

TRAFFIC IMPACT STUDY
HUNTINGWOOD TRAILS
HUNTINGWOOD TRAILS (COLLINGWOOD) LTD.

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TABLE OF CONTENTS

1.0	Introduction	1
1.1.	Development Proposal	1
2.0	Existing Conditions	3
2.1.	Boundary Road Network	3
2.2.	Traffic Data	4
2.3.	Intersection Operations	4
3.0	Future Background Traffic	5
3.1.	Study Horizon	5
3.2.	Future Roadway Improvements	5
3.3.	Traffic Growth Rates	6
3.4.	Intersection Operations	6
4.0	Site Generated Traffic	8
4.1.	Trip Generation	9
4.2.	Trip Distribution and Assignment	10
5.0	Total Future Conditions	11
5.1.	Basis of Assessment	11
5.2.	Auxiliary Lane Analysis	11
5.3.	Intersection Operations	11
5.4.	Roadway Classification	13
6.0	Conclusions and Recommendations	14

LIST OF APPENDICES

Appendix A:	Level of Service Definitions
Appendix B:	Traffic Data
Appendix C:	Detailed Capacity Analyses
Appendix D:	Auxiliary Lane Analysis

LIST OF FIGURES

Figure 1:	Site Location Plan
Figure 2:	Draft Plan
Figure 3:	2008 Existing Traffic Volumes
Figure 4:	2021 Corridor Growth Traffic Volumes
Figure 5:	2026 Corridor Growth Traffic Volumes
Figure 6:	2031 Corridor Growth Traffic Volumes
Figure 7:	Other Background Developments Traffic Volumes
Figure 8:	2021 Future Background Traffic Volumes
Figure 9:	2026 Future Background Traffic Volumes
Figure 10:	2031 Future Background Traffic Volumes
Figure 11:	West Lands Residential Trip Distribution
Figure 12:	East Lands Residential Trip Distribution
Figure 13:	East Lands Primary Commercial Trip Distribution
Figure 14:	West Lands Residential Trip Assignment
Figure 15:	East Lands Residential Trip Assignment
Figure 16:	East Lands Primary Commercial Trip Assignment
Figure 17:	2021 Total Future Traffic Volumes
Figure 18:	2026 Total Future Traffic Volumes
Figure 19:	2031 Total Future Traffic Volumes

1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Huntingwood Trails (Collingwood) Ltd. to undertake a Traffic Impact Study (TIS) in support of an official plan amendment for a proposed residential development in the Town of Collingwood. The 49 hectare property is located south of Highway 26 and Silver Creek Drive, north of the Georgian Trail, and lies astride of Silver Creek. The site is also bordered by two existing subdivisions to the east and west, namely: "Silver Glen Preserve" and "The Forest", respectively. Figure 1 illustrates the site location.

1.1. Development Proposal

The development will consist of a mix of residential uses with a commercial building, intended to serve local area residents. For the purposes of this TIS, the draft plan DP3 prepared by D.C. Slade Consultants Inc. has been used in the analysis, and is shown in Figure 2. Since the time of analysis, an updated draft plan (DP4) has been produced, with a reduction of 30 residential units. This reduction will not have a material effect on the conclusions and recommendations contained herein.

Table 1 provides information on the various uses and the corresponding Institute of Transportation Engineers (ITE) land use codes used for trip generation.

Table 1
Development Components

Type/Block	Area	Units	ITE Code	ITE Category
Single Detached Lots / Block N/A	West	60	210	Single-Family Detached Housing
Semi Detached Units / Block 1	West	14	210	Single-Family Detached Housing
Townhouses / Blocks 2 & 3	West	30	230	Residential Condominium/Townhouse
Single Family Lots / Block N/A	East	39	210	Single-Family Detached Housing
Walk-up Apartment Buildings / Block 5	East	180	220	Apartment
Local Commercial / Block 7	East	450 m ² / 4,844 ft ²	820	Shopping Centre
Townhouses / Blocks 8, 9 & 10	East	120	230	Residential Condominium/Townhouse
Single Detached Lots / Block 11	East	33	210	Single-Family Detached Housing
Seniors Complex / Block 12	East	50	252	Senior Adult Housing – Detached
Community Centre	East	N/A	N/A	N/A

Two distinct accesses to the site are proposed. The lands to the west of Silver Creek will be accessed through a two-lane roadway intersecting Silver Creek Drive. The lands to the east of Silver Creek will be

accessed through a two-lane roadway intersecting Silver Glen Boulevard. The east lands roadway will be contained within a 30 metre right-of-way, to facilitate potential additional travel lanes (refer to Section 5.4).

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.

2.0 Existing Conditions

2.1. Boundary Road Network

Highway 26 is a two-lane east-west highway under the jurisdiction of the Town of Collingwood. The roadway has a rural cross-section. The speed limit transitions at a point approximately 100 metres west of Silver Glen Boulevard from 60 km/h (west) to 50 km/h (east).

County Road 21 (Osler Bluff Road), located west of the property, is a two-lane north-south arterial roadway under the jurisdiction of Grey County. The roadway has a rural cross-section and the posted speed limit is 60 km/h.

Silver Creek Drive is a two-lane east-west local roadway under the jurisdiction of the Town of Collingwood. The roadway has a rural cross-section and the posted speed limit is 50 km/h.

Forest Drive is a two-lane local roadway located west of the site under the jurisdiction of the Town of Collingwood. The roadway has a rural cross-section and the posted speed limit is 50 km/h.

Silver Glen Boulevard is a two-lane north south local roadway with an urban cross-section. It is owned by the developers of the Silver Glen Preserve. The roadway is to be dedicated to the Town of Collingwood upon full build-out of the development and the associated maintenance period.

The critical intersections selected for analysis reflect the anticipated future route of drivers to the arterial roadway system, namely Highway 26 and County Road 21.

The three-legged intersection of Highway 26 and Silver Creek Drive is unsignalized. The south approach (Silver Creek Drive) is stop-controlled and consists of a shared left turn/right turn lane. Insufficient pavement width exists to allow simultaneous left and right turns. No restrictions to free flow are placed on the east and west approaches (Highway 26). The east approach consists of a left turn/through lane while the west approach consists of a through lane and a right-turn taper.

The three-legged intersection of County Road 21 and Forest Drive is unsignalized. The east approach (Forest Drive) is stop-controlled and consists of a shared left turn/right turn lane. Insufficient pavement width exists to allow simultaneous left and right turns. No restrictions to free flow are placed on the north and south approaches (County Road 21). The north approach consists of a shared left turn/through lane while the south approach consists of shared through/right turn lane.

The three-legged intersection of Highway 26 and Silver Glen Boulevard is unsignalized. The south approach (Silver Glen Boulevard) is stop-controlled and consists of a shared left turn/right turn lane.

Sufficient pavement width exists to allow simultaneous left and right turns. No restrictions to free flow are placed on the east and west approaches (Highway 26). The east approach consists of a through lane and left turn lane. The west approach consists of a through lane and a right turn taper. Future improvements will be undertaken to this intersection with the development of the Preserve at Georgian Bay, a proposed residential development located on the north side of Highway 26, and are described in Section 3.2.

2.2. Traffic Data

Turning movement counts were undertaken by Crozier staff at the boundary road intersections from 7:00 to 9:00 a.m. and from 4:00 to 6:00 p.m. on Thursday, August 7, 2008. This traffic data provides the typical roadway peak traffic conditions through these intersections.

The a.m. peak hour was found to be 8:00 to 9:00 a.m. at both intersections while the p.m. peak hour was found to be 4:30 to 5:30 p.m. at Highway 26/Silver Creek Drive and 4:15 to 5:15 p.m. at County Road 21/Forest Drive.

No turning movement counts were undertaken at the intersection of Highway 26 and Silver Glen Boulevard as this intersection serves very few occupied residential homes (i.e. less than 15 at the time of this study). Future traffic data for the intersection was interpolated from the witness statement of the author for the Ontario Municipal Board hearing for the Preserve at Georgian Bay (OMB Case File No. PL040510)

The traffic data contained in Appendix B provides a summary of the turning movement counts. The existing peak hour traffic volumes are outlined in Figure 3.

2.3. Intersection Operations

The operations of the critical intersections were analyzed on the basis of the existing traffic volumes illustrated in Figure 3. Detailed capacity analysis worksheets are included in Appendix C.

Peak hour factors for turning movements were calculated from the field counts. Peak hour factors are an adjustment to traffic volumes to reflect that the flow of traffic is not homogenous, and that a peak 15 minute flow occurs within the peak hour. The intersection is assessed on the peak 15 minute flows of each movement. A minimum peak hour factor of 0.7 was used in this analysis.

The assessment of unsignalized intersections is based on the method outlined in the "Highway Capacity Manual", 2000. Synchro 7 Light modeling software was used for this analysis. The Level of Service (LOS) definitions for intersections are included in Appendix A.

Table 1 outlines the existing Levels of Service.

Table 2
2008 Existing Traffic Levels of Service

Intersection	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Creek Drive	A.M.	B	11.1 s	0.8 m	0.04
	P.M.	B	11.4 s	1.0 m	0.04
County Road 21 and Forest Drive	A.M.	A	9.4 s	0.4 m	0.02
	P.M.	A	9.8 s	0.4 m	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, the subject intersections operate at a LOS "B" or better in both the a.m. and the p.m. peak hour. The 95th percentile queue lengths are one vehicle, and the volume-to-capacity ratios are very low.

3.0 Future Background Traffic

3.1 Study Horizon

Due to the relatively large scale of this development, horizon years of the full-build out, along with five and ten years thereafter were selected for analysis. An initial ten year horizon was considered to be feasible to capture the full build-out of the development, thus horizon years of 2021, 2026 and 2031 were used in the analysis.

A phasing plan for the development had not been formulated at the time of the study, therefore, no intermediary horizon years have been analyzed.

3.2 Future Roadway Improvements

Improvements to the intersection of Highway 26 and Silver Glen Boulevard have been proposed as part of the Preserve at Georgian Bay Residential development. It is proposed that this development will access Highway 26 as the north approach to this intersection, and that the intersection be signalized.

The timing of the signalization improvement is unknown, however, the analysis of the 2021, 2026 and 2031 horizon years has assumed that the intersection is signalized.

3.3. Traffic Growth Rates

Traffic growth rates were based on the "Highway 26 Corridor Collingwood Area Study Design Traffic Operations Report", May 2004, prepared by McCormick Rankin Corporation. This report was a comprehensive examination of the future transportation demands in Collingwood driven by growth in population, tourism and projected development. The report forecasted ten (2013) and twenty year (2023) demands on major routes in the area, including Highway 26. Excerpts of this report were provided by Town of Collingwood staff.

The report provided traffic volume forecasts for the nearby intersection of Highway 26 and County Road 21 to the west of the subject development. Growth rates were calculated from these forecasts. A compound growth rate of 5.2 percent was calculated for Highway 26 and a compound growth rate of 4.4 percent was calculated for County Road 21. For the years following 2023, a more typical industry standard 2 percent growth rate was used.

No background growth rates were applied to volumes on Silver Creek Drive and Forest Drive. With the exception of the subject development, these roadways serve mature neighbourhoods. The calculated 2021, 2026 and 2031 corridor growth traffic volumes are illustrated in Figures 4, 5 and 6, respectively.

The site location is in close proximity to the "Silver Glen Preserve" and "The Preserve at Georgian Bay" developments. These developments will both access the Highway 26 and Silver Glen Boulevard intersection. Information regarding the timing of the full-build out of these developments was unavailable. As such, it was assumed that these developments would be complete by the 2021 horizon year. The increased traffic volumes associated with these developments, available from "The Preserve at Georgian Bay Traffic Impact Study", Crozier, 2007, are illustrated in Figure 7.

The calculated 2021, 2026 and 2031 future background traffic volumes are illustrated in Figures 8, 9 and 10, and constitute the sum of the corridor growth rates and the development specific volumes.

3.4. Intersection Operations

The operations of the critical intersections were analyzed on the basis of the traffic volumes illustrated in Figure 6. The intersection of Highway 26 and Silver Glen Boulevard was modeled as a semi-actuated system, with intergreen periods as prescribed in the ITE "Canadian Capacity Guide for Signalized Intersections", 1995. All approaches were assumed to consist of a left turn lane and a shared through/right turn lane, excepting the eastbound approach which was assumed to consist of a left-turn lane, a through lane and a right-turn taper.

Peak hour factors of 0.9 were used in the analysis of future background traffic conditions. The 0.9 peak hour factor is an industry standard in the assessment of intersections, and reflects the inherent uncertainty of forecasted traffic volumes.

Table 3, 4 and 5 outlines the year 2021, 2026 and 2031 future background traffic levels of service, respectively. Detailed capacity analysis worksheets are included in Appendix C.

Table 3
2021 Future Background Traffic Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Glen Boulevard	Future Signal	A.M.	A	9.3 s	-	0.66
		P.M.	A	9.6 s	-	0.80
Highway 26 and Silver Creek Drive	Stop	A.M.	B	15.0 s	1.0 m	0.04
		P.M.	C	18.3 s	1.7 m	0.07
County Road 21 and Forest Drive	Stop	A.M.	A	9.7 s	0.3 m	0.01
		P.M.	B	10.4 s	0.3 m	0.01

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Highway 26 and Silver Glen Boulevard operations were modeled with optimized signal timing plans.

Table 4
2026 Future Background Traffic Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Glen Boulevard	Future Signal	A.M.	B	10.4 s	-	0.72
		P.M.	B	12.6 s	-	0.86
Highway 26 and Silver Creek Drive	Stop	A.M.	C	17.2 s	1.3 m	0.05
		P.M.	C	22.9 s	2.2 m	0.09
County Road 21 and Forest Drive	Stop	A.M.	A	9.9 s	0.3 m	0.02
		P.M.	B	10.8 s	0.4 m	0.02

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Highway 26 and Silver Glen Boulevard operations were modeled with optimized signal timing plans.

Table 5
2031 Future Background Traffic Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	95 th ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Glen Boulevard	Future Signal	A.M.	B	11.5 s	-	0.78
		P.M.	B	15.6 s	-	0.91
Highway 26 and Silver Creek Drive	Stop	A.M.	C	19.2 s	1.5 m	0.06
		P.M.	D	27.0 s	2.7 m	0.11
County Road 21 and Forest Drive	Stop	A.M.	B	10.1 s	0.4 m	0.02
		P.M.	B	11.1 s	0.4 m	0.02

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Highway 26 and Silver Glen Boulevard operations were modeled with optimized signal timing plans.

As can be seen in Tables 3, 4 and 5, the signalized intersection of Highway 26 and Silver Glen Boulevard will operate at LOS "B" in the both the a.m. and p.m. peak hour. This level of service is a result of the semi-actuated system, which provides continuous green time to the Highway 26 mainline, unless a vehicle is detected on the Silver Glen Boulevard approach.

The intersection of Highway 26 and Silver Creek Drive will experience a deterioration in operations to a Level of Service "D" during the weekday p.m. peak hour in 2031 horizon year. This is a result of greater mainline Highway 26 volumes reducing the availability of gaps for Silver Creek Drive traffic. However, the delay associated with this approach is acceptable, and is characterized by 95th percentile queue lengths of one vehicle and volume-to-capacity ratio of 0.11, indicating significant excess capacity to serve an increase in demand.

The unsignalized intersection of County Road 21 and Forest Drive will operate at a LOS "B" during the a.m. and p.m. peak hours. These intersections will be characterized by 95th percentile queue lengths of one vehicle and low volume-to-capacity ratios.

4.0 Site Generated Traffic

The proposed development will result in additional vehicles on the boundary road network, as well as additional turning movements at the boundary road intersections.

4.1. Trip Generation

The ITE Trip Generation Manual, 8th Edition was used to model the various residential and commercial uses proposed for the subject lands. The specific categories used are specified in Table 6 and 7, along with the corresponding trips.

As defined by the ITE Trip Generation Handbook, 2nd Edition, primary trips are trips made for the specific purpose of visiting the generator and pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Information on primary and pass-by trips was available in Table 5.6 of the ITE Trip Generation Handbook, 2nd Edition. The weekday p.m. peak hour pass-by rate of 34 percent was applied to the weekday a.m. peak hour for lack of specific information on the a.m. pass-by rate.

As the primary trips will be the only net addition of vehicles to the road, only these types are listed in Table 7. The pass-by trips will be captured by the trip generation of the residential uses of both the subject development and the Silver Glen Preserve development (refer to Section 3.3).

Table 6
Site Generated Trips – West Lands

Use	Roadway Peak Hour	Number of Trips		
		Inbound	Outbound	Total
Single Detached Units Category 210	Weekday A.M.	11	34	45
	Weekday P.M.	38	23	61
Townhouse Units Category 230	Weekday A.M.	2	11	13
	Weekday P.M.	11	5	16
Semi-Detached Units Category 210	Weekday A.M.	3	8	11
	Weekday P.M.	9	5	14
Total Trips – West Lands	Weekday A.M.	16	53	69
	Weekday P.M.	58	33	91

Table 7
Site Generated Trips – East Lands

Use	Roadway Peak Hour	Number of Trips		
		Inbound	Outbound	Total
Single Detached Units Category 210	Weekday A.M.	13	41	54
	Weekday P.M.	46	27	73
Apartment Units Category 220	Weekday A.M.	18	74	92
	Weekday P.M.	73	39	112
Townhouse Units Category 230	Weekday A.M.	9	44	53
	Weekday P.M.	42	20	62
Seniors Complex Category 252	Weekday A.M.	3	4	7
	Weekday P.M.	5	3	8
Local Commercial Block – Primary Category 820	Weekday A.M.	11	7	18
	Weekday P.M.	27	28	55
Total Trips – West Lands	Weekday A.M.	54	170	224
	Weekday P.M.	193	117	310

4.2. Trip Distribution and Assignment

The residential trips generated by the proposed development were distributed to the boundary road network based on location of employment, retail and service destinations. The Town of Collingwood is the major employment centre in the area, as well as the site of regional “big box” stores and many services. The Village at Blue Mountain is a smaller area providing retail, service, leisure and employment destinations.

Accordingly, 60 percent were distributed towards Collingwood and areas further east, 20 percent towards the retail and recreational areas at the Village at Blue Mountain, and 20 percent towards Thornbury and areas further west. The residential trip distribution for the west lands is illustrated in Figure 11 and the residential trip distribution for the east lands is illustrated in Figure 12.

The commercial trips generated by the local commercial block were distributed to the boundary road network based on the proximity of nearby existing and proposed residential areas. Accordingly, 20 percent of trips were distributed to the west lands and residential areas of Silver Creek Drive and Forest Drive, 40 percent were distributed to the future residential areas of the Preserve at Georgian Bay development, and 40 percent were distributed to the east to residential areas associated with Princeton Shores Boulevard and the Tanglewood development. The commercial trip distribution is illustrated in Figure 13.

The trips generated by the proposed development were applied to the distributions in Figures 11, 12 and 13. The resulting trip assignments are illustrated in Figures 14, 15 and 16.

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 Figures 14, 15 and 16 being superimposed on the future background traffic volumes in Figure 8, 9 and 10. The resulting 2021, 2026 and 2031 total future traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in Figures 17, 18 and 19, respectively.

5.2. Auxiliary Lane Analysis

A left-turn lane warrant was undertaken for the intersection of Highway 26 and Silver Creek Drive using the Ontario Ministry of Transportation (MTO) Geometric Design Standards for Ontario Highways (GDSOH). During the critical 2031 total traffic p.m. peak hour, 53 vehicles out of an advancing volume (Va) of 1196 vehicles will make an westbound left-turn, equating to 4.4 percent. With an opposing volume of 1105 vehicles, a left turn lane with 35 metres of storage is warranted in the p.m. peak hour under the 2031 total traffic condition per Figure EA-10 of the GDSOH. The left-turn lane warrant has been included in Appendix D.

Table E9-1 of the GDSOH prescribes a left-turn lane parallel and taper requirement of 40 metres and 115 metres, respectively for an 70 km/h design speed and a grade of less than 2 percent.

5.3. Intersection Operations

The 2021, 2026 and 2031 total traffic levels of service are outlined in Tables 8, 9 and 10, respectively. Detailed capacity analysis worksheets are included in Appendix C.

Table 8
2021 Total Traffic Levels of Service

Intersection	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Glen Boulevard	A.M.	B	11.1 s	-	0.71
	P.M.	B	12.1 s	-	0.82
Highway 26 and Silver Creek Drive	A.M.	C	21.5 s	6.7 m	0.23
	P.M.	D	34.2 s	9.4 m	0.31
County Road 21 and Forest Drive	A.M.	B	10.5 s	0.8 m	0.03
	P.M.	B	11.3 s	0.7 m	0.03

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Highway 26 and Silver Glen Boulevard operations were modeled with optimized signal timing plans.

Table 9
2026 Total Traffic Levels of Service

Intersection	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Glen Boulevard	A.M.	B	12.9 s	-	0.78
	P.M.	B	16.5 s	-	0.89
Highway 26 and Silver Creek Drive	A.M.	D	28.0 s	9.1 m	0.30
	P.M.	F	55.6 s	14.7 m	0.44
County Road 21 and Forest Drive	A.M.	B	10.8 s	0.9 m	0.04
	P.M.	B	11.7 s	0.8 m	0.03

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Highway 26 and Silver Glen Boulevard operations were modeled with optimized signal timing plans.

Table 10
2031 Total Traffic Levels of Service

Intersection	Peak Hour	Level of Service	Control Delay	95%ile Queue Length	Volume-to-Capacity
Highway 26 and Silver Glen Boulevard	A.M.	B	14.5 s	-	0.83
	P.M.	B	19.6 s	-	0.93
Highway 26 and Silver Creek Drive	A.M.	D	34.8 s	11.4 m	0.35
	P.M.	F	84.7 s	20.1 m	0.57
County Road 21 and Forest Drive	A.M.	B	11.1 s	0.9 m	0.04
	P.M.	B	12.2 s	0.8 m	0.03

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.

Highway 26 and Silver Glen Boulevard operations were modeled with optimized signal timing plans.

As can be seen in Tables 8, 9 and 10, both the signalized intersection of Highway 26 and Silver Glen Boulevard as well as the unsignalized intersection of County Road 21 and Forest Drive will operate at levels of service unchanged from future background traffic conditions.

The intersection of Highway 26 and Silver Creek Drive will operate at lesser Levels of Service "D" and "F" during the 2031 horizon year weekday a.m. and p.m. peak hours, as compared to Levels "C" and "D" under future background traffic conditions. This is a result of a reduction in available gaps on Highway 26 due to increased mainline traffic volumes, combined with an increase in vehicles on the Silver Creek Drive approach due to site generated traffic. . However, this situation is typical of major arterials and highways, where the intent is to provide traffic flow priority to vehicles once they have accessed the thoroughfare. Additionally, there is no further surplus land in the immediate vicinity for development, thus increased demand on the Silver Creek Drive approach to Highway 26 is not expected.

Furthermore, a proposed development at the former Easter Seal lands in Craighleith, Town of The Blue Mountains (Terrasan development), has required the signalization of the Highway 26 and Grey County Road 21 intersection. Therefore, a viable alternate route via westbound Silver Creek Drive and Grey County Road 21 will be available to access Highway 26 for outbound vehicles destined to areas west upon signalization of this intersection.

5.4. Roadway Classification

The roadway connecting the east lands to Silver Glen Boulevard is designed to allow for a future arterial roadway connecting Highway 26 to Mountain Road. Limited connections between Highway 26 and Mountain Road exist in the area from Collingwood to Craighleith. These existing connecting roadways

occur at the intersection of Highway 26 and Mountain Road in Collingwood, Grey County Road 21 at the Collingwood – Town of The Blue Mountains boundary, and the intersection of Highway 26 and Grey County Road 19 (Mountain Road) in Craighleith.

The areas near the subject lands are rapidly being developed. Major local area developments include "Silver Glen Preserve" (184 units), "Tanglewood at Cranberry Trail" (up to 882 units), "Brandy Lane" (up to 140 units) "The Preserve at Georgian Bay" (426 units). These new residents will cause increased pressure on the public road system.

During the course of approvals associated with the Silver Glen Preserve project, the Town of Collingwood required a dual carriage entrance road allowance (Silver Glen Boulevard). This was to provide opportunities to the Town in the future to realize a north/south arterial roadway between Highway 26 and Mountain Road. Silver Glen Boulevard is to be assumed by the Town of Collingwood upon completion of all phases of the Silver Glen Preserve development and the subsequent maintenance period.

Subject to further study, the proponent sees considerable merit in providing a further linkage between Highway 26 and areas south. The future signalization of the Highway 26 and Silver Glen Boulevard intersection makes it an ideal termini point for this linkage. Accordingly, Huntingwood are following suit by incorporating provisions within their plan for this future arterial roadway.

The alignment of an arterial connection between Highway 26 and Mountain Road would be subject to extensive study through the future Mountain West Secondary Plan. The design of the proposed development has been undertaken to facilitate such a connection at this location, should future study so recommend.

Until such time as the roadway is assumed by the Town of Collingwood, it shall be a privately owned facility within a municipally owned block.

6.0 Conclusions and Recommendations

The analysis undertaken within was prepared using a recent draft plan. Any subsequent, minor changes to the unit count from a revised draft plan will not materially affect the conclusions and recommendations contained within this report.

Intersection analyses of the existing traffic volumes indicate that the subject area intersections are operating at LOS "B" or better in both the a.m. and p.m. peak hours. Both intersections are characterised by low 95th percentile queues and volume-to-capacity ratios.

Intersection analyses of the future background traffic conditions indicate that the Highway 26 and Silver Glen Boulevard intersection will operate at Level of Service "B" in both peak hours under signalization in the 2031 horizon year. Likewise, the intersection of County Road 21 and Forest Drive will operate at Level of Service "B" in both peak hours in the 2031 horizon year. The intersection of Highway 26 and Silver Creek Drive will operate at a Level of Service "D" during the p.m. peak hour in the 2031 horizon year. However, the 95th percentile queue length will be one vehicle and the volume-to-capacity ratio of 0.11 is low.

The proposed development is expected to add 293 and 401 new trips to the boundary road system in the a.m. and p.m. peak hours, respectively. These trips were distributed to the boundary road network and added to the future background traffic volumes to obtain the total traffic volumes.

An auxiliary lane analysis was performed at the intersection of Highway 26 and Silver Creek Drive and a westbound left-turn lane was found to be warranted in the p.m. peak hour of the 2031 total traffic condition. This lane requires 35 metres of storage, 40 metres of parallel and 115 metres of taper as per the MTO Geometric Design Manual. The dimensions of the left-turn lane should be confirmed at the time of detailed design.

Intersection analyses of the total traffic volumes indicate that the Levels of Service will remain unchanged from future background traffic conditions for the intersections of Highway 26 and Silver Glen Boulevard and County Road 21 and Forest Drive. The intersection of Highway 26 and Silver Creek Drive will operate at a Level of Service "D" and "F" during the a.m. and p.m. peak hours, respectively in the 2031 horizon year. This situation is typical for unsignalized access to major arterials and highways, where the intent is to provide traffic flow priority to vehicles once they have accessed the thoroughfare

It is concluded that the proposed residential development will not adversely affect the boundary road system with the introduction of a westbound left-turn lane at the intersection of Highway 26 and Silver Creek Drive.

Respectfully Submitted,

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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	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Level of Service Definitions

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX B

Traffic Data

Job Number: 281-2769
 Date: 7-Aug-08
 Counter: Jesse Matchett

North Leg (Southbound) Road Name: CR 19
 South Leg (Northbound) Road Name: CR 19
 East Leg (Westbound) Road Name: Forest Dr
 West Leg (Eastbound) Road Name: N/A

A.M. Peak Hour 8:00 - 9:00	Eastbound N/A			Westbound Forest Dr			Northbound CR 19			Southbound CR 19		
	L	T	R	L	T	R	L	T	R	L	T	R
7:00	0	0	0	0	0	1	0	8	1	0	10	0
7:15	0	0	0	2	0	0	0	12	0	0	16	0
7:30	0	0	0	0	0	0	0	20	0	1	17	0
7:45	0	0	0	0	0	1	0	17	1	0	25	0
8:00	0	0	0	1	0	1	0	13	0	0	20	0
8:15	0	0	0	2	0	0	0	19	1	1	25	0
8:30	0	0	0	2	0	2	0	11	1	1	26	0
8:45	0	0	0	0	0	2	0	23	3	0	28	0

Peak Hour HV's	0	0	0	1	0	0	0	2	1	0	5	0
Ped Crossings		0			0			0			0	

A.M. Peak Hour	0	0	0	5	0	5	0	66	5	2	99	0
HV% of PHV				20%		0%		3%	20%	0%	5%	

Date: 7-Aug-08
 Counter: Jesse Matchett

P.M. Peak Hour 16:15 - 17:15	Eastbound N/A			Westbound Forest Dr			Northbound CR 19			Southbound CR 19		
	L	T	R	L	T	R	L	T	R	L	T	R
16:00	0	0	0	3	0	0	0	21	1	0	29	0
16:15	0	0	0	1	0	2	0	32	2	1	20	0
16:30	0	0	0	3	0	0	0	20	0	2	34	0
16:45	0	0	0	1	0	1	0	19	3	0	22	0
17:00	0	0	0	1	0	0	0	20	1	1	33	0
17:15	0	0	0	2	0	0	0	31	1	0	23	0
17:30	0	0	0	1	0	0	0	23	2	2	20	0
17:45	0	0	0	1	0	0	0	24	2	0	27	0

Peak Hour HV's	0	0	0	0	0	0	0	2	0	0	3	0
Ped Crossings		0			0			0			0	

P.M. Peak Hour	0	0	0	6	0	3	0	91	6	4	109	0
HV% of PHV				0%		0%		2%	0%	0%	3%	

Job Number: 281-2769
 Date: 7-Aug-08
 Counter: Patrick Hatton

North Leg (Southbound) Road Name: N/A
 South Leg (Northbound) Road Name: Silvercreek Dr
 East Leg (Westbound) Road Name: Highway 26
 West Leg (Eastbound) Road Name: Highway 26

A.M. Peak Hour 8:00 - 9:00	Eastbound Highway 26			Westbound Highway 26			Northbound Silvercreek Dr			Southbound N/A		
	L	T	R	L	T	R	L	T	R	L	T	R
7:00	0	35	0	1	46	0	0	0	1	0	0	0
7:15	0	51	0	2	37	0	1	0	4	0	0	0
7:30	0	64	0	0	80	0	0	0	5	0	0	0
7:45	0	74	0	1	63	0	0	0	3	0	0	0
8:00	0	72	0	0	65	0	1	0	1	0	0	0
8:15	0	78	1	1	82	0	0	0	6	0	0	0
8:30	0	80	0	2	78	0	0	0	5	0	0	0
8:45	0	104	1	2	71	0	0	0	2	0	0	0

Peak Hour HV's	0	13	0	0	21	0	0	0	0	0	0	0
Ped Crossings		0			0			0			0	

A.M. Peak Hour	0	334	2	5	296	0	1	0	14	0	0	0
HV% of PHV		4%	0%	0%	7%		0%		0%			

Date: 7-Aug-08
 Counter: Patrick Hatton

P.M. Peak Hour 16:30 - 17:30	Eastbound Highway 26			Westbound Highway 26			Northbound Silvercreek Dr			Southbound N/A		
	L	T	R	L	T	R	L	T	R	L	T	R
16:00	0	105	0		101	0	0	0	3	0	0	0
16:15	0	78	0	5	120	0	0	0	2	0	0	0
16:30	0	107	1		98	0	1	0	3	0	0	0
16:45	0	106	0	5	97	0	0	0	7	0	0	0
17:00	0	97	0	5	126	0	0	0	4	0	0	0
17:15	0	92	0	3	112	0	0	0	3	0	0	0
17:30	0	97	0	2	94	0	0	0	2	0	0	0
17:45	0	77	0	2	101	0	0	0	1	0	0	0

Peak Hour HV's	0	20	0	0	15	0	0	0	0	0	0	0
Ped Crossings		0			0			0			0	

P.M. Peak Hour	0	402	1	13	433	0	1	0	17	0	0	0
HV% of PHV		5%	0%	0%	3%		0%		0%			

APPENDIX C

Detailed Capacity Analyses

HCM Unsignalized Intersection Capacity Analysis 3: Hwy 26 & Silvercreek Dr

2008 Existing A.M. Traffic
1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	334	2	5	296	1	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.80	0.70	0.70	0.90	0.70	0.70
Hourly flow rate (vph)	418	3	7	329	1	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			420		761	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			420		761	418
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	97
cM capacity (veh/h)			1150		374	640
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	418	3	336	21		
Volume Left	0	0	7	1		
Volume Right	0	3	0	20		
cSH	1700	1700	1150	611		
Volume to Capacity	0.25	0.00	0.01	0.04		
Queue Length 95th (m)	0.0	0.0	0.1	0.8		
Control Delay (s)	0.0	0.0	0.2	11.1		
Lane LOS			A	B		
Approach Delay (s)	0.0		0.2	11.1		
Approach LOS				B		
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			29.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
3: Hwy 26 & Silvercreek Dr

P.M. 2008 Existing Traffic
1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	402	1	13	433	1	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.70	0.70	0.90	0.70	0.70
Hourly flow rate (vph)	428	1	19	481	1	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			429		946	428
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			429		946	428
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	96
cM capacity (veh/h)			1141		288	631
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	428	1	500	26		
Volume Left	0	0	19	1		
Volume Right	0	1	0	24		
cSH	1700	1700	1141	592		
Volume to Capacity	0.25	0.00	0.02	0.04		
Queue Length 95th (m)	0.0	0.0	0.4	1.0		
Control Delay (s)	0.0	0.0	0.5	11.4		
Lane LOS			A	B		
Approach Delay (s)	0.0		0.5	11.4		
Approach LOS				B		
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			43.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

2008 Existing A.M. Traffic

1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	66	5	2	99
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.70	0.71	0.70	0.70	0.88
Hourly flow rate (vph)	7	7	93	7	3	112
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	215	97			100	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	215	97			100	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.7	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	734	965			1505	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	14	100	115			
Volume Left	7	0	3			
Volume Right	7	7	0			
cSH	834	1700	1505			
Volume to Capacity	0.02	0.06	0.00			
Queue Length 95th (m)	0.4	0.0	0.0			
Control Delay (s)	9.4	0.0	0.2			
Lane LOS	A		A			
Approach Delay (s)	9.4	0.0	0.2			
Approach LOS	A					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			16.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

P.M. 2008 Existing Traffic

1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	3	91	6	4	109
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.70	0.71	0.70	0.70	0.80
Hourly flow rate (vph)	9	4	128	9	6	136
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	280	132			137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	280	132			137	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	711	922			1460	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	13	137	142			
Volume Left	9	0	6			
Volume Right	4	9	0			
cSH	770	1700	1460			
Volume to Capacity	0.02	0.08	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s)	9.8	0.0	0.3			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	0.3			
Approach LOS	A					
Intersection Summary						
Average Delay		0.6				
Intersection Capacity Utilization		19.0%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

18: Highway 26 & Silver Glen Boulevard

A.M. 2021 Future Background Traffic
1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	660	4	14	577	42	8	0	31	94	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1795		1825	1833		1825	1633		1825	1633	
Flt Permitted	0.33	1.00		0.30	1.00		0.74	1.00		0.73	1.00	
Satd. Flow (perm)	641	1795		575	1833		1421	1633		1412	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	733	4	16	641	47	9	0	34	104	0	27
RTOR Reduction (vph)	0	0	0	0	5	0	0	30	0	0	23	0
Lane Group Flow (vph)	12	737	0	16	683	0	9	4	0	104	4	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	28.9	28.9		28.9	28.9		6.3	6.3		6.3	6.3	
Effective Green, g (s)	28.9	28.9		28.9	28.9		6.3	6.3		6.3	6.3	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.13	0.13		0.13	0.13	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	384	1074		344	1097		185	213		184	213	
v/s Ratio Prot		c0.41			0.37			0.00			0.00	
v/s Ratio Perm	0.02			0.03			0.01			c0.07		
v/c Ratio	0.03	0.69		0.05	0.62		0.05	0.02		0.57	0.02	
Uniform Delay, d1	4.0	6.6		4.0	6.2		18.4	18.3		19.7	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	1.8		0.1	1.1		0.1	0.0		3.9	0.0	
Delay (s)	4.0	8.4		4.1	7.3		18.5	18.4		23.7	18.3	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		8.4			7.2			18.4			22.6	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM Average Control Delay		9.3		HCM Level of Service				A				
HCM Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		48.3		Sum of lost time (s)				13.1				
Intersection Capacity Utilization		57.8%		ICU Level of Service				B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 18: Highway 26 & Silver Glen Boulevard

P.M. 2021 Future Background Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	787	8	32	850	94	6	0	26	65	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1863		1825	1811		1825	1633		1825	1633	
Flt Permitted	0.17	1.00		0.26	1.00		0.98	1.00		0.98	1.00	
Satd. Flow (perm)	319	1863		492	1811		1874	1633		1874	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	874	9	36	944	104	7	0	29	72	0	18
RTOR Reduction (vph)	0	1	0	0	6	0	0	27	0	0	17	0
Lane Group Flow (vph)	26	882	0	36	1042	0	7	2	0	72	1	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	40.1	40.1		40.1	40.1		4.1	4.1		4.1	4.1	
Effective Green, g (s)	40.1	40.1		40.1	40.1		4.1	4.1		4.1	4.1	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.07	0.07		0.07	0.07	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	1304		344	1267		134	117		134	117	
v/s Ratio Prot		0.47			c0.58			0.00			0.00	
v/s Ratio Perm	0.08			0.07			0.00			c0.04		
v/c Ratio	0.12	0.68		0.10	0.82		0.05	0.02		0.54	0.01	
Uniform Delay, d1	2.8	4.9		2.8	6.1		24.8	24.7		25.7	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.4		0.1	4.4		0.2	0.1		4.1	0.0	
Delay (s)	3.0	6.3		2.9	10.5		25.0	24.8		29.8	24.8	
Level of Service	A	A		A	B		C	C		C	C	
Approach Delay (s)		6.2			10.3			24.8			28.8	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM Average Control Delay	9.6			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	57.3			Sum of lost time (s)			13.1					
Intersection Capacity Utilization	71.6%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

A.M. 2021 Future BackgroundTraffic

1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	661	2	5	604	1	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	734	2	6	671	1	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			737		1417	734
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			737		1417	734
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
IF (s)			2.2		3.5	3.3
p0 queue free %			99		99	96
cM capacity (veh/h)			878		152	423
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	734	2	677	17		
Volume Left	0	0	6	1		
Volume Right	0	2	0	16		
cSH	1700	1700	878	378		
Volume to Capacity	0.43	0.00	0.01	0.04		
Queue Length 95th (m)	0.0	0.0	0.1	1.0		
Control Delay (s)	0.0	0.0	0.2	15.0		
Lane LOS			A	B		
Approach Delay (s)	0.0		0.2	15.0		
Approach LOS				B		
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			45.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 3: Hwy 26 & Silvercreek Dr

P.M. 2021 Future Background Traffic
1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	801	1	13	859	1	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	890	1	14	954	1	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			891		1873	890
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			891		1873	890
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	95
cM capacity (veh/h)			769		78	345
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	890	1	969	20		
Volume Left	0	0	14	1		
Volume Right	0	1	0	19		
cSH	1700	1700	769	290		
Volume to Capacity	0.52	0.00	0.02	0.07		
Queue Length 95th (m)	0.0	0.0	0.4	1.7		
Control Delay (s)	0.0	0.0	0.6	18.3		
Lane LOS			A	C		
Approach Delay (s)	0.0		0.6	18.3		
Approach LOS				C		
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			65.6%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

A.M. 2021 Future Background Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	116	5	2	173
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	6	129	6	2	192
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	328	132			134	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	328	132			134	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	669	923			1463	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	11	134	194			
Volume Left	6	0	2			
Volume Right	6	6	0			
cSH	776	1700	1463			
Volume to Capacity	0.01	0.08	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	9.7	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.7	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			20.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

P.M. 2021 Future Background Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	3	159	6	4	191
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	3	177	7	4	212
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	401	180			183	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	401	180			183	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	607	868			1404	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	183	217			
Volume Left	7	0	4			
Volume Right	3	7	0			
cSH	675	1700	1404			
Volume to Capacity	0.01	0.11	0.00			
Queue Length 95th (m)	0.3	0.0	0.1			
Control Delay (s)	10.4	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	10.4	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization		23.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
18: Highway 26 & Silver Glen Boulevard

A.M. 2026 Future Background Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	772	4	14	677	42	8	0	31	94	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr't	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1795		1825	1835		1825	1633		1825	1633	
Flt Permitted	0.27	1.00		0.23	1.00		0.74	1.00		0.73	1.00	
Satd. Flow (perm)	519	1795		444	1835		1421	1633		1412	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	858	4	16	752	47	9	0	34	104	0	27
RTOR Reduction (vph)	0	0	0	0	3	0	0	30	0	0	24	0
Lane Group Flow (vph)	12	862	0	16	796	0	9	4	0	104	3	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.8	35.8		35.8	35.8		7.2	7.2		7.2	7.2	
Effective Green, g (s)	35.8	35.8		35.8	35.8		7.2	7.2		7.2	7.2	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	331	1145		283	1171		182	210		181	210	
v/s Ratio Prot		c0.48			0.43			0.00			0.00	
v/s Ratio Perm	0.02			0.04			0.01			c0.07		
v/c Ratio	0.04	0.75		0.06	0.68		0.05	0.02		0.57	0.02	
Uniform Delay, d1	3.8	7.1		3.8	6.5		21.4	21.4		23.0	21.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	2.8		0.1	1.6		0.1	0.0		4.4	0.0	
Delay (s)	3.8	9.9		3.9	8.1		21.6	21.4		27.4	21.4	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.8			8.0			21.4			26.1	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay			10.4	HCM Level of Service						B		
HCM Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			56.1	Sum of lost time (s)						13.1		
Intersection Capacity Utilization			63.7%	ICU Level of Service						B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 18: Highway 26 & Silver Glen Boulevard

P.M. 2026 Future Background Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	930	8	32	996	94	6	0	26	65	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1863		1825	1813		1825	1633		1825	1633	
Flt Permitted	0.11	1.00		0.19	1.00		0.75	1.00		0.74	1.00	
Satd. Flow (perm)	208	1863		369	1813		1433	1633		1418	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	1033	9	36	1107	104	7	0	29	72	0	18
RTOR Reduction (vph)	0	0	0	0	4	0	0	27	0	0	17	0
Lane Group Flow (vph)	26	1042	0	36	1207	0	7	2	0	72	1	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.6	58.6		58.6	58.6		6.3	6.3		6.3	6.3	
Effective Green, g (s)	58.6	58.6		58.6	58.6		6.3	6.3		6.3	6.3	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.08	0.08		0.08	0.08	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	156	1400		277	1362		116	132		115	132	
v/s Ratio Prot		0.56			c0.67			0.00			0.00	
v/s Ratio Perm	0.13			0.10			0.00			c0.05		
v/c Ratio	0.17	0.74		0.13	0.89		0.06	0.02		0.63	0.01	
Uniform Delay, d1	2.8	5.5		2.7	7.2		33.1	33.0		34.7	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.2		0.2	7.3		0.2	0.1		10.2	0.0	
Delay (s)	3.3	7.7		2.9	14.5		33.3	33.1		44.9	33.0	
Level of Service	A	A		A	B		C	C		D	C	
Approach Delay (s)		7.6			14.2			33.1			42.5	
Approach LOS		A			B			C			D	
Intersection Summary												
HCM Average Control Delay			12.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			78.0			Sum of lost time (s)			13.1			
Intersection Capacity Utilization			79.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

A.M. 2026 Future Background Traffic

1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	773	2	5	704	1	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	859	2	6	782	1	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			861		1652	859
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			861		1652	859
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	96
cM capacity (veh/h)			789		109	359
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	859	2	788	17		
Volume Left	0	0	6	1		
Volume Right	0	2	0	16		
cSH	1700	1700	789	311		
Volume to Capacity	0.51	0.00	0.01	0.05		
Queue Length 95th (m)	0.0	0.0	0.2	1.3		
Control Delay (s)	0.0	0.0	0.2	17.2		
Lane LOS			A	C		
Approach Delay (s)	0.0		0.2	17.2		
Approach LOS				C		
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			51.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 3: Hwy 26 & Silvercreek Dr

P.M. 2026 Future Background Traffic
1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	944	1	13	1005	1	17
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1049	1	14	1117	1	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			1050		2194	1049
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1050		2194	1049
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	93
cM capacity (veh/h)			671		49	279
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	1049	1	1131	20		
Volume Left	0	0	14	1		
Volume Right	0	1	0	19		
cSH	1700	1700	671	222		
Volume to Capacity	0.62	0.00	0.02	0.09		
Queue Length 95th (m)	0.0	0.0	0.5	2.2		
Control Delay (s)	0.0	0.0	0.8	22.9		
Lane LOS			A	C		
Approach Delay (s)	0.0		0.8	22.9		
Approach LOS				C		
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			73.3%	ICU Level of Service		D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

A.M. 2026 Future Background Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	134	5	2	200
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	6	149	6	2	222
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	378	152			154	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	378	152			154	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	626	900			1438	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	11	154	224			
Volume Left	6	0	2			
Volume Right	6	6	0			
cSH	739	1700	1438			
Volume to Capacity	0.02	0.09	0.00			
Queue Length 95th (m)	0.3	0.0	0.0			
Control Delay (s)	9.9	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.9	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		22.1%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

P.M. 2026 Future Background Traffic

1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	3	184	6	4	220
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	3	204	7	4	244
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	461	208			211	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	461	208			211	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	560	838			1371	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	211	249			
Volume Left	7	0	4			
Volume Right	3	7	0			
cSH	630	1700	1371			
Volume to Capacity	0.02	0.12	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s)	10.8	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	10.8	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			24.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis 18: Highway 26 & Silver Glen Boulevard

A.M. 2031 Future Background Traffic
1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	851	4	14	747	42	8	0	31	94	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1795		1825	1836		1825	1633		1825	1633	
Flt Permitted	0.23	1.00		0.19	1.00		0.74	1.00		0.73	1.00	
Satd. Flow (perm)	447	1795		364	1836		1421	1633		1412	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	946	4	16	830	47	9	0	34	104	0	27
RTOR Reduction (vph)	0	0	0	0	3	0	0	30	0	0	24	0
Lane Group Flow (vph)	12	950	0	16	874	0	9	4	0	104	3	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.7	38.7		38.7	38.7		7.0	7.0		7.0	7.0	
Effective Green, g (s)	38.7	38.7		38.7	38.7		7.0	7.0		7.0	7.0	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.12	0.12		0.12	0.12	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	294	1181		240	1208		169	194		168	194	
v/s Ratio Prot		c0.53			0.48			0.00			0.00	
v/s Ratio Perm	0.03			0.04			0.01			c0.07		
v/c Ratio	0.04	0.80		0.07	0.72		0.05	0.02		0.62	0.02	
Uniform Delay, d1	3.5	7.3		3.6	6.6		23.0	22.9		24.6	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	4.1		0.1	2.2		0.1	0.0		6.6	0.0	
Delay (s)	3.6	11.4		3.7	8.7		23.1	22.9		31.3	22.9	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		11.3			8.6			23.0			29.5	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM Average Control Delay		11.5					HCM Level of Service		B			
HCM Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		58.8					Sum of lost time (s)		13.1			
Intersection Capacity Utilization		67.8%					ICU Level of Service		C			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

18: Highway 26 & Silver Glen Boulevard

P.M. 2031 Future Background Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	1025	8	32	1098	94	6	0	26	65	0	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1863		1825	1815		1825	1633		1825	1633	
Flt Permitted	0.07	1.00		0.16	1.00		0.75	1.00		0.74	1.00	
Satd. Flow (perm)	137	1863		306	1815		1433	1633		1418	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	1139	9	36	1220	104	7	0	29	72	0	18
RTOR Reduction (vph)	0	0	0	0	3	0	0	27	0	0	17	0
Lane Group Flow (vph)	26	1148	0	36	1321	0	7	2	0	72	1	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	70.6	70.6		70.6	70.6		6.6	6.6		6.6	6.6	
Effective Green, g (s)	70.6	70.6		70.6	70.6		6.6	6.6		6.6	6.6	
Actuated g/C Ratio	0.78	0.78		0.78	0.78		0.07	0.07		0.07	0.07	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	107	1457		239	1419		105	119		104	119	
v/s Ratio Prot		0.62			c0.73			0.00			0.00	
v/s Ratio Perm	0.19			0.12			0.00			c0.05		
v/c Ratio	0.24	0.79		0.15	0.93		0.07	0.02		0.69	0.01	
Uniform Delay, d1	2.7	5.6		2.4	7.9		39.0	38.8		40.9	38.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	2.9		0.3	11.2		0.3	0.1		18.1	0.0	
Delay (s)	3.8	8.5		2.7	19.1		39.3	38.9		58.9	38.9	
Level of Service	A	A		A	B		D	D		E	D	
Approach Delay (s)		8.4			18.6			39.0			54.9	
Approach LOS		A			B			D			D	
Intersection Summary												
HCM Average Control Delay	15.6			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	90.3			Sum of lost time (s)			13.1					
Intersection Capacity Utilization	84.7%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 3: Hwy 26 & Silvercreek Dr

A.M. 2031 Future Background Traffic
1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	852	2	5	774	1	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	947	2	6	860	1	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			949		1818	947
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			949		1818	947
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	95
cM capacity (veh/h)			732		86	320
Direction, Lane #	EB 1	EB 2	WB 1	NB 1		
Volume Total	947	2	866	17		
Volume Left	0	0	6	1		
Volume Right	0	2	0	16		
cSH	1700	1700	732	271		
Volume to Capacity	0.56	0.00	0.01	0.06		
Queue Length 95th (m)	0.0	0.0	0.2	1.5		
Control Delay (s)	0.0	0.0	0.2	19.2		
Lane LOS			A	C		
Approach Delay (s)	0.0		0.2	19.2		
Approach LOS				C		
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			54.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

A.M. 2031 Future Background Traffic

1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	5	148	5	2	221
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	6	164	6	2	246
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	417	167			170	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	417	167			170	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	595	882			1420	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	11	170	248			
Volume Left	6	0	2			
Volume Right	6	6	0			
cSH	711	1700	1420			
Volume to Capacity	0.02	0.10	0.00			
Queue Length 95th (m)	0.4	0.0	0.0			
Control Delay (s)	10.1	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	10.1	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		23.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
12: Forest Dr & County Road 21

P.M. 2031 Future Background Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	6	3	203	6	4	244
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	3	226	7	4	271
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	509	229			232	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	509	229			232	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	526	815			1347	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	232	276			
Volume Left	7	0	4			
Volume Right	3	7	0			
cSH	596	1700	1347			
Volume to Capacity	0.02	0.14	0.00			
Queue Length 95th (m)	0.4	0.0	0.1			
Control Delay (s)	11.1	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization		26.0%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis 18: Highway 26 & Silver Glen Boulevard

A.M. 2021 Total Traffic
1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	691	24	44	587	42	75	3	131	94	4	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	0.99		1.00	0.99		1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1790		1825	1833		1825	1639		1825	1670	
Flt Permitted	0.32	1.00		0.26	1.00		0.74	1.00		0.66	1.00	
Satd. Flow (perm)	619	1790		493	1833		1416	1639		1272	1670	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	768	27	49	652	47	83	3	146	104	4	27
RTOR Reduction (vph)	0	2	0	0	4	0	0	125	0	0	23	0
Lane Group Flow (vph)	12	793	0	49	695	0	83	24	0	104	8	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.2	30.2		30.2	30.2		7.1	7.1		7.1	7.1	
Effective Green, g (s)	30.2	30.2		30.2	30.2		7.1	7.1		7.1	7.1	
Actuated g/C Ratio	0.60	0.60		0.60	0.60		0.14	0.14		0.14	0.14	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	371	1073		295	1098		199	231		179	235	
v/s Ratio Prot		c0.44			0.38			0.01			0.00	
v/s Ratio Perm	0.02			0.10			0.06			c0.08		
v/c Ratio	0.03	0.74		0.17	0.63		0.42	0.10		0.58	0.03	
Uniform Delay, d1	4.1	7.3		4.5	6.5		19.8	18.9		20.3	18.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	2.7		0.3	1.2		1.4	0.2		4.7	0.1	
Delay (s)	4.2	10.0		4.8	7.7		21.2	19.1		25.0	18.7	
Level of Service	A	A		A	A		C	B		C	B	
Approach Delay (s)		9.9			7.5			19.8			23.6	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM Average Control Delay		11.1										
HCM Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		50.4										
Intersection Capacity Utilization		67.3%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 18: Highway 26 & Silver Glen Boulevard

P.M. 2021 Total Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	806	79	143	884	94	48	11	90	65	11	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flt	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1845		1825	1812		1825	1664		1825	1748	
Flt Permitted	0.14	1.00		0.20	1.00		0.91	1.00		0.91	1.00	
Satd. Flow (perm)	272	1845		381	1812		1746	1664		1746	1748	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	896	88	159	982	104	53	12	100	72	12	18
RTOR Reduction (vph)	0	6	0	0	6	0	0	92	0	0	17	0
Lane Group Flow (vph)	26	978	0	159	1080	0	53	20	0	72	13	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	40.1	40.1		40.1	40.1		4.4	4.4		4.4	4.4	
Effective Green, g (s)	40.1	40.1		40.1	40.1		4.4	4.4		4.4	4.4	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.08	0.08		0.08	0.08	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	189	1284		265	1261		133	127		133	134	
v/s Ratio Prot		0.53			c0.60			0.01			0.01	
v/s Ratio Perm	0.10			0.42			0.03			c0.04		
v/c Ratio	0.14	0.76		0.60	0.86		0.40	0.15		0.54	0.10	
Uniform Delay, d1	2.9	5.7		4.6	6.6		25.3	24.9		25.6	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.7		3.6	5.9		2.0	0.6		4.4	0.3	
Delay (s)	3.3	8.4		8.2	12.5		27.3	25.4		30.1	25.1	
Level of Service	A	A		A	B		C	C		C	C	
Approach Delay (s)		8.3			12.0			26.0			28.6	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM Average Control Delay			12.1			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			57.6			Sum of lost time (s)			13.1			
Intersection Capacity Utilization			82.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 3: Hwy 26 & Silvercreek Dr

A.M. 2021 Total Traffic

1/27/2011

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↖	↑	↖	↗
Volume (veh/h)	679	5	16	670	12	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	754	6	18	744	13	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			760		1534	754
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			760		1534	754
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		89	87
cM capacity (veh/h)			861		127	412
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	754	6	18	744	66	
Volume Left	0	0	18	0	13	
Volume Right	0	6	0	0	52	
cSH	1700	1700	861	1700	283	
Volume to Capacity	0.44	0.00	0.02	0.44	0.23	
Queue Length 95th (m)	0.0	0.0	0.5	0.0	6.7	
Control Delay (s)	0.0	0.0	9.3	0.0	21.5	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.2		21.5	
Approach LOS					C	
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			46.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

P.M. 2021 Total Traffic

1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	867	13	53	895	8	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	963	14	59	994	9	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			978		2076	963
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			978		2076	963
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			92		84	85
cM capacity (veh/h)			714		55	313
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	963	14	59	994	54	
Volume Left	0	0	59	0	9	
Volume Right	0	14	0	0	46	
cSH	1700	1700	714	1700	177	
Volume to Capacity	0.57	0.01	0.08	0.58	0.31	
Queue Length 95th (m)	0.0	0.0	2.0	0.0	9.4	
Control Delay (s)	0.0	0.0	10.5	0.0	34.2	
Lane LOS			B		D	
Approach Delay (s)	0.0		0.6		34.2	
Approach LOS					D	
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			57.1%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

A.M. 2021 Total Traffic
1/27/2011

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Volume (veh/h)	16	5	125	8	2	206			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly flow rate (vph)	18	6	139	9	2	229			
Pedestrians									
Lane Width (m)									
Walking Speed (m/s)									
Percent Blockage									
Right turn flare (veh)									
Median type			None			None			
Median storage veh)									
Upstream signal (m)									
pX, platoon unblocked									
vC, conflicting volume	377	143			148				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	377	143			148				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	97	99			100				
cM capacity (veh/h)	628	909			1446				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	23	148	231						
Volume Left	18	0	2						
Volume Right	6	9	0						
cSH	678	1700	1446						
Volume to Capacity	0.03	0.09	0.00						
Queue Length 95th (m)	0.8	0.0	0.0						
Control Delay (s)	10.5	0.0	0.1						
Lane LOS	B		A						
Approach Delay (s)	10.5	0.0	0.1						
Approach LOS	B								
Intersection Summary									
Average Delay		0.7							
Intersection Capacity Utilization		22.4%	ICU Level of Service	A					
Analysis Period (min)		15							

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

P.M. 2021 Total Traffic
1/27/2011

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Volume (veh/h)	13	3	192	18	4	209			
Sign Control	Stop		Free			Free			
Grade	0%		0%			0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90			
Hourly flow rate (vph)	14	3	213	20	4	232			
Pedestrians									
Lane Width (m)									
Walking Speed (m/s)									
Percent Blockage									
Right turn flare (veh)									
Median type			None			None			
Median storage veh									
Upstream signal (m)									
pX, platoon unblocked									
vC, conflicting volume	464	223			233				
vC1, stage 1 conf vol									
vC2, stage 2 conf vol									
vCu, unblocked vol	464	223			233				
tC, single (s)	6.4	6.2			4.1				
tC, 2 stage (s)									
tF (s)	3.5	3.3			2.2				
p0 queue free %	97	100			100				
cM capacity (veh/h)	558	821			1346				
Direction, Lane #	WB 1	NB 1	SB 1						
Volume Total	18	233	237						
Volume Left	14	0	4						
Volume Right	3	20	0						
cSH	594	1700	1346						
Volume to Capacity	0.03	0.14	0.00						
Queue Length 95th (m)	0.7	0.0	0.1						
Control Delay (s)	11.3	0.0	0.2						
Lane LOS	B		A						
Approach Delay (s)	11.3	0.0	0.2						
Approach LOS	B								
Intersection Summary									
Average Delay		0.5							
Intersection Capacity Utilization		24.2%	ICU Level of Service		A				
Analysis Period (min)		15							

HCM Signalized Intersection Capacity Analysis

18: Highway 26 & Silver Glen Boulevard

A.M. 2026 Total Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	803	24	44	687	42	75	3	131	94	4	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1791		1825	1835		1825	1639		1825	1670	
Flt Permitted	0.26	1.00		0.19	1.00		0.74	1.00		0.66	1.00	
Satd. Flow (perm)	494	1791		361	1835		1416	1639		1272	1670	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	892	27	49	763	47	83	3	146	104	4	27
RTOR Reduction (vph)	0	2	0	0	3	0	0	126	0	0	23	0
Lane Group Flow (vph)	12	917	0	49	807	0	83	23	0	104	8	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.9	33.9		33.9	33.9		7.3	7.3		7.3	7.3	
Effective Green, g (s)	33.9	33.9		33.9	33.9		7.3	7.3		7.3	7.3	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.13	0.13		0.13	0.13	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	308	1118		225	1146		190	220		171	225	
v/s Ratio Prot		c0.51			0.44			0.01			0.00	
v/s Ratio Perm	0.02			0.14			0.06			c0.08		
v/c Ratio	0.04	0.82		0.22	0.70		0.44	0.10		0.61	0.03	
Uniform Delay, d1	3.9	7.9		4.4	6.8		21.6	20.6		22.2	20.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	4.9		0.5	2.0		1.6	0.2		6.0	0.1	
Delay (s)	4.0	12.8		4.9	8.8		23.2	20.8		28.2	20.5	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		12.7			8.6			21.7			26.4	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM Average Control Delay	12.9			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	54.3			Sum of lost time (s)			13.1					
Intersection Capacity Utilization	73.2%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

18: Highway 26 & Silver Glen Boulevard

P.M. 2026 Total Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	949	79	143	1030	94	48	11	90	65	11	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1848		1825	1814		1825	1664		1825	1748	
Flt Permitted	0.09	1.00		0.14	1.00		0.74	1.00		0.69	1.00	
Satd. Flow (perm)	171	1848		277	1814		1417	1664		1325	1748	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	1054	88	159	1144	104	53	12	100	72	12	18
RTOR Reduction (vph)	0	3	0	0	4	0	0	92	0	0	17	0
Lane Group Flow (vph)	26	1139	0	159	1244	0	53	20	0	72	13	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	57.1	57.1		57.1	57.1		5.8	5.8		5.8	5.8	
Effective Green, g (s)	57.1	57.1		57.1	57.1		5.8	5.8		5.8	5.8	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.08	0.08		0.08	0.08	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	128	1388		208	1363		108	127		101	133	
v/s Ratio Prot		0.62			c0.69			0.01			0.01	
v/s Ratio Perm	0.15			0.57			0.04			c0.05		
v/c Ratio	0.20	0.82		0.76	0.91		0.49	0.15		0.71	0.10	
Uniform Delay, d ₁	2.8	6.1		5.5	7.5		33.7	32.8		34.3	32.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.8	4.0		15.3	9.5		3.5	0.6		21.1	0.3	
Delay (s)	3.6	10.1		20.8	17.0		37.2	33.4		55.4	33.0	
Level of Service	A	B		C	B		D	C		E	C	
Approach Delay (s)		10.0			17.4			34.6			48.8	
Approach LOS		A			B			C			D	
Intersection Summary												
HCM Average Control Delay			16.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			76.0			Sum of lost time (s)			13.1			
Intersection Capacity Utilization			90.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

A.M. 2026 Total Traffic

1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	791	5	16	770	12	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	879	6	18	856	13	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			884		1770	879
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			884		1770	879
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		85	85
cM capacity (veh/h)			774		91	350
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	879	6	18	856	66	
Volume Left	0	0	18	0	13	
Volume Right	0	6	0	0	52	
cSH	1700	1700	774	1700	221	
Volume to Capacity	0.52	0.00	0.02	0.50	0.30	
Queue Length 95th (m)	0.0	0.0	0.5	0.0	9.1	
Control Delay (s)	0.0	0.0	9.8	0.0	28.0	
Lane LOS			A		D	
Approach Delay (s)	0.0		0.2		28.0	
Approach LOS					D	
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			51.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

P.M. 2026 Total Traffic

1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↓	↑	↓	
Volume (veh/h)	1010	13	53	1041	8	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1122	14	59	1157	9	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			1137		2397	1122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1137		2397	1122
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		74	82
cM capacity (veh/h)			622		34	253
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	1122	14	59	1157	54	
Volume Left	0	0	59	0	9	
Volume Right	0	14	0	0	46	
cSH	1700	1700	622	1700	123	
Volume to Capacity	0.66	0.01	0.09	0.68	0.44	
Queue Length 95th (m)	0.0	0.0	2.4	0.0	14.7	
Control Delay (s)	0.0	0.0	11.4	0.0	55.6	
Lane LOS			B		F	
Approach Delay (s)	0.0		0.6		55.6	
Approach LOS					F	
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			64.8%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Forest Dr & County Road 21

A.M. 2026 Total Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	5	143	8	2	233
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	18	6	159	9	2	259
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	427	163			168	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	427	163			168	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	588	887			1422	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	23	168	261			
Volume Left	18	0	2			
Volume Right	6	9	0			
cSH	639	1700	1422			
Volume to Capacity	0.04	0.10	0.00			
Queue Length 95th (m)	0.9	0.0	0.0			
Control Delay (s)	10.8	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	10.8	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		23.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

P.M. 2026 Total Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	3	217	18	4	238
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	3	241	20	4	264
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	524	251			261	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	524	251			261	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	515	792			1315	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	18	261	269			
Volume Left	14	0	4			
Volume Right	3	20	0			
cSH	551	1700	1315			
Volume to Capacity	0.03	0.15	0.00			
Queue Length 95th (m)	0.8	0.0	0.1			
Control Delay (s)	11.7	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	11.7	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		25.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis

18: Highway 26 & Silver Glen Boulevard

A.M. 2031 Total Traffic

1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	882	24	44	757	42	75	3	131	94	4	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	1.00		1.00	0.99		1.00	0.85		1.00	0.87	
Fl _t Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1791		1825	1836		1825	1639		1825	1670	
Fl _t Permitted	0.22	1.00		0.15	1.00		0.74	1.00		0.66	1.00	
Satd. Flow (perm)	422	1791		284	1836		1416	1639		1272	1670	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	12	980	27	49	841	47	83	3	146	104	4	27
RTOR Reduction (vph)	0	1	0	0	3	0	0	117	0	0	24	0
Lane Group Flow (vph)	12	1006	0	49	885	0	83	32	0	104	7	0
Heavy Vehicles (%)	0%	7%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	36.9	36.9		36.9	36.9		7.1	7.1		7.1	7.1	
Effective Green, g (s)	36.9	36.9		36.9	36.9		7.1	7.1		7.1	7.1	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.12	0.12		0.12	0.12	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	1157		184	1186		176	204		158	208	
v/s Ratio Prot		c0.56			0.48			0.02			0.00	
v/s Ratio Perm	0.03			0.17			0.06			c0.08		
v/c Ratio	0.04	0.87		0.27	0.75		0.47	0.16		0.66	0.04	
Uniform Delay, d ₁	3.7	8.2		4.3	6.9		23.3	22.3		23.8	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	0.1	7.1		0.8	2.6		2.0	0.4		9.5	0.1	
Delay (s)	3.7	15.3		5.1	9.5		25.2	22.7		33.3	22.1	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		15.2			9.3			23.6			30.8	
Approach LOS		B			A			C			C	
Intersection Summary												
HCM Average Control Delay			14.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			57.1			Sum of lost time (s)			13.1			
Intersection Capacity Utilization			77.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

18: Highway 26 & Silver Glen Boulevard

P.M. 2031 Total Traffic
1/27/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	1044	79	143	1132	94	48	11	90	65	11	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Fr _t	1.00	0.99		1.00	0.99		1.00	0.87		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1849		1825	1815		1825	1664		1825	1748	
Flt Permitted	0.07	1.00		0.12	1.00		0.74	1.00		0.73	1.00	
Satd. Flow (perm)	127	1849		240	1815		1417	1664		1397	1748	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	26	1160	88	159	1258	104	53	12	100	72	12	18
RTOR Reduction (vph)	0	3	0	0	3	0	0	94	0	0	17	0
Lane Group Flow (vph)	26	1245	0	159	1359	0	53	18	0	72	13	0
Heavy Vehicles (%)	0%	3%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	73.7	73.7		73.7	73.7		5.5	5.5		5.5	5.5	
Effective Green, g (s)	73.7	73.7		73.7	73.7		5.5	5.5		5.5	5.5	
Actuated g/C Ratio	0.80	0.80		0.80	0.80		0.06	0.06		0.06	0.06	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	1476		192	1449		84	99		83	104	
v/s Ratio Prot		0.67			c0.75			0.01			0.01	
v/s Ratio Perm	0.20			0.66			0.04			c0.05		
v/c Ratio	0.26	0.84		0.83	0.94		0.63	0.18		0.87	0.13	
Uniform Delay, d ₁	2.4	5.7		5.5	7.5		42.4	41.3		43.0	41.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d ₂	1.4	4.6		24.4	11.7		14.4	0.9		56.5	0.5	
Delay (s)	3.7	10.3		30.0	19.2		56.8	42.1		99.6	41.7	
Level of Service	A	B		C	B		E	D		F	D	
Approach Delay (s)		10.2			20.3			46.9			82.5	
Approach LOS		B			C			D			F	
Intersection Summary												
HCM Average Control Delay			19.6			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			92.3			Sum of lost time (s)			13.1			
Intersection Capacity Utilization			95.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

A.M. 2031 Total Traffic
1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Volume (veh/h)	870	5	16	840	12	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	967	6	18	933	13	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			972		1936	967
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			972		1936	967
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		81	83
cM capacity (veh/h)			717		71	311
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	967	6	18	933	66	
Volume Left	0	0	18	0	13	
Volume Right	0	6	0	0	52	
cSH	1700	1700	717	1700	185	
Volume to Capacity	0.57	0.00	0.02	0.55	0.35	
Queue Length 95th (m)	0.0	0.0	0.6	0.0	11.4	
Control Delay (s)	0.0	0.0	10.1	0.0	34.8	
Lane LOS			B		D	
Approach Delay (s)	0.0		0.2		34.8	
Approach LOS					D	
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			56.0%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Hwy 26 & Silvercreek Dr

P.M. 2031 Total Traffic

1/27/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↓	↑	↓	↓
Volume (veh/h)	1105	13	53	1143	8	41
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1228	14	59	1270	9	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			1242		2616	1228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1242		2616	1228
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		63	79
cM capacity (veh/h)			567		24	219
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	1228	14	59	1270	54	
Volume Left	0	0	59	0	9	
Volume Right	0	14	0	0	46	
cSH	1700	1700	567	1700	95	
Volume to Capacity	0.72	0.01	0.10	0.75	0.57	
Queue Length 95th (m)	0.0	0.0	2.6	0.0	20.1	
Control Delay (s)	0.0	0.0	12.1	0.0	84.7	
Lane LOS			B		F	
Approach Delay (s)	0.0		0.5		84.7	
Approach LOS					F	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			70.2%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

A.M. 2031 Total Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	5	157	8	2	254
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	18	6	174	9	2	282
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	466	179			183	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	466	179			183	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	558	869			1404	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	23	183	284			
Volume Left	18	0	2			
Volume Right	6	9	0			
cSH	610	1700	1404			
Volume to Capacity	0.04	0.11	0.00			
Queue Length 95th (m)	0.9	0.0	0.0			
Control Delay (s)	11.1	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay		0.6				
Intersection Capacity Utilization		25.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 12: Forest Dr & County Road 21

P.M. 2031 Total Traffic
1/27/2011

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	13	3	236	18	4	262
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	3	262	20	4	291
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	572	272			282	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	572	272			282	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	483	771			1292	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	18	282	296			
Volume Left	14	0	4			
Volume Right	3	20	0			
cSH	520	1700	1292			
Volume to Capacity	0.03	0.17	0.00			
Queue Length 95th (m)	0.8	0.0	0.1			
Control Delay (s)	12.2	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	12.2	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		27.0%		ICU Level of Service	A	
Analysis Period (min)		15				

APPENDIX D

Auxiliary Lane Analysis

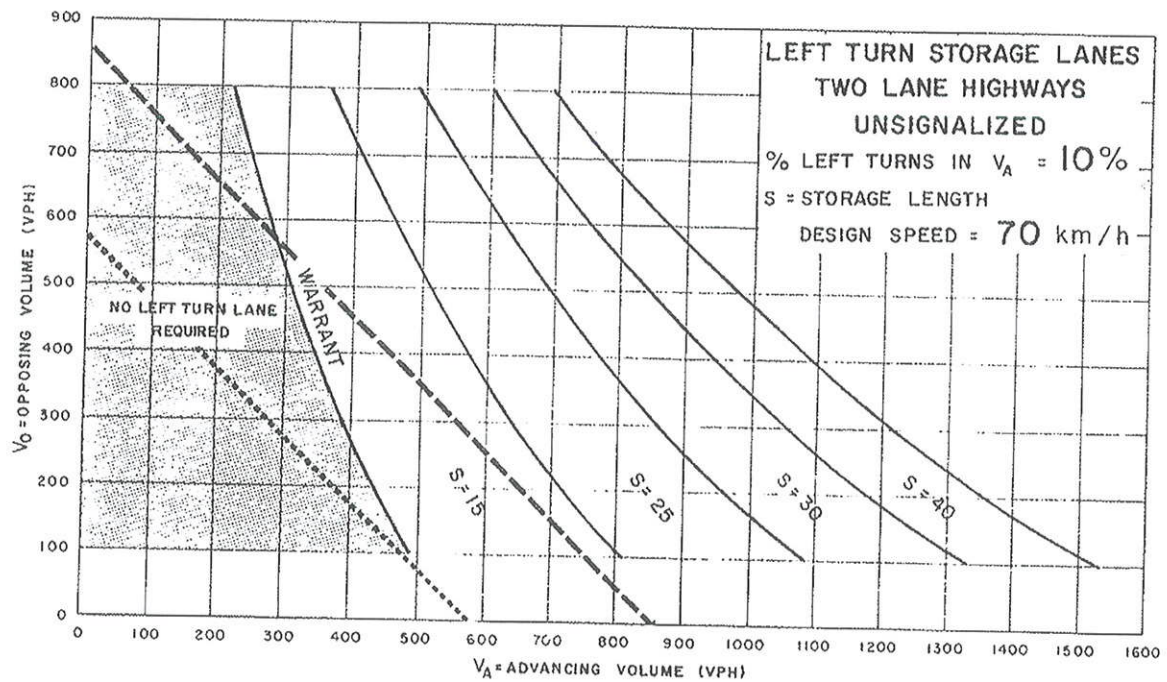
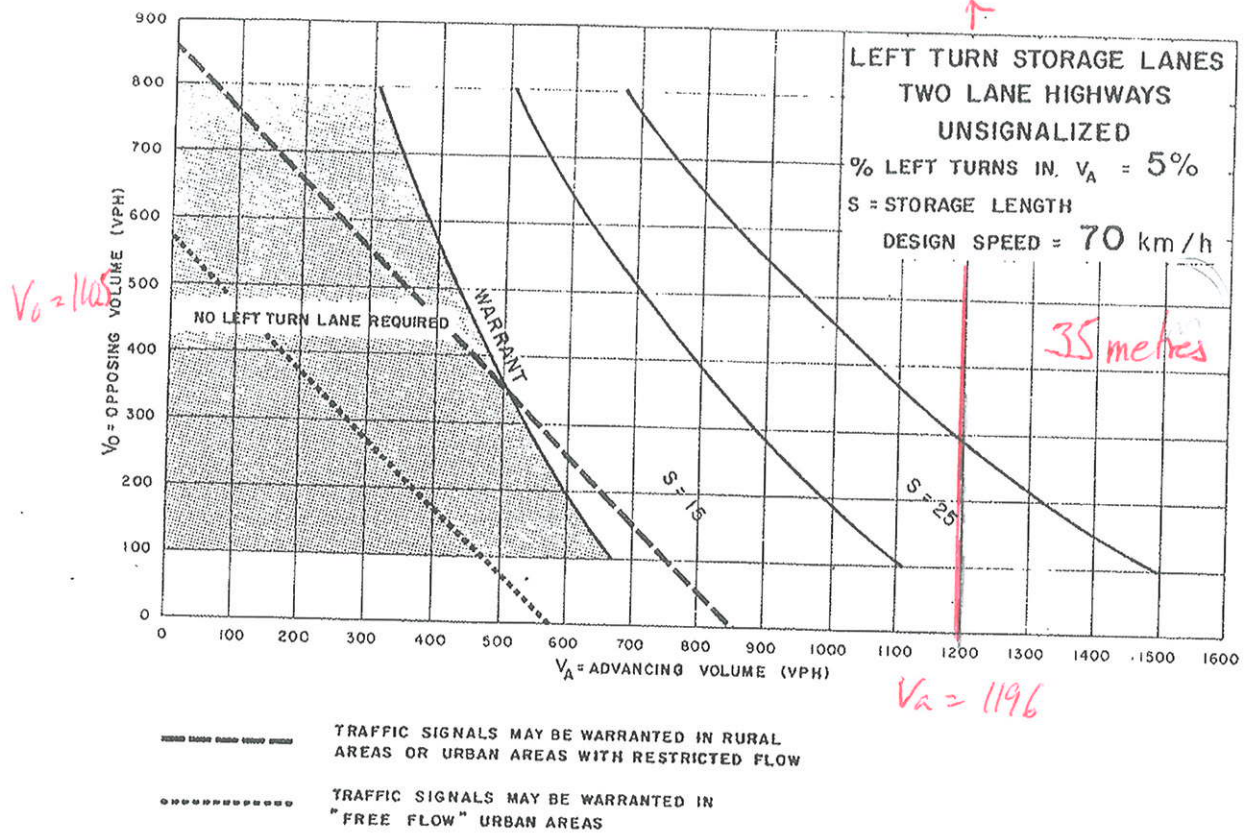


Figure EA-10

FIGURES

Figure 1:	Site Location Plan
Figure 2:	Draft Plan
Figure 3:	2008 Existing Traffic Volumes
Figure 4:	2021 Corridor Growth Traffic Volumes
Figure 5:	2026 Corridor Growth Traffic Volumes
Figure 6:	2031 Corridor Growth Traffic Volumes
Figure 7:	Other Background Developments Traffic Volumes
Figure 8:	2021 Future Background Traffic Volumes
Figure 9:	2026 Future Background Traffic Volumes
Figure 10:	2031 Future Background Traffic Volumes
Figure 11:	West Lands Residential Trip Distribution
Figure 12:	East Lands Residential Trip Distribution
Figure 13:	East Lands Primary Commercial Trip Distribution
Figure 14:	West Lands Residential Trip Assignment
Figure 15:	East Lands Residential Trip Assignment
Figure 16:	East Lands Primary Commercial Trip Assignment
Figure 17:	2021 Total Future Traffic Volumes
Figure 18:	2026 Total Future Traffic Volumes
Figure 19:	2031 Total Future Traffic Volumes



Project	HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD	 CROZIER & ASSOCIATES Consulting Engineers 110 PINE STREET, COLLINGWOOD, ON L9Y 2N9 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA							
Drawing	SITE LOCATION	Drawn By	J.O.	Design By	J.O.	Project	281-2769		
		Scale	N.T.S.	Date	01/20/2011	Check By	J.P./C.F.C.	Drawing	Fig. 1



CONCEPT PLAN

LAND USE	UNITS	AREA
RESIDENTIAL SINGLE DETACHED LOTS	1 to 99	7.36 ha
BLOCK 1 - RESIDENTIAL SEMI'S (12 SEMI-DETACHED UNITS)	12	0.84 ha
BLOCK 2 - RESIDENTIAL TOWNHOUSES (18 TOWNHOUSE UNITS)	18	0.74 ha
BLOCK 3 - RESIDENTIAL TOWNHOUSES (12 TOWNHOUSE UNITS)	12	0.43 ha
BLOCK 4 - STORMWATER MANAGEMENT (DEDICATED TO MUNICIPALITY)		1.20 ha
BLOCK 5 - RESIDENTIAL HIGH DENSITY (5 - 36 UNIT WALK UP APARTMENT BUILDINGS)	144	2.05 ha
BLOCK 6 - STORMWATER MANAGEMENT (TO BE DEDICATED TO MUNICIPALITY)		1.15 ha
BLOCK 7 - LOCAL COMMERCIAL		0.55 ha
BLOCK 8 - RESIDENTIAL TOWNHOUSES (75 TOWNHOUSE UNITS)	75	1.69 ha
BLOCK 9 - RESIDENTIAL TOWNHOUSES (33 TOWNHOUSE UNITS)	32	0.82 ha
BLOCK 10 - RESIDENTIAL TOWNHOUSES (12 TOWNHOUSE UNITS)	12	0.32 ha
BLOCK 11 - RESIDENTIAL SINGLE DETACHED (32 FREEHOLD SINGLE DETACHED LOTS)	32	2.67 ha
BLOCK 12 - SENIORS COMPLEX		0.40 ha
BLOCK 13 - COMMUNITY CENTER + OPEN SPACE + ENVIRONMENTAL PROTECTION (DEDICATED TO TOWN)		7.61 ha
BLOCK 14 - OPEN SPACE + ENVIRONMENTAL PROTECTION (DEDICATED TO TOWN)		2.11 ha
BLOCK 15 - OPEN SPACE + ENVIRONMENTAL PROTECTION (DEDICATED TO TOWN)		14.33 ha
BLOCK 16+17 - WALKWAY (DEDICATED TO TOWN)		0.07 ha
ROADS		4.63 ha
TOTAL	436	48.97 ha

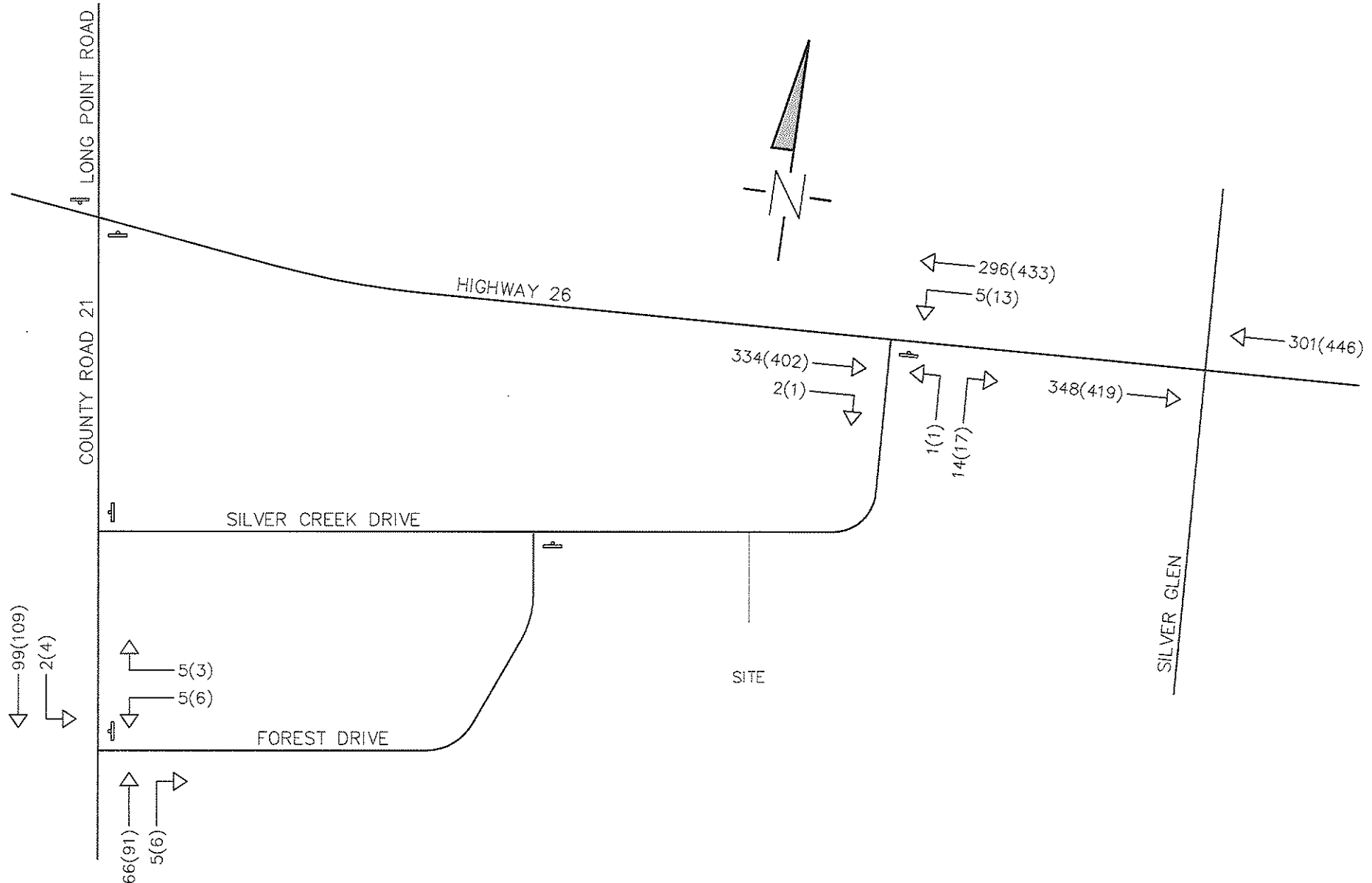
- PROTECTED WETLANDS
- 30 METER SETBACK FROM SILVER CREEK
- PUBLIC TRAIL

FIGURE 2

SCALE 1:2000

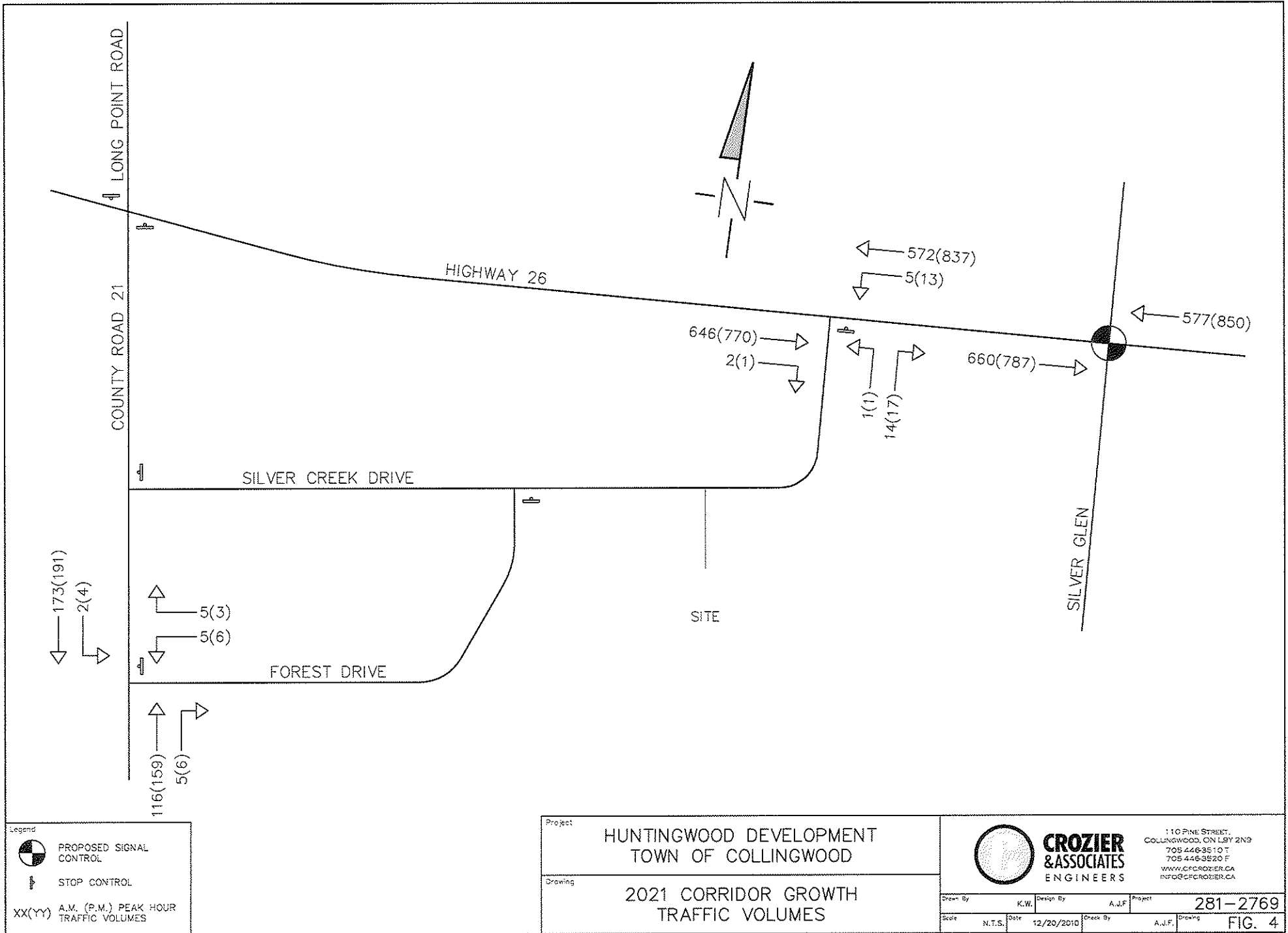
METRIC
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY
DIVIDING BY 0.3048
PROJECT: 704-10 DRAWN: AP DATE: JAN 19/2010

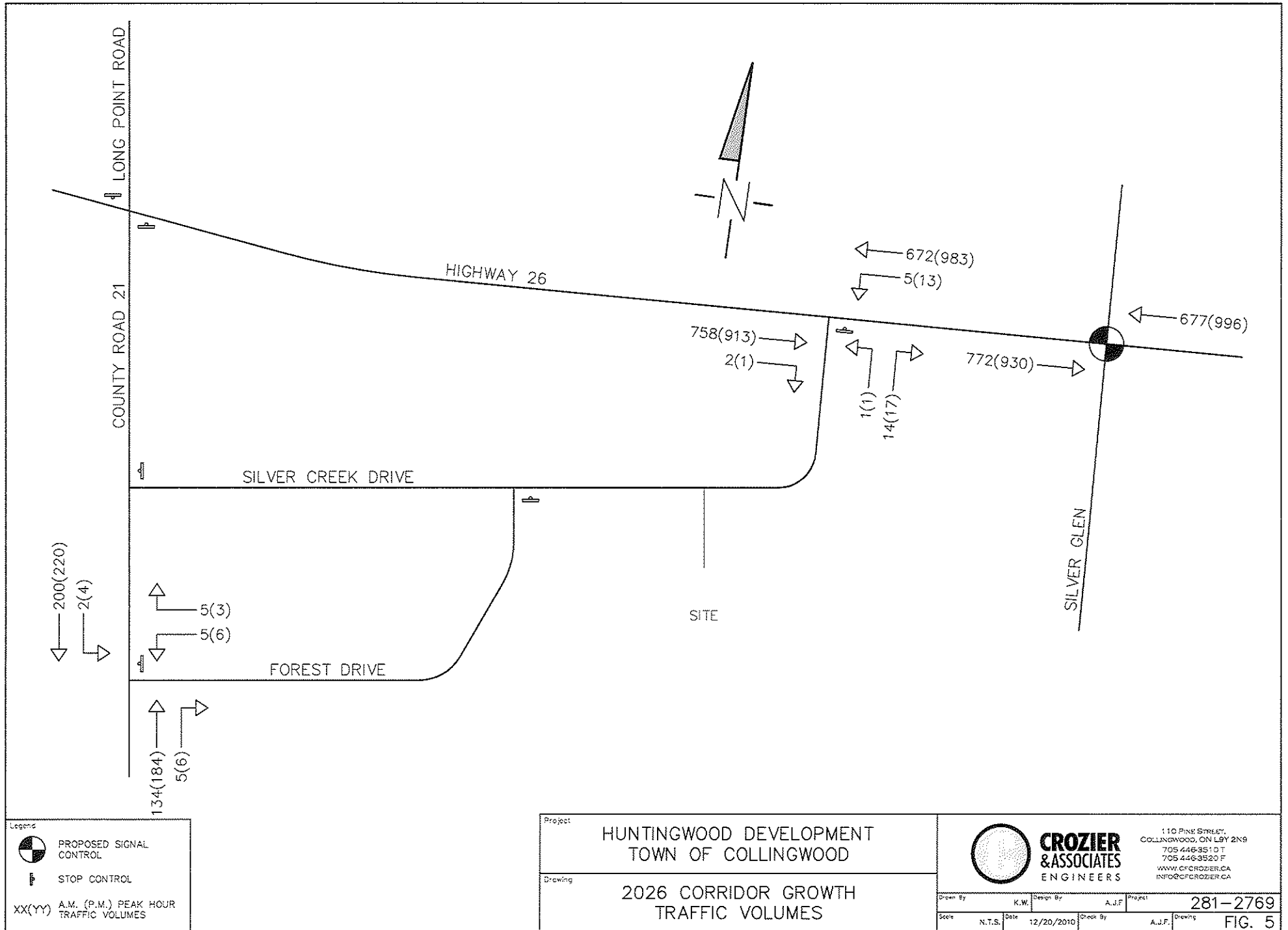
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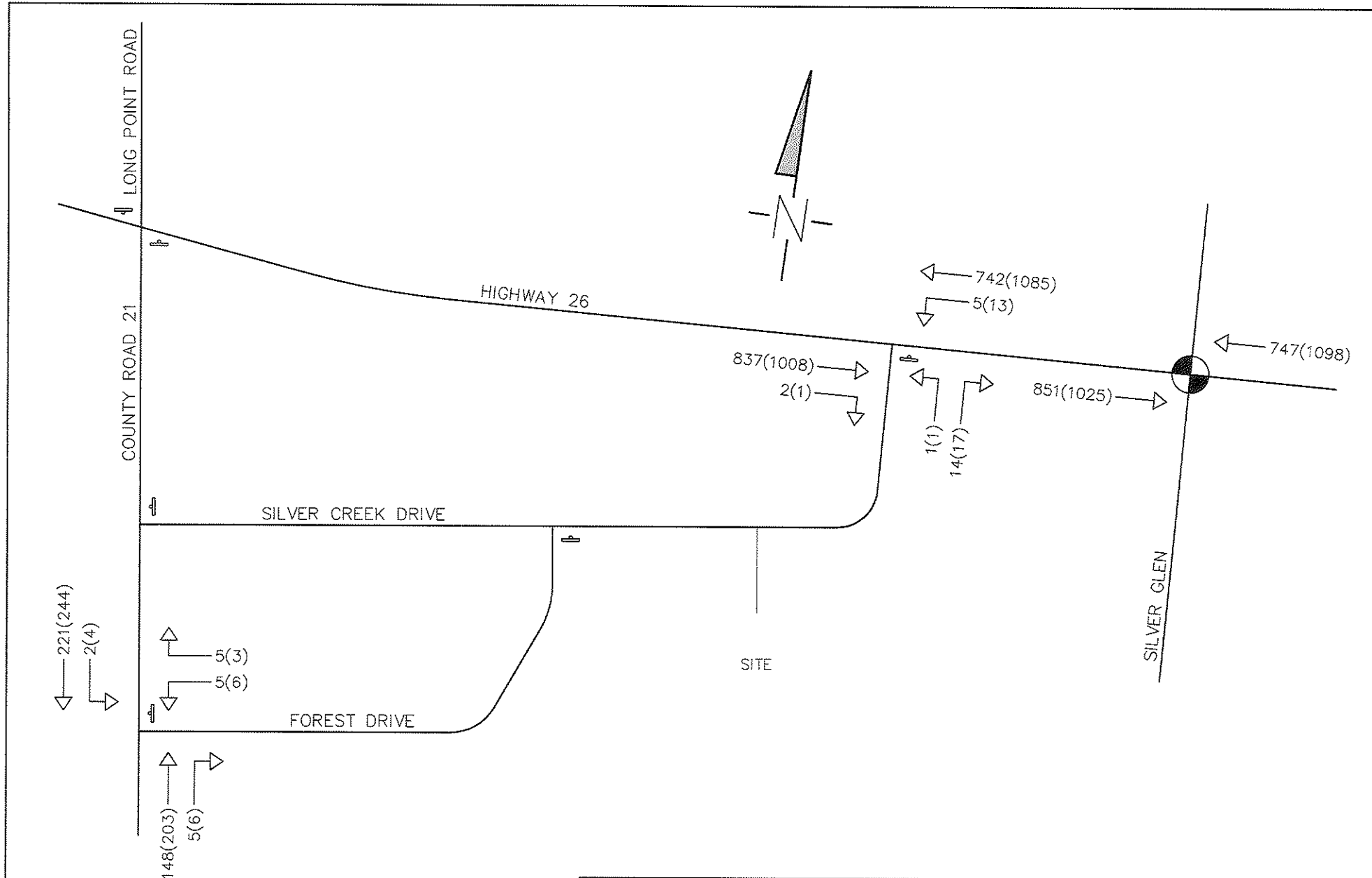


Legend
 STOP CONTROL
 XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

Project		HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD		 CROZIER & ASSOCIATES ENGINEERS		110 PINE STREET, COLLINGWOOD, ON L9Y 2N9 705 446-3510 T 705 446-3520 F WWW.CROZIER.CA INFO@CROZIER.CA			
Drawing		2008 EXISTING TRAFFIC VOLUMES		Drawn By J.R.S.		Design By P.A.H.		Project 281-2769	
				Scale N.T.S.		Date 08/14/2008		Check By A.J.F.	
								Drawing FIG. 3	







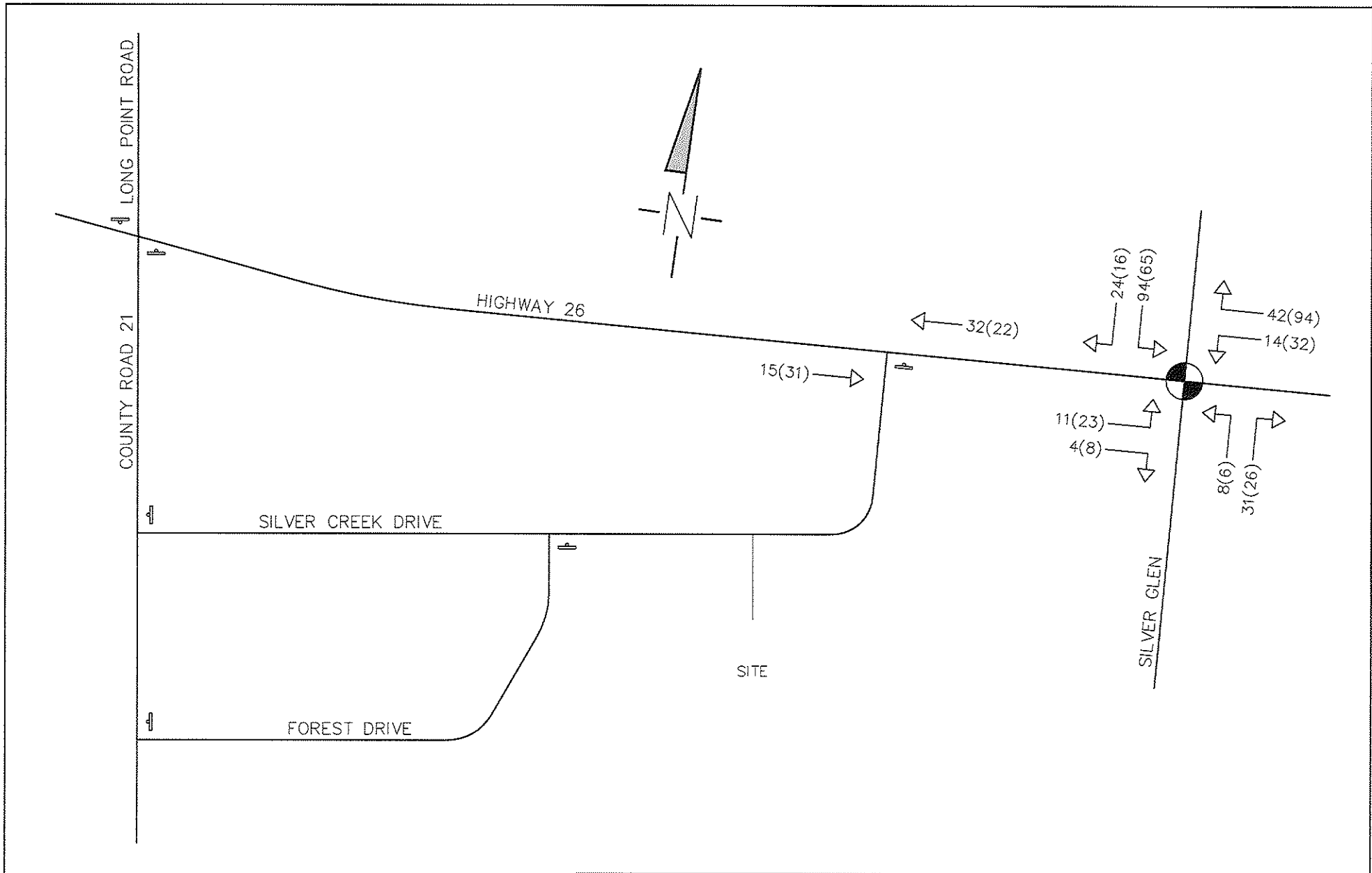
Legend

 PROPOSED SIGNAL CONTROL

 STOP CONTROL

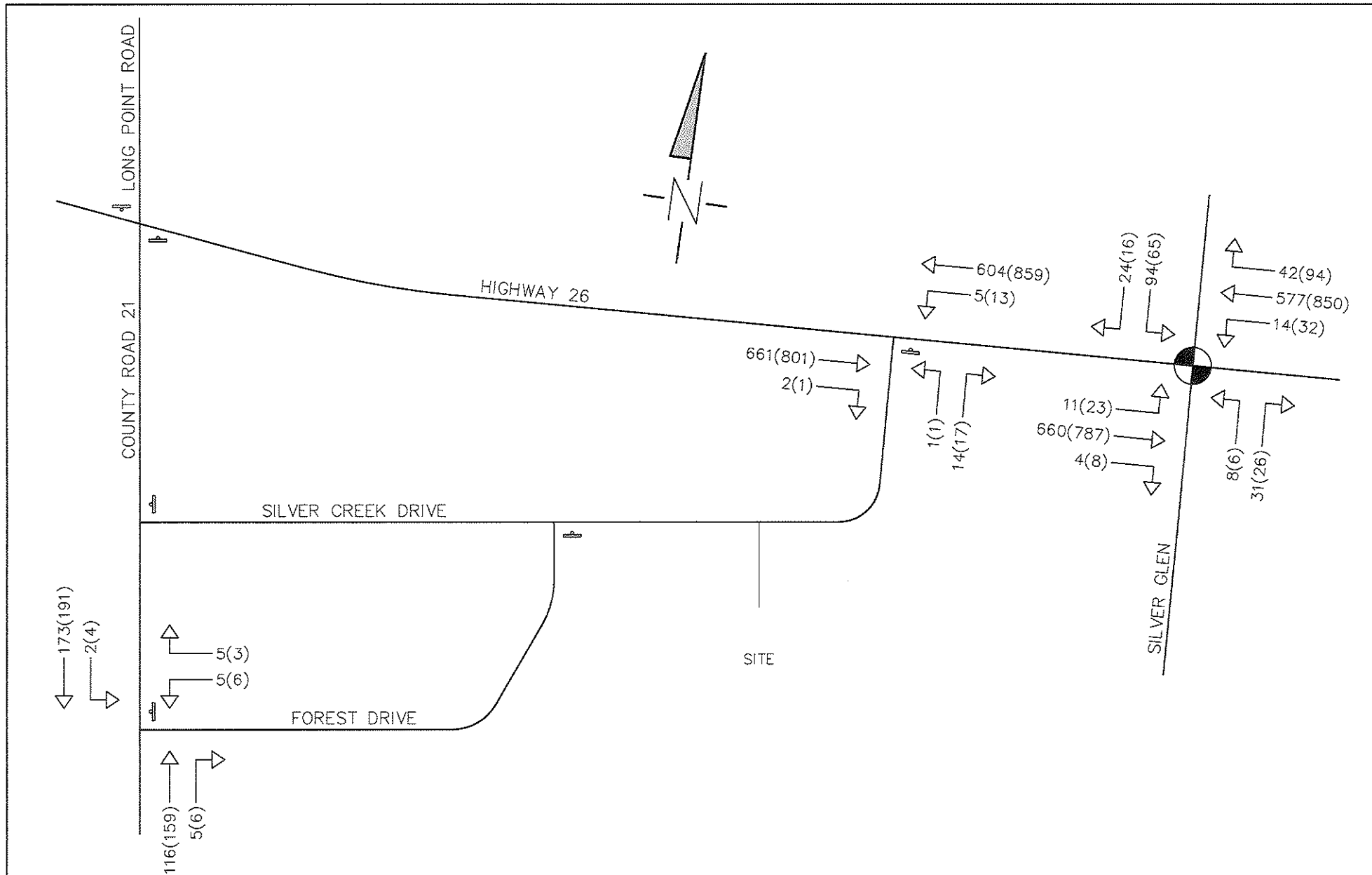
XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

Project	HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD		 CROZIER & ASSOCIATES ENGINEERS 110 PINE STREET, COLLINGWOOD, ON L9Y 2N9 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA		
Drawing	2031 CORRIDOR GROWTH TRAFFIC VOLUMES				
Drawn By	K.W.	Design By	A.J.F.	Project	281-2769
Scale	N.T.S.	Date	12/20/2010	Check By	A.J.F.
					Drawing
					FIG. 6

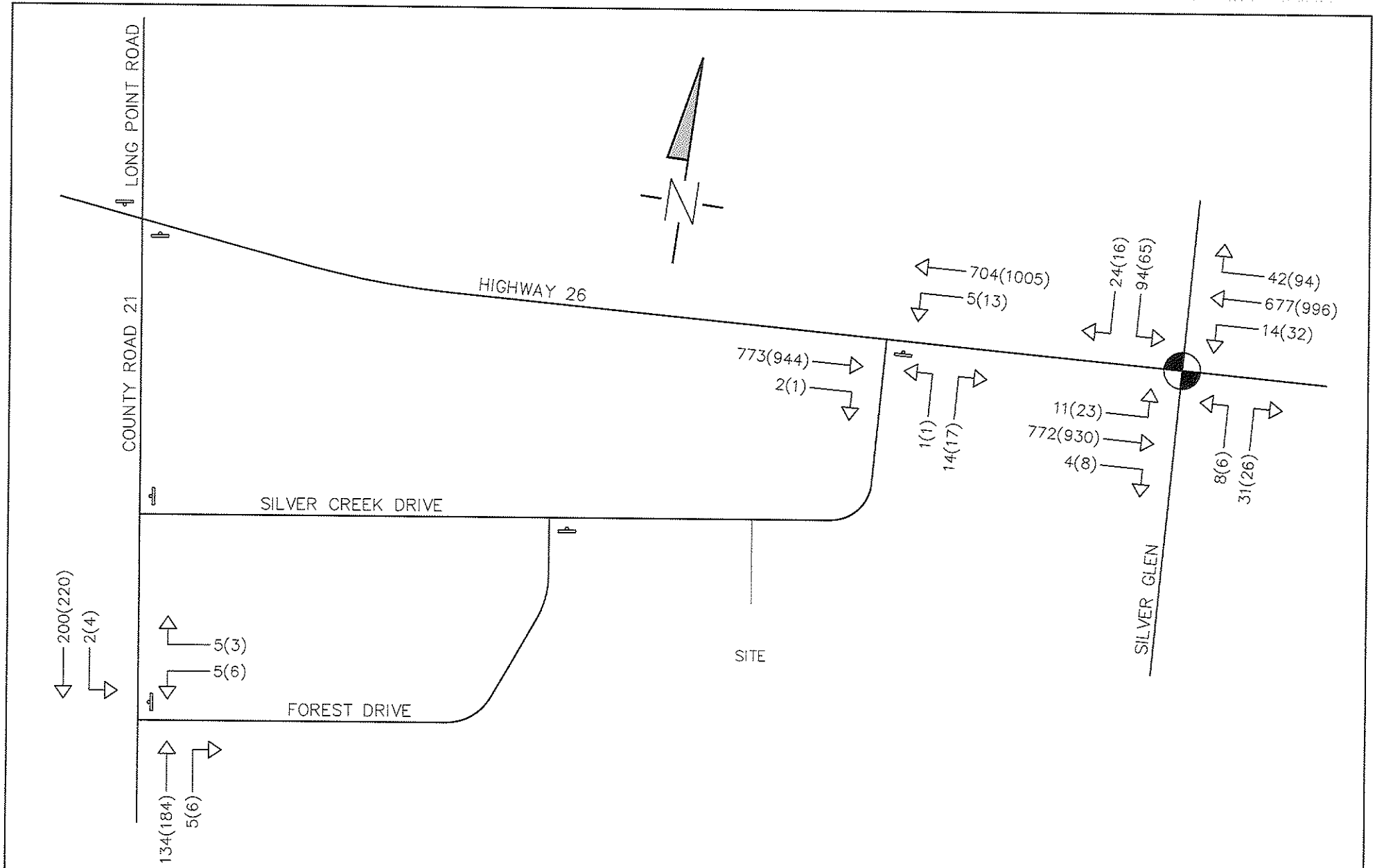


Legend	
	PROPOSED SIGNAL CONTROL
	STOP CONTROL
XX(YY)	A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

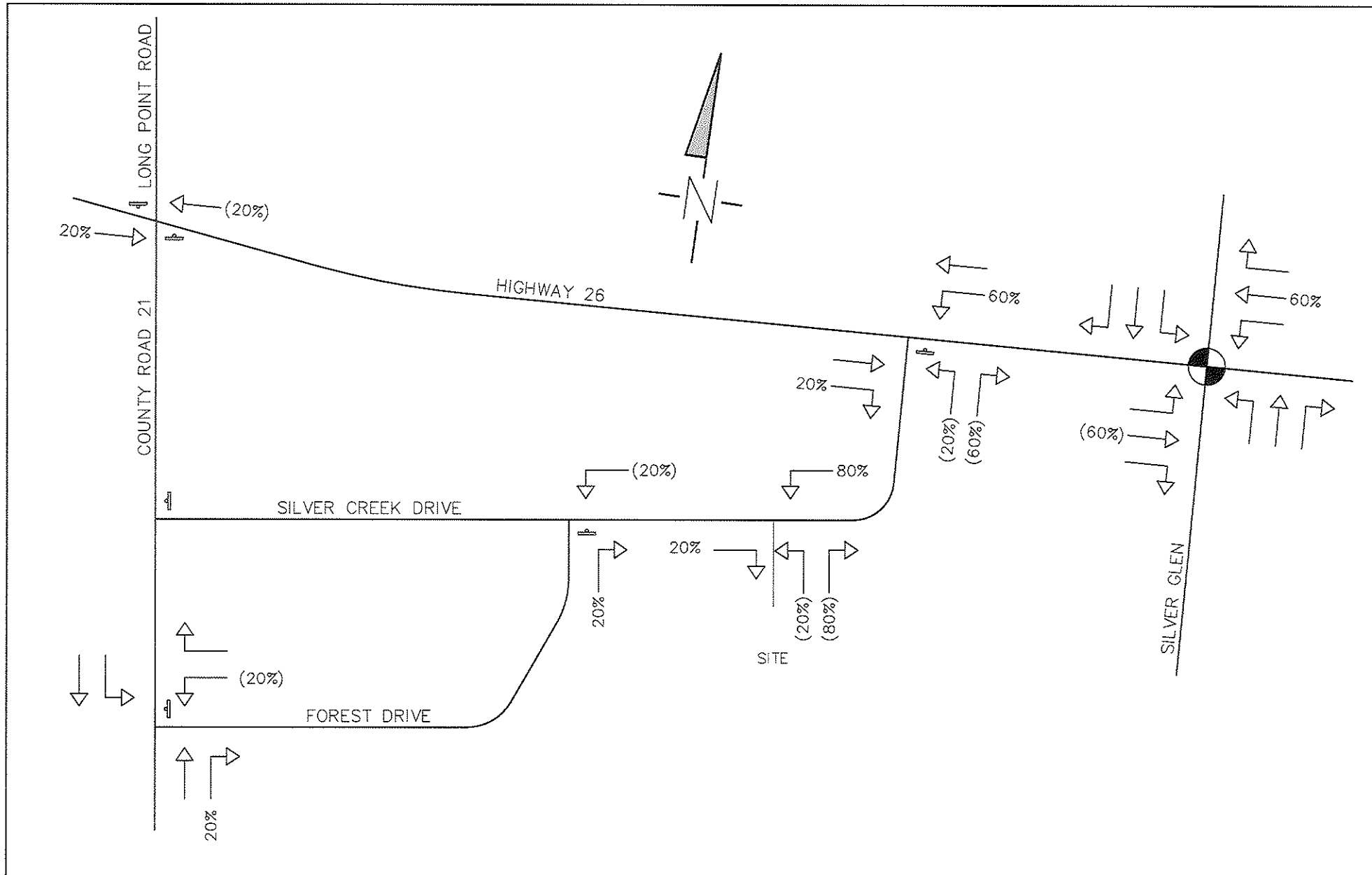
Project	HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD			 CROZIER & ASSOCIATES ENGINEERS 110 PINE STREET, COLLINGWOOD, ON L9Y 2N9 705 446-3810 T 705 446-3820 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
Drawing	OTHER BACKGROUND DEVELOPMENTS TRAFFIC VOLUMES				
Drawn By	J.R.S.	Design By	P.A.H.	Project	281-2769
Scale	N.T.S.	Date	08/14/2008	Check By	A.J.F.
					Drawing
					FIG. 7



Legend PROPOSED SIGNAL CONTROL STOP CONTROL XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project: HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD Drawing: 2021 FUTURE BACKGROUND TRAFFIC VOLUMES	CROZIER & ASSOCIATES ENGINEERS 110 PINE STREET, COLLINGWOOD, ON L9V 2N9 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA <table border="1"> <tr> <td>Drawn By: K.W.</td> <td>Design By: A.J.F.</td> <td>Project: 281-2769</td> </tr> <tr> <td>Scale: N.T.S.</td> <td>Date: 12/20/2010</td> <td>Check By: A.J.F.</td> </tr> <tr> <td colspan="2"></td> <td>Drawing: FIG. 8</td> </tr> </table>	Drawn By: K.W.	Design By: A.J.F.	Project: 281-2769	Scale: N.T.S.	Date: 12/20/2010	Check By: A.J.F.			Drawing: FIG. 8
Drawn By: K.W.	Design By: A.J.F.	Project: 281-2769									
Scale: N.T.S.	Date: 12/20/2010	Check By: A.J.F.									
		Drawing: FIG. 8									



Project HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD		CROZIER & ASSOCIATES ENGINEERS 110 PINE STREET, COLLINGWOOD, ON L3Y 2N9 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
Drawing 2026 FUTURE BACKGROUND TRAFFIC VOLUMES		Project 281-2769	
Drawn By K.W.	Design By A.J.F.	Scale N.T.S.	Date 12/20/2010
Check By A.J.F.		Drawing FIG. 9	



Legend

PROPOSED SIGNAL CONTROL

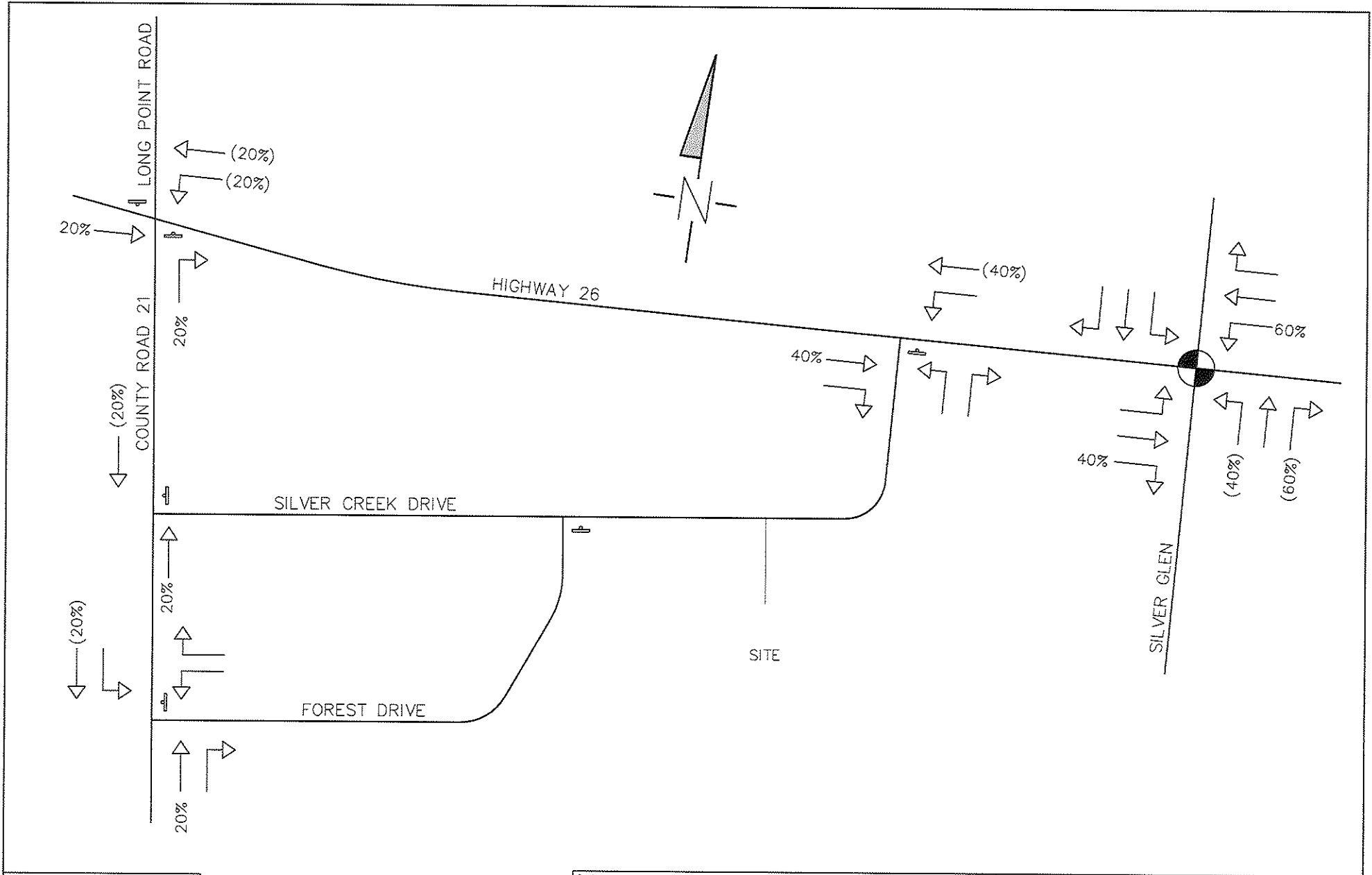
STOP CONTROL

XX(YY) INBOUND (OUTBOUND) TRIP DISTRIBUTION

Project		HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD	
Drawing		WEST LANDS RESIDENTIAL TRIP DISTRIBUTION	
Drawn By	K.W.	Design By	A.J.F.
Date	N.T.S.	Date	12/20/2010
Check By	A.J.F.	Project	281-2769
		FIG. 11	

CROZIER & ASSOCIATES ENGINEERS

110 PINE STREET,
COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA



Legend

 PROPOSED SIGNAL CONTROL

 STOP CONTROL

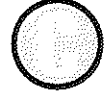
XX(YY) INBOUND (OUTBOUND) TRIP DISTRIBUTION

Project

HUNTINGWOOD DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

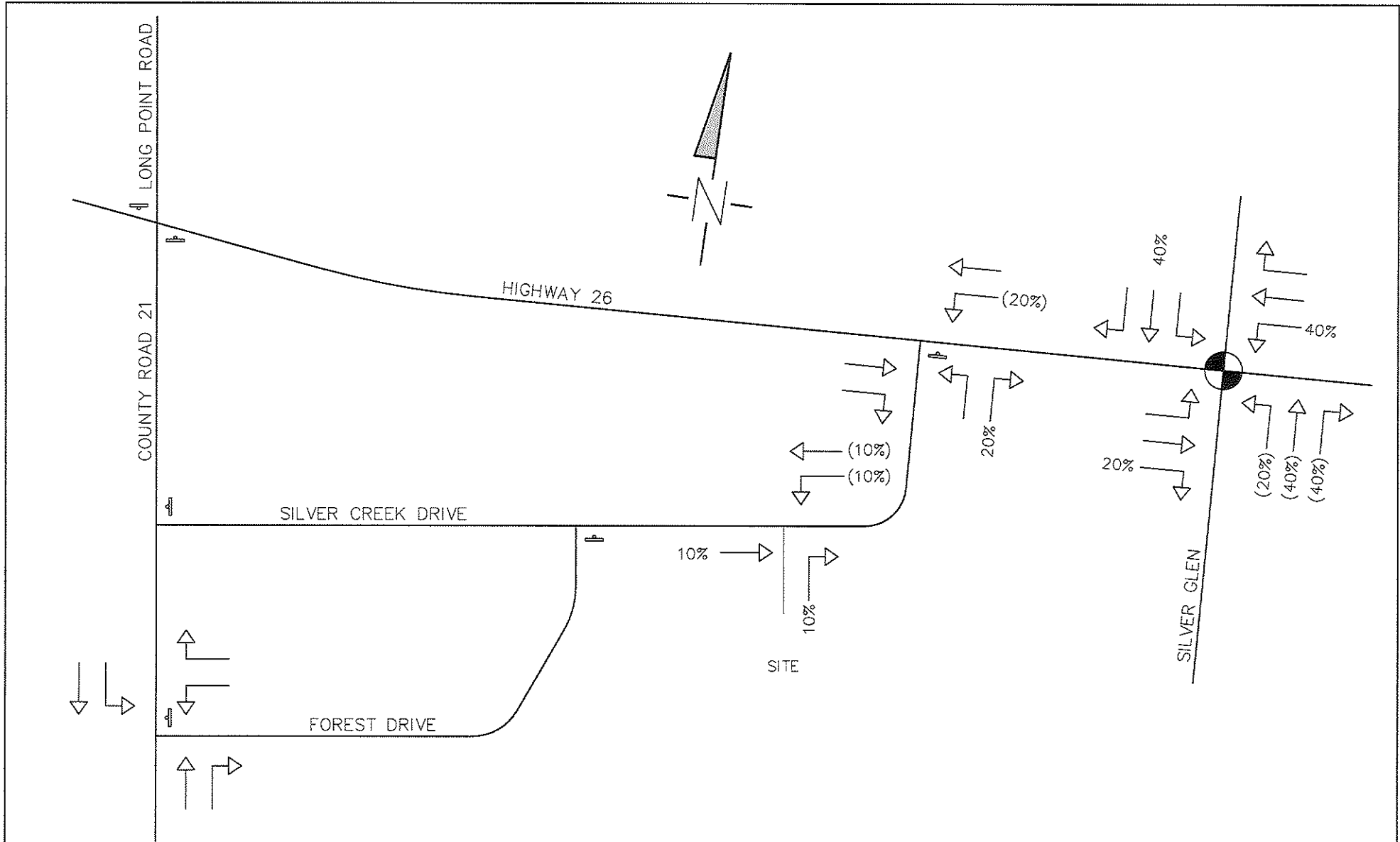
EAST LANDS RESIDENTIAL
TRIP DISTRIBUTION

 **CROZIER & ASSOCIATES**
ENGINEERS

110 PINE STREET,
COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	K.W.	Design By	A.J.F.	Project	281-2769
Scale	N.T.S.	Date	12/20/2010	Check By	A.J.F.
					Drawing

FIG. 12



Legend

 PROPOSED SIGNAL CONTROL

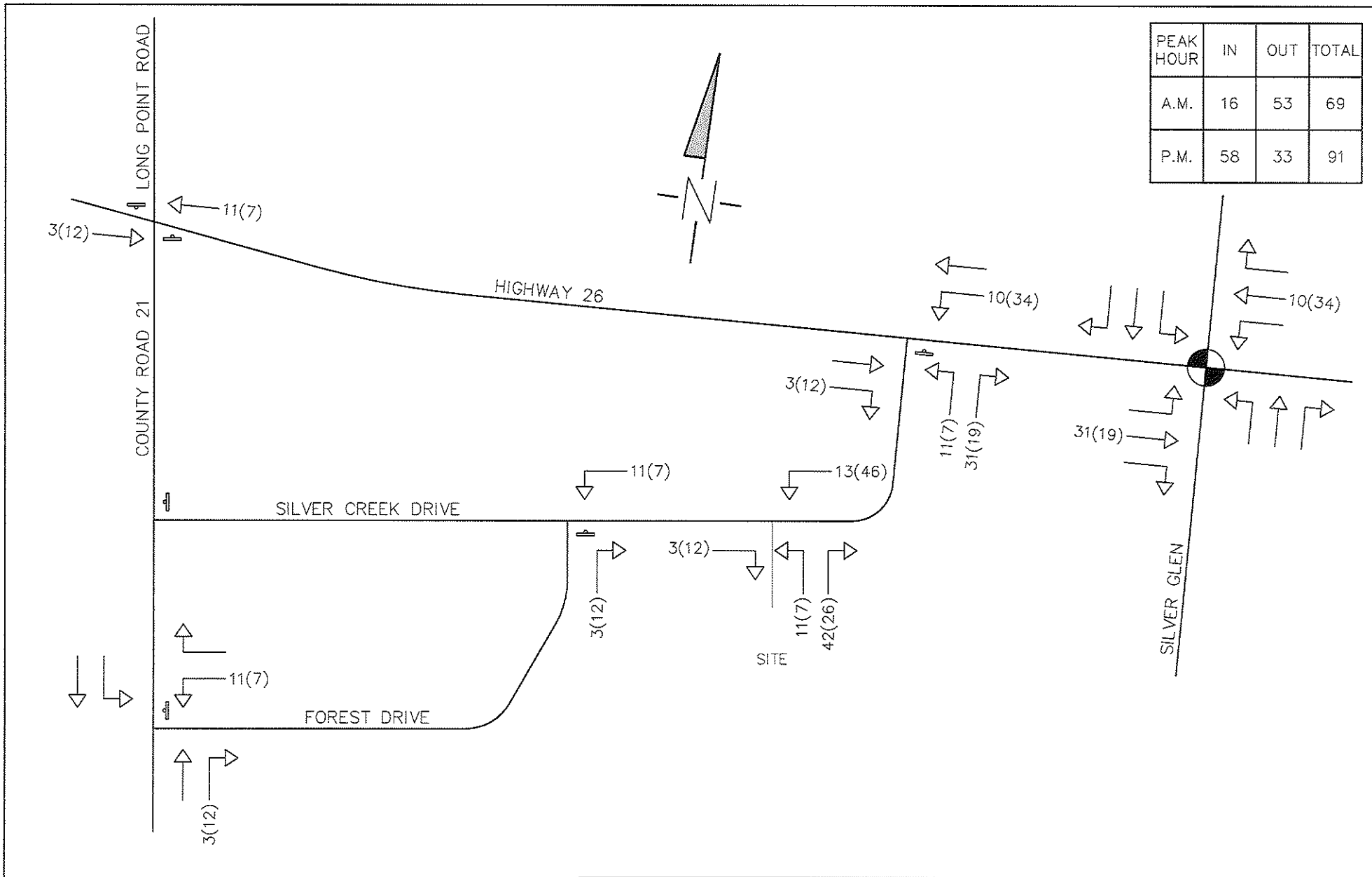
 STOP CONTROL

XX(YY) INBOUND (OUTBOUND) TRIP DISTRIBUTION

Project		HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD	
Drawing		EAST LANDS PRIMARY COMMERCIAL TRIP DISTRIBUTION	
Drawn By	K.W.	Design By	A.J.F.
Scale	N.T.S.	Date	12/20/2010
		Check By	A.J.F.
		Project	281-2769
		Drawing	FIG. 13

 **CROZIER & ASSOCIATES**
ENGINEERS

110 PINE STREET,
COLLINGWOOD, ON L9Y 2N9
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA



PEAK HOUR	IN	OUT	TOTAL
A.M.	16	53	69
P.M.	58	33	91

Legend

PROPOSED SIGNAL CONTROL

STOP CONTROL

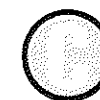
XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

Project

HUNTINGWOOD DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

WEST LANDS RESIDENTIAL
TRIP ASSIGNMENT

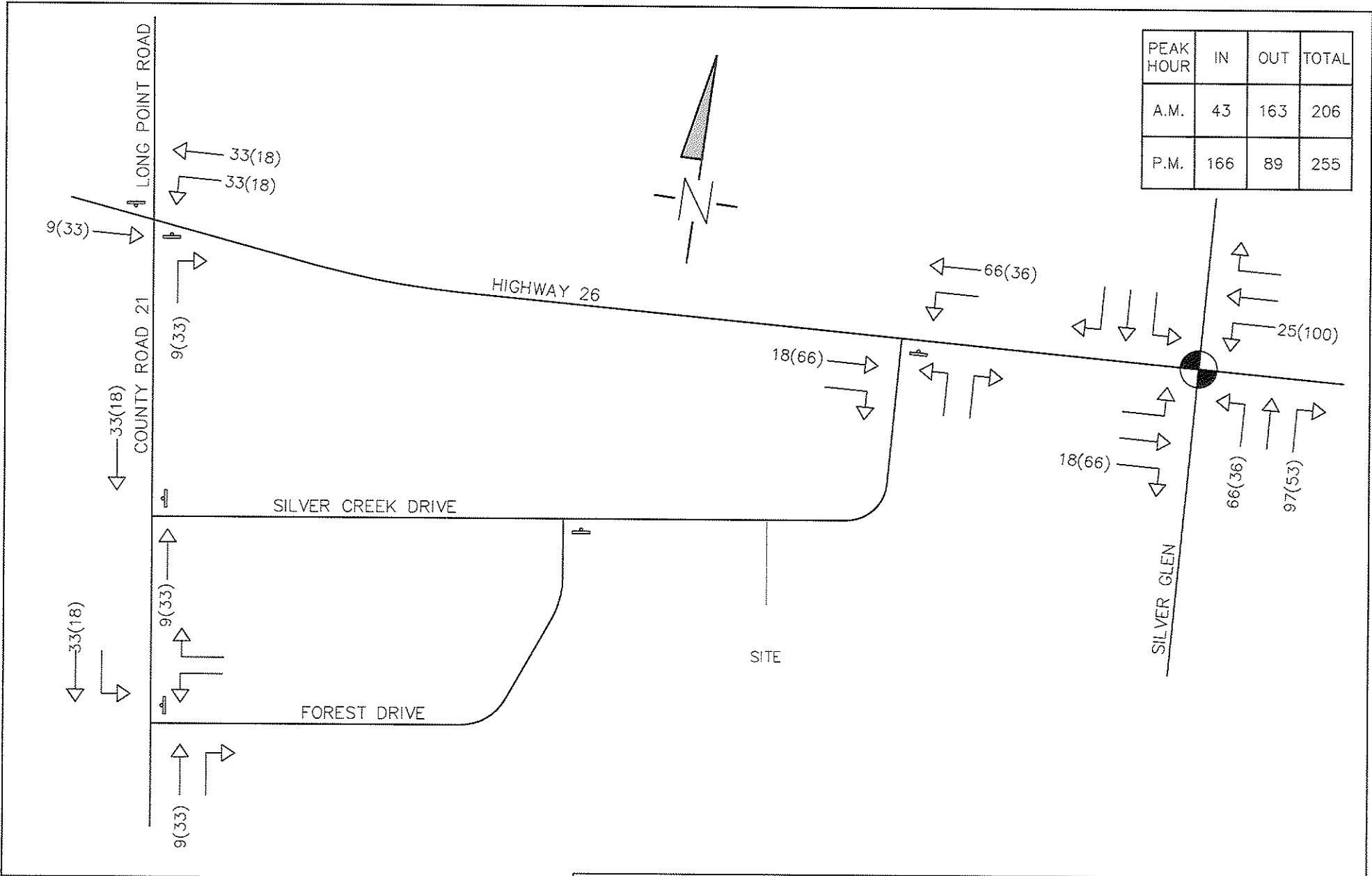


**CROZIER
& ASSOCIATES
ENGINEERS**

110 PINE STREET,
COLLINGWOOD, ON L9V 2N8
705 446-3510 F
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By K.W. Design By A.J.F. Project 281-2769

Scale N.T.S. Date 12/20/2010 Check By A.J.F. Drawing FIG. 14



PEAK HOUR	IN	OUT	TOTAL
A.M.	43	163	206
P.M.	166	89	255

Legend

 PROPOSED SIGNAL CONTROL

 STOP CONTROL

XX(YY) A.M.(P.M.) PEAK HOUR TRAFFIC VOLUMES

Project

HUNTINGWOOD DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

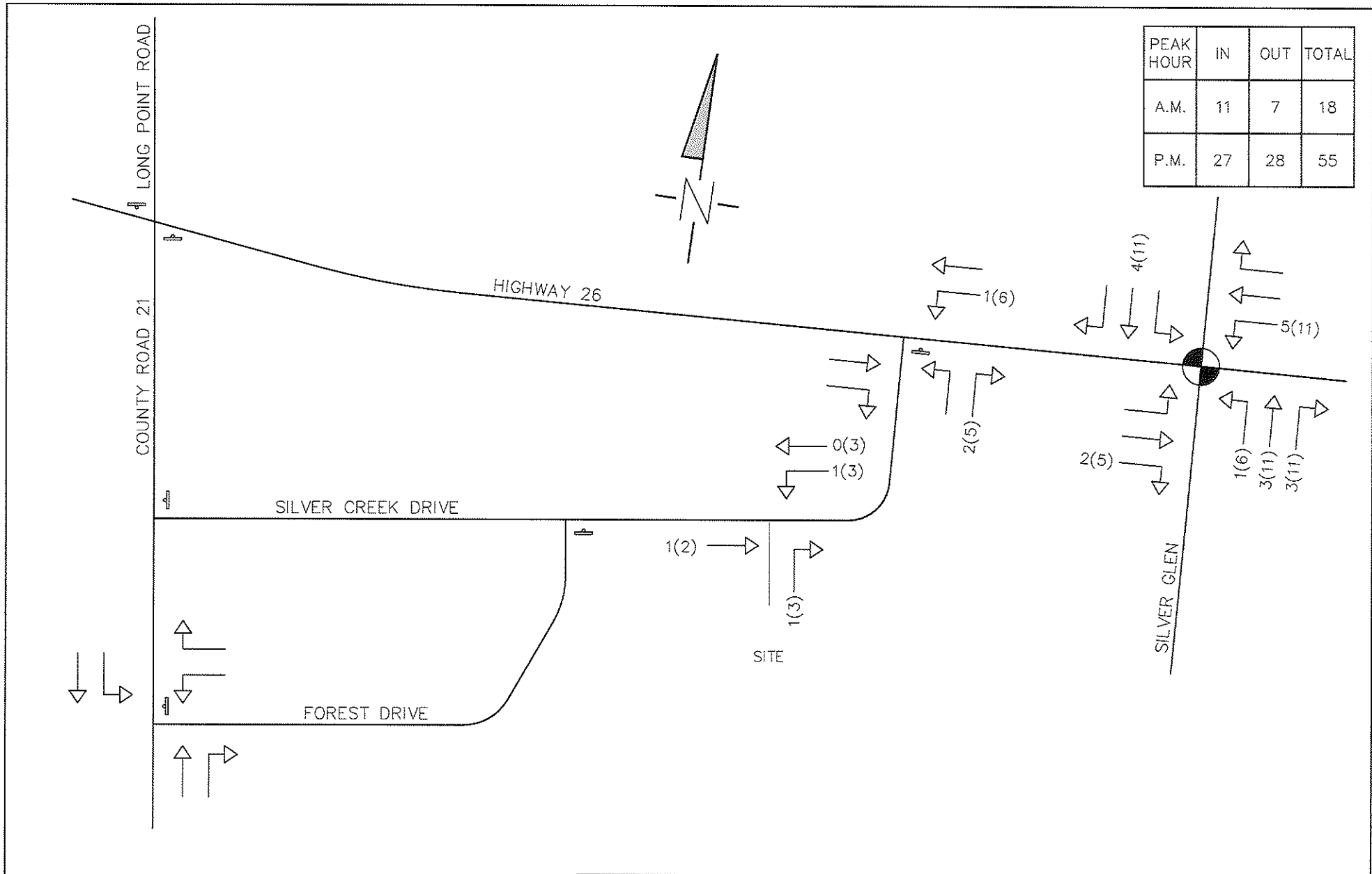
EAST LANDS RESIDENTIAL
TRIP ASSIGNMENT

 **CROZIER & ASSOCIATES**
ENGINEERS

110 PINE STREET,
COLLINGWOOD, ON L9Y 2N9
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705 446-3520 F
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Drawn By: K.W. Design By: A.J.F. Project: 281-2769

Scale: N.T.S. Date: 12/20/2010 Check By: A.J.F. Drawing: FIG. 15



Legend

PROPOSED SIGNAL CONTROL

STOP CONTROL

XX(YY) A.M.(P.M.) PEAK HOUR TRAFFIC VOLUMES

Project

HUNTINGWOOD DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

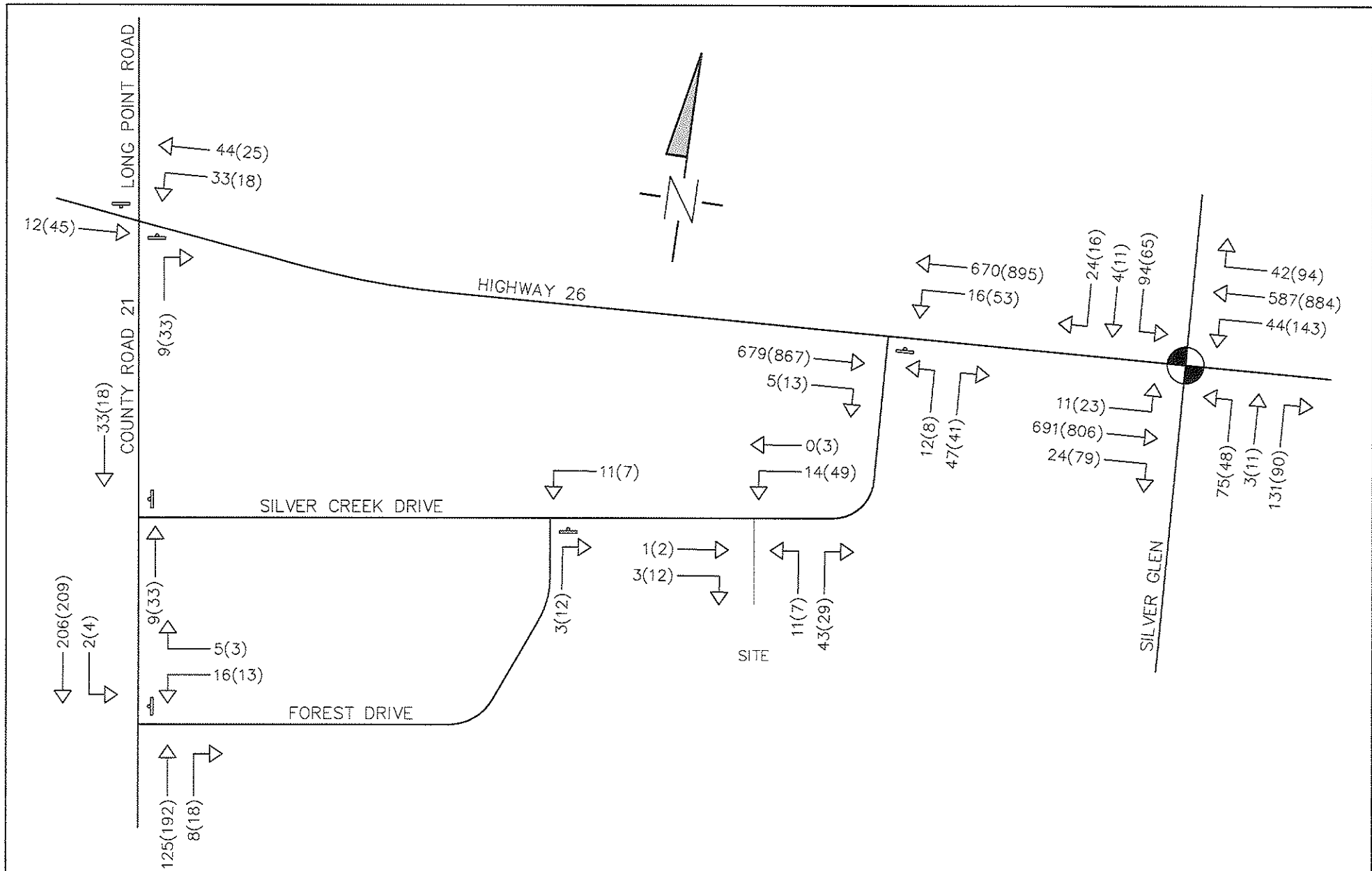
EAST LANDS PRIMARY COMMERCIAL
TRIP ASSIGNMENT

CROZIER & ASSOCIATES ENGINEERS

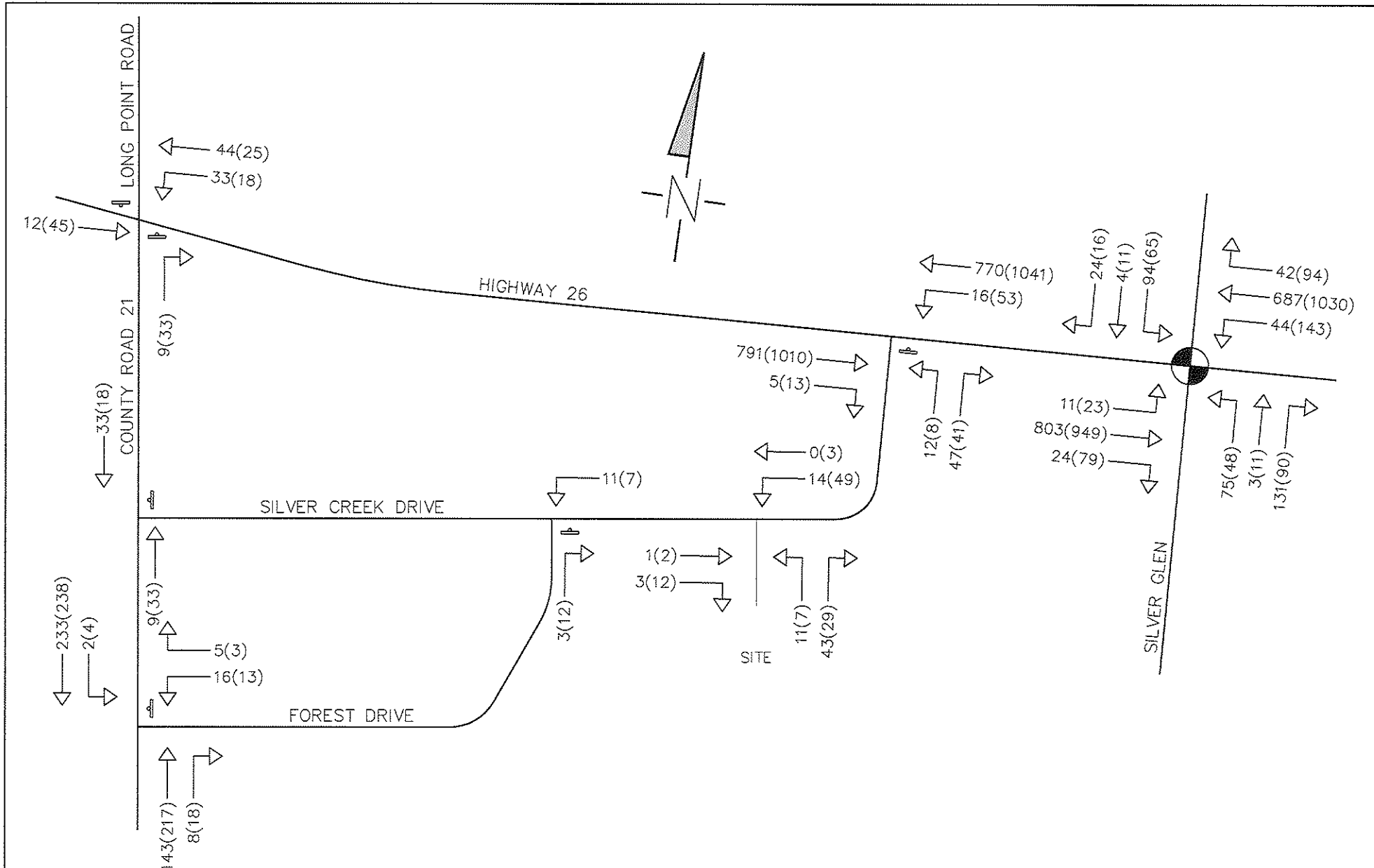
110 PINE STREET,
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Drawn By K.W. Design By A.J.F. Project 281-2769

Scale N.T.S. Date 12/20/2010 Check By A.J.F. Drawing FIG. 16



Project		HUNTINGWOOD DEVELOPMENT TOWN OF COLLINGWOOD		 CROZIER & ASSOCIATES ENGINEERS 110 PINE STREET, COLLINGWOOD, ON L9Y 2N9 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA										
Drawing		2021 TOTAL FUTURE TRAFFIC VOLUMES												
Drawn By		K.W.	Design By		A.J.F.	Project		281-2769						
Scale		N.T.S.		Date		12/20/2010		Check By		A.J.F.	Drawing		FIG. 17	



Legend

PROPOSED SIGNAL CONTROL

STOP CONTROL

XX(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES

Project

HUNTINGWOOD DEVELOPMENT
TOWN OF COLLINGWOOD

Drawing

2026 TOTAL FUTURE
TRAFFIC VOLUMES

CROZIER & ASSOCIATES ENGINEERS

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Drawn By	K.W.	Design By	A.J.F.	Project	281-2769
Scale	N.T.S.	Date	12/20/2010	Check By	A.J.F.

FIG. 18

