

TRAFFIC IMPACT STUDY

ALTA RESIDENTIAL DEVELOPMENT – PHASE 2

TABERA LTD.

PREPARED BY:

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JULY 2007

CFCA FILE No. 119-2528

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INTRODUCTION

CF Crozier & Associates Inc. was retained by Tabera Ltd. to undertake a Traffic Impact Study for Phase 2 of the proposed Alta residential development in the Town of The Blue Mountains, County of Grey. The development is bounded by Hidden Lake Road to the north, the termini of Alta Road to the south and the Niagara Escarpment to the west. The property proposed for residential development is 29.8 hectares. **Figure 1** illustrates the site location.

The development is proposed to consist of 64 single family detached residential units. Access to the site will be provided by extending the existing Alta Road to an intersection with Hidden Lake Road. The internal roadways will be publicly owned as part of the subdivision tenure of the development. **Figure 2** illustrates the proposed layout of the site.

The study has been completed in accordance with the procedures set out in the Institute of Transportation Engineers (ITE) "Transportation Impact Analyses for Site Development" 2005 guide, with the associated analysis and findings outlined herein.

1.0 EXISTING CONDITIONS

1.1 BOUNDARY ROAD NETWORK

Hidden Lake Road is a local two lane unpaved road under the jurisdiction of the Town of The Blue Mountains. The speed limit is not posted, therefore by regulation is 50km/h. Hidden Lake Road terminates to the west of the subject development.

Alta Road is a local two lane paved road that is publicly owned by the Town of the Blue Mountains. The segment of Alta Road from Arrowhead Road to approximately 300 metres west has not to date been assumed by the municipality. The speed limit is not posted, therefore by regulation is 50 km/h. Currently, Alta Road terminates in a cul-de-sac at the southern limits of the subject development.

Arrowhead Road is a local two lane paved road under the jurisdiction of the Town of The Blue Mountains. The posted speed limit is 50 km/h.

Highway 26 is a two lane east-west highway under the jurisdiction of the Ontario Ministry of Transportation. The posted speed limit is 80 km/h.

The intersection of Highway 26 and Hidden Lake Road is unsignalized. The south approach (Hidden Lake Road) is stop-controlled with no exclusive turn lanes. Insufficient pavement width exists on the south approach to allow simultaneous left and right turns. The east and west approaches (Highway 26) have no restrictions to free flow with no exclusive turn lanes. No north approach exists at the intersection.

The intersection of Highway 26 and Arrowhead Road is unsignalized. The south approach (Arrowhead Road) is stop-controlled with no exclusive turn lanes. Sufficient pavement width exists on the south approach to allow simultaneous left and right turns. The east and west approaches

(Highway 26) have no restrictions to free flow with no exclusive turn lanes. No north approach exists at the intersection.

The intersection of Arrowhead Road and Alta Road is unsignalized. The west approach (Alta Road) is stop-controlled with no exclusive turn lanes. Insufficient pavement width exists to allow simultaneous left and right turns. The north and south approaches (Arrowhead Road) have no restrictions to free flow as well as no exclusive turn lanes. No east approach exists at the intersection.

1.2 TRAFFIC DATA

Turning movement counts were undertaken by CF Crozier & Associates staff from 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. on Friday June 15, 2007 at the intersections of Highway 26 and Arrowhead Road, Highway 26 and Hidden Lake Road and Arrowhead Road and Alta Road. This traffic data provides the typical roadway a.m. and p.m. peak traffic conditions through the above mentioned intersections, and was selected to capture both commuter and weekend recreational traffic from the GTA region. At the intersections Highway 26 with Arrowhead Road and Hidden Lake Road, the a.m. peak hour was 7:30 to 8:30 a.m., and the p.m. peak hour from 4:45 to 5:45 p.m. At the intersection of Arrowhead Road and Alta Road the a.m. peak hour was 8:00 to 9:00 a.m. and the p.m. peak hour was 4:00 to 5:00 p.m. The traffic data contained in **Appendix B** provides a summary of the turning movement counts. **Figure 3** illustrates the existing traffic volumes.

1.3 INTERSECTION OPERATIONS

The operations of subject intersections were analyzed on the basis of the traffic volumes illustrated in Figure 3. Detailed capacity analyses are included in **Appendix C**.

The assessment of unsignalized intersections is based on the method outlined in the "Highway Capacity Manual, 2000". The Level of Service definitions for unsignalized intersections are included in **Appendix A**.

Table 1 outlines the current levels of service.

TABLE 1
2007 EXISTING TRAFFIC LEVELS OF SERVICE

Approach	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Arrowhead Road	A.M.	B	11.1 s	0.05	0.02
	P.M.	B	14.6 s	0.07	0.02
Highway 26 and Hidden Lake Road	A.M.	B	10.7 s	0.01	0.00
	P.M.	C	17.2 s	0.00	0.00
Arrowhead Road and Alta Road	A.M.	A	8.7 s	0.05	0.02
	P.M.	A	8.6 s	0.06	0.02

Note: The level of service of a stop-controlled intersection is based on the delay associated with the critical minor road movement.

As indicated in Table 1, all intersections operate at acceptable levels of service and are characterized by low volume-to-capacity ratios and 95% queue lengths of one vehicle.

3.0 FUTURE BACKGROUND CONDITIONS

3.1 HORIZON YEAR

As per the ITE "Transportation Impact Analyses for Site Development" manual, the horizon year was chosen to be the anticipated full build out year. With an assumed construction of the internal road network and services in 2008, it was determined that a horizon year of 2014 would capture full build out of the development and was used for analysis.

3.2 TRAFFIC GROWTH RATES

Traffic growth rates were based on Georgian Triangle Area Transportation Study (Dillon Consulting Ltd. & Ainley and Associated Ltd., June 2001). This report was a comprehensive examination of the future transportation needs of the Georgian Triangle driven by growth in population and tourism. The report forecasted ten and twenty year demands on major routes in the area, including Highway 26.

The report provided traffic volume forecasts for Highway 26 at Arrowhead Road. Growth rates were calculated from these forecasts, and were applied to Highway 26 through volumes at both the Arrowhead Road and Hidden Lake Road intersections. A compound growth rate of 8.2 percent to 2010 and 2.1 percent thereafter was used for Highway 26 eastbound. A compound growth rate of 8.3 percent to 2010 and 2.1 percent thereafter was used for Highway 26 westbound.

3.3 OTHER LOCAL DEVELOPMENTS

Two other developments that will directly influence future background traffic volumes are currently either under construction or in the planning phase. These are Georgian Woodlands Phase 4 and Alpine Springs.

The Georgian Woodlands Phase 4 development is seeking draft plan approval for 102 single family detached units, and is located east of the subject property, east of Arrowhead Road. One portion of the development will have a singular access onto Arrowhead Road north of Alta Road and will service 36 units. Four units are proposed to access Arrowhead Road directly, south of Alta Road. The remaining 62 units will access Arrowhead Road north of Alta Road, or other boundary roadways to the southeast of Alta Phase 2 development. Trip generation and distribution characteristics as per Section 4.0 were applied to the 102 units.

Alpine Springs will consist of 15 single family detached units and 15 single family attached units located south of the subject development. It has a singular access to the Arrowhead Road south of Alta Road. Trip generation and distribution characteristics as per Section 4.0 were applied to these 30 units.

The calculated 2014 future background traffic volumes are illustrated in **Figure 4** and reflect the growth on Highway 26 as well as the traffic generated from the two nearby future developments.

3.4 INTERSECTION OPERATIONS

The operations of the critical intersections were analyzed on the basis of the traffic volumes illustrated in Figure 4. **Table 2** outlines the year 2014 levels of service. Detailed capacity analyses are included in Appendix C.

TABLE 2
2014 FUTURE BACKGROUND TRAFFIC LEVELS OF SERVICE

Approach	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Arrowhead Road	A.M.	B	12.2 s	0.10	0.03
	P.M.	C	17.9 s	0.20	0.06
Highway 26 and Hidden Lake Road	A.M.	B	12.0 s	0.02	0.01
	P.M.	C	24.9 s	--	--
Arrowhead Road and Alta Road	A.M.	A	8.8 s	0.05	0.02
	P.M.	A	8.7 s	0.06	0.02

Note: The level of service of a stop-controlled intersection is based on the delay associated with the critical minor road movement.

As can be seen in Table 2, the critical intersections under future background traffic volumes will continue to operate at an acceptable level of service, maintaining low volume-to-capacity ratios, slight increases in delays and 95% queue lengths of one vehicle.

4.0 SITE GENERATED TRAFFIC

4.1 TRIP GENERATION

The Georgian Triangle Area is branded as a four seasons recreational destination. As a result, many new developments in the Town of The Blue Mountains market to and attract those who have their primary residence elsewhere, mainly the Greater Toronto Area. Accordingly, trip generation rates of existing developments are frequently less than predicted by the Institute of Transportation Engineers (ITE) "Trip Generation Manual", which are reflective of residential urban and suburban areas.

This was supported by the turning movement count undertaken at Arrowhead Road and Alta Road as well as Highway 26 and Hidden Lake Road. It was observed that a significant percentage of overall entering and exiting traffic into the Alta Phase 1 development were for the construction of two residences. At Hidden Lake Road, the 62 units serviced by the roadway generated a total of 7 trips during each of the a.m. and p.m. peak hours, equating to a trip generation rate of 0.11 trips per unit.

It was determined that the use of Category 260, "Recreational Housing" would be an accurate representation of the future traffic characteristics of the Alta Phase 2 development and was therefore used to model the 64 units in the analysis. The trips generated are tabulated in **Table 3**.

TABLE 3
SITE GENERATED TRIPS

ITE Land Use	Roadway Peak Hour	Number of Trips		
		Inbound	Outbound	Total
Category 260	A.M.	10	10	20
	P.M.	9	11	20

4.2 TRIP DISTRIBUTION AND ASSIGNMENT

The trips generated by the proposed residential development were distributed to the boundary roadways based on the location of retail, commercial and recreational destinations. With the Town of Collingwood and the Village at Blue both located to the east of the subject lands, 80 percent of trips were assumed to arrive from/depart to the east. Specifically, 50 percent would access Highway 26 east from Hidden Lake Road and 30 percent would access Arrowhead Road south from Alta Road. The remaining 20 percent were assigned to Highway 26 west from Hidden Lake Road. The trip distribution is illustrated in **Figure 5**.

The trips generated by the proposed development were assigned to the boundary road network as per the distribution. **Figure 6** illustrates the trip assignment.

5.0 TOTAL FUTURE CONDITIONS

5.1 BASIS OF ASSESSMENT

The traffic impacts arising from the proposed development were assessed on the basis of the site generated traffic illustrated in **Figure 6** being superimposed on the future background traffic volumes in **Figure 4**. The resulting total traffic volumes for the a.m. and p.m. peak hours are illustrated in **Figure 7**.

5.2 INTERSECTION OPERATIONS

The intersection levels of service were analyzed on the basis of the total traffic volumes illustrated in **Figure 7**. **Table 4** outlines the year 2014 total traffic levels of service. Detailed capacity analyses are included in Appendix C.

TABLE 4
2014 TOTAL TRAFFIC LEVELS OF SERVICE

Approach	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Arrowhead Road	A.M.	B	12.2 s	0.11	0.03
	P.M.	C	17.8 s	0.20	0.06
Highway 26 and Arrowhead Road	A.M.	B	12.1	0.03	0.01
	P.M.	C	17.7 s	0.05	0.02
Arrowhead Road and Alta Road	A.M.	A	8.9 s	0.07	0.02
	P.M.	A	8.7 s	0.07	0.02

Note: The level of service of a stop-controlled intersection is based on the delay associated with the critical minor road movement.

As indicated in **Table 4**, the critical intersections will continue to operate at acceptable levels of service, with insignificant increases in delay, 95th percentile queue lengths of one vehicle and low volume-to-capacity ratios.

The intersection of Highway 26 and Hidden Lake Road will see decrease in control delay from the future background traffic operations. This decrease in delay, although having introduced greater

traffic volumes, is a result of more northbound right-turns thereby reducing the average delay of all northbound vehicles.

5.3 AFFECT ON LOCAL ROADS

An assessment of the affect of the proposed development on local roads was undertaken. Category 260, "Recreational Housing" of ITE Trip Generation Manual forecasts an average of 3 trips per unit per weekend day. With a total of 64 units, this equates to 195 new trips on Alta Road and Hidden Lake Road. Assuming that that these trips occur over a 12 hour day, 16 trips per hour can be expected on Alta Road and Hidden Lake Road. Using the trip distribution from Figure 5, both Alta Road and Hidden Lake Road will experience an average of eight additional inbound and outbound trips per hour on a weekend.

6.0 CONCLUSIONS

Intersection analyses of existing traffic volumes indicate that the critical intersections are currently operating at acceptable levels of service. Intersection analyses of the 2014 future background traffic volumes indicate that the critical intersections are expected to continue operating at acceptable levels of service with minor increases in delay.

The proposed residential development is expected to add 20 new trips to the boundary road system during both the a.m. and p.m. peak hours. The majority of these new trips are expected to arrive from/depart to the east. Intersection analyses of the 2014 total traffic volumes indicate that the critical intersections are expected to continue to operate at acceptable levels of service and that the addition of the new trips will not materially affect the operations of the intersections in either the a.m. or p.m. peak hours.

The proposed Alta Phase 2 development is expected to add an average of eight vehicles per hour throughout a weekend day on both Hidden Lake Road and Alta Road. These additional vehicles will not significantly affect the operations of these local roadways.

It is concluded that the traffic generated from the proposed residential development will not adversely affect the boundary road system and that no external improvements are required.

Prepared by,

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Alexander J. W. Fleming, MBA, P.Eng.

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ALTA SUBDIVISION PHASE II
TOWN OF THE BLUE MOUNTAINS

TITLE

SITE LOCATION PLAN

DRAWN BY:
J.R.S.

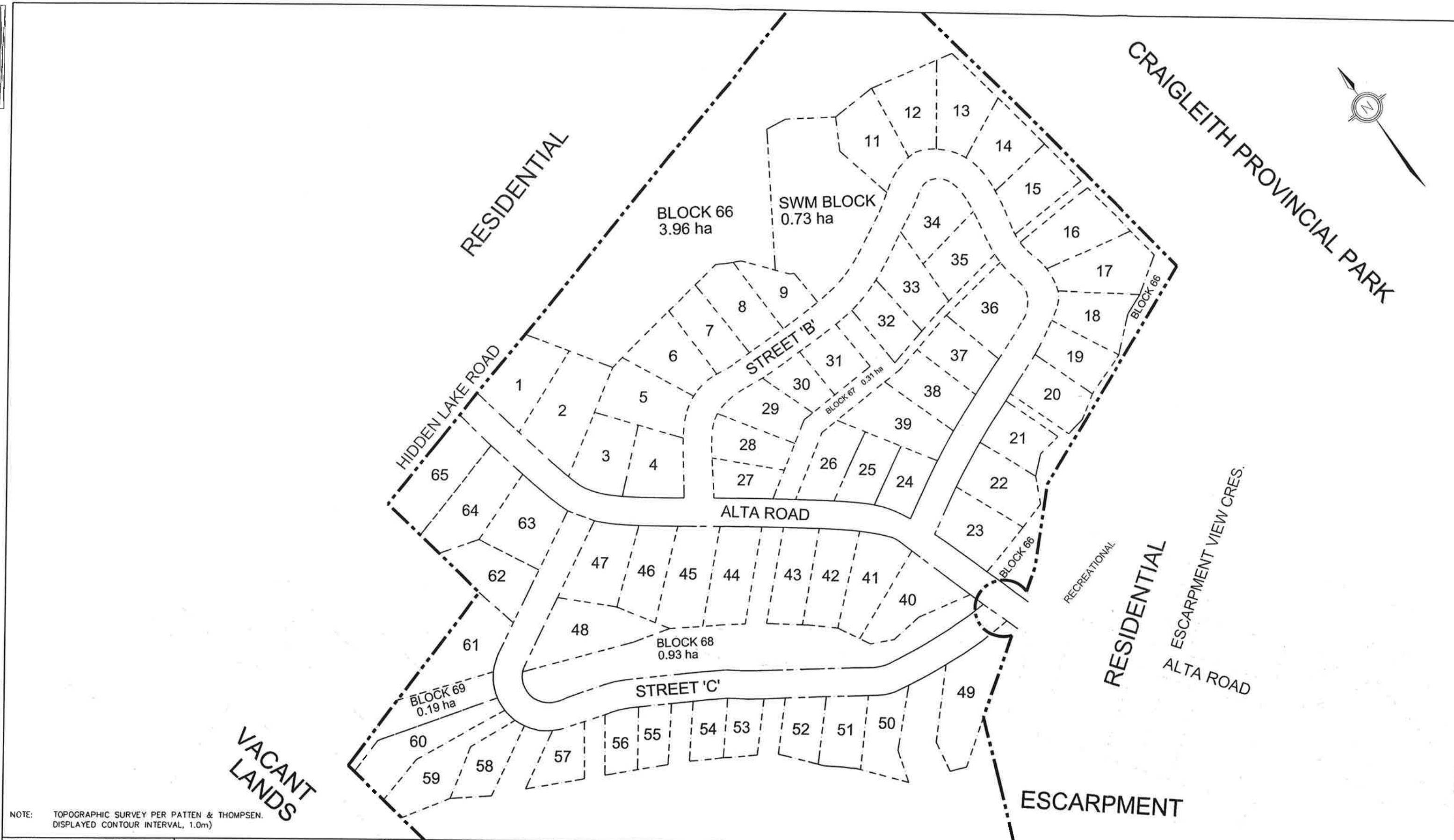
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119-2528-301

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FIG. 1



NOTE: TOPOGRAPHIC SURVEY PER PATTEN & THOMPSEN.
DISPLAYED CONTOUR INTERVAL, 1.0m)

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TEMPORARY BENCHMARKS	

No.	Issue / Revision
0	ISSUE FOR REVIEW

Date: MM/DD/YYYY	Engineer
MM/DD/YYYY	

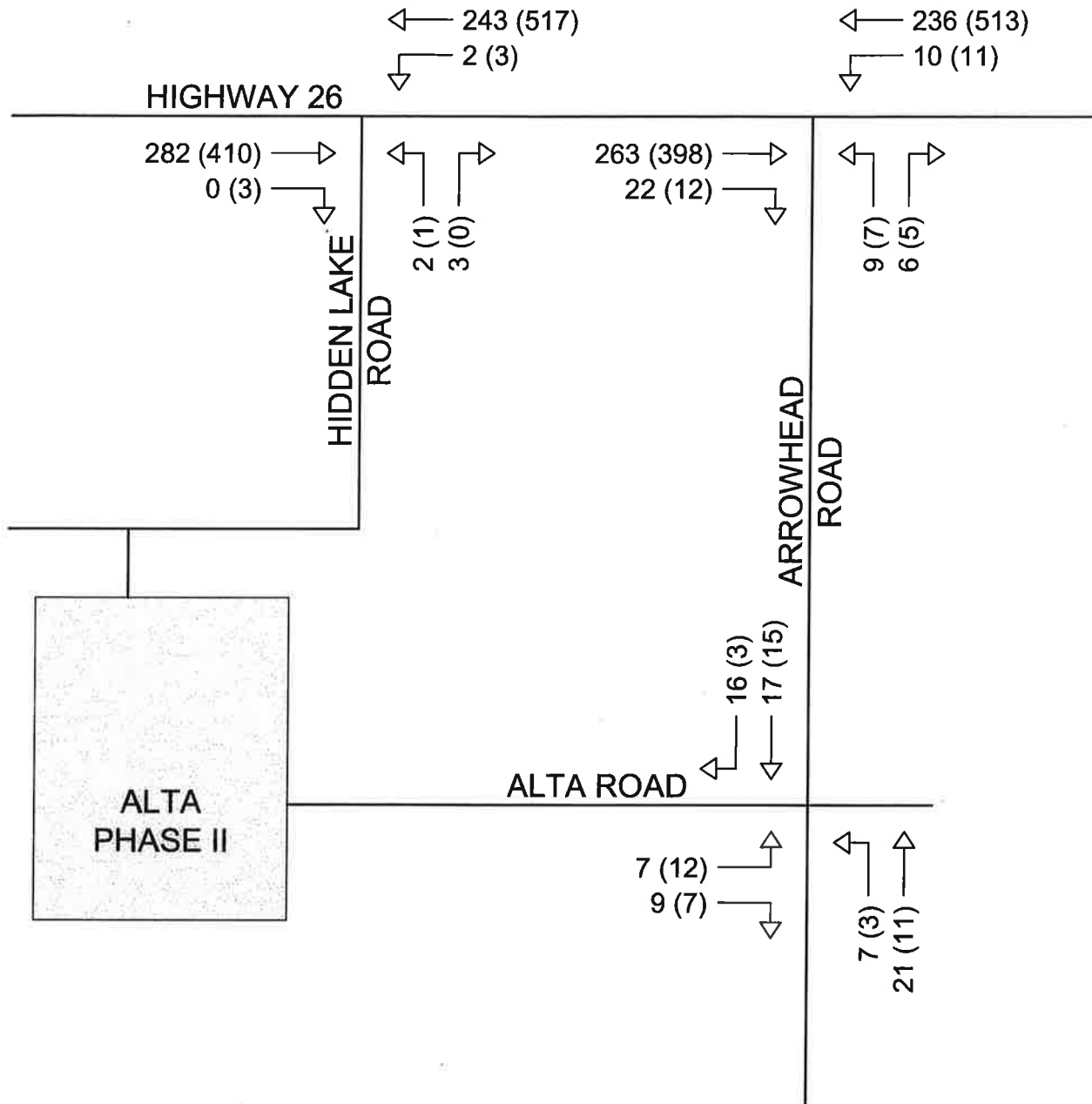
Project
ALTA SUBDIVISION PHASE II TOWN OF THE BLUE MOUNTAINS
Drawing
DEVELOPMENT CONCEPT PLAN

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Drawn By	J.R.S.	Check By	A.J.F.	Project No.	119-2528-302
Scale	1:2500	Date	06/20/2007	Drawing No.	FIG. 2

LEGEND

 STOP CONTROL
xx (yy) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES



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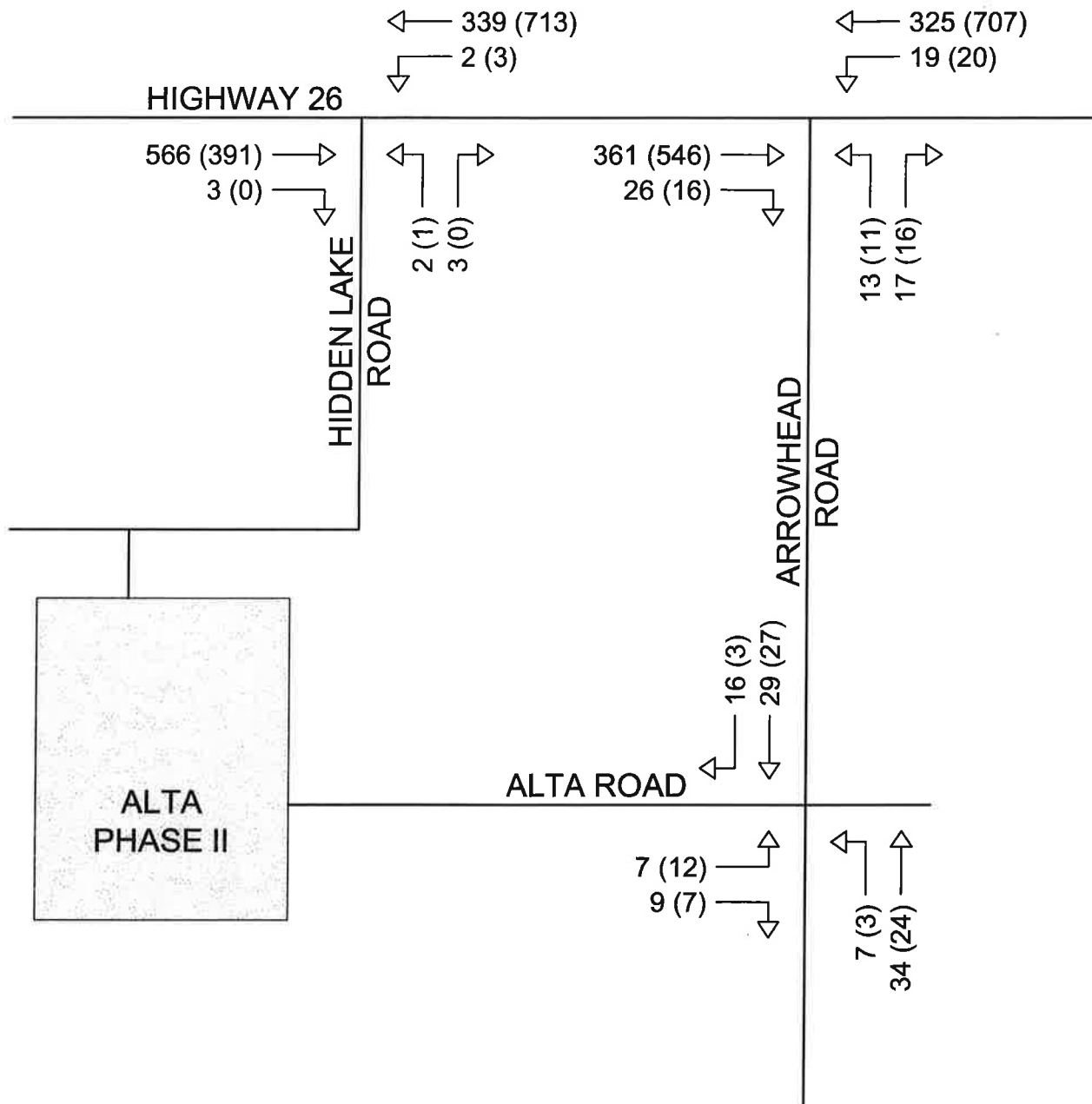
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 119-2528-303
 SCALE:
 N.T.S.

TITLE
 EXISTING
 TRAFFIC VOLUMES

DRAWING No.:
 FIG. 3

LEGEND

 STOP CONTROL
xx (yy) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES



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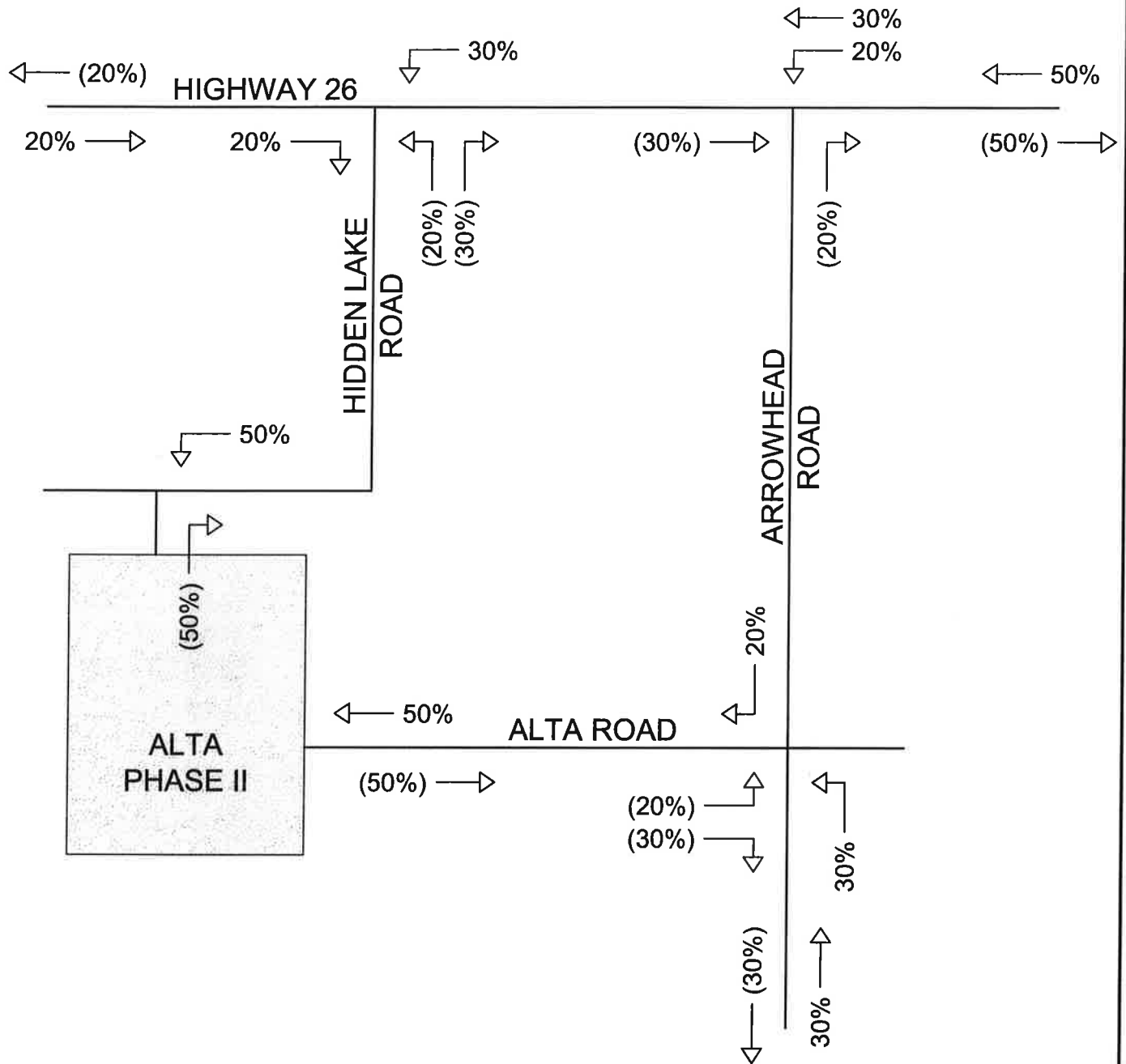
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 2014 FUTURE
 BACKGROUND TRAFFIC
 VOLUMES

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 FIG. 4

LEGEND

 STOP CONTROL
 xx (yy) INBOUND (OUTBOUND)



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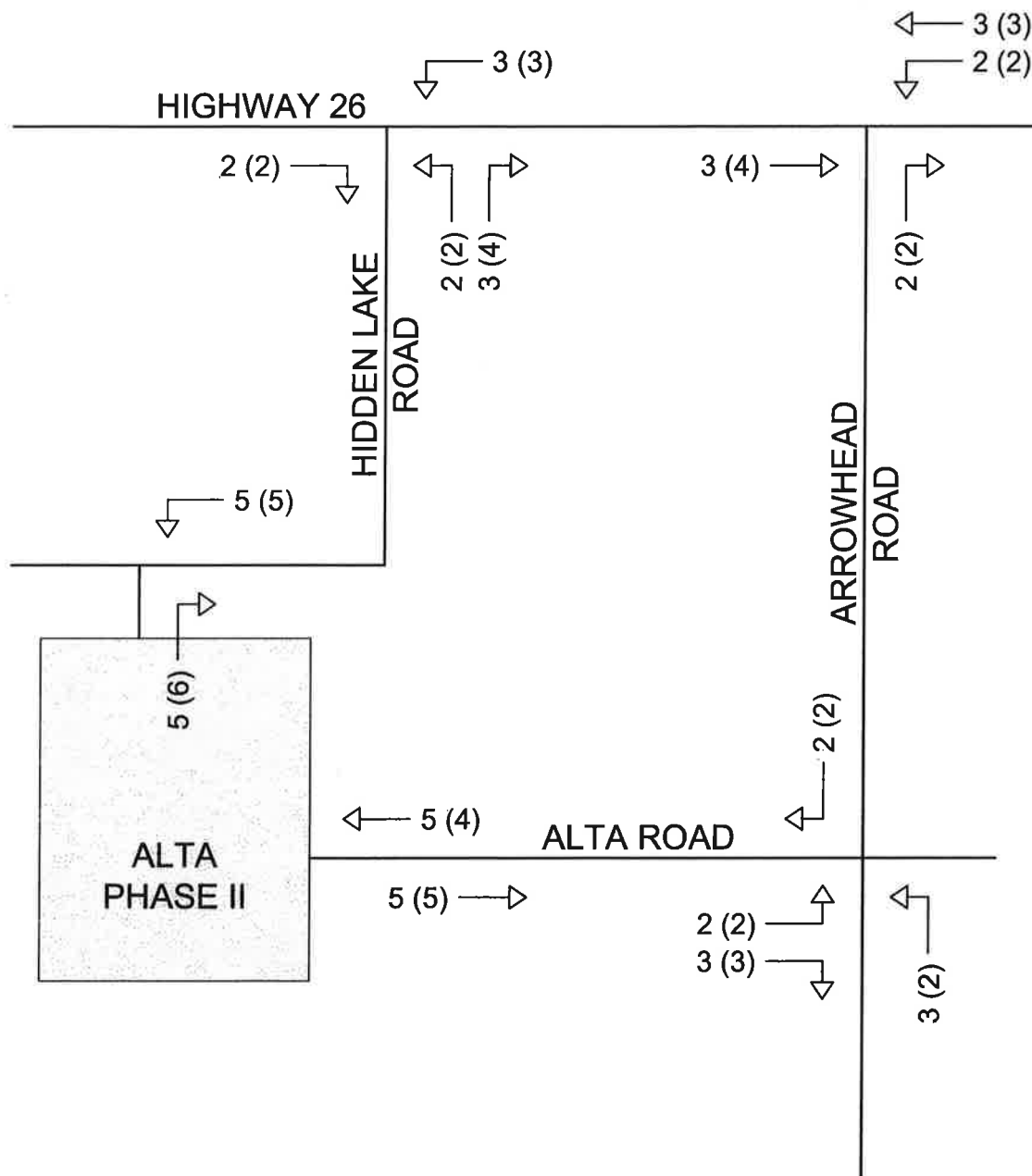
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TRIP DISTRIBUTION

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DATE:
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SCALE:
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FIG. 5

LEGEND

 STOP CONTROL
 xx (yy) A.M. (P.M.) PEAK HOUR
 TRAFFIC VOLUMES



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TOWN OF THE BLUE MOUNTAINS

TITLE

TRIP ASSIGNMENT
TRAFFIC VOLUMES

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DATE:

06/20/2007

DRAWING No.:

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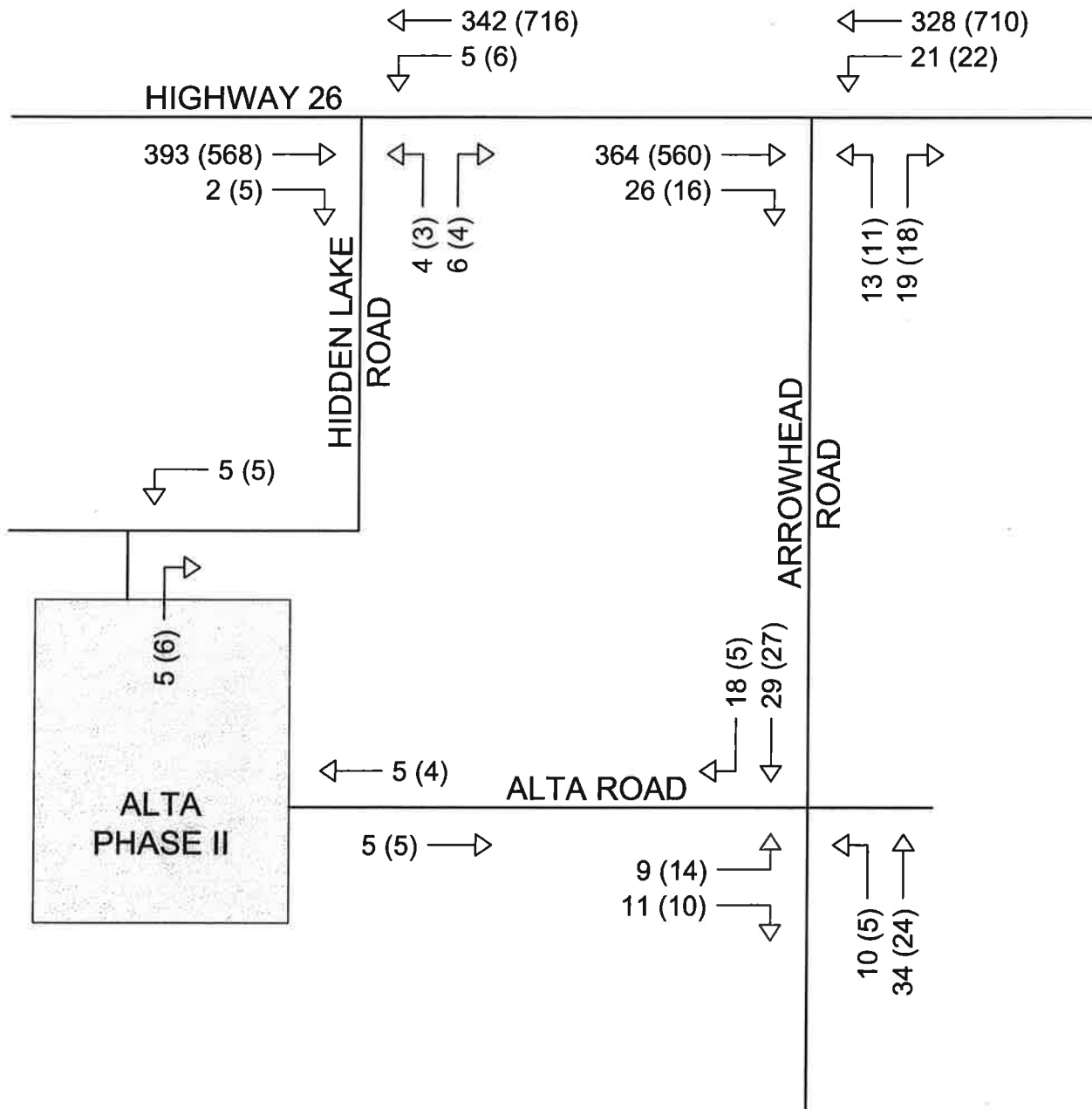
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FIG. 6

LEGEND

 STOP CONTROL
xx (yy) A.M. (P.M.) PEAK HOUR
 TRAFFIC VOLUMES



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PROJECT
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TOWN OF THE BLUE MOUNTAINS

TITLE
2014 TOTAL FUTURE
TRAFFIC VOLUMES

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FIG. 7

APPENDIX A

Level of Service Definitions

LEVEL OF SERVICE DEFINITIONS

TWO-WAY STOP CONTROLLED INTERSECTIONS

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	FAILURE. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Source: Highway Capacity Manual 2000, Transportation Research Board

APPENDIX B

TURNING MOVEMENT COUNTS

Job Number: 119-2528
 Date: 15-Jun-07
 Counter: Ben Prashaw

North Leg Road Name N/A
 South Leg Road Name Hidden Lake Road
 East Leg Road Name: Hwy 26
 West Leg Road Name Hwy 26

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A.M. Peak Hour 7:30 - 8:30	North Leg N/A			East Leg Hwy 26			South Leg Hidden Lake Road			West Leg Hwy 26		
	L	T	R	L	T	R	L	T	R	L	T	R
7:00				0	66		0		0		70	1
7:15				1	53		0		2		71	1
7:30				0	80		0		0		97	0
7:45				0	95		0		1		96	0
8:00				2	68		2		2		89	0
8:15				0	84		2		1		108	0
8:30				0	73		0		1		96	1
8:45				2	88		1		4		101	0

Peak Hour HV's					29						28	
Ped Crossings	--		--	--		--	--		--	--		--

A.M. Peak Hour	0	0	0	2	243	0	2	0	3	0	282	0
----------------	---	---	---	---	-----	---	---	---	---	---	-----	---

HV% of PHV #DIV/0! #DIV/0! #DIV/0! 0% 12% #DIV/0! 0% #DIV/0! 0% #DIV/0! 10% #DIV/0!

P.M. Peak Hour 16:45 - 17:45	North Leg N/A			East Leg Hwy 26			South Leg Hidden Lake Road			West Leg Hwy 26		
	L	T	R	L	T	R	L	T	R	L	T	R
16:00				2	121		1		2		92	1
16:15				0	121		1		0		91	1
16:30				0	115		0		2		98	2
16:45				1	111		0		0		124	1
17:00				0	131		0		0		84	0
17:15				0	137		0		0		104	0
17:30				2	138		1		0		98	2
17:45				5	98		0		1		98	2

Peak Hour HV's					14						14	
Ped Crossings	--		--	--		--	--		--	--		--

P.M. Peak Hour	0	0	0	3	517	0	1	0	0	0	410	3
----------------	---	---	---	---	-----	---	---	---	---	---	-----	---

HV% of PHV #DIV/0! #DIV/0! #DIV/0! 0% 3% #DIV/0! 0% #DIV/0! #DIV/0! 3% 0% 0%

Job Number 119-2528

Date: 15-Jun-07

Counter: Jeremy Ash

North Leg Road Name N/A

South Leg Road Name Arrow Head

East Leg Road Name Hwy 26

West Leg Road Name Hwy 26

Change Blue Font Cells Only

A.M. Peak Hour 7:30 - 8:30		North Leg N/A			East Leg Hwy 26			South Leg Arrow Head			West Leg Hwy 26		
L	T	R	L	T	R	L	T	R	L	T	L	T	R
7:00			1	66		0		1			68		2
7:15			4	54		0		2			70		3
7:30			4	79		1		1			90		7
7:45			2	94		1		2			91		6
8:00			4	63		7		3			82		9
8:15			4	81		3		1			103		6
8:30			3	69		4		4			91		6
8:45			3	83		7		3			103		2

Peak Hour HV's													
Ped Cross	--	--	--	--	--	--	--	--	--	--	--	--	--

A.M. Peak	0	0	0	10	236	9	0	6	0	263	22
-----------	---	---	---	----	-----	---	---	---	---	-----	----

HV% of PT #DIV/0! #DIV/0! #DIV/0! 0% #REF! 0% 0% #DIV/0! 0% 9% 18%

P.M. Peak Hour 6:45 - 17:45		North Leg N/A			East Leg Hwy 26			South Leg Arrow Head			West Leg Hwy 26		
L	T	R	L	T	R	L	T	R	L	T	L	T	R
16:00			4	117		6		2			91		3
16:15			6	119		2		1			88		3
16:30			2	112		3		6			99		1
16:45			3	110		2		2			121		3
17:00			3	127		4		1			83		1
17:15			3	136		1		1			102		2
17:30			2	140		0		1			92		6
17:45			2	99		4		2			99		0

Peak Hour HV's													
Ped Cross	--	--	--	--	--	--	--	--	--	--	--	--	--

P.M. Peak	0	0	0	11	513	7	0	5	0	398	12
-----------	---	---	---	----	-----	---	---	---	---	-----	----

HV% of PT #DIV/0! #DIV/0! #DIV/0! 9% 3% 0% #DIV/0! 0% 4% 0%

Job Number: 119-2528

Date: 15-Jun-07

Counter: Torben Ruddock

North Leg Road Name Arrow Head
 South Leg Road Name Arrow Head
 East Leg Road Name: N/A
 West Leg Road Name Alta Rd.

Change Blue Font Cells Only

A.M. Peak Hour 8:00 - 9:00	North Leg Arrow Head			East Leg N/A			South Leg Arrow Head			West Leg Alta Rd.		
	L	T	R	L	T	R	L	T	R	L	T	R
7:00		2	2				1	0		1		0
7:15		6	1				1	1		0		0
7:30		6	0				0	3		0		2
7:45		6	5				2	2		1		2
8:00		5	4				1	5		2		3
8:15		4	5				2	4		0		2
8:30		3	4				2	6		1		2
8:45		5	3				2	6		4		2

Peak Hour HV's	4	2		2	3							1
Ped Cross	--	--	--	--	--	--	--	--	--	--	--	--

A.M. Peak	0	17	16	0	0	0	7	21	0	7	0	9
-----------	---	----	----	---	---	---	---	----	---	---	---	---

HV% of PT #DIV/0! 24% 13% #DIV/0! #DIV/0! 29% 14% #DIV/0! 0% #DIV/0! 11%

P.M. Peak Hour 6:00 - 17:00	North Leg Arrow Head			East Leg N/A			South Leg Arrow Head			West Leg Alta Rd.		
	L	T	R	L	T	R	L	T	R	L	T	R
16:00		6	1				0	2		6		1
16:15		5	1				1	3		0		0
16:30		1	0				0	4		1		2
16:45		3	1				2	2		3		3
17:00		2	1				1	0		2		1
17:15		3	1				1	1		1		1
17:30		4	1				0	0		1		1
17:45		1	1				1	3		2		0

Peak Hour HV's	2							1				--
Ped Cross	--	--	--	--	--	--	--	--	--	--	--	--

P.M. Peak	0	15	3	0	0	0	3	11	0	12	0	7
-----------	---	----	---	---	---	---	---	----	---	----	---	---

HV% of PT #DIV/0! 13% 0% #DIV/0! #DIV/0! 0% 9% #DIV/0! 0% #DIV/0! 0%

PHASE								
	1	2	3	4	5	6	7	8
0	WALK	-	15			15		12
1	DON'T WALK	-	5			5		5
2	MIN INITIAL	5	20			20		10
3	TYPE 3 LIMIT	-	-			-		-
4	ADD PER VEH	-	-			-		-
5	VEH EXT	2.0	5.0			5.0		3.0
6	MAX GAP	2.0	5.0			5.0		3.0
7	MIN GAP	2.0	5.0			5.0		3.0
8	MAX LIMIT	20	50			50		25
9	MAXIMUM 2	-	-			-		-
A	ADV/DLY WALK	-	-			-		-
B	SEQUENCE TO	-	-			-		-
C	COND SRV MIN	-	-			-		-
D	REDUCE EVERY	-	-			-		-
E	YELLOW	2.0	5.9			5.9		5.0
F	RED CLEAR	-	1.5			1.5		1.4

PHASE BANK #1 < C + O + F = 1 >

ALL RED START

(F/1 + C + O) = 5.0

RED REVERT

(F/1 + O + F) = 5.0

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
		PHASE 1	-	-	-	-	-	-	-						RR1 DLY
		PHASE 2	-	-	-	-	-	-	-						RR1 CLR
		PHASE 3	-	-	-	-	-	-	-						EVA DLY
		PHASE 4	-	-	-	-	-	-	-						EVA CLR
		PHASE 5	-	-	-	-	-	-	-						EV8 DLY
		PHASE 6	-	-	-	-	-	-	-						EV8 CLR
		PHASE 7	-	-	-	-	-	-	-						EVC DLY
		PHASE 8	-	-	-	-	-	-	-						EVC CLR
															EVD DLY
										MAX INT	ALT WALK	ALT FLH	ALT INT	ALT EXT	EVD CLR
															RR2 DLY
															RR2 CLR
															EV CLR
															EV DLY
															RR CLR
															RR DLY

ALL RED START

$$(F/1 + C + O) = 5.0$$

RED REVERT

$$(F/1 + O + F) = 5.0$$

COLUMN F PHASES								
	1	2	3	4	5	6	7	8
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
A								
B								
C								
D								
E								
F								

< C + O + F = 1 >

Column E Phases / Bits

	1	2	3	4	5	6	7	8
0	EXCLUSIVE							
1	RR1 CLEAR							
2	RR2 CLEAR							
3	RR2 LTD SRV							
4	PROT/PERM	X						
5	FLH TO PREMIT							
6	FLASH ENTRY							
7	DISABL MIN YEL	X						
8	DISABL OVP YEL							
9	OVP FLH YEL							
A	EM VEH A							
B	EM VEH B							
C	EM VEH C							
D	EM VEH D							
E	EXTRA 1	X						
F	IC SELECT	X						

< C + O + E = 125 >

Column F Phases / Bits

	1	2	3	4	5	6	7	8
0	EXT PERMIT 1							
1	EXT PERMIT 2							
2	EXCLU PED							
3	PED 2P OUT							
4	PED 6P OUT							
5	PED 4P OUT							
6	PED 8P OUT							
7	FLH YELLOW							
8								
9								
A								
B								
C								
D								
E	RESTRICTED							
F	EXTRA 2							

< C + O + E = 125 >

EXTRA 1

- FLASH TO PREEMPT**
- 1 = EVA
 - 2 = EVB
 - 3 = EVC
 - 4 = EVD
 - 5 = RR1
 - 6 = RR2
 - 7 = SE1
 - 8 = SE2
 - 1 = TBC TYPE 1
 - 2 = NEMA EXT. COORD.
 - 3 = DAYLIGHT SAVINGS
 - 4 =
 - 5 = EXPANDED STATUS REPORTING
 - 6 = INTERNATIONAL PED
 - 7 = CLEAR OUTPUTS DURING FLASH
 - 8 = SPLIT RING

EXTRA 2

- 1 = AWR ON DURING PHASE INITIAL
- 2 = LMU INSTALLED

IC SELECT

- 2 = 2 WAY MODEM
- 3 = 7 WIRE SLAVE
- 4 = FLASH / FREE
- 5 = SIMPLER MASTER
- 7 = 7 WIRE MASTER
- 8 = OFFSET INTURP

COMM ADDRESS (C/O + O + O) = 1

ZONE ADDRESS (C/O + O + 1) = 1 - Always

AREA NUMBER (C/O + O + 2) = 1 - Region/Agcy #

AREA ADDRESS (C/O + O + 3) = 214 - Assigned by System Admin

PREEMPT	A	B	C
MINIMUMS	RR1-2	SP	EMER
A	WLK (DFLT)		
B	D T WALK		
C	INITIAL		

Issued Date: Mar-02

Installed Date:

ONTARIO 233 PROGRAM
HWY 26 at RR 19/BLUE MTN RD.

REDIAL TIME - 10 (C/5 + C + O)

DEFAULT IS : REPORT ALL ALARMS (NO FLAGS SET)

Dial-out Telephone

Number	D
0	NO. OF DIGITS
1	1st DIGIT
2	2nd DIGIT
3	3rd DIGIT
4	4th DIGIT
5	5th DIGIT
6	6th DIGIT
7	7th DIGIT
8	8th DIGIT
9	9th DIGIT
A	10th DIGIT
B	11th DIGIT
C	
D	
E	
F	

Column F

	1	2	3	4	5	6	7	8
0	ADV GRN FLH	X						
1	PHASE FLASH							
2	FLASH WALK							
3	GUAR PASS							
4	SIMUL GAP							
5	SEQ TIMING							
6	ADV WALK							
7	DELAY WALK							
8	EXT RECALL							
9								
A	MAX EXTEN							
B	INH PED RSRV							
C	SEMI ACTUATD							
D								
E	STRT VEH CALL	X						
F	STRT PED CALL	X						

SPECIALS < C + O + F = 2 >

< C + O + C = 5 >

Pretimed

PRETIMED ONTARIO 233 PROGRAM

T.O.D. FUNCTIONS

PHASE										PHASES										DAY OF WEEK										PHASES / BITS									
		1	2	3	4	5	6	7	8			1	2	3	4	5	6	7	8			1	2	3	4	5	6	7	8			1	2	3	4	5	6	7	8
WALK		-	35				35		12	0	PERMIT	X	X								0	Pretimed																	
DONT WALK		-	5				5		5	1	RED LOCK										1	09:00	X	X	X	X	X	X											X
MIN INITIAL		5	40				40		10	2	YELLOW LOCK										2	18:00	X	X	X	X	X	X											
TYPE 3 LIMIT		-	-				-		-	3	VEH MIN CALL	X									3																		
ADD PER VEH		-	-				-		-	4	PED RECALL		X				X				4																		
VEH EXT		2.0	5.0				5.0		3.0	5	PEDESTRIANS										5																		
MAX GAP		2.0	5.0				5.0		3.0	6	REST IN WALK										6																		
MIN GAP		2.0	5.0				5.0		3.0	7	RED REST										7																		
MAX LIMIT		10	50				50		15	8	DOUBLE ENTRY		X				X				8																		
MAXIMUM 2		-	-				-		-	9	VEH MAX CALL										9																		
ADV / DLY WALK		-	-				-		-	A	SOFT RECALL										A																		
SEQUENCE TO		-	-				-		-	B	MAXIMUM 2										B																		
COND SRV MIN		-	-				-		-	C	CORD SERVICE										C																		
REDUCE EVERY		-	-				-		-	D	MAN CONT CALL										D																		
YELLOW		2.0	5.9				5.9		5.0	E	YELLOW START		X				X				E																		
RED CLEAR		-	1.5				1.5		1.4	F	FIRST PHASES										F																		
PHASE BANK #		< C + O + F = 1 >										< C + O + F = 1 >										< C + O + E = 27 >																	

< C + O + F = 1 >

< C + O + F = 1 >

PHASE BANK # < C + O + F = 1 >

< C + O + 7 = 1 >

< C + O + E = 27 >

T.O.D. FUNCTIONS

- 0 = PERMIT PHASES A = VEH SOFT RECALL
- 1 = RED LOCK B = MAXIMUM 2
- 2 = YELLOW LOCK C = CONDITIONAL SERVICE
- 3 = VEH MIN RECALL D = LAG PHASES
- 4 = PED RECALL E = BIT 1 - LOCAL OVERRIDE
- 5 - BIT 4 - DISABLE DET OFF MONITOR
- 6 - REST IN WALK BIT 7 - DET COUNT MONITOR
- 7 = RED REST BIT 8 - REAL TIME SPLIT MONITOR
- 8 = DOUBLE ENTRY F = OUTPUT BITS 1 THRU 4
- 9 = VEH MAX RECALL

LOCATION: HWY 26 & GREY RD 19 (BLUE MTN.RD.)

BI Tran Systems, Inc.
510 Bercut Dr., Sacramento, Calif. 95814
916/441-0260
Traffic Signal Program 233 Ontario
Timing Sheet #2
Revised (02/95)

Issued Date: MAR/2002

Installed Date:

APPENDIX C

DETAILED CAPACITY ANALYSES

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/18/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Arrowhead Rd. & Alta Rd.
Jurisdiction	Town of The Blue Mountains
Analysis Year	2007 Existing Volumes

Project Description 119-2528

East/West Street: Alta Road

North/South Street: Arrowhead Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	7	21			17	16
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	9	0	0	0
Percent Heavy Vehicles	29	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	7		9			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	17	16	7	21	0
Percent Heavy Vehicles	0	0	11	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	7						16	
C (m) (veh/h)	1421						990	
v/c	0.00						0.02	
95% queue length	0.01						0.05	
Control Delay (s/veh)	7.5						8.7	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.7	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/18/2007
Analysis Time Period	P.M. Peak Hour

Site Information

Intersection	Arrowhead Rd. & Alta Rd.
Jurisdiction	Town of The Blue Mountains
Analysis Year	2007 Existing Volumes

Project Description 119-2528

East/West Street: Alta Road

North/South Street: Arrowhead Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	11			15	3
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	12	0	7	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12		7			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	15	3	3	11	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	3						19	
C (m) (veh/h)	1612						1014	
v/c	0.00						0.02	
95% queue length	0.01						0.06	
Control Delay (s/veh)	7.2						8.6	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.6	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/18/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Hidden Lake Rd.
Jurisdiction	MTO
Analysis Year	2007 Existing Volumes

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Hidden Lake Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		282	0	2	243	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	282	0	2	243	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	2		3			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	2	0	3	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		2		5				
C (m) (veh/h)		1292		638				
v/c		0.00		0.01				
95% queue length		0.00		0.02				
Control Delay (s/veh)		7.8		10.7				
LOS		A		B				
Approach Delay (s/veh)	--	--	10.7					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/18/2007
Analysis Time Period	P.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Hidden Lake Rd.
Jurisdiction	MTQ
Analysis Year	2007 Existing Volumes

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Hidden Lake Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		410	3	3	517	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	410	3	3	517	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	
Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1		0			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	1	0	0	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		3		1				
C (m) (veh/h)		1157		297				
v/c		0.00		0.00				
95% queue length		0.01		0.01				
Control Delay (s/veh)		8.1		17.2				
LOS		A		C				
Approach Delay (s/veh)	--	--	17.2					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/18/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Arrowhead Rd.
Jurisdiction	MTO
Analysis Year	2007 Existing Volumes

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Arrowhead Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		263	22	10	236	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	263	22	10	236	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9		6			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	9	0	6	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		Y			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		10		15				
C (m) (veh/h)		1289		862				
v/c		0.01		0.02				
95% queue length		0.02		0.05				
Control Delay (s/veh)		7.8		11.1				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.1					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	Alex Fleming		Intersection	Hwy. 26 & Arrowhead Rd.
Agency/Co.	C.F. Crozier & Associates		Jurisdiction	MTO
Date Performed	6/18/2007		Analysis Year	2007 Existing Volumes
Analysis Time Period	P.M. Peak Hour			

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Arrowhead Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		398	12	11	513	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	398	12	11	513	0
Percent Heavy Vehicles	0	--	--	9	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	7		5			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	5	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		Y			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		11		12				
C (m) (veh/h)		1112		506				
v/c		0.01		0.02				
95% queue length		0.03		0.07				
Control Delay (s/veh)		8.3		14.6				
LOS		A		B				
Approach Delay (s/veh)	--	--	14.6					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/26/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Hidden Lake Rd.
Jurisdiction	MTO
Analysis Year	2014 Future Background

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Hidden Lake Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		391	0	2	339	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	391	0	2	339	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	
Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	2		3			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	2	0	3	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		2		5				
C (m) (veh/h)		1179		517				
v/c		0.00		0.01				
95% queue length		0.01		0.03				
Control Delay (s/veh)		8.1		12.0				
LOS		A		B				
Approach Delay (s/veh)	--	--		12.0				
Approach LOS	--	--		B				

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/26/2007
Analysis Time Period	P.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Hidden Lake Rd.
Jurisdiction	MTO
Analysis Year	2014 Future Background

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Hidden Lake Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		566	3	3	713	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	566	3	3	713	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	1	0	0			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	1	0	0	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		3		1				
C (m) (veh/h)		1013		182				
v/c		0.00		0.01				
95% queue length		0.01		0.02				
Control Delay (s/veh)		8.6		24.9				
LOS		A		C				
Approach Delay (s/veh)	--	--	24.9					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/26/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Arrowhead Rd.
Jurisdiction	MTQ
Analysis Year	2014 Future Background

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Arrowhead Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		361	26	19	325	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	361	26	19	325	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	
Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	13		17			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	13	0	17	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		Y			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		19		30				
C (m) (veh/h)		1183		900				
v/c		0.02		0.03				
95% queue length		0.05		0.10				
Control Delay (s/veh)		8.1		12.2				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.2					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/26/2007
Analysis Time Period	P.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Arrowhead Rd.
Jurisdiction	MTO
Analysis Year	2014 Future Background

Project Description 119-2528

East/West Street: Highway 26

Intersection Orientation: East-West

North/South Street: Arrowhead Road

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		546	16	20	707	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	546	16	20	707	0
Percent Heavy Vehicles	0	--	--	9	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	11		16			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	11	0	16	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		Y			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		20		27				
C (m) (veh/h)		975		434				
v/c		0.02		0.06				
95% queue length		0.06		0.20				
Control Delay (s/veh)		8.8		17.9				
LOS		A		C				
Approach Delay (s/veh)	--	--		17.9				
Approach LOS	--	--		C				

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	Alex Fleming		Intersection	Arrowhead Rd. & Alta Rd.
Agency/Co.	C.F. Crozier & Associates		Jurisdiction	Town of The Blue Mountains
Date Performed	6/26/2007		Analysis Year	2014 Future Background
Analysis Time Period	A.M. Peak Hour			

Project Description 119-2528

East/West Street: Alta Road

North/South Street: Arrowhead Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	7	34			29	16
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	9	0	0	0
Percent Heavy Vehicles	29	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	7		9			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	29	16	7	34	0
Percent Heavy Vehicles	0	0	11	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	7						16	
C (m) (veh/h)	1406						967	
v/c	0.00						0.02	
95% queue length	0.02						0.05	
Control Delay (s/veh)	7.6						8.8	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.8	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	Alex Fleming		Intersection	Arrowhead Rd. & Alta Rd.
Agency/Co.	C.F. Crozier & Associates		Jurisdiction	Town of The Blue Mountains
Date Performed	6/26/2007		Analysis Year	2014 Future Background
Analysis Time Period	P.M. Peak Hour			

Project Description 119-2528

East/West Street: Alta Road

North/South Street: Arrowhead Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	3	24			27	3
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	12	0	7	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12		7			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	27	3	3	24	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	3						19	
C (m) (veh/h)	1596						987	
v/c	0.00						0.02	
95% queue length	0.01						0.06	
Control Delay (s/veh)	7.3						8.7	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.7	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information			Site Information	
Analyst	Alex Fleming		Intersection	Hwy. 26 & Arrowhead Rd.
Agency/Co.	C.F. Crozier & Associates		Jurisdiction	MTO
Date Performed	6/27/2007		Analysis Year	2014 Total Volumes
Analysis Time Period	A.M. Peak Hour			

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Arrowhead Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		364	26	21	328	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	364	26	21	328	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	13		19			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	13	0	19	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		Y			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		21		32				
C (m) (veh/h)		1180		943				
v/c		0.02		0.03				
95% queue length		0.05		0.11				
Control Delay (s/veh)		8.1		12.2				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.2					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/26/2007
Analysis Time Period	P.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Arrowhead Rd.
Jurisdiction	MTO
Analysis Year	2014 Total Volumes

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Arrowhead Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		560	16	22	710	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	560	16	22	710	0
Percent Heavy Vehicles	0	--	--	9	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	11		18			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	11	0	18	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		Y			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		22		29				
C (m) (veh/h)		964		453				
v/c		0.02		0.06				
95% queue length		0.07		0.20				
Control Delay (s/veh)		8.8		17.8				
LOS		A		C				
Approach Delay (s/veh)	--	--	17.8					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/27/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Hidden Lake Rd.
Jurisdiction	MTQ
Analysis Year	2014 Total Volumes

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Hidden Lake Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		393	2	5	342	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	393	2	5	342	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	
Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	4		6			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	4	0	6	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		5		10				
C (m) (veh/h)		1175		511				
v/c		0.00		0.02				
95% queue length		0.01		0.06				
Control Delay (s/veh)		8.1		12.2				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.2					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/26/2007
Analysis Time Period	P.M. Peak Hour

Site Information

Intersection	Hwy. 26 & Hidden Lake Rd.
Jurisdiction	MTO
Analysis Year	2014 Total Volumes

Project Description 119-2528

East/West Street: Highway 26

North/South Street: Hidden Lake Road

Intersection Orientation: East-West

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		568	5	6	716	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	568	5	6	716	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	1	0	1	0
Configuration		T	R	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	3		4			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	3	0	4	0	0	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		1			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		6		7				
C (m) (veh/h)		1010		288				
v/c		0.01		0.02				
95% queue length		0.02		0.07				
Control Delay (s/veh)		8.6		17.8				
LOS		A		C				
Approach Delay (s/veh)	--	--	17.8					
Approach LOS	--	--	C					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/27/2007
Analysis Time Period	A.M. Peak Hour

Site Information

Intersection	Arrowhead Rd. & Alta Rd.
Jurisdiction	Town of The Blue Mountains
Analysis Year	2014 Total Volumes

Project Description 119-2528

East/West Street: Alta Road

North/South Street: Arrowhead Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	10	34			29	18
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	9	0	11	0	0	0
Percent Heavy Vehicles	29	--	--	0	--	--
Median Type	Two Way Left Turn Lane					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9		11			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	29	18	10	34	0
Percent Heavy Vehicles	0	0	11	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	10						20	
C (m) (veh/h)	1404						935	
v/c	0.01						0.02	
95% queue length	0.02						0.07	
Control Delay (s/veh)	7.6						8.9	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.9	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Alex Fleming
Agency/Co.	C.F. Crozier & Associates
Date Performed	6/27/2007
Analysis Time Period	P.M. Peak Hour

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Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	5	24			27	5
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	14	0	10	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	14		10			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	0	27	5	5	24	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	5						24	
C (m) (veh/h)	1593						985	
v/c	0.00						0.02	
95% queue length	0.01						0.07	
Control Delay (s/veh)	7.3						8.7	
LOS	A						A	
Approach Delay (s/veh)	--	--				8.7		
Approach LOS	--	--				A		