43rd Street (EB/WB)		2012 Base	Volumes		68			47							61	Α	Okay.
			Delay		0.0			0.0							9.1		,
		2017 Base	Volumes		96			75							67	Α	Okay.
	Weekday Afternoon		Delay		0.0			0.0							9.5		,
	Peak Hour	2017 Base + Site	Volumes		108			90							67	Α	Okay.
			Delay		0.0			0.0							9.6		
		2022 Base + Site	Volumes		143			125							82	Α	Okay.
			Delay		0.0			0.0							10.0		
		2012 Base	Volumes	23		86					221	9	25	134		Α	Okay.
			Delay	12.1		12.1					0.0	0.0	8.0	8.0			
		2017 Base	Volumes	33		125					243	13	35	147		Α	Okay.
	Weekday Morning		Delay	16.6		16.6					0.0	0.0	8.3	8.3			
	Peak Hour	2017 Base + Site	Volumes	39		147					243	14	38	147		Α	Okay.
			Delay	18.6		18.6					0.0	0.0	8.4	8.4			
		2022 Base + Site	Volumes	53		225					319	17	49	175		С	Okay. Eastbound movements are over
Franklin Avenue (NB/SB) and 43rd			Delay	58.5		58.5					0.0	0.0	8.8	8.8			capacity
Street (EB/WB)		2012 Base	Volumes	28		49					223	10	63	242		Α	Okay.
			Delay	12.4		12.4					0.0	0.0	8.0	8.0			
	Magirater	2017 Base	Volumes	39		67					245	14	89	266		Α	Okay.
	Weekday Afternoon		Delay	17.0		17.0					0.0	0.0	8.4	8.4			
	Peak Hour	2017 Base + Site	Volumes	43		75					245	16	102	226		Α	Okay.
			Delay	17.4		17.4					0.0	0.0	8.4	8.4			Olean Faatha !
		2022 Base + Site	Volumes	56		107					299	21	147	317		В	Okay. Eastbound movements are approaching
		av (seconds/vehicle)	Delay	34.5		34.5					0.0	0.0	8.9	8.9			capacity

Delay = Average Delay (seconds/vehicle)
Intersection approaching capacity (LOS 'D' or 'E'); ; or medium approach delays (25sec to <50sec)

TABLE 6 (con't) VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR <u>UNSIGNALIZED</u> INTERSECTIONS

INTERSECTION	TIME OF	SCENARIO	PERFORMANCE MEASURE		STBOU	ND	WE	STBOU	ND	so	итнвоі	UND	NO	RTHBO	UND	LOS	NOTES
	DAY	0021111110	MEASURE	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	200	
		2017 Base + Site	Volumes	0	0	18	4	0	0	0	15	0	3	3	1	Α	Okay.
	Weekday Morning	2017 Base 1 Oile	Delay	8.8	8.8	8.8	8.8	8.8	8.8	7.2	7.2	7.2	7.3	7.3	7.3	^	Okay.
	Peak Hour	2022 Base + Site	Volumes	0	0	68	4	0	0	0	15	0	12	3	1	А	Okay.
Ballantyne Court (NB/SB) & Lemay			Delay	9.4	9.4	9.4	9.3	9.3	9.3	7.3	7.3	7.3	7.4	7.4	7.4		
Drive (EB,WB)		2017 Base + Site	Volumes	0	0	8	2	0	0	0	7	0	14	16	3	Α	Okay.
	Weekday Afternoon		Delay	9.0	9.0	9.0	8.9	8.9	8.9	7.3	7.3	7.3	7.3	7.3	7.3		
	Peak Hour	2022 Base + Site	Volumes	0	0	36	2	0	0	0	7	0	45	16	3	А	Okay.
			Delay	9.4	9.4	9.4	9.4	9.4	9.4	7.3	7.3	7.3	7.3	7.3	7.3		
	\\/\	2017 Base + Site	Volumes	3	42			53	2	11		13				Α	Okay.
	Weekday Morning		Delay	7.4	7.4			0.0	0.0	9.1		9.1					
Parcel A Site	Peak Hour	2022 Base + Site	Volumes	3	46			56	2	11		13				Α	Okay.
Access (SB) & Niven Drive			Delay	7.4	7.4			0.0	0.0	9.2		9.2					
(EB,WB)	Weekday	2017 Base + Site	Volumes Delay	17 7.5	103 7.5			0.0	6	5 9.5		6 9.5				Α	Okay.
	Afternoon Peak Hour		Volumes	17	109			88	6	9.5		9.5					
	reak Houl	2022 Base + Site	Delay	7.5	7.5			0.0	0.0	9.6		9.6				Α	Okay.
			Volumes	0	9	0	1	2	0.0	3	0	0	0	0	6		
	Weekday Morning Peak Hour	2017 Base + Site	Delay	7.2	7.2	7.2	7.2	7.2	7.2	8.7	8.7	8.7	8.4	8.4	8.4	Α	Okay.
			Volumes	0	59	0	1	11	0	3	0	0	0	0	6		
Parcel B/C Site		2022 Base + Site	Delay	7.2	7.2	7.2	7.4	7.4	7.4	9.2	9.2	9.2	8.8	8.8	8.8	Α	Okay.
Access (NB/SB) & Lemay Dr (EB,WB)	Weekday		Volumes	0	4	0	5	7	2	1	0	0	0	0	3		
		2017 Base + Site	Delay	7.2	7.2	7.2	7.2	7.2	7.2	8.7	8.7	8.7	8.3	8.3	8.3	Α	Okay.
	Afternoon Peak Hour		Volumes	0	32	0	5	38	2	1	0	0	0	0	3		
		2022 Base + Site	Delay	7.3	7.3	7.3	7.3	7.3	7.3	9.1	9.1	9.1	8.5	8.5	8.5	Α	Okay.
		0047.0	Volumes				9		0	0	0			0	2		QL.
	Weekday Morning	2017 Base + Site	Delay				8.6		8.6	7.2	7.2			0.0	0.0	Α	Okay.
	Peak Hour	2022 Base + Site	Volumes				9		0	0	50			9	2	Α	Okay.
Lemay Drive (NB/SB) and Parcel		2022 base + Site	Delay				9.0		9.0	7.2	7.2			0.0	0.0	ζ.	Okay.
D Site Access (WB)		2017 Base + Site	Volumes				4		0	0	0			0	7	Α	Okay.
, ,	Weekday Afternoon	2011 2000 1 0110	Delay				8.6		8.6	7.2	7.2			0.0	0.0		onay.
	Peak Hour	2022 Base + Site	Volumes				4		0	0	28			31	7	Α	Okay.
			Delay				8.9		8.9	7.3	7.3			0.0	0.0		,
		2017 Base + Site	Volumes	0	0	3	3	0	0	0	9	0	1	2	0	Α	Okay.
	Weekday Morning		Delay	8.4	8.4	8.4	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2		,
Ballantyne Court	Peak Hour	2022 Base + Site	Volumes	0	0	3	3	0	0	0	9	0	1	2	0	А	Okay.
(NB/SB) and Parcel C/E Site Access			Delay	8.4	8.4	8.4	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2		
(EB/WB)	10/	2017 Base + Site	Volumes	0	0	2	1	0	0	0	4	0	3	10	3	Α	Okay.
	Weekday Afternoon		Delay	8.3	8.3	8.3	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2		
	Peak Hour		Volumes	0	0	2	1	0	0	0	4	0	3	10	3	Α	Okay.
	Delay = Average Delay		Delay	8.3	8.3	8.3	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2		

Delay = Average Delay (seconds/vehicle)
Intersection approaching capacity (LOS 'D' or 'E'); ; or medium approach delays (25sec to <50sec)

Intersection equals or exceeds capacity (LOS 'F'); or high approach delays (=> 50sec)

From **TABLE 6**, the following observations can be made:

1. Highway 4 (NS) & Niven Gate (EW)

- The intersection currently operates at LOS A (excellent) during the morning and the afternoon peak hours. By the year 2017 under base conditions and with other development traffic condition, the overall level of service is projected to decrease LOS C (fair) during the morning peak hour and to remain unchanged for the afternoon peak hour. During the weekday morning peak, westbound traffic on Niven Gate trying to enter Highway 4 is over capacity due to the higher traffic volumes on Highway 4 and the fact that Niven Gate is stop sign controlled.
- With the additional site traffic in 2017 base condition, it does not result in
 a change as the overall LOS remains at A (excellent) during the weekday
 afternoon peak hour. However, the overall LOS decreases to E
 (approaching capacity) during the weekday morning peak hour.
 Westbound approach on Niven Gate is over capacity during the morning
 peak and approaching capacity during the afternoon peak under stop sign
 traffic control.
- Addition of the site traffic to the base 2022 volumes changes the overall LOS to F (failing) during the morning peak hour and D (poor) during the afternoon peak hour. Of note, the westbound approach on Niven Gate is over capacity in the both morning and afternoon peak under stop sign traffic control. Widening this approach to provide for separate left and right turn lanes will reduce approach delays on Niven Gate. FIGURE 14 illustrates the recommended laning configuration and traffic control for this intersection.
- It is recommended that the Northwest Territories Department of Transportation monitor this intersection and add separate westbound left and right turn lanes on Niven Gate when warranted.

2. Haener Drive (NS) & Niven Gate (EW)

- The intersection operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hours.
- Addition of site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hours. For the year 2022 (i.e. 5 years post buildout), the overall intersection is projected to remains at LOS A (excellent) during the morning peak and at LOS B (good) during the afternoon peak.

 Therefore, no operational and/or capital improvements are recommended for this intersection.

3. Driscoll Road (NS) & Niven Drive (EW)

- The intersection operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of the site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hour. For the year 2022 (i.e. 5 years post buildout), the overall intersection is projected to remains at LOS A (excellent) during the morning and afternoon peak hour.
- No operational and/or geometrical improvements are recommended at this location.

4. Ballantyne Court (NS) & Niven Drive (EW)

- The intersection currently operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of the site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hour. For the year 2022 (i.e. 5 years post buildout), the overall intersection is projected to remains at LOS A (excellent) during the morning and afternoon peak hour.
- No operational and/or geometrical improvements are recommended at this location.

5. 49th Avenue (NS) & Niven Drive / 43rd Street (EW)

- The intersection currently operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of the site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hour. For the year 2022 (i.e. 5 years post buildout),

the overall intersection is projected to remains at LOS A (excellent) during the morning and afternoon peak hour.

 No operational and/or geometrical improvements are recommended at this location.

6. Franklin Avenue (NS) & 43rd Street (EW)

- The intersection currently operates at an overall LOS A (excellent) under existing conditions during the weekday morning and afternoon peak hours and no operational issues were noted in the capacity analysis. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hours.
- For the year 2022, the addition of site traffic to the base traffic volumes decreases the LOS from A (excellent) to C (poor) during the morning peak and from A (excellent) to C (good) during the afternoon peak. Of note, the west approach (for eastbound traffic) on 43rd Street will be over the capacity for the morning peak and approaching the capacity for the afternoon peak. Restriping this approach to provide for separate left and right turn lanes will increase the capacity of this approach when warranted. FIGURE 14 illustrates the recommended laning configuration and traffic control for this intersection.
- It is recommended that the City of Yellowknife monitor traffic volumes at the intersection of Franklin Avenue & 43rd Street to determine when restriping of the east approach is required to provide for separate left and right turn lanes on 43rd Street.

7. Ballantyne Court (NS) & Lemay Drive / Parcel E Site Access (EW)

- This is the proposed new site access for the Parcel E. The proposed stop sign controls are in the north approach and east approach. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

8. Parcel A Site Access (NS) & Niven Drive (EW)

 This is the proposed new site access for the Parcel A development to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.

• **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

9. Parcel B/C Site Access (NS) & Lemay Drive (EW)

- This is the proposed new site access for the Parcel B and Parcel C developments to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

10. Lemay Drive (NS) & Parcel D Site Access (EW)

- This is the proposed new site access for the Parcel D development to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

11. Ballantyne Court (NS) & Parcel C/E Site Access (EW)

- This is the proposed new site access for the Parcel C and Parcel E development to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

6.2 Intersection Laning

Based on the results of the intersection and access capacity analysis, the recommended intersection / access laning and traffic control for the year 2022 was developed and these are illustrated in **FIGURE 14.**

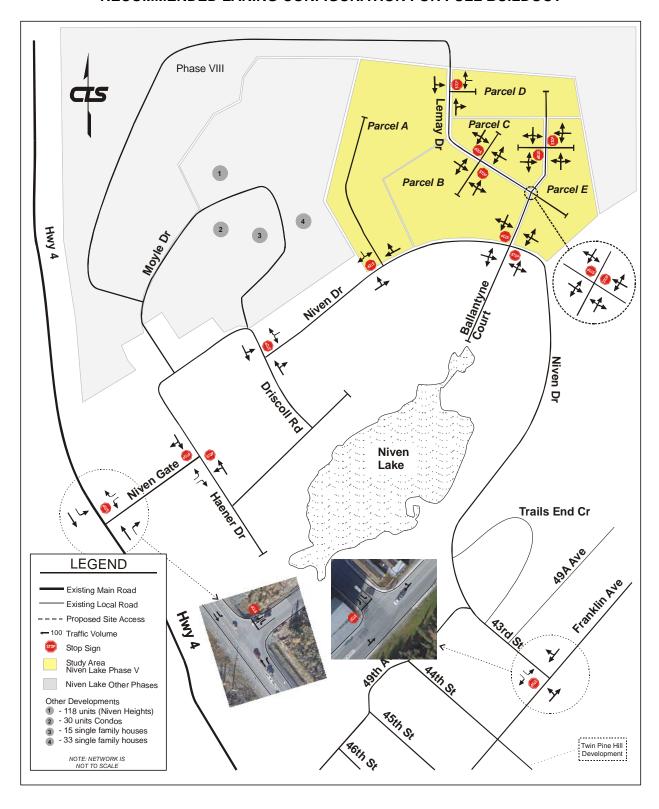


FIGURE 14
RECOMMENDED LANING CONFIGURATION FOR FULL BUILDOUT

6.3 Pavement Marking and Signage Plan

A conceptual pavement marking and signage plan for Parcel E site was subsequently prepared and this is illustrated in **FIGURE 15**.

6.4 Truck Access and Circulation Plan

FIGURE 16 illustrates the recommended truck access and circulation plan for Parcel E site. The design truck selected is Heavy Single Unit (HSU) truck with 2 rear axles which replicates the vehicle path of the typical garbage truck emptying large bins. From the analysis, it was determined that both accesses are wide enough and the design vehicle can enter, exist, and maneuver on site.

6.5 Emergency Vehicle Access and Circulation Plan

FIGURE 17 illustrates the recommended emergency vehicle access and circulation plan for Parcel E site. The design truck is a Yellowknife fire truck that is 38 feet long and which was measured at Fire Hall #1. From the analysis, it was determined that both accesses are wide enough and the design vehicle can enter, exist, and maneuver on site.

6.6 Pedestrian Circulation Plan

FIGURE 18 illustrates the recommended pedestrian circulation plan for Parcel E site.

6.7 Bicycle Circulation Plan

FIGURE 19 illustrates the recommended bicycle circulation plan for Parcel E site. It is assumed that cyclists will share the internal roads with motor vehicles.

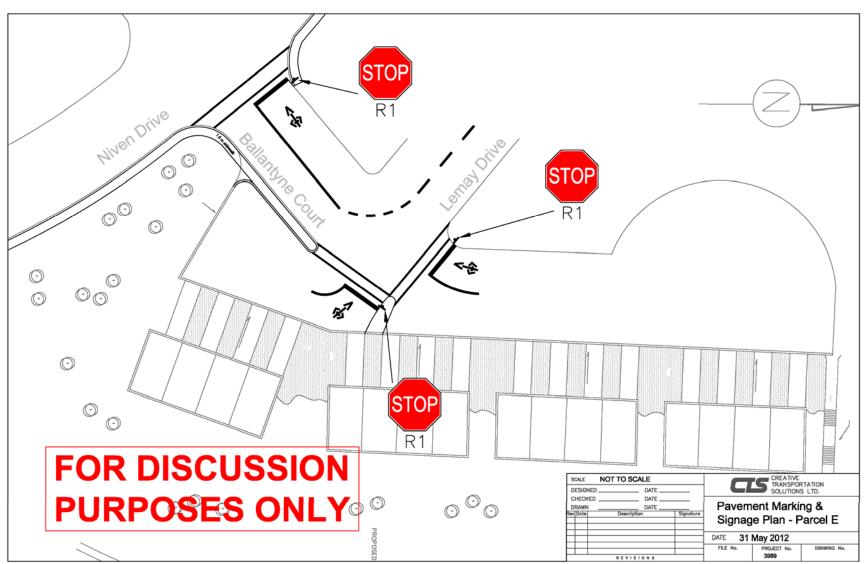


FIGURE 15
PAVEMENT MARKING AND SIGNAGE PLAN – PARCEL E

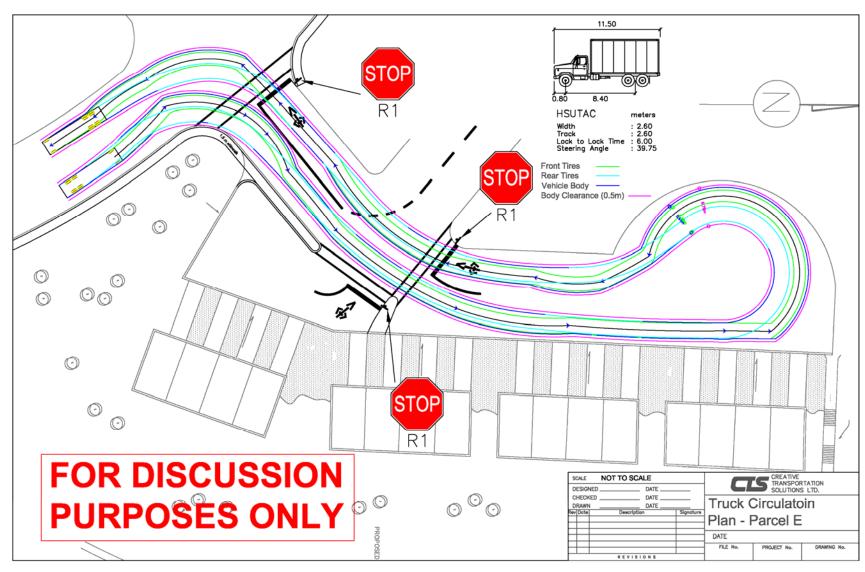


FIGURE 16
TRUCK ACCESS AND CIRCULATION PLAN – PARCEL E

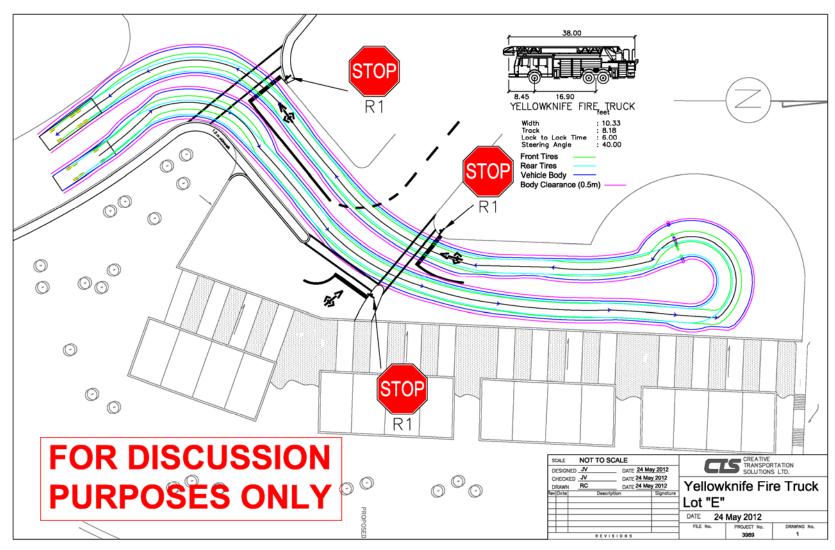


FIGURE 17
EMERGENCY VEHICLE ACCESS CIRCULATION PLAN – PARCEL E

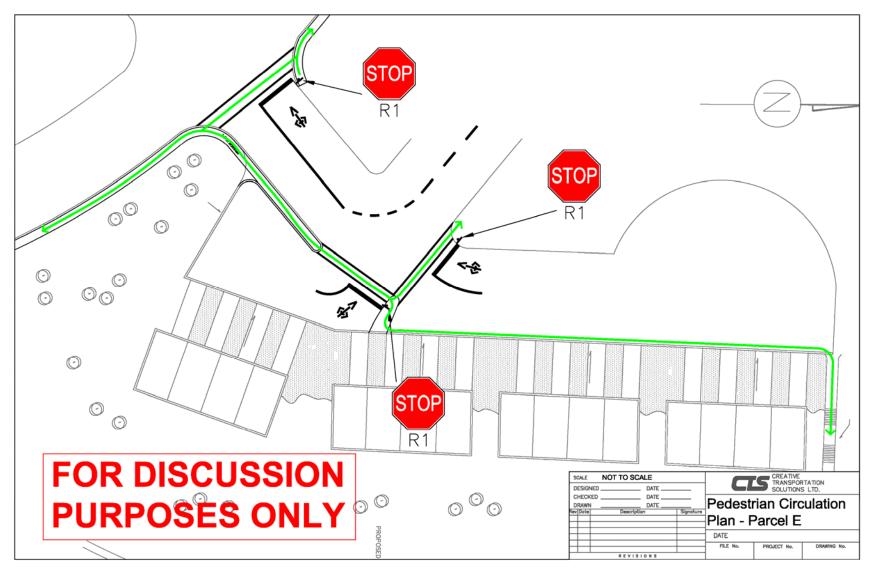


FIGURE 18
PEDESTRIAN CIRCULATION PLAN – PARCEL E

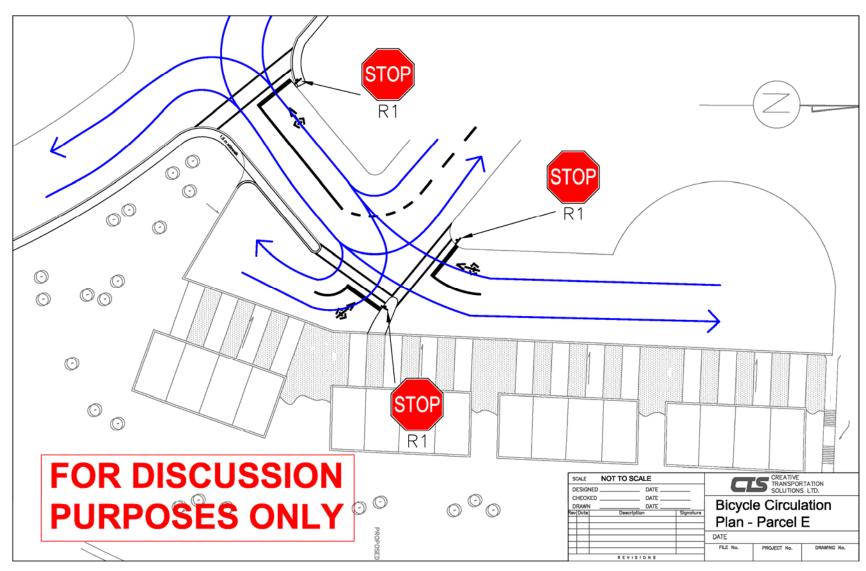


FIGURE 19
BICYCLE CIRCULATION PLAN – PARCEL E

7.1 Conclusions

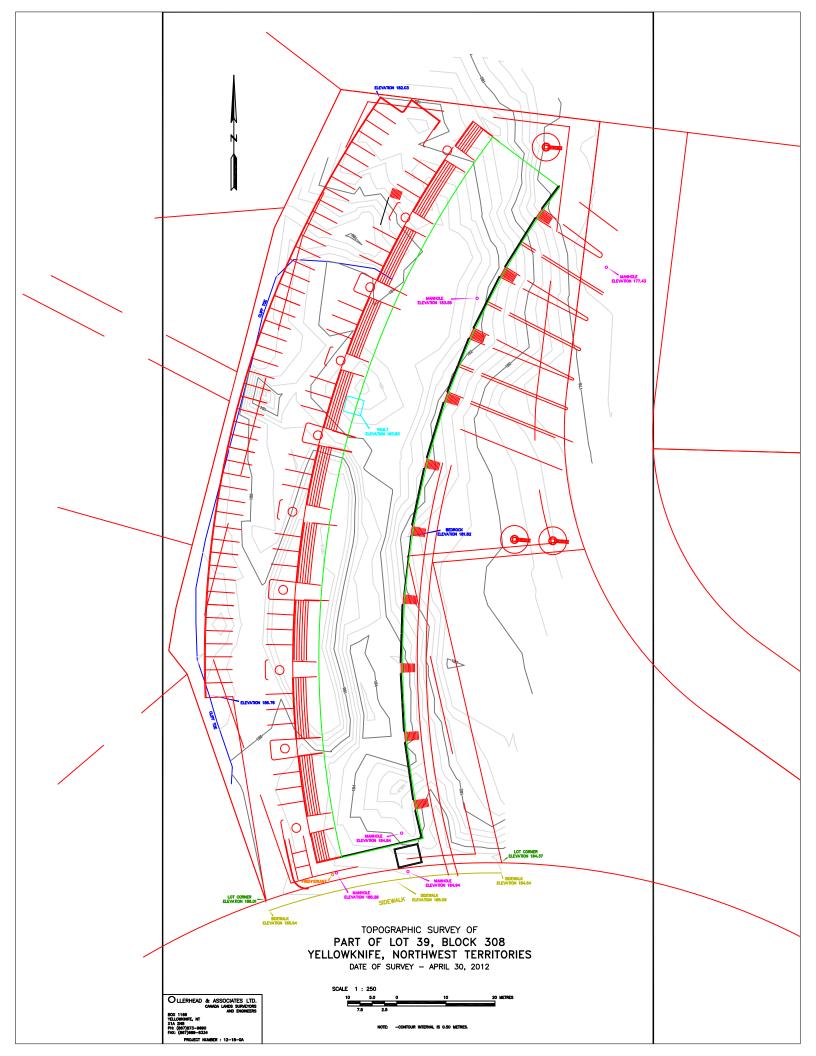
- 1) Creative Transportation Solutions Ltd. (CTS) was retained by the City of Yellowknife. on 23 April 2012 to conduct a traffic impact study of a proposed residential development known as Niven Lake Phase V near Niven Lake in Yellowknife. Currently, there are five proposed parcel sites for the Phase V development, which is proposed to consist of up to 156 residential dwelling units in total comprised of Parcel A (64 units), Parcel B (14 units), Parcel C (14 units), Parcel D (48 units), and Parcel E (16 units). For the purposes of this study, it was assumed that all five parcels would be constructed and fully occupied by the year 2017.
- 2) A Scope Development Meeting with City of Yellowknife officials was held from Tuesday, 1 May 2012 to Thursday, 3 May 2012 to discuss and confirm the study parameters for this project. As well, CTS staff conducted a detailed site visit and collected traffic volume data to document existing conditions.
- 3) The five parcels combined are estimated to generate a total of 73 vehicle trips during the weekday morning in peak hour (i.e. 12 inbound and 61 outbound) and 84 vehicle trips during the weekday afternoon in peak hour (i.e. 53 inbound and 28 outbound). This is equivalent to an average of 1.4 vehicle movements per minute during the busier afternoon peak hour, which from a traffic engineering point of view is not considered significant.
- 4) The traffic impact assessment determined that by the year 2022 (i.e. 5 years post buildout), separate left and right turning lanes will be warranted on Niven Gate at Highway 4. As well, the west approach of the intersection of Franklin Avenue & 43rd Street will need to be restriped to provide for separate eastbound left and right turn lanes by the year 2022.

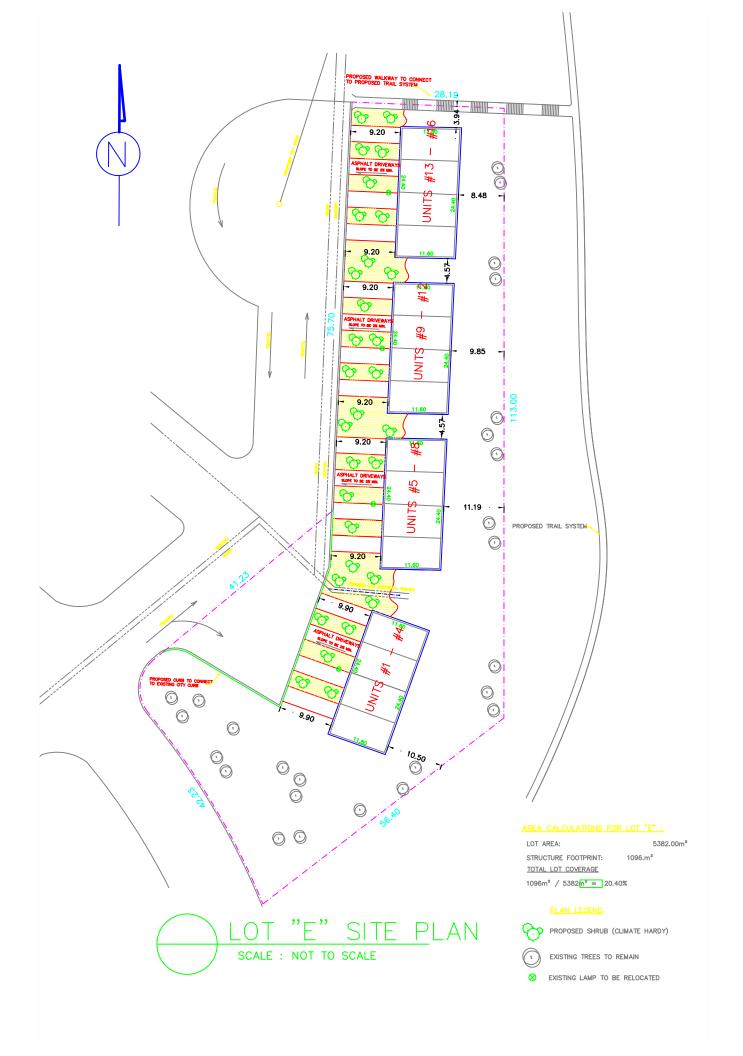
7.2 Recommendations

Based on the findings of this study, the following is recommended:

- 1) That City of Yellowknife monitor traffic volumes at the intersection of Franklin Avenue & 43rd Street to determine when restriping of the east approach is required to provide for separate left and right turn lanes on 43rd Street.
- That the Northwest Territorial Department of Transportation and the City of Yellowknife monitor the intersection of Highway 4 & Niven Gate to determine when Niven Gate should be widened to provide for separate westbound left and right turn lanes.

APPENDIX A Site Plan





APPENDIX B Scope Development Meeting

TERMS OF REFERENCE (1 May 2012)

Niven Lake Phase V Traffic Impact Study Yellowknife, NT

A Confirm study area limits and list of intersections to analyse

Study area to encompass all roads immediately adjacent to the development. The intersections to analyse are as follows:

- Niven Drive & Lemay Drive / Ballantyne Court
- Niven Drive & 49th Avenue / 43rd Street
- Franklin Avenue & 43rd Street
- Niven Drive & Driscoll Road
- Niven Gate & Haener Drive
- Highway 4 & Niven Gate
- All site accesses

B Confirm the existing and future base road network in study area

There are no known geometrical and/or operational changes (e.g. new traffic signal, new left turn bay, etc.) scheduled by the City of Yellowknife that would either improve network capacity and/or redirect base traffic volumes in the study area. Therefore, CTS to use the existing network for both current and future base conditions.

C Obtain relevant background material

City of Yellowknife to confirm density to be used by CTS for each parcel (tentatively: Parcel A = 64 units, Parcel B = 14 units, Parcel C = 14 units, Parcel D = 48 units and Parcel E = 16 units)

City of Yellowknife / Property owners to forward to CTS a copy of the most recent site plan for each parcel (if available).

D <u>Confirm any anticipated future developments within study horizon that are above</u> and beyond what can be assumed to be built into an annual traffic volume growth rate.

CTS to include traffic from the following anticipated developments as they will add background traffic to the road network:

- Niven Heights (from recent CTS traffic impact study)
- Twin Pine Hill development (from recent CTS study)
- Phase 7 for year 2017
- Phase 8 for year 2022

E Confirm design peak hour for analysis

CTS to examine the weekday morning and afternoon commuter peak hours for the impact assessment.

F Confirm horizon years for analysis

CTS to examine the following years:

- 1. 2012 (i.e. existing base) →
- 2. 2017 (future base)
- 3. 2017 (future base+ traffic from full development of site)
- 4. 2022 (i.e. 5 years post buildout)

G Confirm traffic volume growth rate

CTS to use 2.0% per year (simple straight line) to factor up existing base volumes to future horizon years (NOTE: This is identical to the growth rate used by CTS on previous traffic impact studies in Yellowknife.

H Confirm traffic projection methodology

CTS to use current accepted traffic engineering practices for traffic projections and to document any assumptions in the report.

I Confirm trip generation methodology

CTS to use Institute of Transportation Engineers (ITE) vehicle trip generation rates (8th edition) to estimate site traffic volumes as would represent the "worst case scenario" for the impact assessment.

J Confirm trip distribution and traffic assignment parameters

CTS to use existing travel patterns in the study area to develop trip distribution and traffic assignment parameters.

K Confirm traffic engineering methodology for analysis

CTS to use latest Highway Capacity Manual methodologies for all intersection capacity analysis. (HCS software for unsignalized intersections and Synchro for signalized intersections).

L Confirm engineering standards to be adhered to

CTS to use City of Yellowknife standards for municipal roadways and NWT standards (likely TAC) for Highway 4

M Confirm traffic impact study report format

CTS to submit the final report in a bound letter report format with appendices.

N Confirm number of report copies required

 City of Yellowknife (1 bound copy + 1 full digital in pdf format, both with NAPEG seal)

Property owners (1 bound copy per parcel → 5 total = pdf)

O Confirm no other issues to be analysed in study

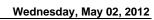
- 1. CTS to include a table of contents and executive summary to the report
- 2. CTS to add PDF tabs in table of contents
- 3. CTS to include the following drawings in the final report:
 - Recommended pavement marking and signage plan for site;
 - Recommended circulation plans (4) for garbage trucks, emergency vehicles, pedestrians and bicycles entering and exiting the site.
- 4. CTS to circulate draft report to staff before issuing the final (and sealed) report.



APPENDIX C

Traffic Movement Count Summary Sheets







Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Yellowknife, NWT Sunny

Municipality: Weather:

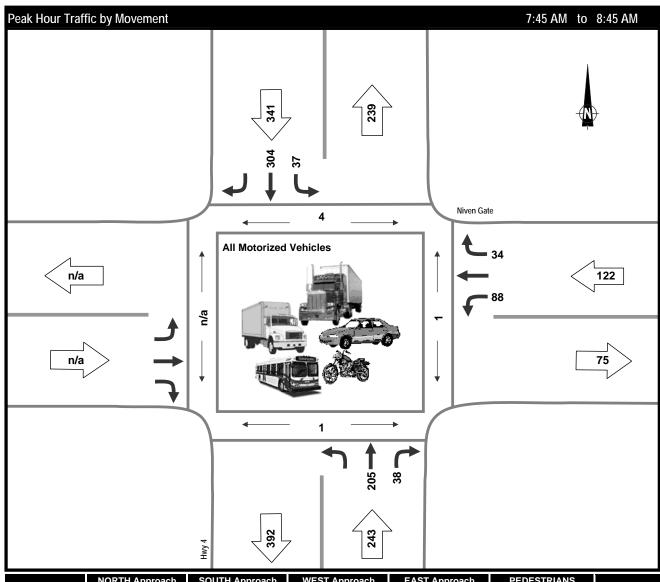
	Entoring		Ve	hicle Classification	
Time Period	Entering Intersection	Passenger Cars	Heavy Trucks		Total
Morning	Volume	1,037	7		1,044
(07:00 - 09:00)	%	99.3%	0.7%		100.0%
Afternoon	Volume	1,423	2		1,425
(16:00 - 18:00)	%	99.9%	0.1%		100.0%
Total	Volume	2,460	9		2,469
(4 Hours)	%	99.6%	0.4%		100.0%



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles

Morning Peak Period

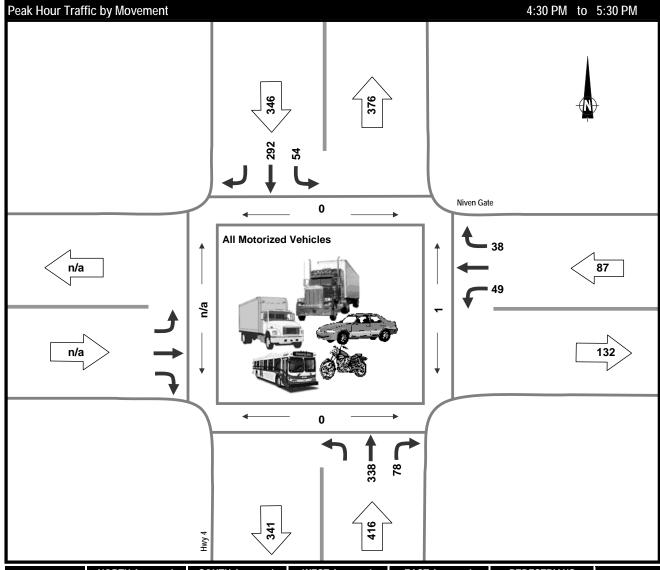


Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	Р	EDEST	TRIAN	S	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	37	304			205	38				88		34	4	1		1	706
PH Factor	0.84	0.72			0.75	0.43				0.82		0.57	0.25	0.25		0.25	0.82
Peak 15 X 4	44	424			272	88				108		60	16	4		4	856
Average Hour	22	214			168	27				59		34	2	1		1	522
Survey Total	43	428			335	53				118		67	4	1		2	1,044
7:00	0	11			18	1				3		4	0	0		0	37
7:15	3	24			22	3				2		5	0	0		1	59
7:30	3	37			42	3				10		13	0	0		0	108
7:45	11	41			61	22				27		15	0	0		0	177
8:00	10	94			39	2				26		9	4	1		0	180
8:15	9	106			68	2				23		6	0	0		1	214
8:30	7	63			37	12				12		4	0	0		0	135
8:45	0	52			48	8				15		11	0	0		0	134



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny



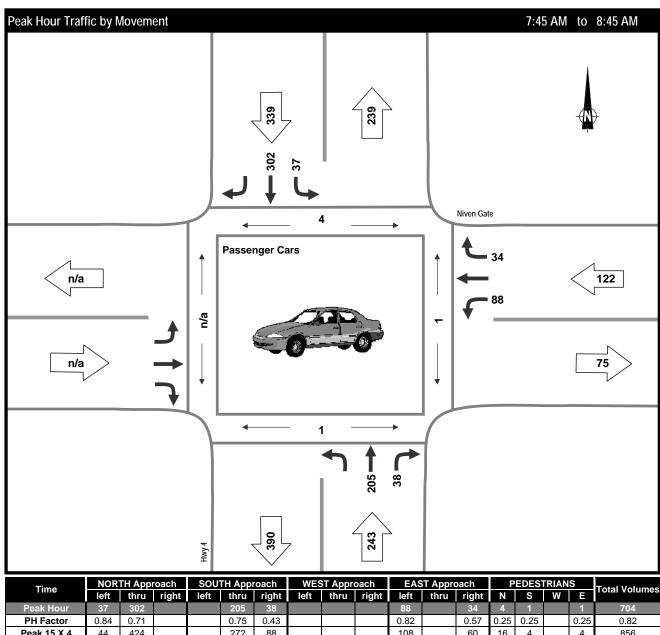


Time	NOR	ТН Арр	roach	SOU	ТН Аррі	roach	WES	ST Appr	oach	EAS	T Appro	oach	P	EDEST	TRIAN	S	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	54	292			338	78				49		38	0	0		1	849
PH Factor	0.84	0.90			0.62	0.89				0.82		0.63	0.00	0.00		0.25	0.74
Peak 15 X 4	64	324			548	88				60		60	0	0		4	1,132
Average Hour	54	265			263	61				42		29	6	5		7	713
Survey Total	108	529			526	122				83		57	11	9		14	1,425
16:00	12	49			55	17				7		5	0	0		1	145
16:15	11	61			58	7				9		6	0	0		0	152
16:30	16	75			67	18				11		9	0	0		0	196
16:45	11	65			61	17				10		7	0	0		0	171
17:00	15	81			137	22				13		15	0	0		1	283
17:15	12	71			73	21				15		7	0	0		0	199
17:30	18	74			42	9				11		2	0	0		0	156
17:45	13	53			33	11				7		6	11	9		12	123



Project: #3989: Niven Lake Phase V Traffic Impact Study

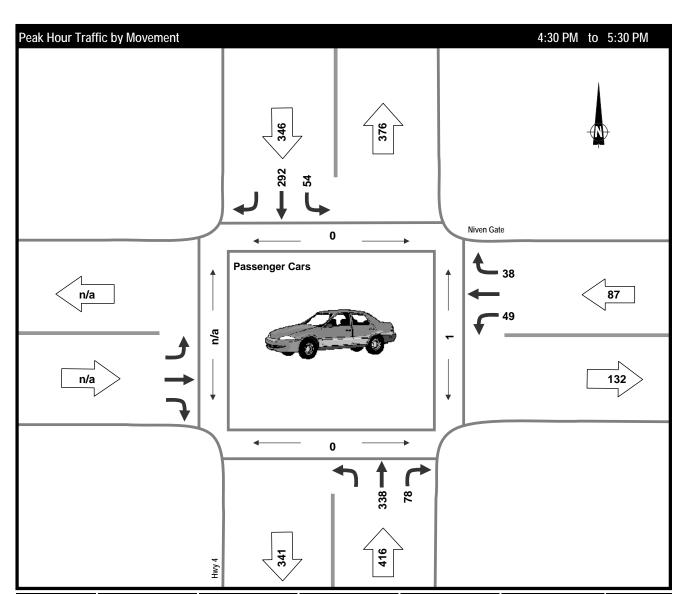
Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Passenger Cars



Time	NOR	ТН Аррі	roach	SOU	ТН Аррі	roach	WES	ST Appro	oach	EAS	T Appro	oach	P	EDEST	TRIAN	S	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	s	W	E	Total Volumes
Peak Hour	37	302			205	38				88		34	4	1		1	704
PH Factor	0.84	0.71			0.75	0.43				0.82		0.57	0.25	0.25		0.25	0.82
Peak 15 X 4	44	424			272	88				108		60	16	4		4	856
Average Hour	22	213			166	27				59		34	2	1		1	519
Survey Total	43	425			331	53				118		67	4	1		2	1,037
7:00	0	11			17	1				3		4	0	0		0	36
7:15	3	23			21	3				2		5	0	0		1	57
7:30	3	37			41	3				10		13	0	0		0	107
7:45	11	41			61	22				27		15	0	0		0	177
8:00	10	92			39	2				26		9	4	1		0	178
8:15	9	106			68	2				23		6	0	0		1	214
8:30	7	63			37	12				12		4	0	0		0	135
8:45	0	52			47	8				15		11	0	0		0	133



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Passenger Cars

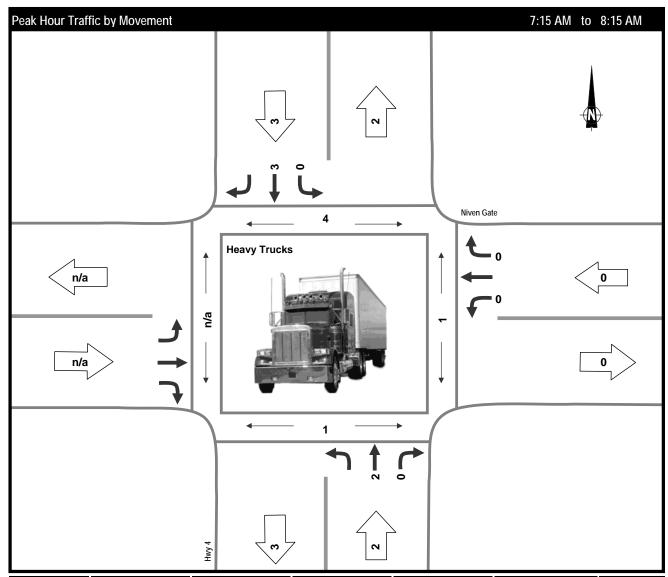


Time	NORTH Approach		roach	SOU	ТН Аррі	roach	WES	ST Appr	oach	EAS	T Appro	oach	PE	DS wit	th BIK	ES	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	54	292			338	78				49		38	0	0		1	849
PH Factor	0.84	0.90			0.62	0.89				0.82		0.63	0.00	0.00		0.25	0.74
Peak 15 X 4	64	324			548	88				60		60	0	0		4	1,132
Average Hour	54	264			263	61				38		26	6	5		7	706
Survey Total	107	528			526	122				83		57	11	9		14	1,423
16:00	11	49			55	17				7		5	0	0		1	144
16:15	11	61			58	7				9		6	0	0		0	152
16:30	16	75			67	18				11		9	0	0		0	196
16:45	11	65			61	17				10		7	0	0		0	171
17:00	15	81			137	22				13		15	0	0		1	283
17:15	12	71			73	21				15		7	0	0		0	199
17:30	18	74			42	9				11		2	0	0		0	156
17:45	13	52			33	11				7		6	11	9		12	122



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Heavy Trucks

Morning Peak Period

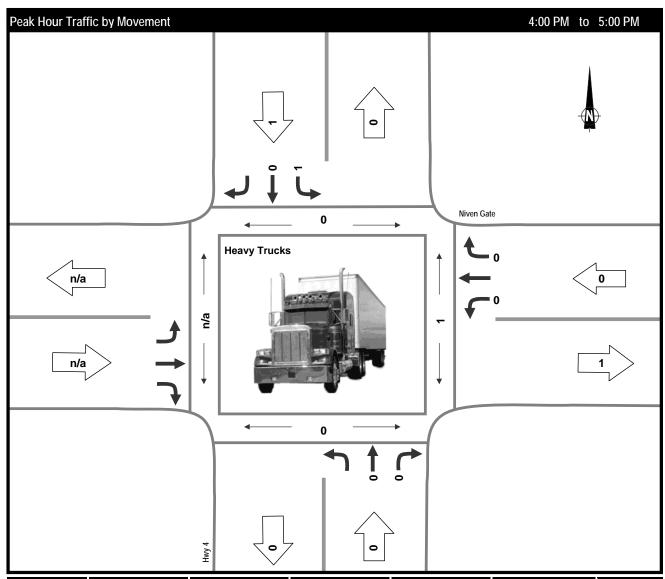


Time	NOR	ТН Арр	roach	SOU	ТН Арр	roach	WES	ST Appr	oach	EAS	T Appro	oach	P	EDEST	TRIAN	S	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total Volumes
Peak Hour	0	3			2	0				0		0	4	1		1	5
PH Factor	0.00	0.38			0.50	0.00				0.00		0.00	0.25	0.25		0.25	0.63
Peak 15 X 4	0	8			4	0				0		0	16	4		4	8
Average Hour	0	2			2	0				0		0	2	1		1	4
Survey Total	0	3			4	0				0		0	4	1		2	7
7:00	0	0			1	0				0		0	0	0		0	1
7:15	0	1			1	0				0		0	0	0		1	2
7:30	0	0			1	0				0		0	0	0		0	1
7:45	0	0			0	0				0		0	0	0		0	0
8:00	0	2			0	0				0		0	4	1		0	2
8:15	0	0			0	0				0		0	0	0		1	0
8:30	0	0			0	0				0		0	0	0		0	0
8:45	0	0			1	0				0		0	0	0		0	1

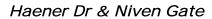


Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Heavy Trucks

Afternoon Peak Period



Time	NOR	ТН Арр	roach	SOU	ТН Аррі	roach	WES	ST Appr	oach	EAS	T Appro	oach	P	EDEST	TRIAN	S	Total Volumes
Tillle	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	1	0			0	0				0		0	0	0		1	1
PH Factor	0.25	0.00			0.00	0.00				0.00		0.00	0.00	0.00		0.25	0.25
Peak 15 X 4	4	0			0	0				0		0	0	0		4	4
Average Hour	1	1			0	0				0		0	6	5		7	2
Survey Total	1	1			0	0				0		0	11	9		14	2
16:00	1	0			0	0				0		0	0	0		1	1
16:15	0	0			0	0				0		0	0	0		0	0
16:30	0	0			0	0				0		0	0	0		0	0
16:45	0	0			0	0				0		0	0	0		0	0
17:00	0	0			0	0				0		0	0	0		1	0
17:15	0	0			0	0				0		0	0	0		0	0
17:30	0	0			0	0				0		0	0	0		0	0
17:45	0	1			0	0				0		0	11	9		12	1





Wednesday, May 02, 2012

Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Municipality: Weather: Yellowknife, NWT Sunny

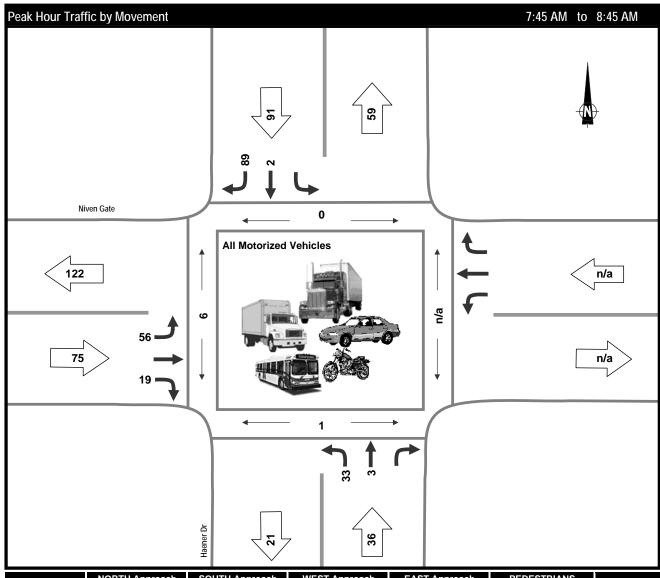
	Entoring		Ve	hicle Classification	ı	
Time Period	Entering Intersection	Passenger Car	Heavy Truck			Total
Morning	Volume	286	0			286
(07:00 - 09:00)	%	100.0%	0.0%			100.0%
Afternoon	Volume	375	1			376
(16:00 - 18:00)	%	99.7%	0.3%			100.0%
Total	Volume	661	1			662
(4 Hours)	%	99.8%	0.2%			100.0%



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles

Morning Peak Period

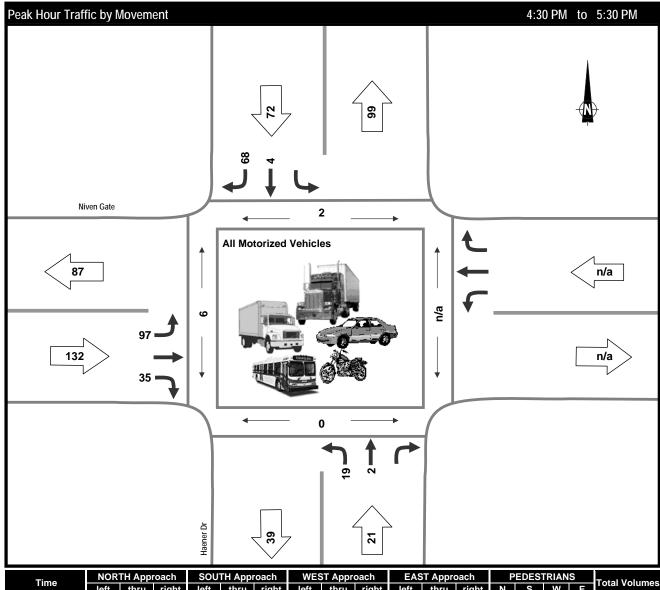


Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	P	EDES"	TRIAN	S	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Ε	Total volumes
Peak Hour		2	89	33	3		56		19				0	1	6		202
PH Factor		0.50	0.65	0.63	0.75		0.64		0.43				0.00	0.25	0.75		0.66
Peak 15 X 4		4	136	52	4		88		44				0	4	8		304
Average Hour		1	65	28	2		38		11				0	1	3		143
Survey Total		2	130	55	3		75		21				0	2	6		286
7:00		0	5	2	0		1		0				0	0	0		8
7:15		0	5	2	0		6		0				0	1	0		13
7:30		0	14	9	0		4		2				0	0	0		29
7:45		0	34	8	1		22		11				0	1	1		76
8:00		1	22	13	1		9		3				0	0	2		49
8:15		0	22	7	1		9		2				0	0	1		41
8:30		1	11	5	0		16		3				0	0	2		36
8:45		0	17	9	0		8		0				0	0	0		34

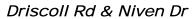


Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles



Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	P	EDES	TRIAN	s	Total Volumes
rime	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total Volumes
Peak Hour		4	68	19	2		97		35				2	0	6		225
PH Factor		0.50	0.77	0.79	0.50		0.78		0.67				0.25	0.00	0.38		0.87
Peak 15 X 4		8	88	24	4		124		52				8	0	16		260
Average Hour		2	55	15	1		82		33				1	1	9		188
Survey Total		4	110	30	2		164		66				2	2	18		376
16:00		0	9	3	0		16		13				0	0	7		41
16:15		0	13	2	0		15		3				0	0	2		33
16:30		1	15	5	0		21		13				2	0	0		55
16:45		1	13	4	1		19		9				0	0	4		47
17:00		0	22	6	0		31		6				0	0	1		65
17:15		2	18	4	1		26		7				0	0	1		58
17:30		0	10	3	0		23		4				0	2	0		40
17:45		0	10	3	0		13		11				0	0	3		37





Friday, May 04, 2012

Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

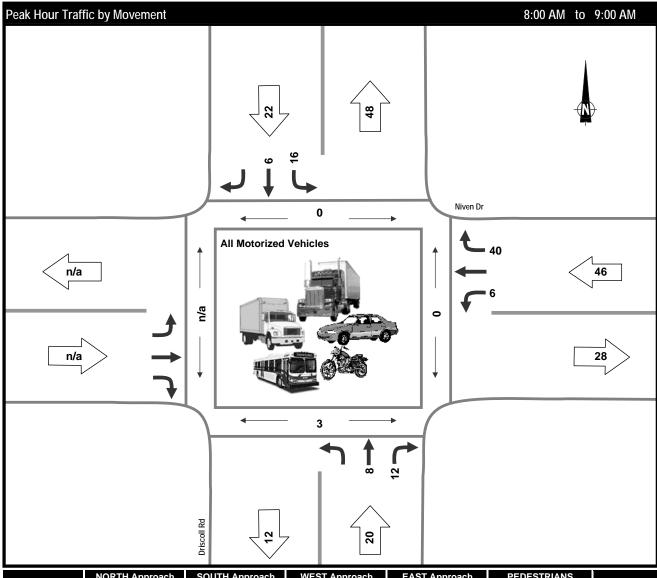
Municipality: Weather: Yellowknife, NWT Sunny

	Entoring		Ve	hicle Classification	n	
Time Period	Entering Intersection	Passenger Cars	Heavy Trucks			Total
Morning	Volume	128	1			129
(07:00 - 09:00)	%	99.2%	0.8%			100.0%
Total	Volume	128	1			129
(2 Hours)	%	99.2%	0.8%			100.0%



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles

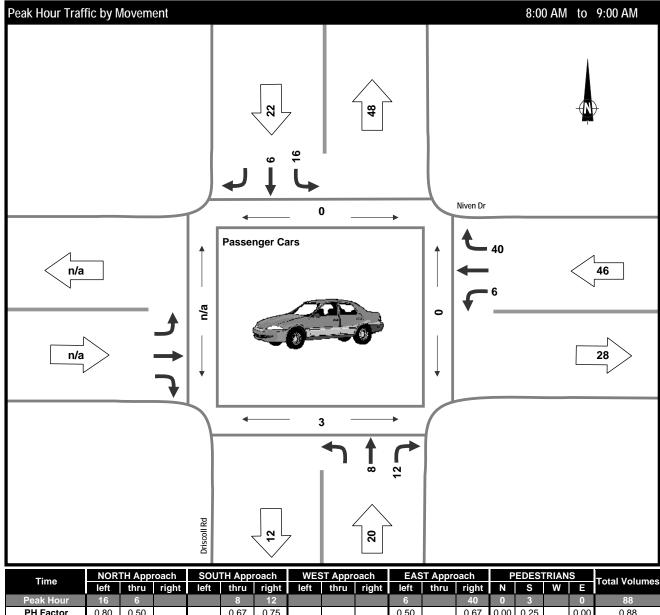


Time	NOR'	ТН Арр	roach	SOU	ТН Арр	roach	WES	ST Appr	oach	EAS	T Appro	oach	Р	EDEST	TRIAN	IS	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	16	6			8	12				6		40	0	3		0	88
PH Factor	0.80	0.50			0.67	0.75				0.50		0.67	0.00	0.25		0.00	0.88
Peak 15 X 4	20	12			12	16				12		60	0	12		0	100
Average Hour	12	4			6	8				4		32	1	2		4	66
Survey Total	23	8			12	15				7		64	1	4		8	129
7:00	1	0			0	0				0		3	1	0		1	4
7:15	1	0			1	1				0		1	0	0		0	4
7:30	0	2			2	1				0		9	0	1		3	14
7:45	5	0			1	1				1		11	0	0		4	19
8:00	5	3			2	4				3		8	0	3		0	25
8:15	3	0			2	4				0		15	0	0		0	24
8:30	3	0			3	0				1		8	0	0		0	15
8:45	5	3			1	4				2		9	0	0		0	24



Project: #3989: Niven Lake Phase V Traffic Impact Study

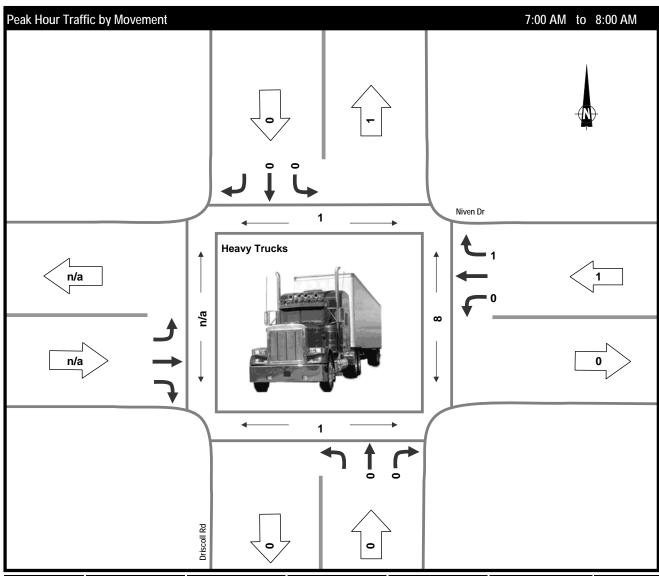
Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Passenger Cars



Time	NOR	ТН Арр	roach	SOU	ТН Арр	roach	WES	ST Appr	oach	EAS	T Appro	oach	S	Total Volumes			
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	16	6			8	12				6		40	0	3		0	88
PH Factor	0.80	0.50			0.67	0.75				0.50		0.67	0.00	0.25		0.00	0.88
Peak 15 X 4	20	12			12	16				12		60	0	12		0	100
Average Hour	12	4			6	8				4		32	1	2		4	66
Survey Total	23	8			12	15				7		63	1	4		8	128
7:00	1	0			0	0				0		3	1	0		1	4
7:15	1	0			1	1				0		1	0	0		0	4
7:30	0	2			2	1				0		9	0	1		3	14
7:45	5	0			1	1				1		10	0	0		4	18
8:00	5	3			2	4				3		8	0	3		0	25
8:15	3	0			2	4				0		15	0	0		0	24
8:30	3	0			3	0				1		8	0	0		0	15
8:45	5	3			1	4				2		9	0	0		0	24



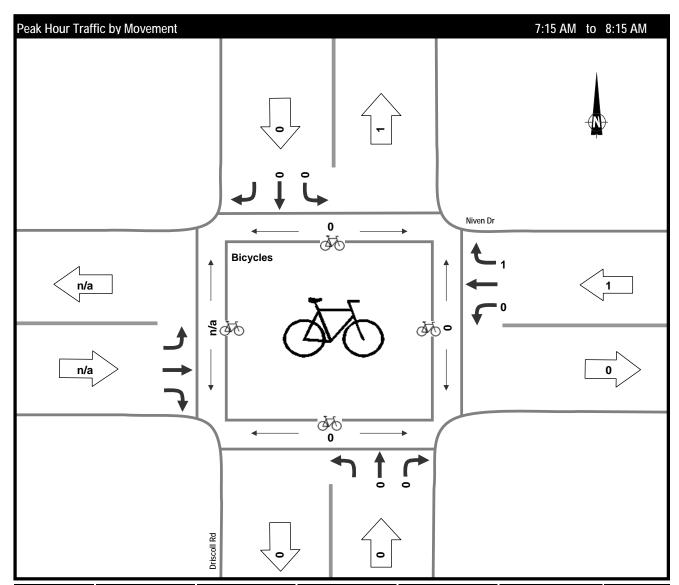
Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Heavy Trucks



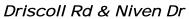
Time	NORTH Approach			SOU	ТН Аррі	roach	WES	T Appr	oach	ach EAST Approach PEDESTRIANS							Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0			0	0				0		1	1	1		8	1
PH Factor	0.00	0.00			0.00	0.00				0.00		0.25	0.25	0.25		0.50	0.25
Peak 15 X 4	0	0			0	0				0		4	4	4		16	4
Average Hour	0	0			0	0				0		1	1	2		4	1
Survey Total	0	0			0	0				0		1	1	4		8	1
7:00	0	0			0	0				0		0	1	0		1	0
7:15	0	0			0	0				0		0	0	0		0	0
7:30	0	0			0	0				0		0	0	1		3	0
7:45	0	0			0	0				0		1	0	0		4	1
8:00	0	0			0	0				0		0	0	3		0	0
8:15	0	0			0	0				0		0	0	0		0	0
8:30	0	0			0	0				0		0	0	0		0	0
8:45	0	0			0	0				0		0	0	0		0	0

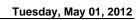


Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time	NOR'	NORTH Approach			ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	BIK	ES in 2	LKS	Total Volumes	
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0			0	0				0		1	0	0		0	1
PH Factor	0.00	0.00			0.00	0.00				0.00		0.25	0.00	0.00		0.00	0.25
Peak 15 X 4	0	0			0	0				0		4	0	0		0	4
Average Hour	0	0			0	0				0		1	0	0		0	1
Survey Total	0	0			0	0				0		1	0	0		0	1
7:00	0	0			0	0				0		0	0	0		0	0
7:15	0	0			0	0				0		0	0	0		0	0
7:30	0	0			0	0				0		0	0	0		0	0
7:45	0	0			0	0				0		0	0	0		0	0
8:00	0	0			0	0				0		1	0	0		0	1
8:15	0	0			0	0				0		0	0	0		0	0
8:30	0	0			0	0				0		0	0	0		0	0
8:45	0	0			0	0				0		0	0	0		0	0







Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Yellowknife, NWT Sunny

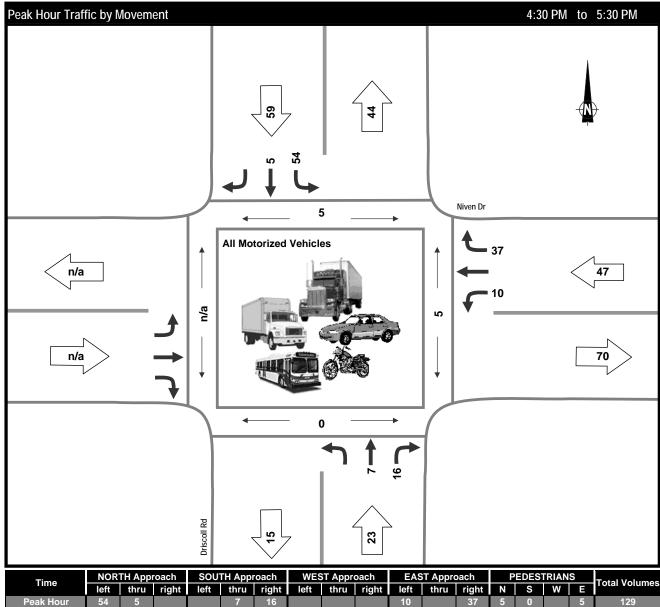
Municipality: Weather:

	Entoring		Vehicle Classification										
Time Period	Entering Intersection	Passenger Cars	Heavy Trucks			Total							
Afternoon	Volume	211	1			212							
(16:00 - 18:00)	%	99.5%	0.5%			100.0%							
Total	Volume	211	1			212							
(2 Hours)	%	99.5%	0.5%			100.0%							



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles



Time	NOR	NORTH Approach			SOUTH Approach WEST Approach EAST Approach PEDESTRIANS								S	Total Volumes			
rime	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	54	5			7	16				10		37	5	0		5	129
PH Factor	0.71	0.63			0.58	0.50				0.63		0.58	0.42	0.00		0.63	0.66
Peak 15 X 4	76	8			12	32				16		64	12	0		8	196
Average Hour	42	5			5	15				7		33	3	0		3	107
Survey Total	84	9			10	29				14		66	5	0		6	212
16:00	2	1			1	5				2		6	0	0		0	17
16:15	9	1			1	6				1		5	0	0		0	23
16:30	7	1			0	7				4		6	3	0		0	25
16:45	9	1			3	1				2		6	0	0		2	22
17:00	19	2			3	8				1		16	0	0		2	49
17:15	19	1			1	0				3		9	2	0		1	33
17:30	9	1			0	2				0		10	0	0		1	22
17:45	10	1			1	0				1		8	0	0		0	21



16:30

16:45

17:00

17:15

17:30

17:45

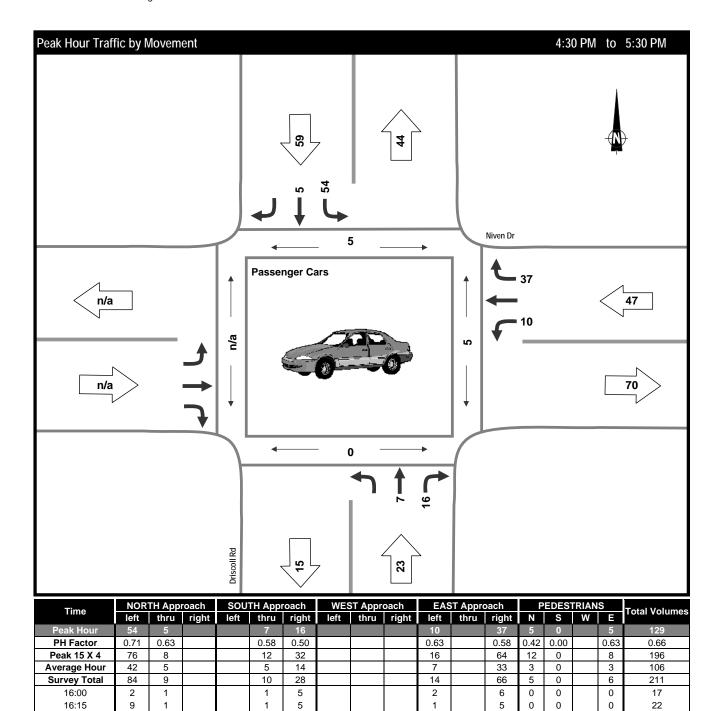
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Project: #3989: Niven Lake Phase V Traffic Impact Study

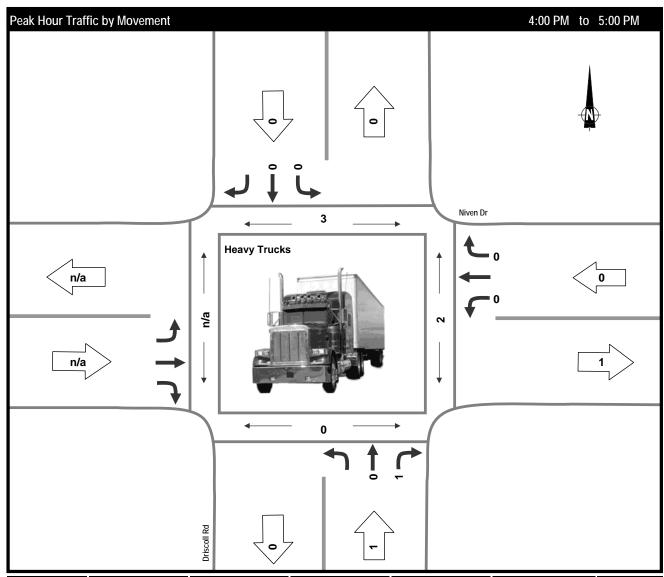
Afternoon Peak Period

Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Passenger Cars





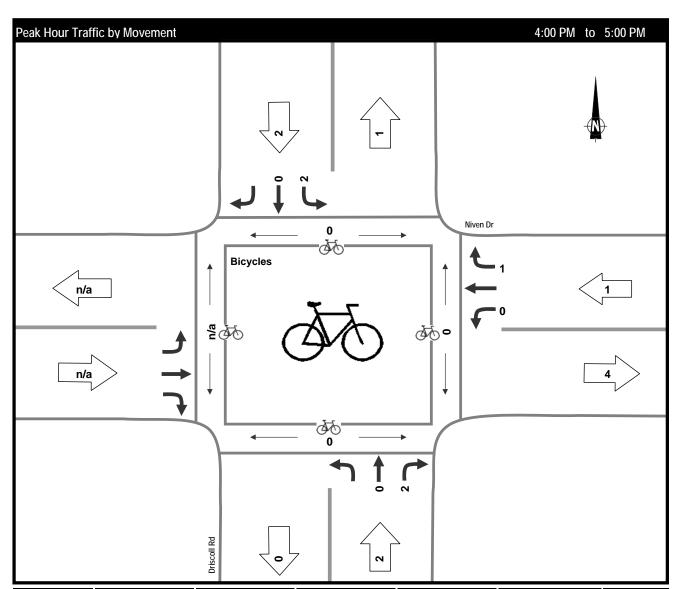
Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Heavy Trucks



Time	NORTH Approach			SOUTH Approach WEST Approach EAST Approach PEDESTRIANS							IS	Total Volumes					
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total Volumes
Peak Hour	0	0			0	1				0		0	3	0		2	1
PH Factor	0.00	0.00			0.00	0.25				0.00		0.00	0.25	0.00		0.25	0.25
Peak 15 X 4	0	0			0	4				0		0	12	0		8	4
Average Hour	0	0			0	1				0		0	3	0		3	1
Survey Total	0	0			0	1				0		0	5	0		6	1
16:00	0	0			0	0				0		0	0	0		0	0
16:15	0	0			0	1				0		0	0	0		0	1
16:30	0	0			0	0				0		0	3	0		0	0
16:45	0	0			0	0				0		0	0	0		2	0
17:00	0	0			0	0				0		0	0	0		2	0
17:15	0	0			0	0				0		0	2	0		1	0
17:30	0	0			0	0				0		0	0	0		1	0
17:45	0	0			0	0				0		0	0	0		0	0



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time		NORTH Approach			ТН Аррі	roach	WES	ST Appr	oach	EAS	T Appro	oach	BIK	ES in 2	LKS	Total Volumes	
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	2	0			0	2				0		1	0	0		0	5
PH Factor	0.25	0.00			0.00	0.50				0.00		0.25	0.00	0.00		0.00	0.42
Peak 15 X 4	8	0			0	4				0		4	0	0		0	12
Average Hour	1	2			0	1				0		1	0	0		0	5
Survey Total	2	3			0	2				0		1	0	0		0	8
16:00	0	0			0	0				0		0	0	0		0	0
16:15	2	0			0	1				0		0	0	0		0	3
16:30	0	0			0	1				0		1	0	0		0	2
16:45	0	0			0	0				0		0	0	0		0	0
17:00	0	0			0	0				0		0	0	0		0	0
17:15	0	1			0	0				0		0	0	0		0	1
17:30	0	1			0	0				0		0	0	0		0	1
17:45	0	1			0	0				0		0	0	0		0	1







Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Yellowknife, NWT Sunny

Municipality: Weather:

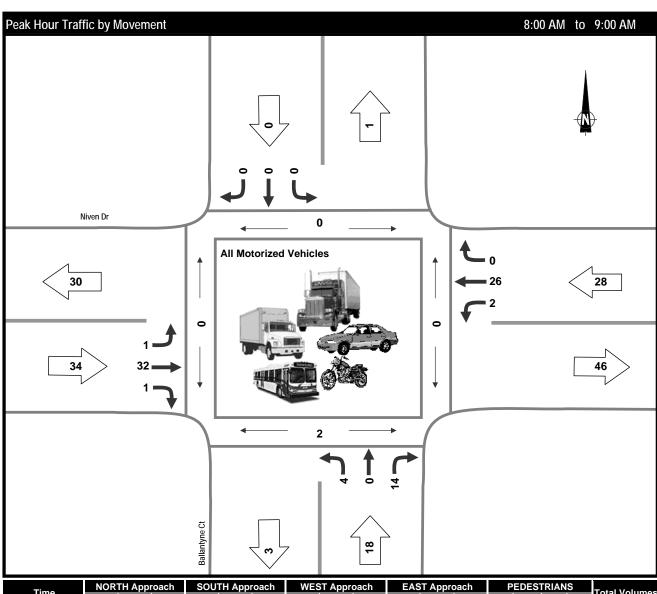
	Entoring		Ve	hicle Classification		
Time Period	Entering Intersection	Passenger Cars	Heavy Trucks			Total
Moring	Volume	115	1			116
(07:00 - 09:00)	%	99.1%	0.9%			100.0%
Total	Volume	115	1			116
(2 Hours)	%	99.1%	0.9%			100.0%



Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles



Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appr	oach	Р	EDES	TRIAN	S	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0	0	4	0	14	1	32	1	2	26	0	0	2	0	0	80
PH Factor	0.00	0.00	0.00	0.50	0.00	0.39	0.25	0.80	0.25	0.50	0.65	0.00	0.00	0.50	0.00	0.00	0.80
Peak 15 X 4	0	0	0	8	0	36	4	40	4	4	40	0	0	4	0	0	100
Average Hour	0	0	0	4	0	8	1	22	1	2	22	0	1	3	0	2	60
Survey Total	0	0	0	8	0	16	1	43	1	4	43	0	1	5	0	3	116
7:00	0	0	0	0	0	1	0	2	0	0	3	0	0	0	0	0	6
7:15	0	0	0	0	0	0	0	2	0	0	2	0	0	3	0	0	4
7:30	0	0	0	1	0	1	0	3	0	0	5	0	1	0	0	1	10
7:45	0	0	0	3	0	0	0	4	0	2	7	0	0	0	0	2	16
8:00	0	0	0	1	0	4	0	10	1	0	8	0	0	1	0	0	24
8:15	0	0	0	2	0	9	0	10	0	0	4	0	0	1	0	0	25
8:30	0	0	0	1	0	0	0	5	0	1	4	0	0	0	0	0	11
8:45	0	0	0	0	0	1	1	7	0	1	10	0	0	0	0	0	20



8:00

8:15

8:30

8:45

0 0

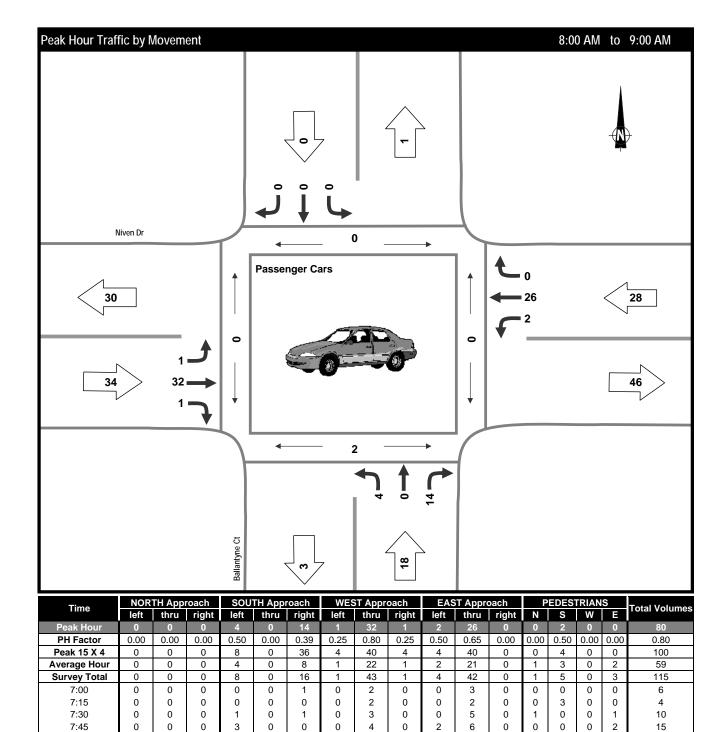
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Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study

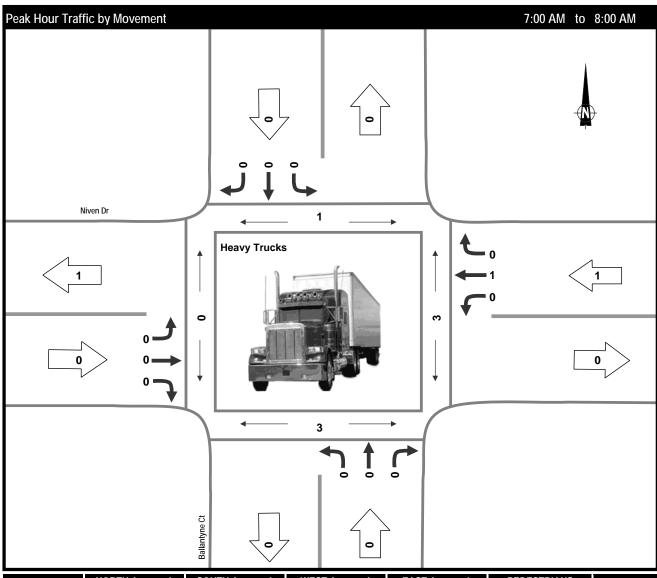
Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Passenger Cars





Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Heavy Trucks



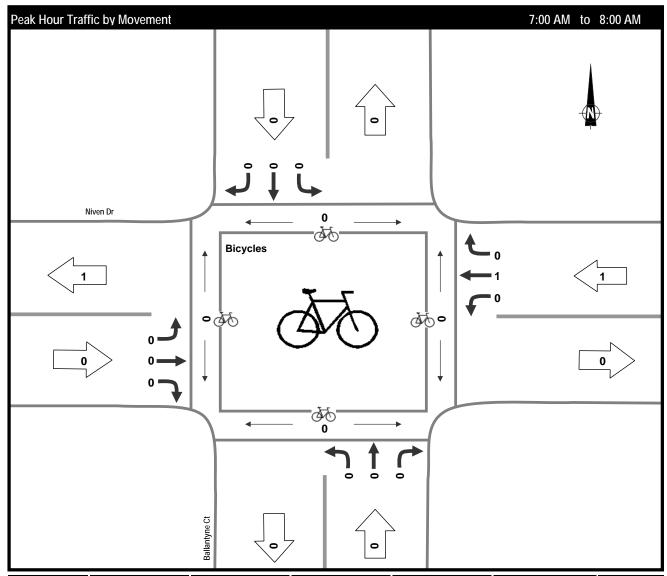
Time	NOR	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	Р	EDES	TRIAN	S	Total Volumes
Tillle	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0	0	0	0	0	0	0	0	0	1	0	1	3	0	3	1
PH Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.25	0.25	0.00	0.38	0.25
Peak 15 X 4	0	0	0	0	0	0	0	0	0	0	4	0	4	12	0	8	4
Average Hour	0	0	0	0	0	0	0	0	0	0	1	0	1	3	0	2	1
Survey Total	0	0	0	0	0	0	0	0	0	0	1	0	1	5	0	3	1
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
7:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	1
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



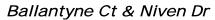
089: Niven Lake Phase V Traffic Impact Study

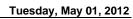
Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	BIK	ES in	X-WAI	LKS	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
PH Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.25
Peak 15 X 4	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Average Hour	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Survey Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0







Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Municipality: Weather: Yellowknife, NWT Sunny

	Entoring		Ve	hicle Classification	on	
Time Period	Entering Intersection	Passenger Cars	Heavy Trucks			Total
Afternoon	Volume	202	1			203
(16:00 - 18:00)	%	99.5%	0.5%			100.0%
Total	Volume	202	1			203
(2 Hours)	%	99.5%	0.5%			100.0%



16:15

16:30

16:45

17:00

17:15

17:30

17:45

9 0

2 3

1 3

0 0

2 3

0 1

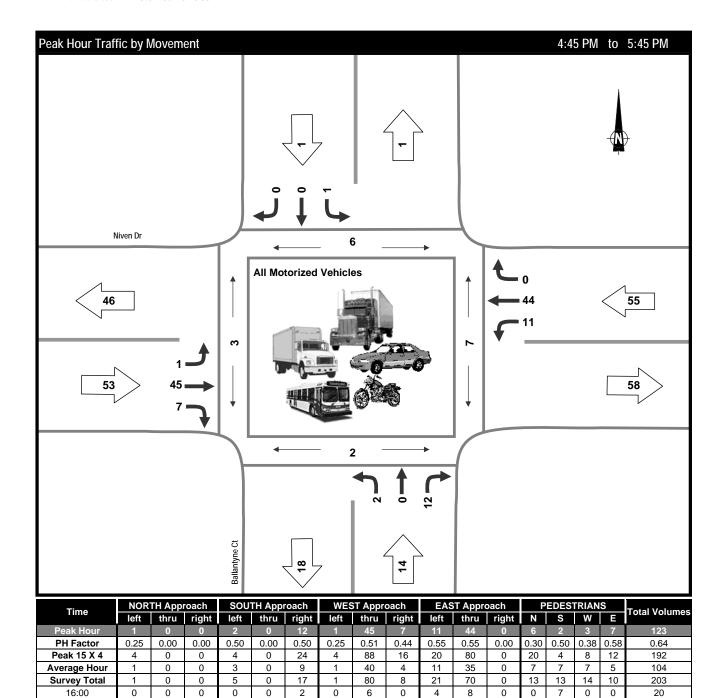
Afternoon Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study

Municipality: Yellowknife, NWT

Weather: Sunny

Vehicle Class: All Motorized Vehicles





Project: #3989: Niven Lake Phase V Traffic Impact Study

16:45

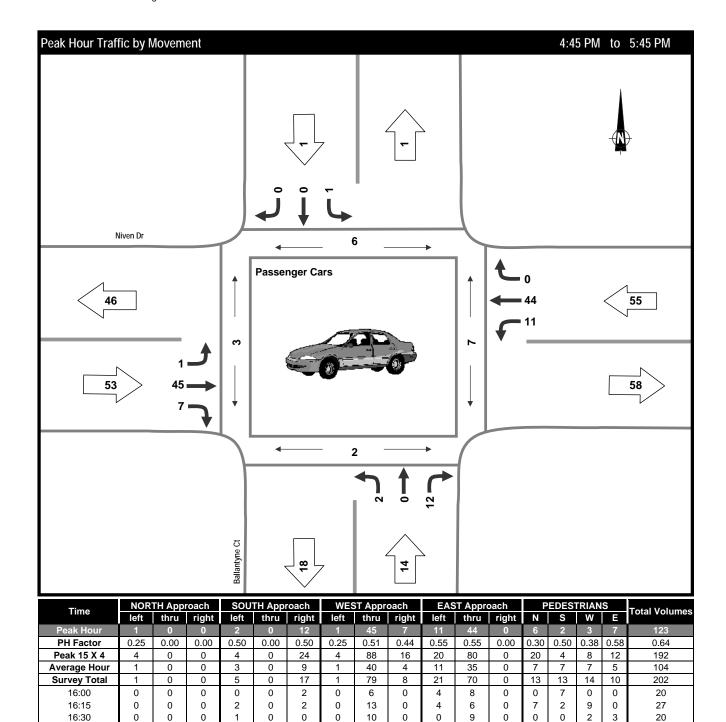
17:00

17:15

17:30

17:45

Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Passenger Cars

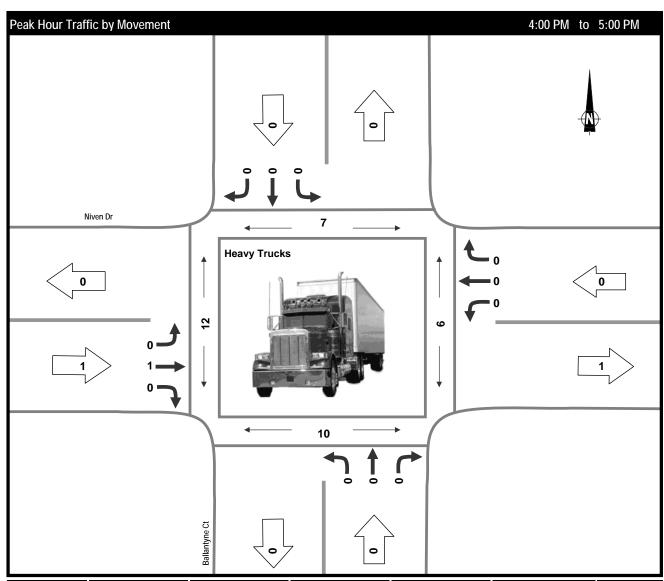


0 0

2 3



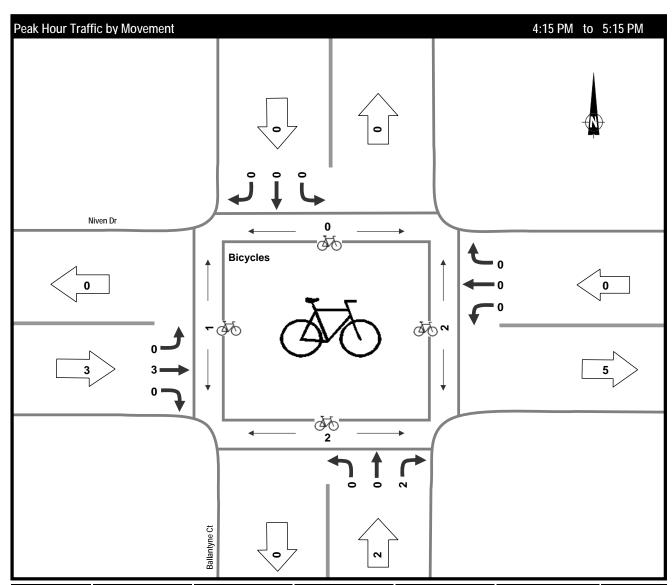
Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Heavy Trucks



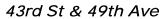
Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	Р	EDES	TRIAN	S	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0	0	0	0	0	0	1	0	0	0	0	7	10	12	6	1
PH Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.25	0.36	0.33	0.50	0.25
Peak 15 X 4	0	0	0	0	0	0	0	4	0	0	0	0	28	28	36	12	4
Average Hour	0	0	0	0	0	0	0	1	0	0	0	0	7	7	7	5	1
Survey Total	0	0	0	0	0	0	0	1	0	0	0	0	13	13	14	10	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0
16:15	0	0	0	0	0	0	0	1	0	0	0	0	7	2	9	0	1
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	5	1	2	3	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appr	oach	BIK	ES in	X-WAI	_KS	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour	0	0	0	0	0	2	0	3	0	0	0	0	0	2	1	2	10
PH Factor	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.50	0.25	0.25	0.63
Peak 15 X 4	0	0	0	0	0	4	0	8	0	0	0	0	0	4	4	8	16
Average Hour	0	0	0	0	0	1	0	2	0	0	0	0	1	1	1	2	8
Survey Total	0	0	0	0	0	2	0	3	0	0	0	0	1	2	1	4	13
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	2	0	0	0	0	0	1	1	0	4
16:30	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2
16:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
17:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	3
17:15	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	3
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





Wednesday, May 02, 2012

Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Yellowknife, NWT Sunny

Municipality: Weather:

Total (4 Hours)	Volume %	509 100.0%		509 100.0%
(16:00 - 18:00)	%	100.0%		100.0%
Afternoon	Volume	296		296
(07:00 - 09:00)	%	100.0%		100.0%
Morning	Volume	213		213
Time Period	Entering Intersection	All Motorized Vehicles		Total
	F		Vehicle Classification	



7:15

7:30

7:45

8:00

8:15

8:30

8:45

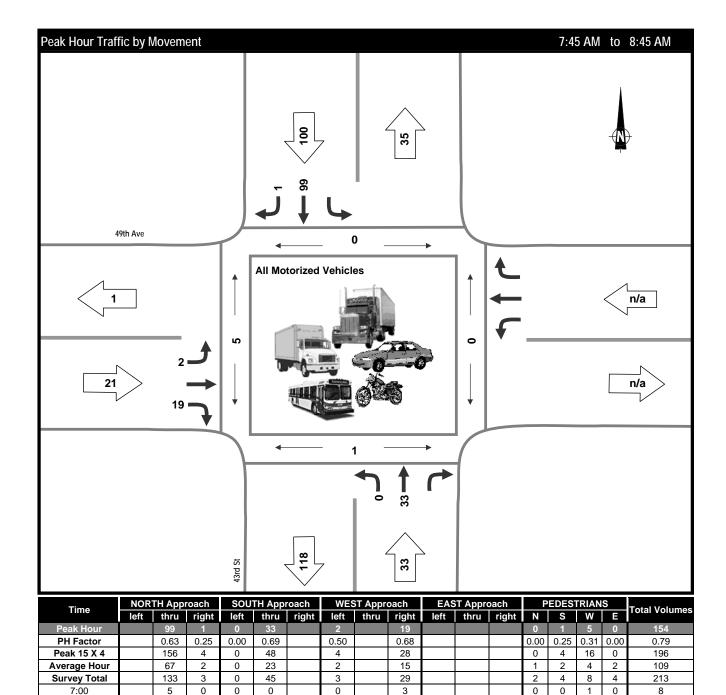
Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study

Municipality: Yellowknife, NWT

Weather: Sunny

Vehicle Class: All Motorized Vehicles



2 2

4 0

0 0

0 0



Project: #3989: Niven Lake Phase V Traffic Impact Study

Municipality: Yellowknife, NWT

Weather: Sunny

16:15

16:30

16:45

17:00

17:15

17:30

17:45

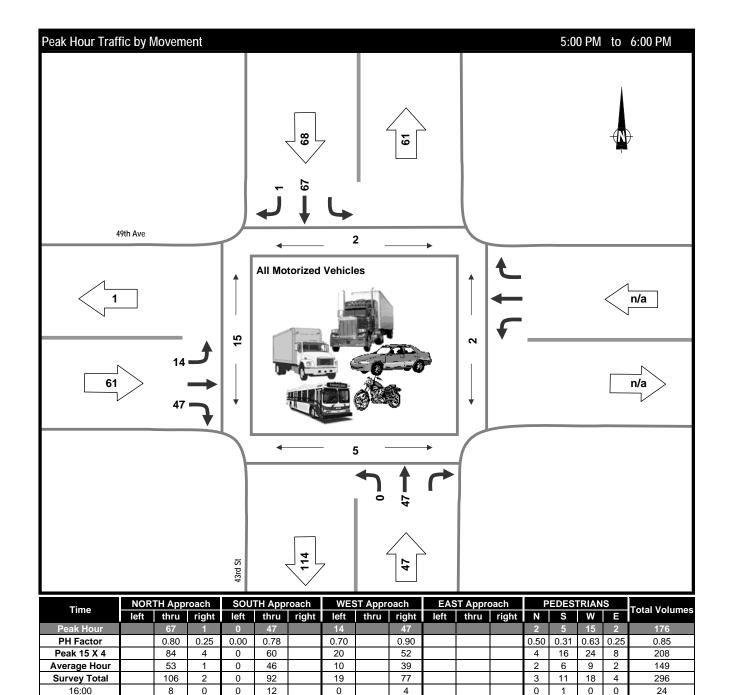
0 0

3 2

5 0

6 0

Vehicle Class: All Motorized Vehicles

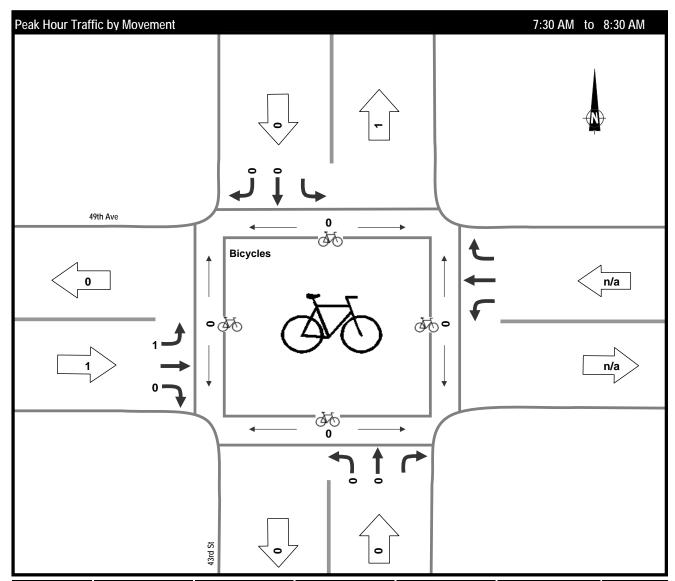




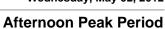
Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: Bicycles

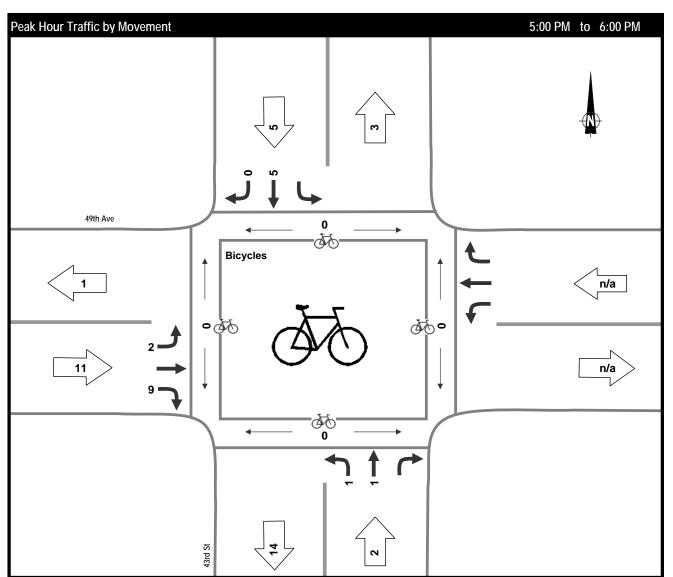


Time	NOR'	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	BIK	ES in	X-WAI	LKS	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	Ν	S	W	Е	Total volumes
Peak Hour		0	0	0	0		1		0				0	0	0	0	1
PH Factor		0.00	0.00	0.00	0.00		0.25		0.00				0.00	0.00	0.00	0.00	0.25
Peak 15 X 4		0	0	0	0		4		0				0	0	0	0	4
Average Hour		0	0	0	0		1		0				0	0	0	0	1
Survey Total		0	0	0	0		1		0				0	0	0	0	1
7:00		0	0	0	0		0		0				0	0	0	0	0
7:15		0	0	0	0		0		0				0	0	0	0	0
7:30		0	0	0	0		0		0				0	0	0	0	0
7:45		0	0	0	0		0		0				0	0	0	0	0
8:00		0	0	0	0		0		0				0	0	0	0	0
8:15		0	0	0	0		1		0				0	0	0	0	1
8:30		0	0	0	0		0		0				0	0	0	0	0
8:45		0	0	0	0		0		0				0	0	0	0	0





Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time	NOR	ТН Арр	roach	SOU	ТН Арр	roach	WES	ST Appr	oach	EAS	T Appr	oach	BIK	ES in	X-WA	LKS	Total Volumes
Tillle	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	Е	Total Volumes
Peak Hour		5	0	1	1		2		9				0	0	0	0	18
PH Factor		0.31	0.00	0.25	0.25		0.25		0.45				0.00	0.00	0.00	0.00	0.64
Peak 15 X 4		16	0	4	4		8		20				0	0	0	0	28
Average Hour		3	0	1	1		2		5				0	0	0	0	12
Survey Total		5	0	1	2		3		9				0	0	0	0	20
16:00		0	0	0	0		1		0				0	0	0	0	1
16:15		0	0	0	0		0		0				0	0	0	0	0
16:30		0	0	0	1		0		0				0	0	0	0	1
16:45		0	0	0	0		0		0				0	0	0	0	0
17:00		1	0	1	0		0		5				0	0	0	0	7
17:15		0	0	0	0		2		2				0	0	0	0	4
17:30		0	0	0	1		0		0				0	0	0	0	1
17:45		4	0	0	0		0		2				0	0	0	0	6





Wednesday, May 02, 2012

Vehicle Classification Summary

#3989: Niven Lake Phase V Traffic Impact Study Project:

Yellowknife, NWT Sunny

Municipality: Weather:

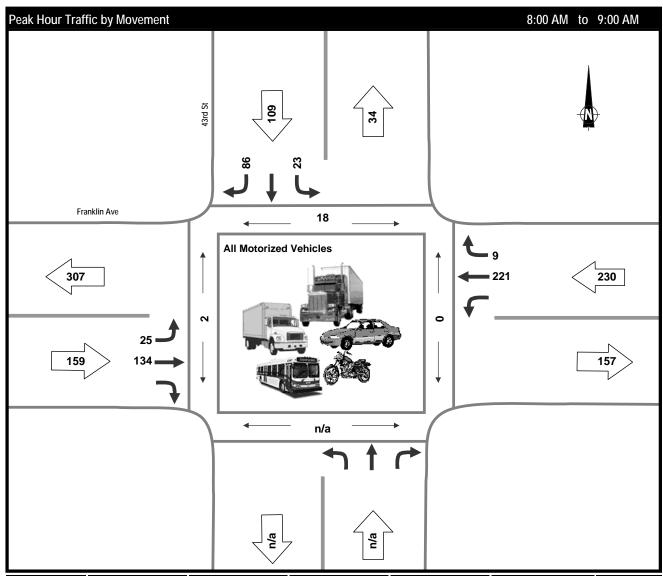
	Entoring		Ve	hicle Classifica	tion	
Time Period	Entering Intersection	All Motorized Vehicles				Total
Morning	Volume	720				720
(07:00 - 09:00)	%	100.0%				100.0%
Afternoon	Volume	1,083				1,083
(16:00 - 18:00)	%	100.0%				100.0%
Total	Volume	1,803				1,803
(4 Hours)	%	100.0%				100.0%



Morning Peak Period

Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles

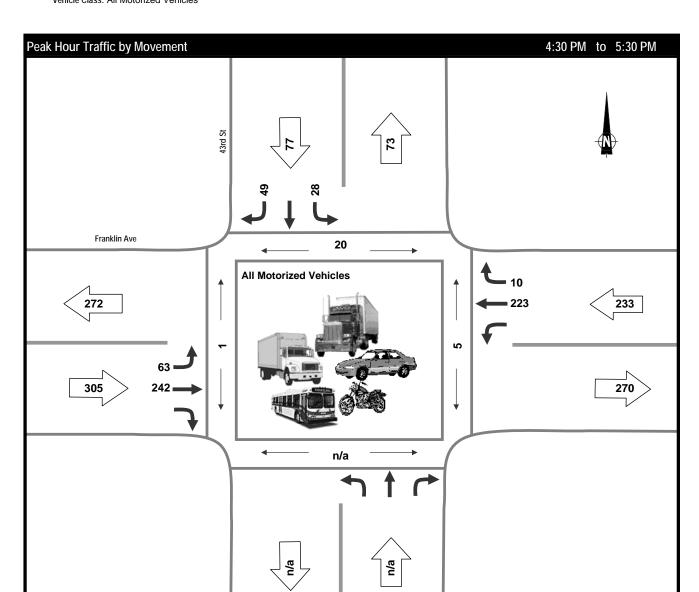


Time	NOR	ТН Арр	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	Р	EDES'	TRIAN	S	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	Е	Total volumes
Peak Hour	23		86				25	134			221	9	18		2	0	498
PH Factor	0.58		0.60				0.78	0.76			0.82	0.75	0.50		0.25	0.00	0.76
Peak 15 X 4	40		144				32	176			268	12	36		8	0	652
Average Hour	15		62				18	100			159	8	15		2	0	362
Survey Total	29		123				36	200			317	15	29		3	0	720
7:00	1		5				0	11			12	0	0		1	0	29
7:15	0		8				1	19			14	0	2		0	0	42
7:30	1		10				3	16			38	3	1		0	0	71
7:45	4		14				7	20			32	3	8		0	0	80
8:00	5		30				8	31			53	3	5		2	0	130
8:15	10		36				5	44			67	1	9		0	0	163
8:30	5		10				6	29			44	3	4		0	0	97
8:45	3		10				6	30			57	2	0		0	0	108



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny

Vehicle Class: All Motorized Vehicles

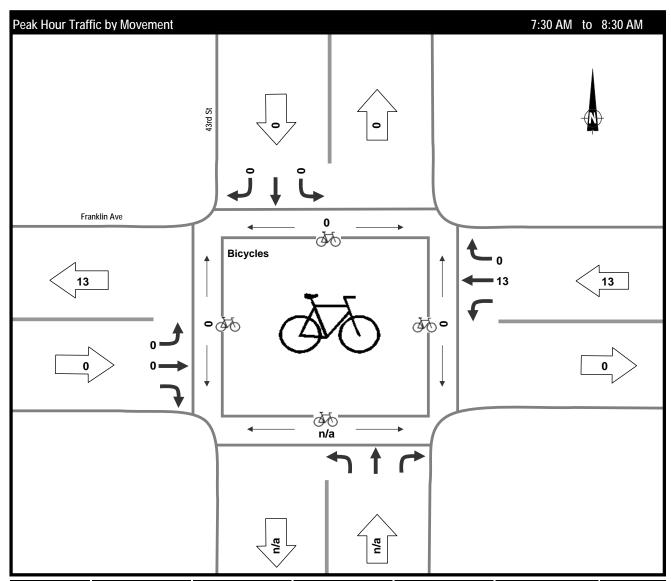


Time	NOR	ТН Аррі	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	Р	EDES'	TRIAN	S	Total Volumes
Time	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	Е	Total Volumes
Peak Hour	28		49				63	242			223	10	20		1	5	615
PH Factor	0.54		0.72				0.83	0.83			0.83	0.83	0.63		0.25	0.31	0.92
Peak 15 X 4	52		68				76	292			268	12	32		4	16	668
Average Hour	29		44				62	214			182	12	20		1	4	543
Survey Total	58		87				123	428			364	23	40		1	7	1,083
16:00	0		5				13	45			42	3	3		0	0	108
16:15	10		10				15	40			29	4	3		0	2	108
16:30	5		10				12	63			56	3	6		1	4	149
16:45	4		7				14	50			60	2	3		0	0	137
17:00	6		17				19	56			67	2	3		0	0	167
17:15	13		15				18	73			40	3	8		0	1	162
17:30	10		10				22	57			41	4	5		0	0	144
17:45	10		13				10	44			29	2	9		0	0	108



Morning Peak Period

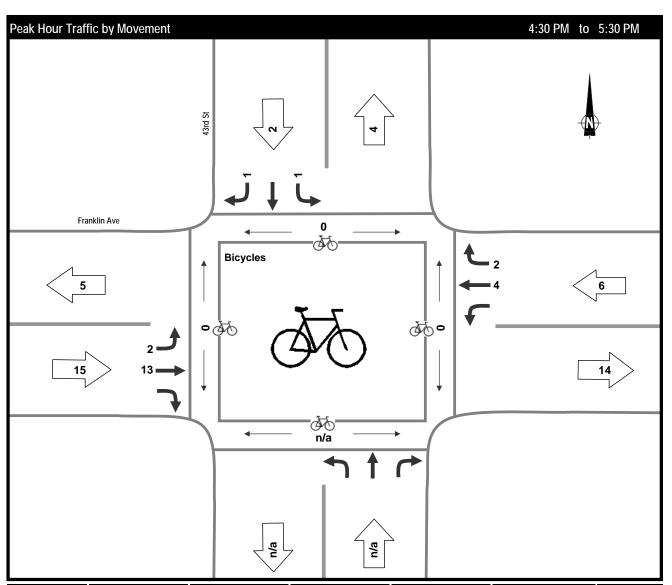
Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time	NOR'	ТН Аррі	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	BIK	ES in	X-WAI	LKS	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	Е	Total volumes
Peak Hour	0		0				0	0			13	0	0		0	0	13
PH Factor	0.00		0.00				0.00	0.00			0.46	0.00	0.00		0.00	0.00	0.46
Peak 15 X 4	0		0				0	0			28	0	0		0	0	28
Average Hour	0		0				0	0			8	0	0		0	0	8
Survey Total	0		0				0	0			16	0	0		0	0	16
7:00	0		0				0	0			0	0	0		0	0	0
7:15	0		0				0	0			2	0	0		0	0	2
7:30	0		0				0	0			1	0	0		0	0	1
7:45	0		0				0	0			1	0	0		0	0	1
8:00	0		0				0	0			4	0	0		0	0	4
8:15	0		0				0	0			7	0	0		0	0	7
8:30	0		0				0	0			1	0	0		0	0	1
8:45	0		0				0	0			0	0	0		0	0	0



Project: #3989: Niven Lake Phase V Traffic Impact Study Municipality: Yellowknife, NWT Weather: Sunny Vehicle Class: Bicycles



Time	NOR'	ТН Аррі	roach	SOU	ТН Аррі	roach	WES	T Appr	oach	EAS	T Appro	oach	BIK	ES in	X-WAI	LKS	Total Volumes
Tille	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	Total Volumes
Peak Hour	1		1				2	13			4	2	0		0	0	23
PH Factor	0.25		0.25				0.50	0.46			0.33	0.50	0.00		0.00	0.00	0.48
Peak 15 X 4	4		4				4	28			12	4	0		0	0	48
Average Hour	1		1				1	9			3	1	0		0	0	16
Survey Total	2		1				2	18			5	2	0		0	0	30
16:00	0		0				0	2			0	0	0		0	0	2
16:15	0		0				0	0			0	0	0		0	0	0
16:30	0		0				1	3			0	0	0		0	0	4
16:45	0		1				0	0			0	0	0		0	0	1
17:00	1		0				0	7			3	1	0		0	0	12
17:15	0		0				1	3			1	1	0		0	0	6
17:30	0		0				0	2			1	0	0		0	0	3
17:45	1		0				0	1			0	0	0		0	0	2

APPENDIX D

Intersection Capacity Analysis Worksheets

TWO-WAY STOP CONTROL SUMMARY_

Analyst: RC
Agency/Co.: CTS
Date Performed: Weekday AM Peak Hour
Tntersection: Highway 4 & Niven Gate
Yellowknife Analysis Time Period: Weekday AM Peak Hour
Intersection: Highway 4 & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate
North/South Street: Highway 4
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

			ımes and					
Major Street:	Approach		rthbound		Sou	ıthbound		
	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
					•			
Volume			205	36	37	304		
Peak-Hour Facto	or, PHF		0.82	0.82	0.82	0.82		
Hourly Flow Rat	te, HFR		250	43	45	370		
Percent Heavy V	Vehicles				1			
Median Type/Sto	orage	Undivi	ided		/			
RT Channelized?	?			No				
Lanes			1 1		1	1		
Configuration			T R		L	T		
Upstream Signal	1?		No			No		
Minor Street:	Approach	Wes	stbound		Eas	tbound		
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
					'			
Volume		88		34				
Peak Hour Facto	or, PHF	0.82		0.82				
Hourly Flow Rat	te, HFR	107		41				
Percent Heavy V	Vehicles	1		1				
Percent Grade			0			0		
Flared Approach		torage		No	/			/
Lanes		0	0		•			•
Configuration			LR					

Approach	NB	SB	_ W	estbound		Ea	stbound	d .
Movement	1	4	7	8	9	10	11	12
Lane Config		L		LR				
v (vph)		45		148				
C(m) (vph)		1272		449				
v/c		0.04		0.33				
95% queue length		0.11		1.42				
Control Delay		7.9		16.9				
LOS		A		C				
Approach Delay				16.9				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour Intersection: Highway 4 & Niven Gate Jurisdiction: Yellowknife

Jurisdiction: Units: U. S. Metric

Analysis Year: 2017 Future Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate

North/South Street: Highway 4 Intersection Orientation: NS Study period (hrs): 0.25

						P	. (, -		
			mes and		tme				
Major Street:	Approach	Nor	rthbound			Sou	thbound	l	
-	Movement	1	2	3		4	5	6	
		L	T	R		L	T	R	
Volume			226	52		52	334		
Peak-Hour Fact	or. PHF		0.65	0.65		0.65	0.65		
Hourly Flow Ra			347	80		80	513		
Percent Heavy						2			
Median Type/St		Undivi	dod			,-			
RT Channelized		OHGI VI		No		/			
Ki Channelized Lanes	4:		1 1	INO		1	1		
			T R			Τ.	T T		
Configuration	1.0					ь	-		
Upstream Signa	11.		No				No		
Minor Street:	Approach	Wes	tbound			Eas	tbound		
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		131		50					
Peak Hour Fact	or, PHF	0.65		0.65					
Hourly Flow Ra		201		76					
Percent Heavy		2		1					
Percent Grade		2	0	_			0		
Flared Approac		torago	U	No	/		U		/
	DAISUS:/S			INO	/				/
Lanes		0	0						
Configuration			LR						

Approach	_Delay,	Queue L		and Leve	el of		astboun	d
Movement	1	4	7	8	9	10	11	12
Lane Config		L		LR				
v (vph)		80		277				
C(m) (vph)		1130		295				
v/c		0.07		0.94				
95% gueue length		0.23		9.13				
Control Delay		8.4		76.6				
LOS		A		F				
Approach Delay				76.6				
Approach LOS				F				
Approach 103				r				

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour Intersection: Highway 4 & Niven Gate Jurisdiction: Yellowknife

Jurisdiction: Units: U. S. Metric

Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate
North/South Street: Highway 4
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

				and Adjus	tments_			
Major Street:				und		Southboun		
	Movement	1	2	3	4	5	6	
		L	Т	R	L	T	R	
Volume			226	56	56	334		
Peak-Hour Fact	or, PHF		0.6	0.65	0.6	5 0.65		
Hourly Flow Ra			347	86	86	513		
Percent Heavy	Vehicles				2			
Median Type/St		Undivi	.ded		/			
RT Channelized	.?			No				
Lanes			1	1		1 1		
Configuration			T	R		L T		
Upstream Signa	1?		No			No		
Minor Street:	Approach	Wes	tbou	nd		Eastbound		
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume		155		59				
Peak Hour Fact	or, PHF	0.65		0.65				
Hourly Flow Ra		238		90				
Percent Heavy	Vehicles	2		1				
Percent Grade			0			0		
Flared Approac	h: Exists?/	'Storage		No	/			/
Lanes		0		0				
Configuration			LR					

Approach	_Delay,	Queue I SB	engtl	n, and Leve Westbound	l of	Servic	e Eastboun	d	_
Movement	1	4	7	8	9	10	11	12	
Lane Config		L		LR					
v (vph)		86		328					_
C(m) (vph)		1125		289					
v/c		0.08		1.13					
95% queue length		0.25		13.79					
Control Delay		8.5		133.2					
LOS		A		F					
Approach Delay				133.2					
Approach LOS				F					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
Agency/Co:: CTS
Date Performed: CTS
Date Performed: Weekday AM Peak Hour
Intersection: Highway 4 & Niven Gate
Thrisdiction: Yellowknife

Analysis Year: 2022 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study

	Vehic	cle Volu	mes and	Adjustm	ents			
Major Street: A	pproach	Nor	thbound	-	Sou	thbound		
M	ovement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume			246	70	70	365		
Peak-Hour Factor			0.65	0.65	0.65	0.65		
Hourly Flow Rate			378	107	107	561		
Percent Heavy Ve					2			
Median Type/Stor	age	Undivi		_	/			
RT Channelized?				No.				
Lanes			1 1 T R		1 T.	1 T		
Configuration					ь	-		
Upstream Signal?			No			No		
	pproach		tbound			tbound		
M	ovement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume		209		80				
Peak Hour Factor	, PHF	0.65		0.65				
Hourly Flow Rate	, HFR	321		123				
Percent Heavy Ve	hicles	2		1				
Percent Grade (%			0			0		
Flared Approach:	Exists?/S	Storage		No	/			/
Lanes		0	0					
Configuration			LR					

Approach	_Delay,	Queue Ler		nd Leve	el of	Servic	e Eastbour	nd
Movement	1	4	7	8	9	1 10	11	12
Lane Config		L		LR				
v (vph)		107		444				
C(m) (vph)		1076		244				
v/c		0.10		1.82				
95% queue length		0.33		30.47				
Control Delay		8.7		418.9				
LOS		A		F				
Approach Delay				418.9				
Approach LOS				F				

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour Intersection: Highway 4 & Niven Gate Jurisdiction: Yellowknife

Jurisdiction: Units: U. S. Metric

Analysis Year: 2012 Base Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: Niven Gate

North/South Street: Highway 4

Intersection Or	ientation: N	S		Sti	ıdy	period	(hrs):	0.25	
	Vehic	le Volu	mes and	Adjust	me	nts			
Major Street: 1	Approach	Nor	thbound			Sou	thbound		
	Movement	1	2	3		4	5	6	
		L	T	R		L	T	R	
Volume			338	78		54	292		
Peak-Hour Facto:	r, PHF		0.74	0.74		0.74	0.74		
Hourly Flow Rate			456	105		72	394		
Percent Heavy Ve						1			
Median Type/Sto:	rage	Undivi	ded			/			
RT Channelized?			1	No.					
Lanes			1 1			1	1		
Configuration			T R			L	T		
Upstream Signal	?		No				No		
Minor Street: 1	Approach	Wes	tbound			Eas	tbound		
1	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		49		38					
Peak Hour Facto:	r, PHF	0.74		0.74					
Hourly Flow Rate	e, HFR	66		51					
Percent Heavy Ve	ehicles	1		1					
Percent Grade (%)		0				0		
Flared Approach	: Exists?/S	torage		No	/				/
Lanes		ō	0						
Configuration			LR						

Approach	_Delay,	Queue I SB		and Leve			Eastbound	d
Movement	1	4	7	8	9	10	11	12
Lane Config		L		LR				
v (vph)		72		117				
C(m) (vph)		1013		339				
v/c		0.07		0.35				
95% queue length		0.23		1.50				
Control Delay		8.8		21.1				
LOS		A		C				
Approach Delay				21.1				
Approach LOS				C				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour Intersection: Highway 4 & Niven Gate Jurisdiction: Yellowknife

Jurisdiction: Units: U. S. Metric

Analysis Year: 2017 Future Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate

North/South Street: Highway 4
Intersection Orientation: NS

Study period (hrs): 0.25

Intersection C	rientation: N	S		Sti	ıdy	period	(hrs):	0.25	
			mes and		me				
Major Street:	Approach	Nor	thbound			Sou	thbound		
	Movement	1	2	3		4	5	6	
		L	T	R		L	T	R	
Volume			372	124		85	321		
Peak-Hour Fact			0.78	0.78		0.78	0.78		
Hourly Flow Ra	te, HFR		476	158		108	411		
Percent Heavy	Vehicles					2			
Median Type/St	orage	Undivi	.ded			/			
RT Channelized				No					
Lanes			1 1			1	1		
Configuration			T R			L	T		
Upstream Signa	1?		No				No		
Minor Street:	Approach	Wes	tbound			Eas	tbound		
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		69		53					
Peak Hour Fact	or, PHF	0.78		0.78					
Hourly Flow Ra	te, HFR	88		67					
Percent Heavy		2		2					
Percent Grade			0				0		
Flared Approac		torage		No	/				/
Lanes		0	0		,				,
Configuration		Ü	LR						

Approach	_Delay,	Queue L		, and Leve Westbound	l of		Eastboun	d
Movement	1	4	7	8	9	10	11	12
Lane Config		L		LR				
v (vph)		108		155				
C(m) (vph)		947		288				
v/c		0.11		0.54				
95% gueue length		0.38		2.97				
Control Delay		9.3		31.2				
LOS		A		D				
Approach Delay				31.2				
Approach LOS				D				

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Intersection: Highway 4 & Niven Gate Jurisdiction: Yellowknife Intersection: Highway 4 & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate
North/South Street: Highway 4
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

	cle Vol			tme				
Major Street: Approach	No:	rthbound			Sou	thbound	i	
Movement	1	2	3		4	5	6	
	L	T	R		L	T	R	
Volume		372	148		102	321		
Peak-Hour Factor, PHF		0.78	0.78		0.78			
Hourly Flow Rate, HFR		476	189		130	411		
Percent Heavy Vehicles		470	103		2	411		
	TT 22				,2			
Median Type/Storage	Undiv				/			
RT Channelized?			No					
Lanes		1 1			1	1		
Configuration		T R			L	T		
Upstream Signal?		No				No		
-								
Minor Street: Approach	We	stbound			Eas	tbound		
Movement	7	8	9		10	11	12	
	T.	т	R		T ₁	т	R	
	_	-			_	_		
Volume	78		60					
Peak Hour Factor, PHF	0.78		0.78					
Hourly Flow Rate, HFR	100		76					
	2		2					
Percent Heavy Vehicles	2	_	2			_		
Percent Grade (%)		0		,		0		,
Flared Approach: Exists?			No	/				/
Lanes	0	C	1					
Configuration		LR						

Approach	_Delay,	Queue 1		, and Leve	el of	Service	Eastboun	d
Movement	1	4	7	8	9	10	11	12
Lane Config		L		LR				
v (vph)		130		176				
C(m) (vph)		922		267				
v/c		0.14		0.66				
95% queue length		0.49		4.23				
Control Delay		9.5		41.2				
LOS		A		E				
Approach Delay				41.2				
Approach LOS				E				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Intersection: Highway 4 & Niven Gate Jurisdiction: Yellowknife Jurisdiction: Units: U. S. Metric

Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate

North/South Street: Highway 4
Intersection Orientation: NS

Study period (hrs): 0.25

Intersection Orientation:	IND		St	uuy	berroa	(hrs):	0.25
Veh	icle Volu	mes and	Adjus	tme	nts		
Major Street: Approach		thbound				thbound	
Movement	1	2	3		4	5	6
	L	T	R		L	T	R
Volume		406	207		144	350	
Peak-Hour Factor, PHF		0.78	0.78		0.78	0.78	
Hourly Flow Rate, HFR		520	265		184	448	
Percent Heavy Vehicles					2		
Median Type/Storage	Undivi	.ded			/		
RT Channelized?			No				
Lanes		1 1			1	1	
Configuration		T R			L	T	
Upstream Signal?		No				No	
Minor Street: Approach	Wes	tbound			Eas	tbound	
Movement	7	8	9		10	11	12
	L	T	R		L	T	R
/olume	103		80				
Peak Hour Factor, PHF	0.78		0.78				
Hourly Flow Rate, HFR	132		102				
Percent Heavy Vehicles	2		2				
Percent Grade (%)		0				0	
Flared Approach: Exists?	/Storage		No	/			/
							,
Lanes	0	0					

12

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Haener Dr & Niven Gate
Yellowknife Analysis Time Period: Weekday AM Peak Hour
Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Ea	stbou	nd	We	stbou	nd	No	rthbo	ound	So	uthbo	ound
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	56	0	19	0	0	0	33	3	0	0	2	89

% Thrus Left Lane

	Eastbound	Westbound	Northbound	Southbound
	L1 L2	L1 L2	L1 L2	L1 L2
Configuration	LR		LT	TR
PHF	0.66		0.66	0.66
Flow Rate	112		53	137
% Heavy Veh	0		0	0
No. Lanes	1		1	1
Opposing-Lanes	0		1	1
Conflicting-lanes	1		1	1
Geometry group	1		1	1
Duration, T 0.25	hrs.			

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastb	ound	Westb	ound	Northb	ound	South	oound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
	112				53		137	
Left-Turn	84				49		0	
Right-Turn	28				0		134	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.3				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1		1	L
Adjustments Exhibi								
hLT-adj		. 2				. 2		0.2
hRT-adj	- 0					. 6		0.6
hHV-adj		.7			_	.7	_	1.7
hadj, computed	-0.0				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	East!	bound	West	bound	North	oound	South	oound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	112				53		137	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.10				0.05		0.12	
hd, final value	4.29				4.47		3.63	
x, final value	0.13				0.07		0.14	
Move-up time, m		2.0			:	2.0	:	2.0
Service Time	2.3				2.5		1.6	

Worksheet 5 - Capacity and Level of Service

	Easth	nound	West	bound	Northh	ound	South	bound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	112				53		137	
Service Time	2.3				2.5		1.6	
Jtilization, x	0.13				0.07		0.14	
Dep. headway, hd	4.29				4.47		3.63	
Capacity	362				303		387	
Delay	7.94				7.78		7.21	
Los	A				A		A	
Approach:								
Delay		7.94			7	7.78		7.21
LOS	1	A			P	1		A
Intersection Delay	7.58		Int	ersectio	on LOS A			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: KC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Tntersection: Haener Dr & Niven Gate
Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound		We	Westbound			orthbo	ound	S	Southbound		
	L	T	R	L	Т	R	L	T	R	L	T	R
Volume	85	0	21	- 0	0	0	36	3	0	- 0	2	145

	Eastbound	Westbound	Northbound	Southbound
	L1 L2	L1 L2	L1 L2	L1 L2
Configuration	LR		LT	TR
PHF	0.65		0.65	0.65
Flow Rate	162		59	226
% Heavy Veh	2		2	2
No Tones	1		1	1

% neavy ven 2
No. Lanes 2
Opposing-Lanes 0
Conflicting-lanes 1
Geometry group 1
Duration, T 0.25 hrs. 0

__Worksheet 3 - Saturation Headway Adjustment Worksheet_

	Eastbour L1 I	Westbound	Northbo L1	und L2	Southb L1	ound L2
Flow Rates:						
Total in Lane	162		59		226	
Left-Turn	130		55		0	
Right-Turn	32		0		223	
Prop. Left-Turns	0.8		0.9		0.0	
Prop. Right-Turns	0.2		0.0		1.0	
Prop. Heavy Vehicl	e0.0		0.0		0.0	
Geometry Group	1		1		1	
Adjustments Exhibi	t 17-33:					
hLT-adj	0.2		0.	2	0	. 2
hRT-adj	-0.6		-0.	6	- 0	.6
hHV-adj	1.7		1.	7	1	. 7
hadj, computed	0.1		0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	162				59		226	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.14				0.05		0.20	
hd, final value	4.57				4.75		3.81	
x, final value	0.21				0.08		0.24	
Move-up time, m		2.0			2	2.0	1	2.0
Service Time	2.6				2.7		1.8	

Worksheet	5	-	Capacity	and	Level	of	Service	
-----------	---	---	----------	-----	-------	----	---------	--

	East	bound	West	bound	North	oound	South	bound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	162				59		226	
Service Time	2.6				2.7		1.8	
Utilization, x	0.21				0.08		0.24	
Dep. headway, hd	4.57				4.75		3.81	
Capacity	412				309		476	
Delay	8.75				8.15		8.01	
LOS	A				A		A	
Approach:								
Delay		8.75			8	3.15		8.01
LOS		A			I	A		A
Intersection Delay	7 8.30		Int	ersection	on LOS A			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: KC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Tutersection: Haener Dr & Niven Gate
Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			We	Westbound			orthbo	ound	Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	90	0	24	0	0	0	40	3	0	0	2	174

% Thrus Left Lane

	Eastbou	ınd	Westbo	und	North	oound	South	oound
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.65				0.65		0.65	
Flow Rate	174				65		270	
% Heavy Veh	2				2		2	
No. Lanes	1				1	L		1
Opposing-Lanes	0				1	L	:	1
Conflicting-lanes	1				1	L		1
Geometry group	1				1	L		1
Duration, T 0.25	hrs.							

__Worksheet 3 - Saturation Headway Adjustment Worksheet_

	Eastbo L1	ound L2	Westb	ound L2	Northbo L1	ound L2	South L1	bound L2
Flow Rates:								
Total in Lane	174				65		270	
Left-Turn	138				61		0	
Right-Turn	36				0		267	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1			1
Adjustments Exhibi	t 17-33:							
hLT-adj	0.	2			0.	. 2		0.2
hRT-adj	-0.	6			-0.	. 6	-	0.6
hHV-adj	1.	7			1.	. 7		1.7
hadj, computed	0.1				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	174				65		270	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.15				0.06		0.24	
hd, final value	4.68				4.84		3.86	
x, final value	0.23				0.09		0.29	
Move-up time, m		2.0				2.0		2.0
Service Time	2.7				2.8		1.9	

Worksheet 5 - Capacity and Level of Service

	East	bound	West	bound	Northb	ound	South	bound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	174				65		270	
Service Time	2.7				2.8		1.9	
Utilization, x	0.23				0.09		0.29	
Dep. headway, hd	4.68				4.84		3.86	
Capacity	424				315		520	
Delay	9.04				8.30		8.43	
LOS	A				A		A	
Approach:								
Delay		9.04			8	3.30		8.43
LOS		A			P	1		A
Intersection Delay	8.62		Int	ersection	on LOS A			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Haener Dr & Niven Gate
Turisdiction: Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Gate
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			We	stbou	ınd	No	orthbo	ound	Southbound		
	L	T	R	L	T	R	L	Т	R	L	T	R
Volume	117	0	26	0	0	0	44	4	0	0	2	245

% Thrus Left Lane

	Eastbound	Westbound	Northbound	Southbound		
	L1 L2	L1 L2	L1 L2	L1 L2		
Configuration	LR		LT	TR		
PHF	0.65		0.65	0.65		
Flow Rate	220		73	379		
% Heavy Veh	2		2	2		
No. Lanes	1		1	1		
Opposing-Lanes	0		1	1		
Conflicting-lanes	1		1	1		
Geometry group	1		1	1		
Duration, T 0.25	hrs.					

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbo L1	ound L2	Westb	ound L2	Northbo L1	ound L2	South L1	bound L2
Flow Rates:								
Total in Lane	220				73		379	
Left-Turn	180				67		0	
Right-Turn	40				0		376	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1			1
Adjustments Exhibi	t 17-33:							
hLT-adj	0.	2			0.	. 2		0.2
hRT-adj	-0.	6			-0.	. 6	-	0.6
hHV-adj	1.	7			1.	. 7		1.7
hadj, computed	0.1				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		West	oound	North	oound	Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Flow rate	220				73		379		
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	
x, initial	0.20				0.06		0.34		
hd, final value	4.97				5.12		4.03		
x, final value	0.30				0.10		0.42		
Move-up time, m		2.0				2.0	1	2.0	
Service Time	3.0				3.1		2.0		

Worksheet 5 - Capacity and Level of Service

	Easth	Eastbound		bound	North	Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Flow Rate	220				73		379		
Service Time	3.0				3.1		2.0		
Utilization, x	0.30				0.10		0.42		
Dep. headway, hd	4.97				5.12		4.03		
Capacity	470				323		629		
Delay	10.13				8.72		9.97		
LOS	В				A		A		
Approach:									
Delay	1	10.13			1	3.72		9.97	
LOS	E	3			1	A	1	A	
Intersection Delay	9.89		Int	ersection	on LOS A				

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
Agency/Co: CTS
Date Performed:
Analysis Time Period: Weekday PM Peak Hour
Intersection: Haener Dr & Niven Gate
Turisdiction: Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowkhife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Ea	stbo	und	We	estbo	und	No	orthb	ound	S	outhb	ound	
	L	Т	R	L	т	R	L	Т	R	L	Т	R	
Volume	97	0	35	0	0	0	19	2	0	0	4	68	

% Thrus Left Lane

	Eastbound		West	Westbound		oound	Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LR				LT		TR		
PHF	0.87				0.87		0.87		
Flow Rate	151				23		82		
% Heavy Veh	0				0		0		
No. Lanes	1					1	1		
Opposing-Lanes	0					1	1		
Conflicting-lanes	1					1	1		
Geometry group	1					1	1		
Duration, T 0.25	hrs.								

__Worksheet 3 - Saturation Headway Adjustment Worksheet_

	Eastbo L1	und L2	Westb	ound L2	Northbo L1	ound L2	South L1	bound L2
Flow Rates:								
	151				23		82	
Left-Turn	111				21		0	
Right-Turn	40				0		78	
Prop. Left-Turns	0.7				0.9		0.0	
Prop. Right-Turns	0.3				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1			1
Adjustments Exhibi								
hLT-adj	0.	2			0.	. 2		0.2
hRT-adj	-0.	6			-0.	. 6	_	0.6
hHV-adj	1.	7			1.	. 7		1.7
hadj, computed	-0.0				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		West	oound	North	oound	Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Flow rate	151				23		82		
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20	
x, initial	0.13				0.02		0.07		
hd, final value	4.10				4.50		3.69		
x, final value	0.17				0.03		0.08		
Move-up time, m		2.0				2.0		2.0	
Service Time	2.1				2.5		1.7		

Worksheet	5	-	Capacity	and	Level	of	Service	
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	East	bound	West	oound	Northb	ound	South	nbound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	151				23		82	
Service Time	2.1				2.5		1.7	
Utilization, x	0.17				0.03		0.08	
Dep. headway, hd	4.10				4.50		3.69	
Capacity	401				273		332	
Delay	7.95				7.63		7.03	
LOS	A				A		A	
Approach:								
Delay		7.95			7	7.63		7.03
LOS		A			P	A.		A
Intersection Delay	7.63		Int	ersection	on LOS A			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: KC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday PM Peak Hour
Tntersection: Haener Dr & Niven Gate
Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
North/South Street: Niven Gate
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Ea	stboı	ınd	W∈	stbou	ınd	No	orthbo	ound	So	outhbo	ound	ı
	L	T	R	L	Т	R	L	T	R	L	T	R	
Volume	171	0	39	0	0	0	21	2	0	0	4	101	

% Thrus Left Lane

	Eastbound	Westbound	Northbound	Southbound		
	L1 L2	L1 L2	L1 L2	L1 L2		
Configuration	LR		LT	TR		
PHF	0.78		0.78	0.78		
Flow Rate	269		28	134		
% Heavy Veh	2		2	2		
No. Lanes	1		1	1		
Opposing-Lanes	0		1	1		
Conflicting-lanes	1		1	1		
Geometry group	1		1	1		
Duration, T 0.25	hrs.					

__Worksheet 3 - Saturation Headway Adjustment Worksheet_

	Eastbo L1	ound L2	Westb L1	ound L2	Northbo L1	ound L2	South L1	bound L2
Flow Rates:								
Total in Lane	269				28		134	
Left-Turn	219				26		0	
Right-Turn	50				0		129	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1			1
Adjustments Exhibi	t 17-33:	:						
hLT-adj	0.	. 2			0.	. 2		0.2
hRT-adj	-0.	. 6			-0.	. 6	-	0.6
hHV-adj	1.	. 7			1.	. 7		1.7
hadj, computed	0.1				0.2		-0.5	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	269				28		134	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.24				0.02		0.12	
hd, final value	4.34				4.90		4.03	
x, final value	0.32				0.04		0.15	
Move-up time, m		2.0				2.0		2.0
Service Time	2.3				2.9		2.0	

Worksheet 5 - Capacity and Level of Service_

	East	tbound	West	bound	North	oound	South	oound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	269				28		134	
Service Time	2.3				2.9		2.0	
Utilization, x	0.32				0.04		0.15	
Dep. headway, hd	4.34				4.90		4.03	
Capacity	519				278		384	
Delay	9.41				8.10		7.74	
LOS	A				A		A	
Approach:								
Delay		9.41			1	3.10		7.74
LOS		A			1	A	1	A
Intersection Delay	8.81		Int	ersection	on LOS A			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday PM Peak Hour
Intersection: Haener Dr & Niven Gate
Turisdiction: Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Ea	stboı	und	We	estboi	ınd	No	orthbo	ound	Southbound				
	L	T	R	L	T	R	L	T	R	L	T	R		
Volume	203	0	48	0	0	0	24	2	0	0	4	114		

% Thrus Left Lane

	Eastbound		Westbound		North	oound	Southbound		
	L1	L2	L1	L2	L1	L2	L1	L2	
Configuration	LR				LT		TR		
PHF	0.78				0.78		0.78		
Flow Rate	321				32		151		
% Heavy Veh	2				2		2		
No. Lanes	1					1		1	
Opposing-Lanes	0					1		1	
Conflicting-lanes	1					1		1	
Geometry group	1					1		1	
Duration, T 0.25	hrs.								

__Worksheet 3 - Saturation Headway Adjustment Worksheet_

	Eastbo L1	ound L2	Westb L1	ound L2	Northbo L1	ound L2	South L1	bound L2
Flow Rates:								
Total in Lane	321				32		151	
Left-Turn	260				30		0	
Right-Turn	61				0		146	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1			1
Adjustments Exhibi	t 17-33:							
hLT-adj	0.	. 2			0.	. 2		0.2
hRT-adj	-0.	. 6			-0.	. 6	-	0.6
hHV-adj	1.	. 7			1.	. 7		1.7
hadj, computed	0.1				0.2		-0.5	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	321				32		151	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.29				0.03		0.13	
hd, final value	4.40				5.07		4.17	
x, final value	0.39				0.05		0.17	
Move-up time, m		2.0				2.0	1	2.0
Service Time	2.4				3.1		2.2	

Worksheet	5	-	Capacity	and	Level	of	Service
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	East	bound	West	bound	North	bound	South	ıbound
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	321				32		151	
Service Time	2.4				3.1		2.2	
Jtilization, x	0.39				0.05		0.17	
Dep. headway, hd	4.40				5.07		4.17	
Capacity	571				282		401	
Delay	10.21				8.31		8.04	
Los	В				A		A	
Approach:								
Delay		10.21				8.31		8.04
LOS		В			1	A		A
ntersection Delay	9.44		Int	ersection	on LOS A			

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday PM Peak Hour
Intersection: Haener Dr & Niven Gate
Turisdiction: Yellowknife

Intersection: Haener Dr & Niven Gate
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
North/South Street: Haener Drive
Worksheet 2 - Volume Adjustments and Site Characteristics

	Ea	stbo	und	We	estbou	ınd	No	orthbo	ound	Southbound			
	L	T	R	L	T	R	L	T	R	L	T	R	
Volume	299	0	51	0	0	0	26	2	0	0	5	157	

% Thrus Left Lane

	Eastbound		Westbound		North	oound	Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.78				0.78		0.78	
Flow Rate	448				35		207	
% Heavy Veh	2				2		2	
No. Lanes	1					1	1	
Opposing-Lanes	0					1	1	
Conflicting-lanes	1					1	1	
Geometry group	1					1	1	
Duration, T 0.25	hrs.							

__Worksheet 3 - Saturation Headway Adjustment Worksheet_

	Eastbo L1	ound L2	Westb	ound L2	Northbo L1	und L2	South L1	bound L2
Flow Rates:								
Total in Lane	448				35		207	
Left-Turn	383				33		0	
Right-Turn	65				0		201	
Prop. Left-Turns	0.9				0.9		0.0	
Prop. Right-Turns	0.1				0.0		1.0	
Prop. Heavy Vehicl	e0.0				0.0		0.0	
Geometry Group	1				1			1
Adjustments Exhibi	t 17-33:							
hLT-adj	0.	2			0.	2		0.2
hRT-adj	-0.	6			-0.	6	-	0.6
hHV-adj	1.	7			1.	7		1.7
hadj, computed	0.1				0.2		-0.5	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westl	oound	Northb	oound	Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	448				35		207	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.40				0.03		0.18	
hd, final value	4.61				5.54		4.53	
x, final value	0.57				0.05		0.26	
Move-up time, m		2.0			2	2.0	:	2.0
Service Time	2.6				3.5		2.5	

Worksheet	5	_	Capacity	and	Level	of	Service

	Eastbo	ound	Westbound		North	Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2	
Flow Rate	448				35		207		
Service Time	2.6				3.5		2.5		
Utilization, x	0.57				0.05		0.26		
Dep. headway, hd	4.61				5.54		4.53		
Capacity	698				285		457		
Delay	13.64				8.85		9.12		
LOS	В				A		A		
Approach:									
Delay	13	3.64			8	3.85		9.12	
LOS	В				1	A		A	
Intersection Delay	12.04		Inte	ersection	on LOS B				

TWO-WAY STOP CONTROL SUMMARY_

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak
Intersection: Driscoll Rd & Niven Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Driscoll Road
Intersection Orientation: NS Study period (h:

Study period (hrs): 0.25

					-	_			
	Vehic	le Volu	mes and	Adius	tme	nts			
Major Street:	Approach		thbound				thbound		
najor berece.	Movement	1	2	3	1	4	5	6	
	110 1 0 1110110	Ī.	Ť	R		Ť.	T	R	
			-		1	_	-	••	
Volume			8	12		16	6		
Peak-Hour Fact	or PHF		0.88	0.88		0.88	0.88		
Hourly Flow Ra			9	13		18	6		
Percent Heavy						1			
Median Type/St		Undivi	AoA.			/			
RT Channelized		OHGIVI	ucu			/			
Lanes	•		1 0			0	1		
Configuration			TR			T.T			
Upstream Signa	12		No				No		
opscream bigna			140				140		
Minor Street:	Approach	Was	tbound			Fac	thound		
MINOI DEFECE.	Movement.	7	8	9	1	10	11	12	
	HOVEMEN	Ť.	т	R		T.	T	R	
		_	-	10	- 1	-	-	10	
Volume		6		4.0					
Peak Hour Fact	or PHF	0.88		0.88					
Hourly Flow Ra		6		45					
Percent Heavy		1		1					
Percent Grade		-	0	-			0		
Flared Approac		torago	U	No	/		U		/
Tanes	II. EAISUSI/S	0	0	INO	/				/
		U	LR						
Configuration			ик						

Approach	_Delay,	Queue Len	gth, and Le Westbound			astbound	1
Movement	1	4	7 8	9	10	11	12
Lane Config		LT	LR				
v (vph)		18	51				
C(m) (vph)		1600	1049				
v/c		0.01	0.05				
95% queue length		0.03	0.15				
Control Delay		7.3	8.6				
LOS		A	A				
Approach Delay			8.6				
Approach LOS			A				

HCS+: Unsignalized Intersections Release 5.6

	TW	O-WAY ST	OP CON	TROL SUM	MARY		
Analyst: Agency/Co.: Date Performed: Analysis Time Per Intersection: Jurisdiction: Units: U. S. Meti	Dri Yel ric	kday AM scoll Rd lowknife	& Nive	en Dr			
Analysis Year: Project ID: 3989 East/West Street: North/South Stree	- Niven Nive	7 Future Lake Ph en Drive scoll Ro	ase V 7	Traffic	Impact S	tudy	
Intersection Orie				St	udy peri	od (hrs)	: 0.25
	Veh proach ovement	icle Vol No 1 L	umes ar rthbour 2 T			outhboun 5 T	d 6 R
Volume			9	13	56	7	
Peak-Hour Factor, Hourly Flow Rate, Percent Heavy Veh	HFR nicles		0.65	0.65 20	0.65 86 2	0.65 10	
Median Type/Stora RT Channelized? Lanes	age	Undiv	1	0	0		
Configuration Upstream Signal?			No '	ΓR		LT No	
	oproach ovement	We 7 L	stbound 8 T	9 R	10 L	astbound 11 T	12 R
Volume Peak Hour Factor, Hourly Flow Rate, Percent Heavy Veh Percent Grade (%)	HFR nicles	7 0.65 10 2	0	54 0.65 83 2		0	
Flared Approach: Lanes Configuration	Exists?	/Storage 0	LR	No 0	/		/
					el of Ser	vice	
Approach Movement Lane Config	NB 1	SB 4 LT	Wes	stbound 8 LR	9		bound 11 12
v (vph) C(m) (vph) v/c 95% queue length Control Delay		86 1579 0.05 0.17 7.4		93 1007 0.09 0.30 8.9			

TWO-WAY STOP CONTROL SUMMARY Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday AM Peak Intersection: Driscoll Rd & Niven Dr Jurisdiction: Yellowknife Units: U. S. Metric Analysis Year: 2017 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: North/South Street: Niven Drive Driscoll Road Intersection Orientation: NS Study period (hrs): 0.25 _Vehicle Volumes and Adjustments_ ch Northbound Major Street: Approach Movement Southbound Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage RT Channelized? 0.65 0.65 0.65 0.65 93 13 24 10 Undivided Lanes 0 1 Configuration TR LT Upstream Signal? No No Minor Street: Approach Movement Westbound Eastbound 11 Volume 11 Peak Hour Factor, PHF 0.65 0.65 Hourly Flow Rate, HFR 16 127 Percent Heavy Vehicles 2 Percent Grade (%) Flared Approach: Exists?/Storage No Lanes Configuration LR _Delay, Queue Length, and Level of Service Approach SB Westbound Eastbound Movement 10 12 LT Lane Config LR v (vph) C(m) (vph) 143 1574 999

0.14

9.2

A 9.2

Α

0.06

7.4

Α

v/c 95% queue length Control Delay

Approach Delay

Approach LOS

HCS+: Unsignalized Intersections Release 5.6

	HCS+: Uns	signalize	d Inter	section	ons Releas	se 5.6		
	TWC	-WAY STO	P CONTI	ROL SUM	MARY			
Analyst: Agency/Co.: Date Performed Analysis Time Intersection: Jurisdiction: Units: U. S. M. Analysis Year: Project ID: 3 East/West Stre- North/South St Intersection O	Period: Week Dris Yell etric 2022 989 - Niven et: Nive reet: Dris	scoll Rd owknife ! Future Lake Pha en Drive scoll Roa	& Niver Base + se V Tr	Site raffic	Impact St	-	: 0.25	
Major Street:		cle Volu Nor 1 L	mes and thbound 2 T			outhboun 5 T	d 6 R	
Volume Peak-Hour Fact Hourly Flow Ra Percent Heavy Median Type/St RT Channelized Lanes Configuration Upstream Signa	te, HFR Vehicles orage ?	Undivi	10 0.65 15 ded 1 (No		62 0.65 95 2 /	7 0.65 10 1 No		
Minor Street:	Approach Movement	Wes 7 L	tbound 8 T	9 R	10 L	astbound 11 T	12 R	
Volume Peak Hour Fact Hourly Flow Ra Percent Heavy Percent Grade Flared Approact Lanes Configuration	te, HFR Vehicles (%)	11 0.65 16 2 Storage 0	O LR	87 0.65 133 2 No	/	0		/
Approach Movement Lane Config	Delay, Ç NB 1	Queue Len SB 4 LT		nd Leve bound 8 LR	el of Ser	East!	bound 11 1	.2
v (vph) C(m) (vph) v/c 95% queue leng Control Delay LOS Approach Delay Approach LOS	th	95 1568 0.06 0.19 7.4 A		149 996 0.15 0.53 9.2 A 9.2 A				

TWO-WAY STOP CONTROL SUMMARY_ Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Intersection: Driscoll Rd & Niven Dr Jurisdiction: Yellowknife Units: U. S. Metric Analysis Year: 2012 Base Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: North/South Street: Niven Drive Driscoll Road Intersection Orientation: NS Study period (hrs): 0.25 _Vehicle Volumes and Adjustments_ ch Northbound Major Street: Approach Movement Southbound Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR 0.66 0.66 0.66 0.66 10 24 81 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided Lanes 0 1 Configuration TR LT Upstream Signal? No No Minor Street: Approach Movement Westbound Eastbound 11 T Volume 10 Peak Hour Factor, PHF 0.66 0.66 Hourly Flow Rate, HFR 15 56 Percent Heavy Vehicles 1 Percent Grade (%) Flared Approach: Exists?/Storage No Lanes Configuration LR _Delay, Queue Length, and Level of Service Approach SB Westbound Eastbound Movement 10 12 LT Lane Config LR v (vph) C(m) (vph) 1570 959 v/c 95% queue length Control Delay 0.07 0.05

9.1

A 9.1

Α

0.16 7.4

Α

Approach Delay Approach LOS

HCS+: Unsignalized Intersections Release 5.6

	HCS+: Uns	ignalize	d Inter	section	ons Releas	e 5.6		
	TWO	-WAY STO	P CONTR	OL SUN	MARY			
Analyst: Agency/Co.: Date Performed: Analysis Time I Intersection: Jurisdiction: Units: U. S. Manalysis Year: Project ID: 39 East/West Stren North/South Str Intersection On	Period: Week Dris Yell etric 2017 989 - Niven et: Nive reet: Dris	coll Rd owknife Future: Lake Pha n Drive coll Roa	& Niver Base se V Tr	affic	Impact St	_	. 0.25	
Major Street:		cle Volu Nor 1 L	mes and thbound 2 T			uthbound 5 T	l 6 R	
Volume Peak-Hour Factor Hourly Flow Rat Percent Heavy V Median Type/Stc RT Channelized: Lanes Configuration Upstream Signal	ce, HFR Mehicles orage	Undivi	8 0.78 10 ded 1 C		80 0.78 102 2 /	6 0.78 7 1 No		
Minor Street:	Approach Movement	Wes 7 L	tbound 8 T	9 R	L Ea	stbound 11 T	12 R	
Volume Peak Hour Factor Hourly Flow Rat Percent Heavy V Percent Grade Flared Approach Lanes Configuration	e, HFR Mehicles (%)	11 0.78 14 2 Storage 0	O LR	64 0.78 82 2 No	/	0		/
Approach Movement Lane Config	Delay, Q NB 1	SB		d Leve bound 8 LR	of Serv	Easth	oound .1 1	2
v (vph) C(m) (vph) v/c 95% queue lengt Control Delay LOS Approach Delay Approach LOS	:h	102 1565 0.07 0.21 7.5		96 966 0.10 0.33 9.1 A 9.1				

TWO-WAY STOP CONTROL SUMMARY Analyst: RC Agency/Co.: CTS Date Performed: Analysis Time Period: Weekday PM Peak Intersection: Driscoll Rd & Niven Dr Jurisdiction: Yellowknife Units: U. S. Metric Analysis Year: 2017 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: Niven Drive North/South Street: Driscoll Road Intersection Orientation: NS Study period (hrs): 0.25

Vehic Major Street: Approach Movement		umes and thbound 2			ıthbound 5	1 6
	L	T	R	L	T	R
Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Median Type/Storage RT Channelized?	Undiv	8 0.78 10 ided	27 0.78 34 	112 0.78 143 2	6 0.78 7	
Lanes Configuration Upstream Signal?		1 0 TR No		0 L'	1 I No	
Minor Street: Approach	Wes	stbound		Eas	stbound	
Movement	7 L	8 T	9 R	10 L	11 T	12 R
Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists?/S Lanes Configuration	14 0.78 17 2 storage 0	0 LR	77 0.78 98 2 No	/	0	/

Approach	_Delay, NB	Queue Le		nd Leve tbound	l of	Service	Eastbound	
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		143		115				
C(m) (vph)		1552		930				
v/c		0.09		0.12				
95% queue length		0.30		0.42				
Control Delay		7.6		9.4				
LOS		A		A				
Approach Delay				9.4				
Approach LOS				A				

HCS+. Unsignalized Intersections Release 5

	HCS+: Uns	signalize	d Inter	section	ons Release	5.6		
	TWC	-WAY STO	P CONTE	ROL SUM	MMARY			
Analyst: Agency/Co.: Date Performed Analysis Time Intersection: Jurisdiction: Units: U. S. M Analysis Year: Project ID: 3 East/West Stre North/South St Intersection 0	Period: Week Dris Yell etric 2022 989 - Niven et: Nive reet: Dris	scoll Rd lowknife Puture Lake Pha en Drive scoll Roa	& Niver Base + se V Tr	Site raffic	Impact Stu	-	: 0.25	
Major Street:		cle Volu Nor 1 L	mes and thbound 2 T			thbound 5 T	i 6 R	
Volume Peak-Hour Fact Hourly Flow Ra Percent Heavy Median Type/St RT Channelized Lanes Configuration Upstream Signa	te, HFR Vehicles orage ?	Undivi	8 0.78 10 ded 1 TF		118 0.78 151 2 /	6 0.78 7 		
Minor Street:	Approach Movement	Wes 7 L	tbound 8 T	9 R	Eas	tbound 11 T	12 R	
Volume Peak Hour Fact Hourly Flow Ra Percent Heavy Percent Grade Flared Approac Lanes Configuration	te, HFR Vehicles (%)	15 0.78 19 2 /Storage 0	0 LR	80 0.78 102 2 No	/	0		/
Approach Movement Lane Config	Delay, Ç NB 1	SB		nd Leve bound 8 LR	el of Servi	Easth	oound 11 1	2
v (vph) C(m) (vph) v/c 95% queue leng Control Delay LOS Approach Delay Approach LOS		151 1551 0.10 0.32 7.6 A		121 918 0.13 0.45 9.5 A 9.5 A				

TWO-WAY STOP CONTROL SUMMARY_

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court
Intersection Orientation: EW Study period (h:

Study period (hrs). 0 25

Intersection Orientation: E	N		Sti	ıdy	period	(hrs):	0.25	
Vehic	le Volu	mes and	Adjust	me	nts			
Major Street: Approach	Eas	tbound	-		West	tbound		
Movement	1	2	3		4	5	6	
	L	T	R		L	T	R	
Volume	1	32	1		2	26	0	
Peak-Hour Factor, PHF	0.80	0.80	0.88		0.88	0.88	0.88	
Hourly Flow Rate, HFR	1	39	1		2	29	0	
Percent Heavy Vehicles	1				1			
Median Type/Storage RT Channelized?	Undivi	ded			/			
Lanes	0	1 0			0	1 0)	
Configuration	LT	R			LT	R		
Upstream Signal?		No				No		
Minor Street: Approach	Nor	thbound			Sou	thbound	l	
Movement	7	8	9		10	11	12	
	L	T	R		L	T	R	
Volume	4	0	14		0	0	0	
Peak Hour Factor, PHF	0.88	0.88	0.88		0.88	0.88	0.88	
Hourly Flow Rate, HFR	4	0	15		0	0	0	
Percent Heavy Vehicles	1	1	1		1	1	1	
Percent Grade (%)		0				0		,
Flared Approach: Exists?/S			No	/			No	/
Lanes Configuration	0	1 0 LTR			0	1 C)	

Approach	_Delay, EB	Queue L WB	engt	h, and Leve Northbound			outhboun	ıd
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	2		19			0	
C(m) (vph)	1591	1570		1002				
v/c	0.00	0.00		0.02				
95% queue length	0.00	0.00		0.06				
Control Delay	7.3	7.3		8.7				
LOS	A	A		A				
Approach Delay				8.7				
Approach LOS				A				

HCS+: Unsignalized Intersections Release 5.6

	HCS+: Uns	signalize	ed Inter	sectio	ns Release	5.6	
	TWC	-WAY STO	OP CONTR	ROL SUM	MARY		
Analyst: Agency/Co.: Date Performed: Analysis Time Per Intersection: Jurisdiction: Units: U. S. Metr Analysis Year: Project ID: 3989 East/West Street: North/South Stree Intersection Orie	Ball Yell ic 2017 - Niven Nive t: Ball	antyne (owknife Future Lake Pha n Drive antyne (Ct & Niv Base ase V Tr	ven Dr		dy . (hrs): 0.:	25
Major Street: Ap		cle Volu Eas 1 L	mes and stbound 2 T	Adjus 3 R		tbound 5 6 T R	
Volume Peak-Hour Factor, Hourly Flow Rate, Percent Heavy Veh Median Type/Stora RT Channelized? Lanes Configuration Upstream Signal?	HFR icles	1 0.65 1 2 Undivi	1 (1 0.65 1 	2 0.65 3 2 / 0 LT	39 0 0.65 0.69 60 0 	5
	proach vement	Nor 7 L	thbound 8 T	9 R	Sou 10 L	thbound 11 12 T R	
Volume Peak Hour Factor, Hourly Flow Rate, Percent Heavy Veh Percent Grade (%) Flared Approach: Lanes Configuration	HFR icles	4 0.65 6 2 Storage 0	0 0.65 0 2 0	15 0.65 23 2 No	0 0.65 0 2 /	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5
Approach Movement Lane Config	_Delay, Q EB 1 LTR	WB 4 LTR		nd Leve hbound 8 LTR		ce Southbound 0 11 LTR	d 12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	1 1544 0.00 0.00 7.3 A	3 1472 0.00 0.01 7.5 A		29 898 0.03 0.10 9.1 A 9.1		0	

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour Analysis Time Period: weekday AM PEAK HOUR
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court

Intersection Orientation: EW Study period (hrs): 0.25

Vehic	le Volu	mes and	Adjus	tments			
Major Street: Approach		tbound	_	_	Westbour	nd	
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	6	84	1	2	41	2	
Peak-Hour Factor, PHF	0.65	0.65		0.6			
Hourly Flow Rate, HFR	9	129	1	3	63	3	
Percent Heavy Vehicles	2			2			
Median Type/Storage	Undivi	.ded		/			
RT Channelized?							
Lanes	0	1 0			0 1	0	
Configuration	LT	'R			LTR		
Upstream Signal?		No			No		
Minor Street: Approach		thbound			Southbou		
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume	4	0	15	17	0	20	
Peak Hour Factor, PHF	0.65	0.65	0.65	0.6			
Hourly Flow Rate, HFR	6	0	23	26	0	30	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)		0			0		
Flared Approach: Exists?/S	Storage		No	/		No	/
Lanes	0	1 0			0 1	0	
Configuration		LTR			LTR		

	Delay,	Queue L	ength, and Level of	Service
Approach	EB	WB	Northbound	Southbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	9	3	29	56
C(m) (vph)	1536	1451	857	835
v/c	0.01	0.00	0.03	0.07
95% queue length	0.02	0.01	0.10	0.22
Control Delay	7.4	7.5	9.3	9.6
LOS	A	A	A	A
Approach Delay			9.3	9.6
Approach LOS			A	A

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court
Intersection Orientation: EW Study period (h Study period (hrs): 0.25

Intersection Offentation:			Dea	dy beriod	(111.5)	. 0.23	
		mes and	Adjust		stbound		
			2				
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	6	87	1	2	43	11	
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR	9	133	1	3	66	16	
Percent Heavy Vehicles	2			2			
Median Type/Storage	Undivi	ided		/			
RT Channelized?							
Lanes	0	1 0		0	1	0	
Configuration	L7	ľR		L'	ľR		
Upstream Signal?		No			No		
	N					2	
Minor Street: Approach		thbound			ıthboun		
	7	thbound 8	9	10	ithbound	12	
Minor Street: Approach		thbound			ıthboun		
Minor Street: Approach	7	thbound 8	9	10	ithbound	12	
Minor Street: Approach Movement Volume	7 L	thbound 8 T	9 R	10 L	ithbound 11 T	12 R	
Minor Street: Approach Movement Volume Peak Hour Factor, PHF	7 L 5	o 0 0.65	9 R 17 0.65	10 L 67 0.65	uthbound 11 T 0 0.65	12 R 20 0.65	
Minor Street: Approach Movement Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR	7 L 5 0.65	o 0 0.65	9 R	10 L	11 T 0 0.65	12 R	
Minor Street: Approach Movement Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles	7 L 5 0.65 7	o 0 0.65	9 R 17 0.65 26	10 L 67 0.65 103	uthbound 11 T 0 0.65	12 R 20 0.65 30	
Minor Street: Approach Movement Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%)	7 L 5 0.65 7 2	0 0.65 0 2	9 R 17 0.65 26 2	10 L 67 0.65 103	11 T 0 0.65	12 R 20 0.65 30 2	
Minor Street: Approach Movement Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles	7 L 5 0.65 7 2	0 0.65 0 2	9 R 17 0.65 26 2 No	10 L 67 0.65 103	0 0 0.65 0 2	12 R 20 0.65 30	/
Minor Street: Approach Movement Volume Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists?/	7 L 5 0.65 7 2 Storage	0 0.65 0 2	9 R 17 0.65 26 2 No	10 L 67 0.65 103 2	0 0 0.65 0 2	12 R 20 0.65 30 2	/

Approach	_Delay, 	Queue Le	ength, and Level of Northbound	ServiceSouthbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	9	3	33	133
C(m) (vph)	1515	1446	849	735
v/c	0.01	0.00	0.04	0.18
95% queue length	0.02	0.01	0.12	0.66
Control Delay	7.4	7.5	9.4	11.0
LOS	A	A	A	В
Approach Delay			9.4	11.0
Approach LOS			A	В
White Top			A	В

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour Analysis Time Period: Weekday PM Peak Hour
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court
Intersection Orientation: EW Study period (h

Study period (hrs): 0.25

Ve Major Street: Approach	hicle Vol	umes an stbound		tments	Westboun	a	
				1 4			
Movement	1	2	3	4	5	6	
	L	Т	R	L	T	R	
Volume	1	45	7	11	44	0	
Peak-Hour Factor, PHF	0.64	0.64	0.64	0.6	54 0.64	0.64	
Hourly Flow Rate, HFR	1	70	10	17	68	0	
Percent Heavy Vehicles	1			1			
Median Type/Storage RT Channelized?	Undiv	ided		/			
Lanes	0	1	0		0 1	0	
Configuration	T./	TR	•		LTR	Ü	
Upstream Signal?	_	No			No		
Minor Street: Approach	No	rthboun	d		Southbou	nd	
Movement	7	8	9	1 10	11	12	
	L	T	R	L	T	R	
Volume	2	0	12	1	0	0	
Peak Hour Factor, PHF	0.64	0.64	0.64	0.6	64 0.64	0.64	
Hourly Flow Rate, HFR	3	0	18	1	0	0	
Percent Heavy Vehicles	1	1	1	1	1	1	
Percent Grade (%)		0			0		
Flared Approach: Exists	?/Storage		No	/		No	/
Lanes	0		0	,	0 1	0	•
Configuration	-	LTR			LTR	-	

	Delay,	Queue 1	Length,	and Lev	el of	Service_		
Approach	EB	WB	N	orthboun	d	5	Southbound	d
Movement	1	4	7	8	9	10	11	12
Lane Config	LTR	LTR		LTR			LTR	
v (vph)	1	17		21			1	
C(m) (vph)	1524	1519		935			727	
v/c	0.00	0.01		0.02			0.00	
95% queue length	0.00	0.03		0.07			0.00	
Control Delay	7.4	7.4		8.9			10.0-	
LOS	A	A		A			A	
Approach Delay				8.9			10.0-	
Approach LOS				A			A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court
Intersection Orientation: EW Study period (h

Study period (hrs): 0.25

Major Street:			mes and	l Adjus	tme		t.bound		
major berece.	Movement	1 L	2 T	3 R		4 L	5 T	6 R	
Volume Peak-Hour Fact	or, PHF	1	71 0.78	8		12	71 0.78	0	
Hourly Flow Ra Percent Heavy	te, HFR Vehicles	1 2	91	10		15 2	91	0	
Median Type/St RT Channelized		Undivi				/			
Lanes Configuration		0 LT	1 0 'R)		0 LT	1 R	0	
Upstream Signa	1?		No				No		
Minor Street:	Approach	Nor	thbound	1		Sou	thboun	d	
	Movement	7 L	8 T	9 R		10 L	11 T	12 R	
Volume Peak Hour Fact	or, PHF	2 0.78	0	13 0.78		1	0 0.78	0	
Hourly Flow Ra		2	0	16		1 2	0	0	
Percent Heavy Percent Grade		2	2	2		2	2	2	
Flared Approac Lanes Configuration	h: Exists?/S	torage 0	1 C	No)	/	0	1 LTR	No 0	/

Approach	_Delay, _EB	Queue Le	ngth, and Level of Northbound	ServiceSouthbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	1	15	18	1
C(m) (vph)	1489	1487	911	685
v/c	0.00	0.01	0.02	0.00
95% gueue length	0.00	0.03	0.06	0.00
Control Delay	7.4	7.4	9.0	10.3
LOS	A	A	A	В
Approach Delay			9.0	10.3
Approach LOS			A	В

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour Analysis Time Period: Weekday AM Peak Hour
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court
Intersection Orientation: EW Study period (h

Study period (hrs): 0.25

incersection offencation.	ъ.,		Dec	uuy	periou	(111.0)	. 0.23	'
	icle Volu		Adjust	mei				
Major Street: Approach		tbound				tbound		
Movement	1	2	3		4	5	6	
	L	T	R		L	T	R	
Volume	6	84	1		2	41	2	
Peak-Hour Factor, PHF	0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Rate, HFR	9	129	1		3	63	3	
Percent Heavy Vehicles	2				2			
Median Type/Storage	Undivi	ded			/			
RT Channelized?								
Lanes	0	1 0			0	1	0	
Configuration	LT	"R			LT	R		
Upstream Signal?		No				No		
Minor Street: Approach		thbound			Sou	thbour		
Movement	7	8	9		10	11	12	
	L	T	R		L	T	R	
Volume	4	0	15		17	0	20	
Peak Hour Factor, PHF	0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Rate, HFR	6	0	23		26	0	30	
Percent Heavy Vehicles	2	2	2		2	2	2	
Percent Grade (%)		0				0		
Flared Approach: Exists?	/Storage		No	/			No	/
Lanes	,	1 0	-	,	0	1	0	
Configuration		LTR				T ₁ TR		

	Delay,	Queue L	ength, an	d Level of	Service		
Approach	EB	WB	Nort!	hbound	So	uthbound	
Movement	1	4	7	8 9	10	11	12
Lane Config	LTR	LTR		LTR		LTR	
v (vph)	9	3		29		56	
C(m) (vph)	1536	1451		857		835	
v/c	0.01	0.00		0.03		0.07	
95% queue length	0.02	0.01		0.10		0.22	
Control Delay	7.4	7.5		9.3		9.6	
LOS	A	A		A		A	
Approach Delay				9.3		9.6	
Approach LOS				A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour
Intersection: Ballantyne Ct & Niven Dr
Jurisdiction: Yellowknife

Intersection: Jurisdiction:

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Ballantyne Court
Intersection Orientation: EW Study period (h

Study period (hrs): 0.25

	icle Volu				stbound		
Major Street: Approach		stbound					
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	25	80	8	13	82	40	
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR	32	102	10	16	105	51	
Percent Heavy Vehicles	2	102	10	2	103	31	
	Undiv:			,2			
Median Type/Storage	undiv	Laea		/			
RT Channelized?	_		_			_	
Lanes	0)	0)	
Configuration	L'	ľR		L'	ľR		
Upstream Signal?		No			No		
Minor Street: Approach	No	rthbound	f	Soi	ithbound	f	
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
				'			
Volume	2	0	14	36	0	10	
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR	2	0	17	46	0	12	
Percent Heavy Vehicles	2	2	2	2	2	2	
	2		2	2	0	2	
Percent Grade (%)		0		,	0		,
Flared Approach: Exists?			No	/		No	/
Lanes	0)	0)	
Configuration		LTR			LTR		

Approach	_Delay, EB	Queue Le	ength, and Level of Northbound	ServiceSouthbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	32	16	19	58
C(m) (vph)	1410	1473	873	612
v/c	0.02	0.01	0.02	0.09
95% gueue length	0.07	0.03	0.07	0.31
Control Delay	7.6	7.5	9.2	11.5
LOS	A	A	A	В
Approach Delay			9.2	11.5
Approach LOS			A	В

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed:

Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Ballantyne Court & Lemay Dr
Jurisdiction: Yellowknife

Units: U. S. Metric

Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Lemay Dr WB, Ballantyne Ct SB
North/South Street: Ballantyne Ct NB, Lemay Dr EB

Intersection Orientation: NS Study period (hrs): 0.25

Vehic Major Street: Approach Movement		mes and thbound 2 T		tments		thbour 5 T	nd 6 R	
Volume	3	3	1	0		18	0	
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.	65	0.65	0.65	
Hourly Flow Rate, HFR	4	4	1	0		27	0	
Percent Heavy Vehicles	2			2				
Median Type/Storage RT Channelized?	Undivi	lded		/				
Lanes	0	1 0			0	1	0	
Configuration	LT	"R			LT	R		
Upstream Signal?		No				No		
Minor Street: Approach	Wes	tbound			Eas	tbound	d	
Movement	7	8	9	1 10	1	11	12	
	L	T	R	L		T	R	
Volume	4	0	0	15		0	0	
Peak Hour Factor, PHF	0.65	0.65	0.65		65	0.65	0.65	
Hourly Flow Rate, HFR	6	0	0	23		0	0	
Percent Heavy Vehicles	2	2	2	2		2	2	
Percent Grade (%)		0				0		
Flared Approach: Exists?/S	torage	-	No	/		-	No	/
Lanes	Ö	1 0			0	1	0	•
Configuration		LTR				LTR		

Approach	_Delay,	Queue Le	ength, and Level of Westbound	ServiceEastbound	
Movement Lane Config	1 LTR	4 LTR	7 8 9 LTR	10 11 12 LTR	
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay	4 1587 0.00 0.01 7.3 A	0 1616 0.00 0.00 7.2 A	6 964 0.01 0.02 8.8 A 8.8	23 964 0.02 0.07 8.8 A 8.8	
Approach LOS			A	A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour
Intersection: Ballantyne Court & Lemay Dr
Jurisdiction: Yellowknife

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Lemay Dr WB, Ballantyne Ct SB
North/South Street: Ballantyne Ct NB, Lemay Dr EB
Intersection Orientation: NS Study period (hrs): 0.25

intersection Orientation: N			Dec	uy	periou	(111.5)	: 0.25	
		mes and		me				
Major Street: Approach	Nor	thbound			Sou	thboun	d	
Movement	1	2	3		4	5	6	
	L	T	R		L	T	R	
Volume	3	12	1		0	68	0	
Peak-Hour Factor, PHF	0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Rate, HFR	4	18	1		0	104	0	
Percent Heavy Vehicles	2				2			
Median Type/Storage RT Channelized?	Undivi	ded			/			
Lanes	0	1 0			0	1	0	
Configuration	LT	R			LT	R		
Upstream Signal?		No				No		
Minor Street: Approach	Wes	tbound			Eas	tbound		
Movement	7	8	9		10	11	12	
	L	T	R		L	T	R	
Volume	4	0	0		15	0	0	
Peak Hour Factor, PHF	0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Rate, HFR	6	0	0		23	0	0	
Percent Heavy Vehicles	2	2	2		2	2	2	
Percent Grade (%)		0				0		
Flared Approach: Exists?/S	torage		No	/			No	/
		1 0		,	0	1	0	,
Lanes	0							

Approach	_Delay, NB	Queue Le	ength, and Level of Westbound	ServiceEastbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	4	0	6	23
C(m) (vph)	1488	1597	841	841
v/c	0.00	0.00	0.01	0.03
95% gueue length	0.01	0.00	0.02	0.08
Control Delay	7.4	7.3	9.3	9.4
LOS	A	A	A	A
Approach Delay			9.3	9.4
Approach LOS			A	A

TWO-WAY STOP CONTROL SUMMARY_

Analyst: RC
Agency/Co.: CTS
Date Performed: CTS
Date Performed: Weekday PM Peak Hour
Intersection: Ballantyne Court & Lemay Dr
Yellowknife Analysis Time Period: Weekday PM Peak Hour
Intersection: Ballantyne Court & Lemay Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Lemay Dr WB, Ballantyne Ct SB
North/South Street: Ballantyne Ct NB, Lemay Dr EB
Intersection Orientation: NS Study period (hrs): 0.25

Veh	icle Volu	ımes and	Adjus	tments			
Major Street: Approach		thbound			thboun	d	
Movement	1	2	3	4	5	6	
	L	T	R	L	т	R	
Volume	16	14	3	0	8	0	
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR	20	17	3	0	10	0	
Percent Heavy Vehicles	2			2			
Median Type/Storage	Undivi	ded		/			
RT Channelized?							
Lanes	0	1 0		0	1	0	
Configuration	LT	"R		L	ľR		
Upstream Signal?		No			No		
Minor Street: Approach	Wes	tbound		Eas	stbound		
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
				'			
Volume	2	0	0	7	0	0	
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR	2	0	0	8	0	0	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)		0			0		
Flared Approach: Exists?	/Storage		No	/		No	/
Lanes	Ö	1 0		0	1	0	
Configuration		LTR			LTR		

	Delay,	Queue Le	ength, and Level	of Service	
Approach	NB	SB	Westbound	Ea	astbound
Movement	1	4	7 8 9	10	11 12
Lane Config	LTR	LTR	LTR		LTR
v (vph)	20	0	2		8
C(m) (vph)	1610	1596	916		916
v/c	0.01	0.00	0.00		0.01
95% queue length	0.04	0.00	0.01		0.03
Control Delay	7.3	7.3	8.9		9.0
LOS	A	A	A		A
Approach Delay			8.9		9.0
Approach LOS			A		A

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
Agency/Co.: CTS
Date Performed: Weekday PM Peak Hour
Analysis Time Period: Weekday PM Peak Hour
Tutersection: Ballantyne Court & Lemay Dr
Yellowknife

		nicle Volu						
Major Street:	Approach Movement		thbound			uthboun	-	
	Movement	1 L	2 T	3 R	L L	5 T	6 R	
Volume		16	45	3	0	36	0	
Peak-Hour Facto	or, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rat		20	57	3	0	46	0	
Percent Heavy V	/ehicles	2			2			
Median Type/Sto	orage	Undivi	.ded		/			
RT Channelized?	?							
Lanes		0	1 ()	0	1	0	
Configuration		L7	TR.		L'	ΓR		
Upstream Signal	L?		No			No		
Minor Street:	Approach	Wes	tbound		Ea	stbound		
	Movement.	7	8	9	1 10	11	12	
		L	T	R	L	T	R	
Volume		2	0	0	7	0	0	
Peak Hour Facto		0.78		0.78	0.78	0.78	0.78	
Hourly Flow Rat		2	0	0	8	0	0	
Percent Heavy V		2	2	2	2	2	2	
Percent Grade			0		,	0		,
Flared Approach	n: Exists			No	/		No	/
Lanes Configuration		0	1 ()	0		0	
			LTR			T.TR		

Approach	_Delay, NB	Queue Le	ength, and Level of Westbound	ServiceEastbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	20	0	2	8
C(m) (vph)	1562	1544	817	817
v/c	0.01	0.00	0.00	0.01
95% queue length	0.04	0.00	0.01	0.03
Control Delay	7.3	7.3	9.4	9.4
LOS	A	A	A	A
Approach Delay			9.4	9.4
Approach LOS			A	A

TWO-WAY STOP CONTROL SUMMARY Analyst: Agency/Co.: CTS Date Performed: Analysis Time Period: Weekday AM Peak Hour Intersection: 49th Ave & Niven Dr/43rd St Jurisdiction: Yellowknife Units: U. S. Metric 2012 Base Analysis Year: 2012 Base Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: Niven Drive / 43rd Street North/South Street: 49th Avenue Study period (hrs): 0.25 Intersection Orientation: EW Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Movement 2 Volume 100 Peak-Hour Factor, PHF 0.79 0.79 Hourly Flow Rate, HFR 126 41 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? Lanes Configuration Upstream Signal? No No Minor Street: Approach Northbound Movement 8 10 11 Τ. R Volume Peak Hour Factor, PHF 0 79 Hourly Flow Rate, HFR Percent Heavy Vehicles 2.6 Percent Grade (%) Flared Approach: Exists?/Storage Lanes Configuration Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound 10 Movement. 4 8 11 12 Lane Config v (vph) 26 921 C(m) (vph) v/c 0.03 95% queue length 0.09 Control Delay 9.0 LOS Α Approach Delay 9.0 Approach LOS HCS+: Unsignalized Intersections Release 5.6 TWO-WAY STOP CONTROL SUMMARY Analyst: RC Agency/Co.: CTS Date Performed: Analysis Time Period: Weekday AM Peak Hour Thtersection: 49th Ave & Niven Dr/43rd St

Jurisdiction:

Units: U. S. Metric

Yellowknife

East/West Street: Niven Drive / 43rd Street 49th Avenue North/South Street: Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street: Approach Westhound Eastbound Movement. 2 L Volume 148 Peak-Hour Factor, PHF 0.65 0.65 Hourly Flow Rate, HFR 227 70 Percent Heavy Vehicles Median Type/Storage Undivided RT Channelized? Lanes Configuration Upstream Signal? No No Minor Street: Approach Northbound Southbound 10 Movement 11 Volume Peak Hour Factor, PHF 0.65 Hourly Flow Rate, HFR 35 Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists?/Storage Lanes Configuration Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound Movement 11 Lane Config v (vph) 35 C(m) (vph) 807 0.04 95% queue length 0.14 Control Delay 9.7 LOS Approach Delay Approach LOS HCS+: Unsignalized Intersections Release 5.6 TWO-WAY STOP CONTROL SUMMARY Analyst: Agency/Co.: Date Performed: Analysis Time Period: Weekday AM Peak Hour Intersection: 49th Ave & Niven Dr/43rd St Yellowknife Jurisdiction: Units: U. S. Metric Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive / 43rd Street
North/South Street: 49th Avenue Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street: Approach Westbound Eastbound Movement Volume 176 50

0.65

0.65

2017 Future Base

Project ID: 3989 - Niven Lake Phase V Traffic Impact Study

Analysis Year:

Peak-Hour Factor, PHF

Hourly Flow Rat Percent Heavy V Median Type/Sto RT Channelized?	ehicles	Undiv	270 ided		/	76 		
Lanes			1			1		
Configuration			T			T		
Upstream Signal	?		No			No		
	Approach		rthbound			uthbour		
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume Peak Hour Facto	~ DUE	, , , , , , , , , , , , , , , , , , , ,		23				
Hourly Flow Rat				35				
Percent Heavy V				2				
Percent Grade (-1	-		0		
Flared Approach		Storage			/	•		/
Lanes	,			1	,			,
Configuration			R					
				1 -				
7					l of Serv		. 1-1 2	
Approach Movement	EB 1	WB 4	7	thbound 8		10	hbound 11	12
Lane Config	1	4	,	0	R	10	TI	12
Lane Coning		- 1			1			
v (vph)					35			
C(m) (vph)					765			
v/c					0.05			
95% queue lengt	h				0.14			
Control Delay					9.9			
LOS				0 0	A			
Approach Delay				9.9				
Approach LOS				A				

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	TWO	-WAY S	STOP CON	TROL SU	MMARY			
Analyst:	RC							
Agency/Co.:	CTS							
Date Performed:								
Analysis Time F		dav AN	1 Peak H	our				
Intersection:	4911	ı Ave 8	Niven	Dr/43rd	St			
Jurisdiction:		Lowknif		D1, 151G	00			
Units: U. S. Me								
Analysis Year:		Futur	e Base	+ Site				
Project ID: 39					Tmnact 9	Study.		
East/West Stree			re / 43r			, caa,		
North/South Str		n Avenu		a beree	_			
Intersection Or			ie	0	tudy peri	od (hra)	. 0 25	
Incersection of	Tencacion.	EW			cuay peri	.ou (III.S)	. 0.23	
			lumes a					
	Approach		lastboun			Vestbound		
	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume			236			63		
	n DIIE		0.65			0.65		
Peak-Hour Facto								
Hourly Flow Rat			363			96		
Percent Heavy V		TT 3.5			,			
Median Type/Sto		Undi	.vided		/			
RT Channelized?								
Lanes			1			1		
Configuration			T			T		
Upstream Signal	.?		No			No		
Minor Street:	Approach	1	Jorthbou	nd		Southbour	d	-
	Movement	7	8	9	1 10	11	12	
		L	T	R	L	T	R	
Volume	D.110			56				
Peak Hour Facto				0.65				
Hourly Flow Rat				86				
Percent Heavy V				2				
Percent Grade (-1			0		
Flared Approach	: Exists?/	/Storag	je		/		/	
Lanes				1				
Configuration				R				
					el of Ser			
Approach	EB	WB		rthboun			hbound	
Movement	1	4	7	8	9	10	11 12	
Lane Config					R			
								_
v (vph)					86			
					681			
C(m) (vph)					0.13			
v/c					0.43			
v/c 95% queue lengt	h							
v/c	:h				11.0			
v/c 95% queue lengt	h				11.0 B			
v/c 95% queue lengt Control Delay LOS	h			11.0				
v/c 95% queue lengt Control Delay	h			11.0 B				

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: CTS Date Performed: Analysis Time Period: Weekday PM Peak Hour
Intersection: 49th Ave & Niven Dr/43rd St
Jurisdiction: Yellowknife Units: U. S. Metric Analysis Year: 2012 Base Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: Niven Drive / 43rd Street North/South Street: 49th Avenue

Intersection Orientation: EW Study period (hrs): 0.25

	Vehic	cle Vo	Lumes an	d Adius	tments			
Major Street:			stbound			estbound	3	
,	Movement	1	2	3	4	5	- 6	
	110 1 0 1110110	T.	Ť	R	T.	Ť	R	
					. –			
Volume			68			47		
Peak-Hour Fact	or, PHF		0.85			0.85		
Hourly Flow Ra	te, HFR		79			55		
Percent Heavy	Vehicles							
Median Type/St		Undiv	rided		/			
RT Channelized								
Lanes			1			1		
Configuration			T			T		
Upstream Signa	1?		No			No		
Minor Street:	Approach	M	orthboun	d		outhbour	24	
MINOI SCIECC.	Movement.	7	8	9	1 10	11	12	
	Movement	T.	T	R	T.	T	R	
		ш	1	I.	1 1	1	I.	
Volume				61				
Peak Hour Fact	or. PHF			0.85				
Hourly Flow Ra				71				
Percent Heavy				0				
Percent Grade			-1			0		
Flared Approac		Storage			/	-		/
Lanes				1	,			,
Configuration			R					

Approach	_Delay, EB	Queue WB	Lengt	h, and Lev Northbour			Southbou	nd
Movement	1	4	7	8	9	10	11	12
Lane Config			1		R			
v (vph)					71			
C(m) (vph)					949			
v/c					0.07	7		
95% queue length					0.24	Į.		
Control Delay					9.1			
LOS					A			
Approach Delay				9.1				
Approach LOS				A				

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TWO-WAY STOP CONTROL SUMMARY Analyst: Agency/Co.: CTS Date Performed: Date Performed: Analysis Time Period: Weekday PM Peak Hour Intersection: 49th Ave & Niven Dr/43rd St Jurisdiction: Yellowknife Units: U. S. Metric Units: U. S. Metric Analysis Year: 2017 Future Base Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: Niven Drive / 43rd Street North/South Street: 49th Avenue Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Volume Peak-Hour Factor, PHF 0.78 0.78 Hourly Flow Rate, HFR 123 96 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided Configuration T No т Upstream Signal? No Minor Street: Approach Northbound Southbound 11 L Т Volume Peak Hour Factor, PHF 0.78 Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists?/Storage 85 Configuration Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound 10 12 Movement 1 4 11 Lane Config v (vph) C(m) (vph) v/c 95% queue length 893

Control Delay

Approach Delay

Approach LOS

LOS

0.10 0.31

9.5

Α

9.5

Α

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: CTS Date Performed: Date Performed: Analysis Time Period: Weekday PM Peak Hour Intersection: 49th Ave & Niven Dr/43rd St Jurisdiction: Yellowknife Units: U. S. Metric Onlts: U. S. Metric Analysis Year: 2017 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: Niven Drive / 43rd Street North/South Street: 49th Avenue Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Volume Peak-Hour Factor, PHF 0.78 0.78 Hourly Flow Rate, HFR 138 115 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided Configuration Т Upstream Signal? No No Minor Street: Approach Northbound Southbound 11 т. Volume 0.78 Peak Hour Factor, PHF Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) 85 -1 Flared Approach: Exists?/Storage Configuration Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound 10 Movement 4 8 11 12 Lane Config v (vph) C(m) (vph) 876 v/c 0.10 95% queue length 0.32 Control Delay 9.6

Α

9.6

LOS

Approach Delay

Approach LOS

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TWO-WAY STOP CONTROL SUMMARY Analyst: Agency/Co.: CTS Date Performed: Analysis Time Period: Weekday PM Peak Hour Intersection: 49th Ave & Niven Dr/43rd St Jurisdiction: Yellowknife Units: U. S. Metric 2022 Future Base + Site Niven Lake Phase V Traffic Impact Study Analysis Year: Project ID: 3989 -East/West Street: Niven Drive / 43rd Street North/South Street: 49th Avenue Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street: Approach Eastbound Westbound Volume Peak-Hour Factor, PHF 0.78 0.78 Hourly Flow Rate, HFR 183 160 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided Configuration Т т Upstream Signal? No No Minor Street: Approach Northbound Southbound 11 т. Volume Peak Hour Factor, PHF 0.78 Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) 105 Flared Approach: Exists?/Storage Lanes Configuration Delay, Queue Length, and Level of Service Approach EB WB Northbound Southbound 12 10 Movement 1 4 11 Lane Config v (vph) C(m) (vph) 828 v/c 0.13 95% queue length 0.43 Control Delay 10.0-

Α

10.0-

Α

LOS

Approach Delay

Approach LOS

TWO-WAY STOP CONTROL SUMMARY_

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Franklin Ave & 43rd St
Juriadiction: Yellowknife

Lanes Configuration

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: 43rd Street
North/South Street: Franklin Avenue
Intersection Orientation: NS Study period (h

Study period (hrs). 0 25

Intersection C	rientation:	NS		S	tudy peri	od (hrs)	: 0.25	
	Vehi	cle Vol	umes and	Adju	stments			
Major Street:	Approach	No:	rthbound	-	S	outhboun	d	
•	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume		25	134			221	9	
Peak-Hour Fact	or, PHF	0.76	0.76			0.76	0.76	
Hourly Flow Ra	te, HFR	32	176			290	11	
Percent Heavy	Vehicles	0						
Median Type/St RT Channelized		Undiv	ided		/			
Lanes		0	1			1	0	
Configuration		L'				T	R	
Upstream Signa	1?		No			No		
Minor Street:	Approach	We	stbound		Eastbound			
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume					23		86	
Peak Hour Fact	or, PHF				0.76		0.76	
Hourly Flow Ra	te, HFR				30		113	
Percent Heavy	Vehicles				0		0	
Percent Grade	(%)		0			0		
Flared Approac	h: Exists?/	Storage			/		No /	
Tanaa		_						

Approach	_Delay,	Queue SB		, and Le			stbound	[
Movement Lane Config	1 LT	4	7	8	9	10	11 LR	12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	32 1233 0.03 0.08 8.0 A						143 649 0.22 0.84 12.1 B	

HCS+: Unsignalized Intersections Release 5.6

	HCS+: Unsi	gnalized	lInters	ections	Release	5.6		
	TWO-	WAY STOR	CONTRO	L SUMMAR	YY			
Analyst: Agency/Co.: Date Performed: Analysis Time Per Intersection: Jurisdiction: Units: U. S. Metr Analysis Year: Project ID: 3989 East/West Street North/South Street Intersection Orice	Frank Yello ric 2017 9 - Niven L 43rd et: Frank	lin Ave wknife Future E ake Phas Street lin Aver	& 43rd Base Se V Tra	St ffic Imp	act Stud	-	0.25	
Major Street: Ap			hbound 2	Adjustme 3 R			6 R	
Volume Peak-Hour Factor, Hourly Flow Rate, Percent Heavy Vel Median Type/Stora RT Channelized? Lanes Configuration Upstream Signal?	, HFR nicles	35 0.65 53 2 Undivid	147 0.65 226 led 1		/	0.65 373	13 0.65 20 	
	pproach ovement	West 7 L		9 R	East 10 L		12 R	
Volume Peak Hour Factor, Hourly Flow Rate, Percent Heavy Vel Percent Grade (%) Flared Approach: Lanes Configuration	, HFR nicles	torage	0	/	33 0.65 50 2		125 0.65 192 2	/
Approach Movement Lane Config		eue Leng SB 4 7	Westb	ound	of Service 10	Eastbo		12
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	53 1131 0.05 0.15 8.3 A					24 55 0. 2. 16 C	1 44 22 .6	

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday AM Peak Hour Franklin Ave & 43rd St Yellowknife Intersection: Jurisdiction: Units: U. S. Metric

Analysis Year: 2017 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study

East/West Street: North/South Street: 43rd Street Franklin Avenue

Intersection Orientation: NS Study period (hrs): 0.25

	Vehi	cle Vol	ımes and	l Adju	stments			
Major Street:	Approach	No	rthbound	1	S	outhboun	d	
	Movement	1	2	3	4	5	6	
		T ₁	T	R	L	T	R	
		-	-		1 2	-		
Volume		38	147			243	14	
Peak-Hour Fact	or, PHF	0.65	0.65			0.65	0.65	
Hourly Flow Ra		58	226			373	21	
Percent Heavy		2						
Median Type/St		Undiv	i ded		/			
RT Channelized		Olida V	Lucu		,			
Lanes		0	1			1	0	
Configuration		1.7	г _			- т	R	
Upstream Signa	11?		No			No		
Minor Street:			stbound			astbound		
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume					3.9		147	
Peak Hour Fact	or. PHF				0.65		0.65	
Hourly Flow Ra					60		226	
Percent Heavy					2		2	
Percent Grade			0		2	0	2	
Flared Approac		Ctomoro	U		,	U	No	,
	m: Exists:/	scorage			/		NO N	/
Lanes					0		U	
Configuration						LR		

Approach	_Delay, NB	Queue SB	Len		and Leve		Service	Eastbound	
Movement	1	4	1 '	7	8	9	10	11	12
Lane Config	LT							LR	
v (vph)	58							286	
C(m) (vph)	1130							546	
v/c	0.05							0.52	
95% queue length	0.16							3.02	
Control Delay	8.4							18.6	
LOS	A							C	
Approach Delay								18.6	
Approach LOS								C	

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TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday AM Peak Hour Intersection: Franklin Ave & 43rd St Jurisdiction: Yellowknife Units: U. S. Metric Analysis Year: Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: North/South Street: 43rd Street Franklin Avenue Intersection Orientation: NS Study period (hrs): 0.25 _Vehicle Volumes and Adjustments_ ch Northbound Major Street: Approach Movement Southbound 5 T Volume Peak-Hour Factor, PHF Hourly Flow Rate, HFR 175 0.65 49 319 0.65 0.65 0.65 75 269 490 26 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided Lanes 1 1 Configuration LT TR Upstream Signal? No No Minor Street: Approach Westbound Eastbound 10 11 Movement L R Volume 53 225 Peak Hour Factor, PHF 0.65 0.65 Hourly Flow Rate, HFR 81 346 Percent Heavy Vehicles
Percent Grade (%)
Flared Approach: Exists?/Storage 2 No Lanes 0 Configuration LR

Approach	_Delay, NB	Queue SB	Lengt	h, and Le Westbound			stbound	
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	75						427	
C(m) (vph)	1018						455	
v/c	0.07						0.94	
95% gueue length	0.24						11.02	
Control Delay	8.8						58.5	
LOS	A						F	
Approach Delay							58.5	
Approach LOS							F	

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Intersection: Franklin Ave & 43rd St Jurisdiction: Yellowknife Analysis Time Period: Weekday PM Peak Hour
Intersection: Franklin Ave & 43rd St
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2012 Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: 43rd Street
North/South Street: Franklin Avenue
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

Vel	icle Vol	umes and	l Adiu	stments			
Major Street: Approach		rthbound			outhboun	d	
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
				'			
Volume	63	242			223	10	
Peak-Hour Factor, PHF	0.92	0.92			0.92	0.92	
Hourly Flow Rate, HFR	68	263			242	1.0	
Percent Heavy Vehicles	0						
Median Type/Storage	Undiv	ided		/			
RT Channelized?				,			
Lanes	0	1			1	0	
Configuration	T.				- т		
Upstream Signal?		No			No		
Minor Street: Approach	We	stbound		Ea	stbound		
Movement	7	8	9	1 10	11	12	
	L	T	R	L	T	R	
				1			
Volume				28		49	
Peak Hour Factor, PHF				0.92		0.92	
Hourly Flow Rate, HFR				3.0		53	
Percent Heavy Vehicles				0		0	
Percent Grade (%)		0		Ü	0	Ü	
Flared Approach: Exists?	/Storage	-		/	-	No	/
Lanes	,			′ 0		0	,
Configuration				· ·	T ₁ R	-	
							

Approach	_Delay, NB	Queue SB	Leng	th, and Westh	of	ServiceEastbound
Movement	1	4	7	8	9	10 11 12
Lane Config	LT		ı			LR
v (vph)	68					83
C(m) (vph)	1281					570
v/c	0.05					0.15
95% queue length	0.17					0.51
Control Delay	8.0					12.4
LOS	A					В
Approach Delay						12.4
Approach LOS						В

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TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Intersection: Franklin Ave & 43rd St Jurisdiction: Yellowknife Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: 43rd Street
North/South Street: Franklin Avenue
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

							,	
	Vehi	icle Vol	umes and	d Adju	stments	3		
Major Street:	Approach	No	rthbound	d -		Southbou	nd	
-	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume		89	266			245	14	
Peak-Hour Fact	or, PHF	0.78	0.78			0.78	0.78	}
Hourly Flow Ra	te, HFR	114	341			314	17	
Percent Heavy	Vehicles	2						
Median Type/St RT Channelized	Undiv	ided		/				
Lanes		0	1			1	0	
Configuration	L'	T				TR		
Jpstream Signal?			No			No		
Minor Street:	Approach	We	stbound			Eastboun	d	
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume					3.9		67	
Peak Hour Fact						78	0.78	}
Hourly Flow Ra					50)	85	
Percent Heavy					2		2	
Percent Grade			0			0		
Flared Approac	h: Exists?/	/Storage			/		No	/
Lanes						0	0	
Configuration						LR		

Approach	_Delay,	Queue SB		, and Leve Westbound	el of		stbound	
Movement	1	4	7	8	9	10	11	12
Lane Config	LT						LR	
v (vph)	114						135	
C(m) (vph)	1188						434	
v/c	0.10						0.31	
95% gueue length	0.32						1.31	
Control Delay	8.4						17.0	
LOS	A						C	
Approach Delay							17.0	
Approach LOS							C	

TWO-WAY STOP CONTROL SUMMARY_

Analyst: KC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday PM Peak Hour
Intersection: Franklin Ave & 43rd St
Yellowknife

Rase + Sit Analysis Time Period: Weekday PM Peak Hour
Intersection: Franklin Ave & 43rd St
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: 43rd Street
North/South Street: Franklin Avenue
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

	Vehi	cle Volu	ımes and	l Adju	stments			
Major Street:	Approach	No	rthbound	1	So	uthboun	.d	
•	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume		102	226			245	16	
Peak-Hour Fact	or, PHF	0.78	0.78			0.78	0.78	
Hourly Flow Ra	te, HFR	130	289			314	20	
Percent Heavy	Vehicles	2						
Median Type/St		Undiv	ided		/			
RT Channelized	1?							
Lanes		0	1			1	0	
Configuration		L?	r			Т	'R	
Upstream Signa	1?		No			No		
Minor Street:	Approach	Wes	stbound		Ea	stbound		
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume					43		75	
Peak Hour Fact	or, PHF				0.78		0.78	
Hourly Flow Ra	te, HFR				55		96	
Percent Heavy					2		2	
Percent Grade			0			0		
Flared Approac	h: Exists?/	Storage			/		No	/
Lanes		. 5 .			, 0		0	
Configuration						LR		

Approach	_Delay, NB	Queue Le		and Levestbound		Service Eastbound
Movement	1	4	7	8	9	10 11 12
Lane Config	LT					LR
v (vph)	130					151
C(m) (vph)	1185					439
v/c	0.11					0.34
95% queue length	0.37					1.51
Control Delay	8.4					17.4
LOS	A					C
Approach Delay						17.4
Approach LOS						C

HCS+: Unsignalized Intersections Release 5.6

H	CS+: Unsig TWO-	malized WAY STO				se 5.6		
Analyst: Agency/Co: Date Performed: Analysis Time Per Intersection: Jurisdiction: Units: U. S. Metr Analysis Year: Project ID: 3983 East/West Street: North/South Stree Intersection Orie	RC CTS Frank Yello ic 2022 - Niven I 43rd t: Frank	lay PM P llin Ave wknife Future ake Pha Street llin Ave	eak Hou & 43rd Base + se V Tr	r St Site	Impact	Study	: 0.25	
	Vehic proach vement	le Volu Nor 1 L	mes and thbound 2 T		tments_	Southbour 5 T	nd 6 R	
Volume Peak-Hour Factor, Hourly Flow Rate, Percent Heavy Veh Median Type/Stora RT Channelized? Lanes Configuration Upstream Signal?	HFR icles	147 0.78 188 2 Undivi 0 LT	1		/	299 0.78 383 1 No	21 0.78 26 	
	proach vement	Wes 7 L	tbound 8 T	9 R	10 L	Eastbound 11 T	12 R	
Volume Peak Hour Factor, Hourly Flow Rate, Percent Heavy Veh Percent Grade (%) Flared Approach: Lanes Configuration	HFR icles	Storage	0		56 0.7 71 2	0 0 LR	107 0.78 137 2 No /	
Approach Movement Lane Config	_Delay, Qu NB 1 LT	SB	West	d Leve bound 8	of Se		bound 11 12 LR	
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	188 1111 0.17 0.61 8.9 A						208 322 0.65 4.22 34.5 D	

HCS+: Unsignalized Intersections Release 5.6

	2.5						
Analyst: Agency/Co.:	RC CTS						
Mate Performed:							
Analysis Time P		lav AM	Peak Ho	ır			
Intersection:			te Acce		iven Dr		
Jurisdiction:		wknife					
Units: U. S. Me	tric						
Analysis Year:	2017	Future	Base +	Site			
Project ID: 39				raffic	Impact S	tudy	
East/West Stree		Drive					
North/South Str			te Acce			2 (2)	
Intersection Or	rientation: E	SW		S	tudy peri	od (nrs):	0.25
	Vehic	le Vol	umes and	d Adju	stments		
	Approach		stbound			estbound	
	Movement	1	2	3	4	5	6
		L	T	R	L	T	R
Volume		3	42			53	2
Peak-Hour Facto	or, PHF	0.65	0.65			0.65	0.65
Hourly Flow Rat		4	64			81	3
Percent Heavy V		2					
Median Type/Sto RT Channelized?	rage	Undiv	ided		/		
ki chamerizeur Lanes		0	1			1 ()
Configuration		L				TI	-
Upstream Signal	.?		No			No	•
Minor Street:	Approach	No	rthbound	4	s	outhbound	3
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume					11		13
Peak Hour Facto	r PHF				0.65		0.65
Hourly Flow Rat					16		20
Percent Heavy V					2		2
Percent Grade (0		_	0	
Flared Approach	: Exists?/S	Storage			/		No /
Lanes		_			0)
Configuration						LR	
Approach	Delay, Qu EB	ieue Le: WB		nd Lev thboun	el of Ser		nbound
Movement	1	4	7	8	9		L1 12
Lane Config	LT	-		-	_		LR IZ
v (vph)	4						36
C(m) (vph)	1513						909
v/c	0.00						0.04
95% queue lengt							0.12
Control Delay	7.4					9	9.1
LOS	A						A
						9	9.1
Approach Delay Approach LOS							A

nc	.s+: unsign	nalized	1 Inters	section	s kelease	5.6		
	TWO-WA	AY STO	CONTRO	OL SUMM	ARY			
Analyst: Agency/Co.: Date Performed: Analysis Time Peric Intersection: Jurisdiction: Units: U. S. Metric Analysis Year: Project ID: 3989 - East/West Street: North/South Street: Intersection Orient	Parcel Yellowh 2022 Fu Niven Lah Niven I Parcel	A Site knife uture H ke Phas Drive	e Access Base + S	s & Niv Site affic I		-	0.25	
	Vehicle	e Volum	mes and	Adjust	ments			
		East 1 L	bound 2 T	3 R	Wes	tbound 5 T	6 R	
Volume Peak-Hour Factor, F Hourly Flow Rate, E Percent Heavy Vehic Median Type/Storage RT Channelized? Lanes Configuration Upstream Signal?	PHF (FR 4)	3 0.65 4 2 Undivid	46 0.65 70 ded 1		/	56 0.65 86 1 0 TR	0.65	
		Nort 7 L	hbound 8 T	9 R	Sou 10 L	thbound 11 T	12 R	
Volume Peak Hour Factor, F Hourly Flow Rate, F Percent Heavy Vehic Percent Grade (%) Flared Approach: F Lanes Configuration	IFR :les	orage	0		11 0.65 16 2 /	0 0 LR	13 0.65 20 2	/
Approach Movement Lane Config	Delay, Quei EB WE 1 4 LT		North	d Level nbound		ce South	1 1	2
v (vph) C(m) (vph) v/c 95% queue length Control Delay LOS Approach Delay Approach LOS	4 1506 0.00 0.01 7.4 A					0 0 9	6 98 .04 .13 .2 A .2	

TWO-WAY STOP CONTROL SUMMARY_

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour
Intersection: Parcel A Site Access & Niven Dr
Jurisdiction: Yellowknife Intersection:
Jurisdiction:
Units: U. S. Metric

Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Parcel A Site Access

Intersection Orientation: EW Study period (hrs): 0.25

incorporation o	richederon.			-	ocaa, perre	u (1111)	. 0.25	
					istments			
Major Street:	Approach	Eas	stbound		We	stbound		
	Movement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume		17	103			84	6	
Peak-Hour Fact	or, PHF	0.78	0.78			0.78	0.78	
Hourly Flow Ra	te, HFR	21	132			107	7	
Percent Heavy	Vehicles	2						
Median Type/St RT Channelized	orage	Undiv	ided		/			
Lanes		0	1			1	0	
Configuration		L'	Г			T	R	
Upstream Signa	1?		No			No		
Minor Street:	Approach	No	rthbound	d	So	uthboun	d	
	Movement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume					5		6	
Peak Hour Fact					0.78		0.78	
Hourly Flow Ra	te, HFR				6		7	
Percent Heavy	Vehicles				2		2	
Percent Grade			0			0		
Flared Approac	h: Exists?/	'Storage			/		No	/
Lanes					0		0	
Configuration						LR		

Approach	_Delay, _EB	Queue WB	Len		and Lev		ServiceSouthbound
Movement	1	4		7	8	9	10 11 12
Lane Config	LT						LR
v (vph)	21						13
C(m) (vph)	1475						810
v/c	0.01						0.02
95% queue length	0.04						0.05
Control Delay	7.5						9.5
LOS	A						A
Approach Delay							9.5
Approach LOS							A

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour
Intersection: Parcel A Site Access & Niven Dr
Jurisdiction: Yellowknife

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Niven Drive
North/South Street: Parcel A Site Access
Intersection Orientation: EW Study period (h Study period (hrs): 0.25

	Vehic	le Volu	ımes and	Adjus	tme	nts			
Major Street:	Approach	Eas	tbound	-		Wes	tbound		
3	Movement	1	2	3	- [4	5	6	
		L	T	R		L	T	R	
Volume		17	109				88	6	
Peak-Hour Fact	ow DIE	0.78	0.78				0.78	0.78	
		21					112	7	
Hourly Flow Ra		21	139				112	/	
Percent Heavy		-				,			
Median Type/St		Undivi	aea			/			
RT Channelized	1?	_	_					_	
Lanes		0	1					0	
Configuration		LI					-	R	
Upstream Signa	1?		No				No		
Minor Street:	Approach	Nor	thbound			Sou	thboun	d	
	Movement	7	8	9	- [10	11	12	
		L	T	R		L	T	R	
Volume						5		6	
Peak Hour Fact	or PHF					0.78		0.78	
Hourly Flow Ra						6		7	
Percent Heavy						2		2	
Percent Grade			0			2	0	2	
Flared Approac		+ 0 20 0 00	U		,		U	No	/
Lanes	m. DAISUS:/S	corage			/	0		0	/
						U	T ₁ R	U	
Configuration							ПK		

Approach	_Delay, EB	Queue WB	Leng		Level	. of	ServiceSo	uthbound	
Movement	1	4	1 '	7 8		9	10	11	12
Lane Config	LT							LR	
v (vph)	21							13	
C(m) (vph)	1469							800	
v/c	0.01							0.02	
95% gueue length	0.04							0.05	
Control Delay	7.5							9.6	
LOS	A							A	
Approach Delay								9.6	
Approach LOS								A	

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
Agency/Co.: CTS
Date Performed: CTS
Analysis Time Period: Weekday AM Peak Hour
Analysis Time Period: Weekday AM Peak Hour
Variable B, C Access on Lemay Dr
Vallowknife

Jurisdiction: Units: U. S. Metric Analysis Year:

Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study

Project 10: 3767 - Nivem Back Finance v Haillo Impact Study
East/West Street: Lemay Drive
North/South Street: Parcel B, C Site Access
Intersection Orientation: EW Study period (hrs): 0.25

Vehic	le Volu	mes and	Adjust	tments			
Major Street: Approach	Eas	tbound		Wes	tbound		
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	0	9	0	1	2	0	
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR	0	13	0	1	3	0	
Percent Heavy Vehicles	2			2			
Median Type/Storage RT Channelized?	Undivi	ded		/			
Lanes	0	1 0		0	1	0	
Configuration	LT	'R		LT	'R		
Upstream Signal?		No			No		
Minor Street: Approach	Nor	thbound		Sou	thboun	ıd	
Movement	7	8	9	10	11	12	
	L	T	R	L	Т	R	
Volume	0	0	6	3	0	0	
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR	0	0	9	4	0	0	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)		0			0		
Flared Approach: Exists?/S	torage		No	/		No	/
Lanes	0	1 0		0	1	0	•
Configuration		LTR			LTR		

Approach	_Delay, 	Queue L WB	ength, and Level of Northbound	ServiceSouthbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	0	1	9	4
C(m) (vph)	1619	1606	1067	980
v/c	0.00	0.00	0.01	0.00
95% queue length	0.00	0.00	0.03	0.01
Control Delay	7.2	7.2	8.4	8.7
LOS	A	A	A	A
Approach Delay			8.4	8.7
Approach LOS			A	A

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour
Intersection: Parcel B,C Access on Lemay Dr
Jurisdiction: Yellowknife Intersection: Jurisdiction:

Jurisdiction: Yellowknire
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Lemay Drive
North/South Street: Parcel B, C Site Access
Intersection Orientation: EW Study period (hrs): 0.25

			mes and	Adjust	me				
	pproach	Eas	tbound			Wes	tbound	l	
M	ovement	1	2	3		4	5	6	
		L	T	R		L	T	R	
Volume		0	59	0		1	11	0	
Peak-Hour Factor	, PHF	0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Rate	, HFR	0	90	0		1	16	0	
Percent Heavy Ve		2				2			
Median Type/Stor RT Channelized?	age	Undivi	ded			/			
Lanes		0	1 0			0	1	0	
Configuration		LT	R			LT	R		
Upstream Signal?			No				No		
Minor Street: A	pproach	Nor	thbound			Sou	thbour	ıd	
M	ovement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		0	0	6		3	0	0	
Peak Hour Factor		0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Rate	, HFR	0	0	9		4	0	0	
Percent Heavy Ve		2	2	2		2	2	2	
Percent Grade (%			0				0		
Flared Approach:	Exists?/S	torage		No	/			No	/
Lanes		0	1 0			0	1	0	
Configuration			LTR				LTR		

Approach	_Delay, _EB	Queue Le	ngth, and Level of Northbound	ServiceSouthbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	0	1	9	4
C(m) (vph)	1602	1505	968	858
v/c	0.00	0.00	0.01	0.00
95% gueue length	0.00	0.00	0.03	0.01
Control Delay	7.2	7.4	8.8	9.2
LOS	A	A	A	A
Approach Delay			8.8	9.2
Approach LOS			A	A

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday PM Peak Hour
Intersection: Parcel B,C Access on Lemay Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Lemay Drive
North/South Street: Parcel B, C Site Access
Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments ch Eastbound Major Street: Approach Movement Westbound Volume Peak-Hour Factor, PHF 0.78 0.78 0.78 0.78 Hourly Flow Rate, HFR Percent Heavy Vehicles Undivided Median Type/Storage RT Channelized? Lanes 1 1 0 Configuration LTR LTR Upstream Signal? No No Minor Street: Approach Northbound Southbound 11 Movement Volume Peak Hour Factor, PHF 0.78 0.78 0.78 0.78 0.78 0.78 Hourly Flow Rate, HFR Percent Heavy Vehicles Percent Grade (%) Flared Approach: Exists?/Storage No No Lanes 0 0

Approach Movement	_Delay, EB 1	Queue Le WB 4	ength, and Level of Northbound 7 8 9	Service Southbound 10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	0	6	3	1
C(m) (vph)	1610	1616	1078	977
v/c	0.00	0.00	0.00	0.00
95% queue length	0.00	0.01	0.01	0.00
Control Delay	7.2	7.2	8.3	8.7
LOS	A	A	A	A
Approach Delay			8.3	8.7
Approach LOS			A	A

LTR

LTR

Configuration

HCS+: Unsignalized Intersections Release 5.6

THIO - HIN V	CTOD	CONTRDOT	CITMMADV	

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Parcel B,C Access on Lemay Dr Yellowknife Intersection: Jurisdiction: Units: U. S. Metric Analysis Year: 2022 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: North/South Street: Lemay Drive Parcel B, C Site Access Intersection Orientation: EW Study period (hrs): 0.25 Vehicle Volumes and Adjustments Eh Eastbound Major Street: Approach Westbound Movement 5 Volume Peak-Hour Factor, PHF 0.78 0.78 0.78 0.78 0.78 0.78 Hourly Flow Rate, HFR 41 0 48 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided Lanes 0 1 Configuration LTR LTR Upstream Signal? No No Minor Street: Approach Northbound Southbound

10

0.78

0

11

0.78

0.78

2

No

0

Approach	_Delay,	Queue 1 WB	Length, and Level of Northbound	Service
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	0	6	3	1
C(m) (vph)	1557	1568	1030	872
v/c	0.00	0.00	0.00	0.00
95% gueue length	0.00	0.01	0.01	0.00
Control Delay	7.3	7.3	8.5	9.1
LOS	A	A	A	A
Approach Delay			8.5	9.1
Approach LOS			A	A

0.78

0.78

0

LTR

0.78

No

0

Volume

Lanes

Configuration

Peak Hour Factor, PHF

Hourly Flow Rate, HFR

Percent Heavy Vehicles

Percent Grade (%) Flared Approach: Exists?/Storage

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Parcel C, E Site Access on Ballantyne Ct
Yellowknife

Jurisdiction: Units: U. S. Metric Analysis Year:

Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study

Rast/West Street: Parcel C, E Site Access
North/South Street: Ballantyne Court
Intersection Orientation: NS

Study period (hrs): 0.25

Vehi	.cle Volu	mes and	Adjust	tments			
Major Street: Approach	Nor	thbound		Sou	thbound	f	
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume	1	2	0	0	9	0	
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR	1	3	0	0	13	0	
Percent Heavy Vehicles	2			2			
Median Type/Storage	Undivi	ded		/			
RT Channelized?							
Lanes	0	1 0		0	1 ()	
Configuration	LT	r.		LT	'R		
Upstream Signal?		No			No		
Minor Street: Approach	Wes	tbound		Eas	tbound		
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
				'			
Volume	3	0	0	0	0	3	
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR	4	0	0	0	0	4	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)		0			0		
Flared Approach: Exists?	Storage		No	/		No	/
Lanes	ŏ	1 0		0	1 ()	
Configuration		LTR			LTR		

Approach	_Delay, NB	Queue L SB	Length, and Level of Westbound	Service Eastbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	1	0	4	4
C(m) (vph)	1606	1619	989	1067
v/c	0.00	0.00	0.00	0.00
95% queue length	0.00	0.00	0.01	0.01
Control Delay	7.2	7.2	8.7	8.4
LOS	A	A	A	A
Approach Delay			8.7	8.4
Approach LOS			A	A

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday AM Peak Hour Intersection: Parcel C, E Site Access on Ballantyne Ct Jurisdiction: Yellowknife

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year:
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Parcel C, E Site Access
North/South Street: Ballantyne Court
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

Major Street:			mes and		tme		thboun	4	
.m.jor bereee.	Movement	1 T.	2 T	3 R		4 T.	5 T	6 R	
Volume		1	2	0		0	9	0	
Peak-Hour Fact		0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Ra		1	3	0		0	13	0	
Percent Heavy		2				2			
Median Type/St RT Channelized		Undivi	ded			/			
Lanes		0	1 0			0	1	D	
Configuration		LT	'R			LT	R		
Upstream Signa	11?		No				No		
Minor Street:	Approach	Wes	tbound			Eas	tbound		
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		3	0	0		0	0	3	
Peak Hour Fact	or, PHF	0.65	0.65	0.65		0.65	0.65	0.65	
Hourly Flow Ra		4	0	0		0	0	4	
Percent Heavy		2	2	2		2	2	2	
Percent Grade			0				0		
Flared Approac	h: Exists?/S	torage		No	/	,		No	/
Lanes		Ö	1 0			0	1	0	
Configuration			T.TR				T.TR		

Approach	_Delay, NB	Queue Le	ength, and Level of Westbound	ServiceEastbound
Movement	1	4	7 8 9	10 11 12
Lane Config	LTR	LTR	LTR	LTR
v (vph)	1	0	4	4
C(m) (vph)	1606	1619	989	1067
v/c	0.00	0.00	0.00	0.00
95% gueue length	0.00	0.00	0.01	0.01
Control Delay	7.2	7.2	8.7	8.4
LOS	A	A	A	A
Approach Delay			8.7	8.4
Approach LOS			A	A

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Parcel C, E Site Access on Ballantyne Ct Yellowknife Intersection: Jurisdiction: Units: U. S. Metric Analysis Year: 2017 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study Parcel C, E Site Access East/West Street: North/South Street: Ballantyne Court Intersection Orientation: NS Study period (hrs): 0.25

			umes and		tme				
Major Street:	Approach		thbound			Sou	ıthbou	nd	
	Movement	1	2	3		4	5	6	
		L	T	R		L	T	R	
Volume		3	10	3		0	4	0	
Peak-Hour Facto	r, PHF	0.78	0.78	0.78		0.78	0.78	0.78	
Hourly Flow Rat	e, HFR	3	12	3		0	5	0	
Percent Heavy V	ehicles	2				2			
Median Type/Sto		Undivi	.ded			/			
RT Channelized?									
Lanes		0	1 0			0	1	0	
Configuration		LT	'R			LT	'R		
Upstream Signal	?		No				No		
11									
Minor Street:	Approach	Wes	tbound			Eas	tboun	d	
	Movement	7	8	9		10	11	12	
		L	T	R		L	T	R	
Volume		1	0	0		0	0	2	
Peak Hour Facto	r, PHF	0.78	0.78	0.78		0.78	0.78	0.78	
Hourly Flow Rat	e. HFR	1	0	0		0	0	2	
Percent Heavy V		2	2	2		2	2	2	
Percent Grade (0				0		
Flared Approach		torage		No	/			No	/
Lanes		0	1 0		,	0	1	0	•
Configuration			LTR				LTR		

	Delay,	Queue Le	ength, and	Level of	Service		
Approach	NB	SB	Westbo	ound	Ea	stbound	
Movement	1	4	7 8	9	10	11	12
Lane Config	LTR	LTR	L'	ľR		LTR	
v (vph)	3	0	1			2	
C(m) (vph)	1616	1603	91	31		1078	
v/c	0.00	0.00	0	.00		0.00	
95% queue length	0.01	0.00	0	.00		0.01	
Control Delay	7.2	7.2	8	. 7		8.3	
LOS	A	A	1	A		A	
Approach Delay			8	. 7		8.3	
Approach LOS			1	A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY Analyst: Agency/Co.: Date Performed: RC CTS Analysis Time Period: Weekday PM Peak Hour Intersection: Parcel C, E Site Access on Ballantyne Ct Jurisdiction: Yellowknife Units: U. S. Metric Analysis Year: 2022 Future Base + Site Project ID: 3989 - Niven Lake Phase V Traffic Impact Study East/West Street: North/South Street: Parcel C, E Site Access Ballantyne Court Intersection Orientation: NS Study period (hrs): 0.25 Vehicle Volumes and Adjustments
Northbound Major Street: Approach Movement Southbound 5 T Volume Peak-Hour Factor, PHF 0.78 0.78 0.78 0.78 0.78 0.78 Hourly Flow Rate, HFR 12 0 5 Percent Heavy Vehicles Median Type/Storage RT Channelized? Undivided 1 1 Lanes 0 0 Configuration LTR LTR Upstream Signal? No No Minor Street: Approach Westbound Eastbound 10 11 Movement L Volume Peak Hour Factor, PHF 0.78 0.78 0.78 0.78 0.78 0.78 Hourly Flow Rate, HFR Percent Heavy Vehicles 2 Percent Grade (%) Flared Approach: Exists?/Storage 0 No No Lanes 0 0 Configuration LTR Delay, Queue Length, and Level of Service SB Westbound Approach NB Eastbound 10 Movement 11 LTR Lane Config LTR LTR LTR v (vph) C(m) (vph) 1616 1603 981 1078 v/c 95% queue length 0.00 0.00 0.00 0.00 0.00 0.00 0.01 0.01 Control Delay 7.2 7.2 8.7 8.3 LOS Α Α Α Α Approach Delay 8.3 Approach LOS Α Α

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
Agency/Co.: CTS
Date Performed:
Analysis Time Period: Weekday AM Peak Hour
Intersection: Parcel D Site Access on Lemay Dr
Turisdiction: Yellowknife

Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Parcel D Site Access
North/South Street: Lemay Drive
Intersection Orientation: NS Study period (h

Study period (hrs): 0.25

Major Street:	Vehic Approach Movement		umes and rthbound 2 T			thbound 5 T	6 R
Volume			0	2	0	0	
Peak-Hour Fact			0.65	0.65	0.65	0.65	
Hourly Flow Ra			0	3	0	0	
Percent Heavy Median Type/St RT Channelized	orage	Undiv	ided		/2		
Lanes			1 0		0	1	
Configuration			TR		T ₁ T		
Upstream Signa	1?		No			No	
Minor Street:	Approach	Wes	stbound		Eas	tbound	
	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume		9		0			
Peak Hour Fact	or, PHF	0.65		0.65			
Hourly Flow Ra		13		0			
Percent Heavy		2		2			
Percent Grade			0			0	
Flared Approac	h: Exists?/S	Storage	0	No	/		/
Configuration		U	LR				

Approach	_Delay,	Queue Le		, and Leve Westbound	el of		astboun	d
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		0		13				
C(m) (vph)		1619		1021				
v/c		0.00		0.01				
95% gueue length		0.00		0.04				
Control Delay		7.2		8.6				
LOS		A		A				
Approach Delay				8.6				
Approach LOS				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: KC
Agency/Co.: CTS
Date Performed: CTS
Date Performed: Weekday AM Peak Hour
Intersection: Parcel D Site Access on Lemay Dr
Yellowknife

Pase + Site

Intersection: Farcel D Site Access on Lemay Dr
Jurisdiction: Yellowknife
Units: U. S. Metric
Analysis Year: 2022 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Parcel D Site Access
North/South Street: Lemay Drive

		.cle Volu			ment				
Major Street:	Approach Movement	NOI 1	thbound 2	3	4		thbound 5	6	
	Movement	Ĺ	T	R	I		T	R	
Volume			9	2	C		50		
Peak-Hour Fact			0.65	0.65	C	.65	0.65		
Hourly Flow Ra			13	3	C		76		
Percent Heavy					. 2				
Median Type/St RT Channelized		Undivi	.ded		/				
Lanes			1 0			0	1		
Configuration			TR			LT			
Upstream Signa	1?		No				No		
Minor Street:	Approach	Wes	tbound			Eas	tbound		
	Movement	7	8	9	1	. 0	11	12	
		L	T	R	I		T	R	
Volume		9		0					
Peak Hour Fact		0.65		0.65					
Hourly Flow Ra		13		0					
Percent Heavy		2		2					
Percent Grade			0				0		
Flared Approac	h: Exists?/	Storage		No	/				/
Lanes		0	0						
Configuration			LR						

Approach	_Delay,	Queue Le	engt	h, and Leve Westbound	el of	Serv		astbound	1
Movement	1	4	7	8	9		10	11	12
Lane Config		LT		LR					
v (vph)		0		13					
C(m) (vph)		1602		910					
v/c		0.00		0.01					
95% queue length		0.00		0.04					
Control Delay		7.2		9.0					
LOS		A		A					
Approach Delay				9.0					
Approach LOS				A					

TWO-WAY STOP CONTROL SUMMARY

Analyst: Agency/Co.: Date Performed: RC CTS

Analysis Time Period: Weekday PM Peak Hour
Intersection: Parcel D Site Access on Lemay Dr
Jurisdiction: Yellowknife
Units: U. S. Metric

Onlie: U. S. Medile
Analysis Year: 2017 Future Base + Site
Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
East/West Street: Parcel D Site Access

North/South Street: Lemay Drive

Intersection Orientation:	NS		Sti	udy per	iod (hrs):	0.25
Vehi	cle Vol	umes and	Adjust	tments		
Major Street: Approach	No	rthbound			Southbound	1
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		0	7	0	0	
Peak-Hour Factor, PHF		0.78	0.78	0.7	0.78	
Hourly Flow Rate, HFR		0	8	0	0	
Percent Heavy Vehicles				2		
Median Type/Storage RT Channelized?	Undiv	ided		/		
Lanes		1 0			0 1	
Configuration		TR			T.T	
Upstream Signal?		No IR			No	
opscream Signair		NO			NO	
Minor Street: Approach	We	stbound			Eastbound	
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	4		0			
Peak Hour Factor, PHF	0.78		0.78			
Hourly Flow Rate, HFR	5		0			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/	Storage		No	/		/
Lanes	Ō	0				
Configuration		LR				

Approach	_Delay, NB	Queue Lengt	d Leve bound	l of	Servic	bound	
Movement	1	4 7	8	9	10	11	12
Lane Config		LT	LR				
v (vph)		0	 5				
C(m) (vph)		1612	1018				
v/c		0.00	0.00				
95% queue length		0.00	0.01				
Control Delay		7.2	8.6				
LOS		A	A				
Approach Delay			8.6				
Approach LOS			A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

	TWO	-WAY ST	FOP CONT	ROL SUM	MARY			
3	RC							
Analyst:	CTS							
Agency/Co.:	CTS							
Date Performed:	- 2 - 7/1 1-	J DM	D1- II-					
Analysis Time Peri								
Intersection:			ite Acce	ss on I	Jemay I	r		
Jurisdiction:		owknife	2					
Units: U. S. Metri								
Analysis Year:			Base +			G: 1		
Project ID: 3989					Impact	Study		
East/West Street:				SS				
North/South Street		y Drive	2		,		١	_
Intersection Orien	tation:	NS		St	uay pe	eriod (hr	s): 0.2	5
	Vehi	cle Vol	lumes an	d Adjus	stments	3		
Major Street: App	roach		orthboun			Southbo	und	
Mov	ement	1	2	3	4	5	6	
		L	T	R	L	T	R	
Volume			31	7	0	28	_	
Peak-Hour Factor,			0.78	0.78		.78 0.7	8	
Hourly Flow Rate,			39	8	0	35		
Percent Heavy Vehi					,2			
Median Type/Storag	e	Undiv	71ded		/			
RT Channelized?			_	_				
Lanes				0		0 1		
Configuration			T	R		LT		
Upstream Signal?			No			No		
Minor Street: App	roach	We	stbound			Eastbou	nd	
Mov	ement	7	8	9	10	11	12	
		L	T	R	L	T	R	
Volume		4		0				
Peak Hour Factor,	PHF	0.78		0.78				
Hourly Flow Rate,		5		0.70				
Percent Heavy Vehi		2		2				
Percent Grade (%)		2	0	-		0		
Flared Approach:	Eviete2/	Storage		No	/			/
Lanes	DAISCS:/	0		0	/			/
Configuration		U	LR	U				
	Delay, Q	110110 T.4	nath =	nd Leve	al of 9	Service		
Approach	NB	SB		tbound	01 1		stbound	
Movement	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
_						'		
v (vph)		0		5				
C(m) (vph)		1560		925				
v/c		0.00		0.01				
95% queue length		0.00		0.02				
Control Delay		7.3		8.9				
LOS		A		A				
Approach Delay				8.9				
Approach LOS				A				
-FF- 34011 200								