paradigm
TRANSPORTATION SOLUTIONS LIMITED

Downey Road, Guelph Transportation Improvement Study

Paradigm Transportation Solutions Limited

October 2016

Project Summary

Project Number
150730

October 2016

Client
City of Guelph
1 Carden Street
Guelph ON N1H 3A1

Client Contact
Jennifer Juste

Consultant Project Team
Jim Mallett, M.A.Sc., P.Eng., PTOE
Matt Brouwer, P.Eng.

Paradigm Transportation Solutions Limited
22 King Street South Suite 300
Waterloo ON N2J 1N8
p: 519.896.3163
www.ptsl.com

Shelburne Commercial Centre Transportation Impact Study

List of Revisions

Version	Date	Description
1	August 2016	Draft for Comment
2	August 2016	Revised Draft
3	October 2016	Final for Submission

Signatures and Seals

Signature

Engineer's Seal

Disclaimer

Executive Summary

Content

Downey Road is a two-lane residential arterial road that runs though the Kortright Hills neighbourhood in the City of Guelph, west of the Hanlon Expressway. Several separate transportation studies and projects have been undertaken in this community over the past several years by the City of Guelph and the Ministry of Transportation. As part of those projects, extensive engagement with residents of the community were undertaken. Issues raised by the residents consistently included the desire for traffic calming on Downey Road or to change the classification as an Arterial Road.

This study reviews the traffic conditions on Downey Road, makes a recommendation on the current classification of Downey Road, and recommends a traffic calming plan.

Existing Conditions

Review of the traffic conditions indicate:

- Average weekday daily volumes range from 7100 vehicles at the south end of the study area to 15000 vehicles approaching the Hanlon Expressway.
- 85th percentile speeds range from 58 to 65 km/h within the residential areas of Downey Road, and are higher on either ends of the study area at the transitions to the residential areas.
- A review of the collision history does not indicate a concern as the number of collisions is similar or less than other roads with the same classification and volumes.
- The number of trucks/buses observed during the week represented between 1% and 2% of the total volume. The percentage of tractor trailers observed represented less than 0.5% of the total volume.

The role and function of Downey Road is consistent with its arterial designation.

Recommended Traffic Calming Plan

The recommended traffic calming for Downey Road is illustrated in **Figure ES.1**. It includes a roundabout at Niska Road, pedestrian refuge islands at Hazelwood Drive and Pheasant Run Drive / Quail Drive, a raised intersection at Teal Drive, speed cushions with chokers at four locations, and enhanced pedestrian crosswalk pavement markings at the signalized intersection of Ptarmigan Drive.

Conclusions

As a result of the study, the following conclusions were made:

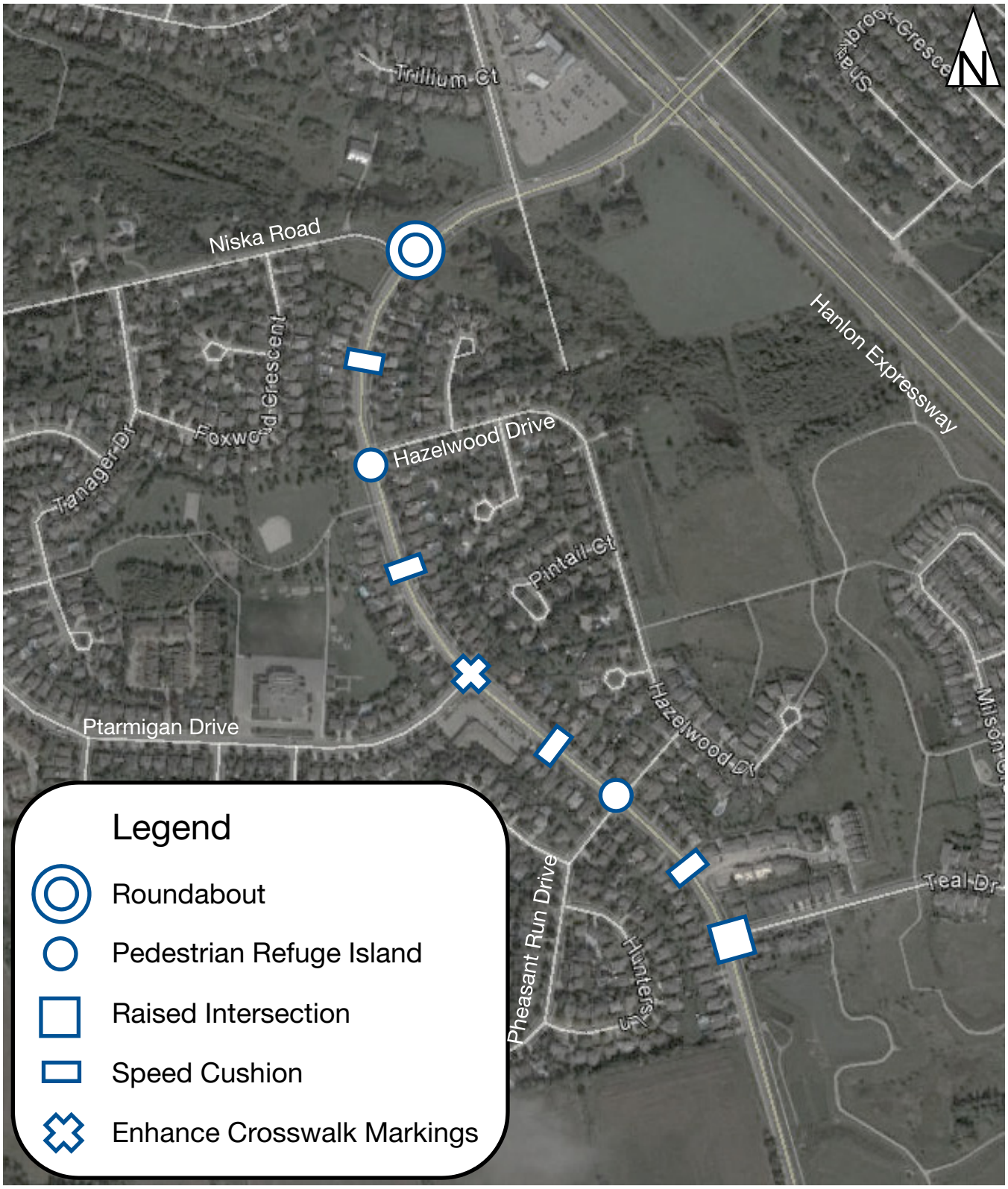
- Speeding is an issue of concern on Downey Road. 85th percentile speeds are as high as 65 km/h within the residential area, and even higher just outside the residential areas. Speeding is at least partially attributable to the width of Downey Road (14.5 metres).
- There is high support from the residents and community stakeholders for some form of traffic calming on Downey Road.
- Changing of the classification of Downey Road from an arterial road is not justified.
- Traffic calming devices, bike lanes and travel lanes can all be accommodated within the current width of Downey Road.
- On-Street parking can be accommodated on a single side of the road only.
- A signal or roundabout should be installed at the intersection of Downey Road and Niska Road, despite the volumes not technically meeting the threshold for signalization as the stop-controlled leg operates well over capacity and the volumes were only slightly under the threshold during the mid-day peak.
- A roundabout at the Niska Road intersection would serve a dual purpose of traffic control and traffic calming.
- Left-turn lanes are warranted on Downey Road at Hazelwood Drive (southbound), Pheasant Run Drive (northbound), and Teal Drive (southbound).

Recommendations

The recommended traffic calming plan includes:

- Reduction of the travel lane width to 3.25 metres.
- Inclusion of bike lanes along entirety of Downey Road.
- Single sided on-street parking where feasible.
- Roundabout at the intersection of Downey Road and Niska Road.
- Pedestrian Refuge Island on the south leg of the intersection of Downey Road and Hazelwood Drive.
- Enhanced pedestrian crosswalk pavements markings at the signalized intersection of Downey Road and Ptarmigan Drive.
- Pedestrian Refuge Island on the north leg of the intersection of Downey Road and Pheasant Run Drive / Quail Creek Drive.
- Raised intersection at Downey Road and Teal Drive.

- Centre Island Pedestrian Refuge / Entry Feature along with Speed Bars on the northbound lane leading from the higher speed rural section of Downey Road to the residential area.
- 4 sets of Speed Cushions with Chokers.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Traffic Calming Plan

Downey Road, Guelph – Transportation Improvement Study
150730

Figure ES.1

Contents

Appendix

Figures

Tables

1 Introduction

1.1 Background

Downey Road is a two-lane residential arterial road that runs though the Kortright Hills neighbourhood in the City of Guelph, west of the Hanlon Expressway. Downey Road is the continuation of the arterial road Kortright Road West, which is east of the Hanlon Expressway. Downey Road serves as a connection between the Hanlon Expressway and Kortright Road West, and the Hanlon Creek Business Park to the south and Puslinch County beyond.

Several separate transportation studies and projects have been undertaken in this community over the past several years by the City of Guelph and the Ministry of Transportation. As part of those projects, extensive engagement with residents of the community were undertaken. Issues raised by the residents consistently included the desire for traffic calming on Downey Road or to change the classification as an Arterial Road.

1.2 Scope

The purpose of this study is:

- Collect and analyse traffic data, including volumes, class and speed.
- Recommend whether changing the classification of Downey Road from Arterial Road is appropriate.
- Recommend traffic calming solutions to reduce speed and enhance pedestrian and cycling experience on Downey Road.

As part of this study, two sets of public workshops were held to gather the feedback of residents and community stakeholders on the issues facing Downey Road and on the potential solutions.

The study area of the project consists of Downey Road from Woodland Glen Drive in the north to the end of the residential area, south of Teal Drive in the south. **Figure 1.1** shows the study area.

paradigm TRANSPORTATION SOLUTIONS LIMITED

Study Area

Downey Road, Guelph – Transportation Improvement Study
150730

Figure 1.1

2 Traffic Conditions and Issues

2.1 Existing Traffic Control

Downey Road is currently a three lane road, with a single lane for both directions of traffic and a centre two-way left-turn lane. The curb to curb width is 14.5 metres along the entire study area, with the exception of widening at the signalized intersection with Ptarmigan Road.

The intersection of Downey Road and Ptarmigan Road is controlled by a traffic signal. The remainder of the intersections within the study area are stop-controlled with priority assigned to Downey Road.

2.2 Existing Volumes

Turning movement counts were collected by Paradigm in April 2016. The AM and PM peak hours are summarized in **Figure 2.1a** and **Figure 2.1b**. The detailed count data is included in **Appendix A**.

2.2.1 Traffic Operations Analysis

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

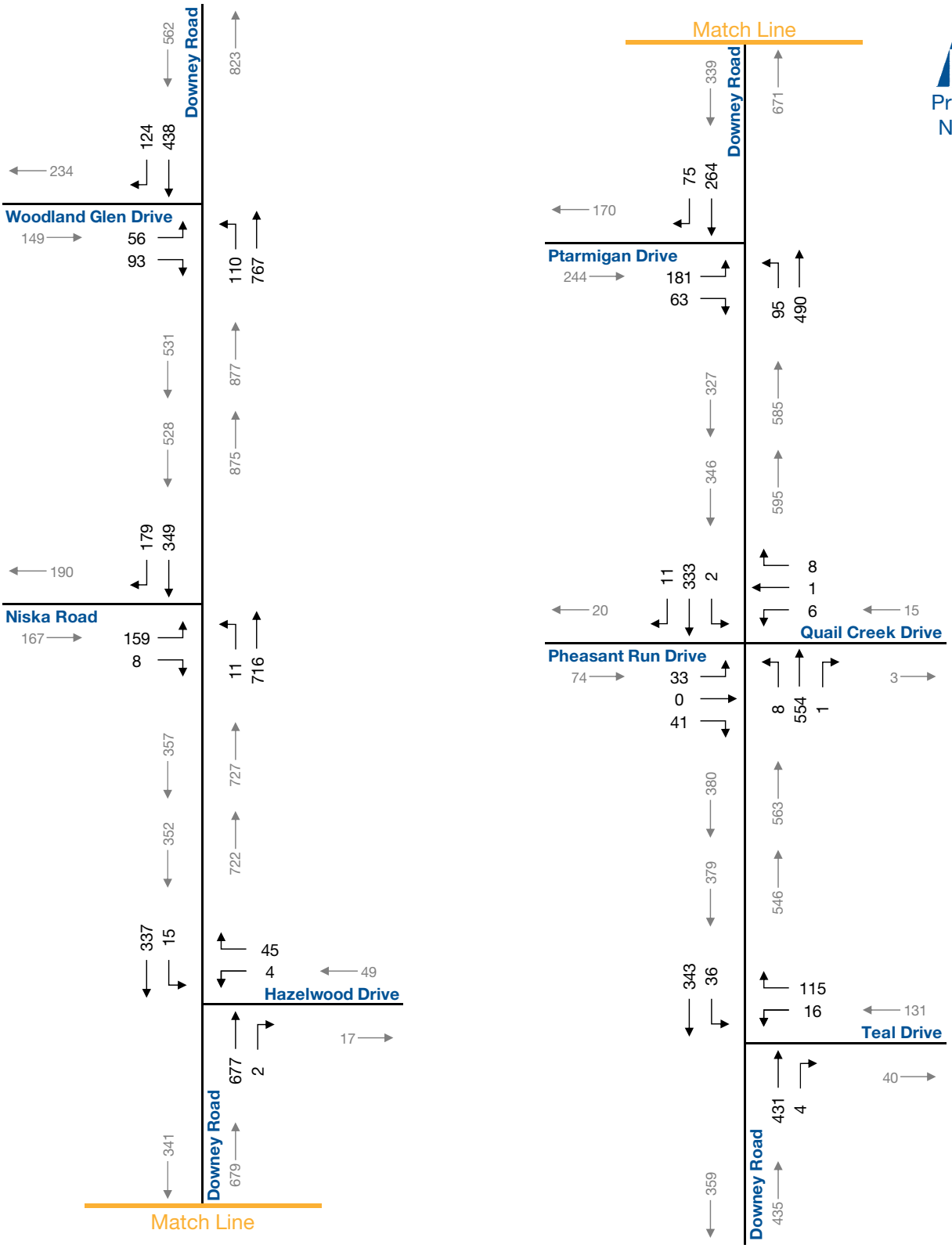
The operations of intersections in the study area were evaluated with the existing turning movement volumes using Synchro 9.

The intersection analysis considered two separate measures of performance:

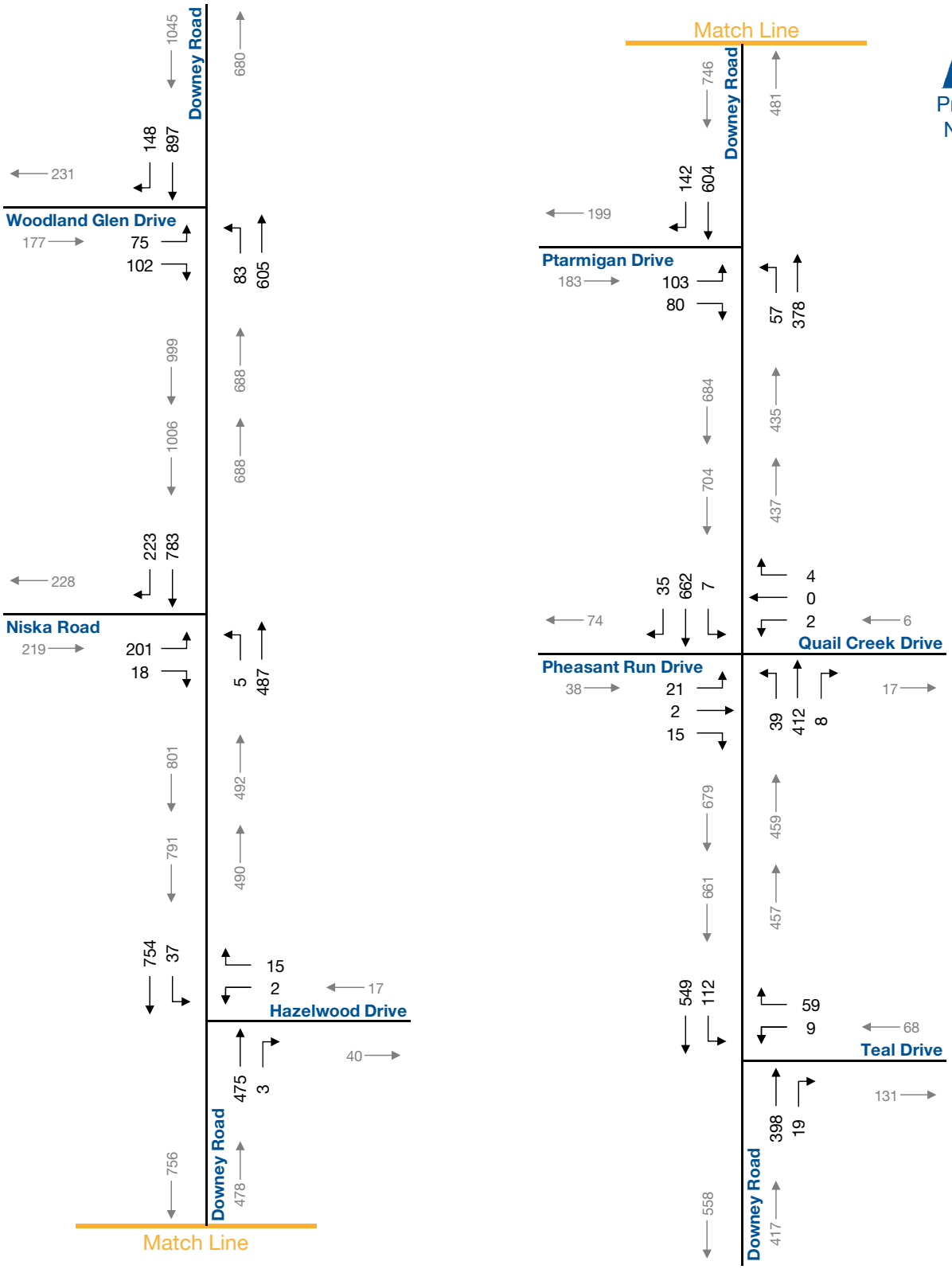
- The volume to capacity ratio for each intersection; and
- The LOS for each turning movement. LOS is based on the average control delay per vehicle.

The existing intersection operations are summarized in **Table 2.1** indicating the existing levels of service (LOS), volume to capacity ratios (V/C) and 95th percentile queues experienced within the study area, for the AM and PM peak hours. Detailed Synchro reports are provided in **Appendix B**.

The analysis indicates that sidestreet movements on Niska Road currently experience LOS F conditions during both the AM and PM peak hours. Additionally, the sidestreet movements on Woodland Glen Drive also experience LOS F conditions during the PM peak hour. The remaining intersections and movements operate within acceptable levels of delay during the peak hours.



Existing Traffic Volumes
AM Peak Hour



Existing Traffic Volumes
PM Peak Hour

TABLE 2.1: EXISTING PEAK HOUR TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	1 - Downey Road & Woodland Glen Drive	TWSC	LOS Delay V/C Q	D 29 0.53 23		D 29 0.53 23	**D 29**					A 4 0.12 3	A 0 0.33 0		**A 2**		A 0 0.19 0	A 0 0.17 0	**A 0**	**4**
	2 - Downey Road & Niska Road	TWSC	LOS Delay V/C Q	F 76 0.85 52		F 76 0.85 52	**F 76**					A 9 0.01 0	A 0 0.46 0		**A 0**		A 0 0.22 0	A 0 0.11 0	**A 0**	**9**
	3 - Downey Road & Hazelwood Drive	TWSC	LOS Delay V/C Q					C 16 0.13 4		C 16 0.13 4	**C 16**		A 0 0.43 0	A 0 0.43 0	**A 0**	A 9 0.02 1	A 0 0.22 0		**A 0**	**1**
	4 - Downey Road & Ptarmigan Drive	TCS	LOS Delay V/C Q	C 24 0.64 41		C 24 0.64 41	**C 24**					A 8 0.18 14	A 10 0.50 65		**A 10**		A 8 0.35 39	A 8 0.35 39	**A 8**	**B 12**
	5 - Downey Road & Pheasant Run Drive / Quail Creek Drive	TWSC	LOS Delay V/C Q	C 18 0.23 7	C 18 0.23 7	C 18 0.23 7	**C 18**	C 18 0.06 2	C 18 0.06 2	C 18 0.06 2	**C 18**	A 8 0.01 0	A 0 0.35 0	A 0 0.35 0	**A 0**	A 9 0.00 0	A 0 0.00 0	A 0 0.00 0	**A 0**	**2**
	6 - Downey Road & Teal Drive	TWSC	LOS Delay V/C Q					B 14 0.27 9		B 14 0.27 9	**B 14**		A 0 0.28 0	A 0 0.28 0	**A 0**	A 8 0.04 1	A 0 0.22 0		**A 1**	**2**
PM Peak Hour	1 - Downey Road & Woodland Glen Drive	TWSC	LOS Delay V/C Q	F 173 1.16 82		F 173 1.16 82	**F 173**					A 5 0.14 4	A 0 0.26 0		**A 2**		A 0 0.38 0	A 0 0.29 0	**A 0**	**17**
	2 - Downey Road & Niska Road	TWSC	LOS Delay V/C Q	F 293 1.47 123		F 293 1.47 123	**F 293**					B 11 0.01 0	A 0 0.31 0		**A 0**		A 0 0.50 0	A 0 0.14 0	**A 0**	**37**
	3 - Downey Road & Hazelwood Drive	TWSC	LOS Delay V/C Q					B 14 0.04 1		B 14 0.04 1	**B 14**		A 0 0.31 0	A 0 0.31 0	**A 0**	A 9 0.04 1	A 0 0.48 0		**A 0**	**0**
	4 - Downey Road & Ptarmigan Drive	TCS	LOS Delay V/C Q	B 19 0.56 27		B 19 0.56 27	**B 19**					A 9 0.23 10	A 7 0.36 40		**A 8**		B 14 0.71 130	B 14 0.71 130	**B 14**	**B 12**
	5 - Downey Road & Pheasant Run Drive / Quail Creek Drive	TWSC	LOS Delay V/C Q	E 36 0.26 8	E 36 0.26 8	E 36 0.26 8	**E 36**	C 21 0.03 1	C 21 0.03 1	C 21 0.03 1	**C 21**	A 10 0.05 1	A 0 0.27 0	A 0 0.27 0	**A 0**	A 8 0.01 0	A 0 0.01 0	A 0 0.01 0	**A 0**	**2**
	6 - Downey Road & Teal Drive	TWSC	LOS Delay V/C Q					B 15 0.16 5		B 15 0.16 5	**B 15**		A 0 0.27 0	A 0 0.27 0	**A 0**	A 9 0.11 3	A 0 0.35 0		**A 2**	**2**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

2.2.2 Signal Warrant Analysis

Using the turning movement volumes gathered, calculations to determine if signals are warranted at the intersections within the study area were completed. Signal warrants are also used to determine if a roundabout is warranted.

For the intersection of Downey Road and Niska Road, it was found that despite the poor levels of service experienced at both peak hours, the warrant for a signal is technically not met. The signal warrant calculation is based on 8 hours of traffic data. The reason that the warrant is not met is the mid-day volumes on Downey Road dip slightly below the threshold (by 14% to 19%). Therefore, a signal can not be recommended on the basis of the warrant calculations and current volumes alone. However, given the over capacity operations during the peak hours and the near threshold volumes during the mid-day peak, it can be argued that continued unsignalized control at this intersection will lead to further degrading operations and that signalization or a roundabout should be considered for this intersection. Signalization or roundabout control was also recommended in the Niska Road Bridge Environmental Assessment[1], completed before this study.

For the intersection of Downey Road and Woodland Glen Drive, it was found that a signal is not warranted. The warrant calculations were not as close to the threshold as they were for the Niska calculations, as the widening of Downey Road to 4 lanes at this intersection raises the threshold to be met. Signalization is not warranted at this intersection, as an alternate route to the Hanlon Expressway is possible by travelling north on Woodland Glen Drive and the close proximity to the Hanlon Expressway would add challenges to implementation of a signal or roundabout at this intersection.

The signal warrant calculations worksheets are included in **Appendix C**.

2.2.3 Left-Turn Lane Warrant Analysis

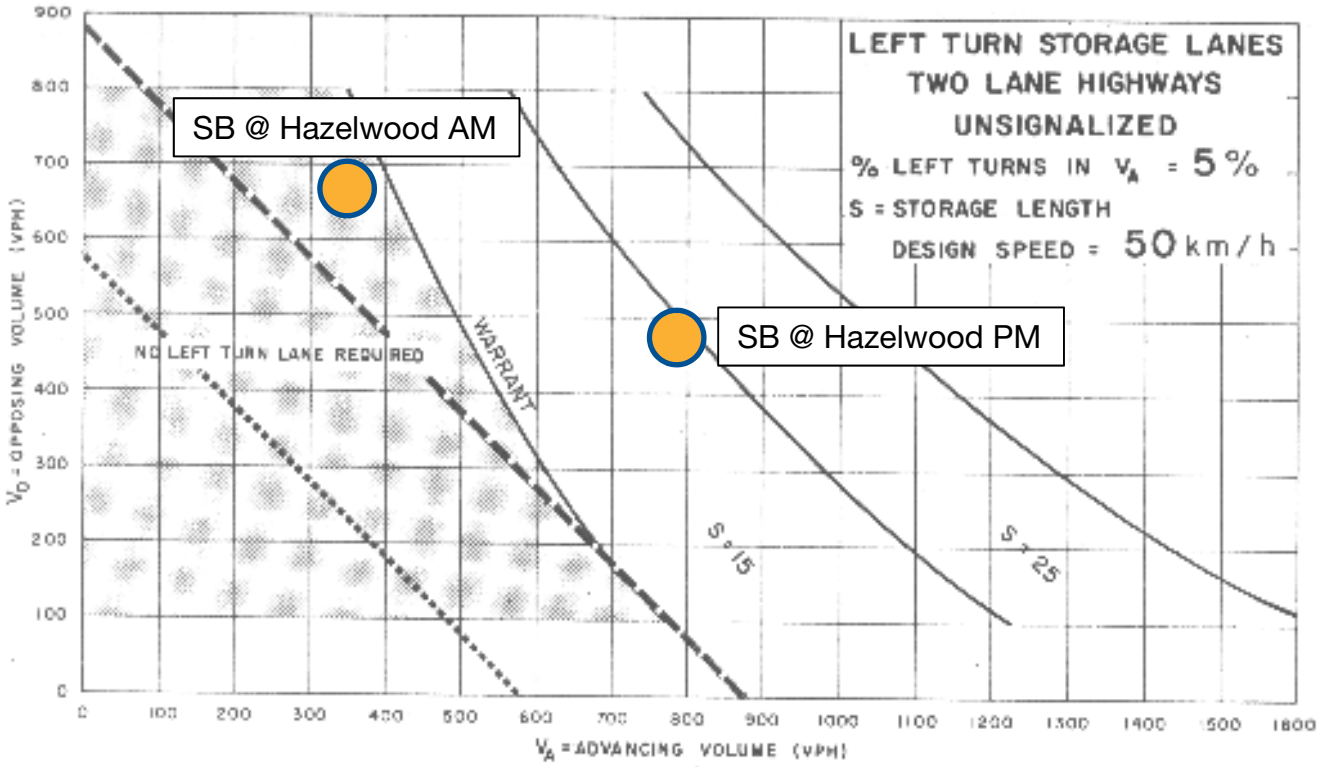
Currently, there is a centre two-way left-turn lane along the length of Downey Road, which acts as left-turn lanes at each intersection. To anticipate the potential loss of this centre lane, left-turn lane warrant analyses were completed to determine which locations would require dedicated left-turn lanes.

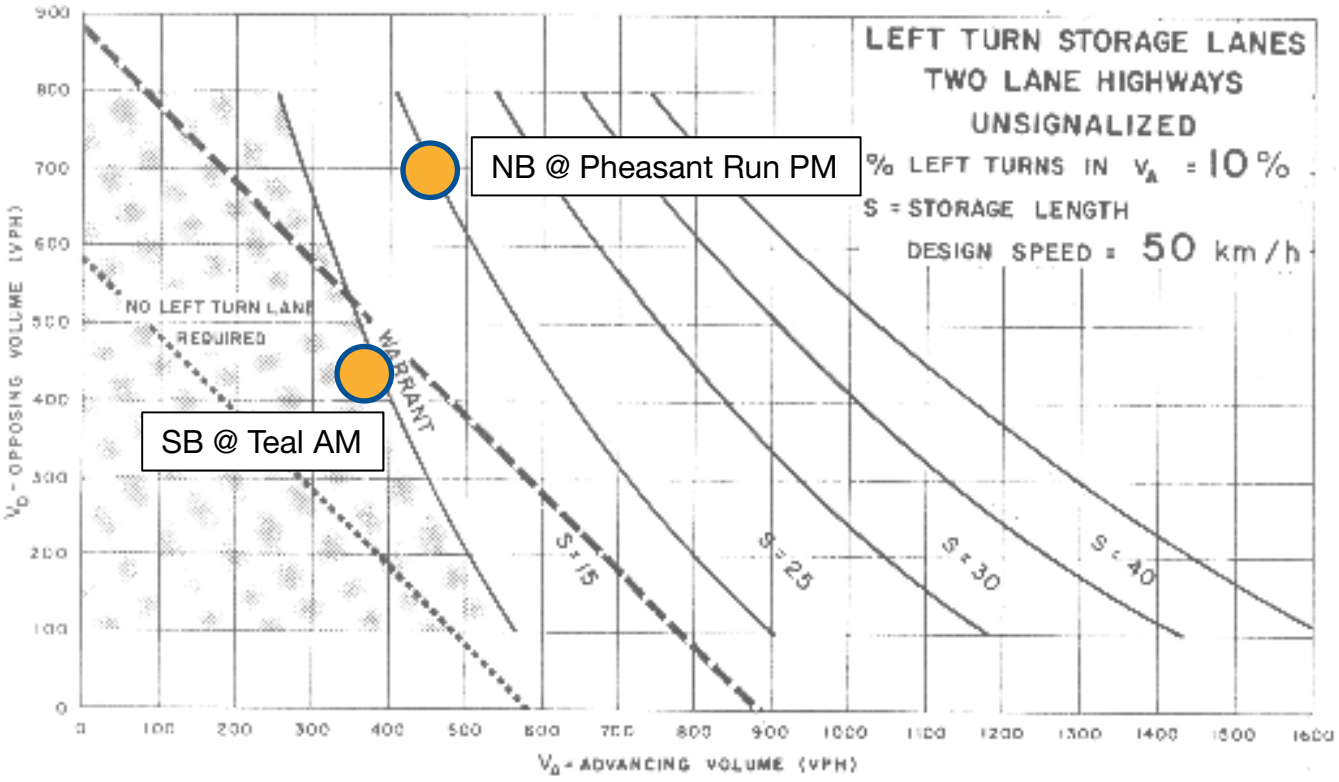
The left-turn lane warrants are shown in **Figure 2.2a** and **Figure 2.2b** and indicate that:

- A southbound left-turn lane with 15 metres of storage is warranted at Hazelwood Drive,
- A northbound left-turn lane with 15 metres of storage is warranted at Pheasant Run Drive, and

[1] Niska Road Improvements Schedule C Municipal Class Environmental Assessment Environmental Study Report, R.J. Burnside & Associates Limited, February 2016.

- A southbound left-turn lane with 25 metres of storage is warranted at Teal Drive.



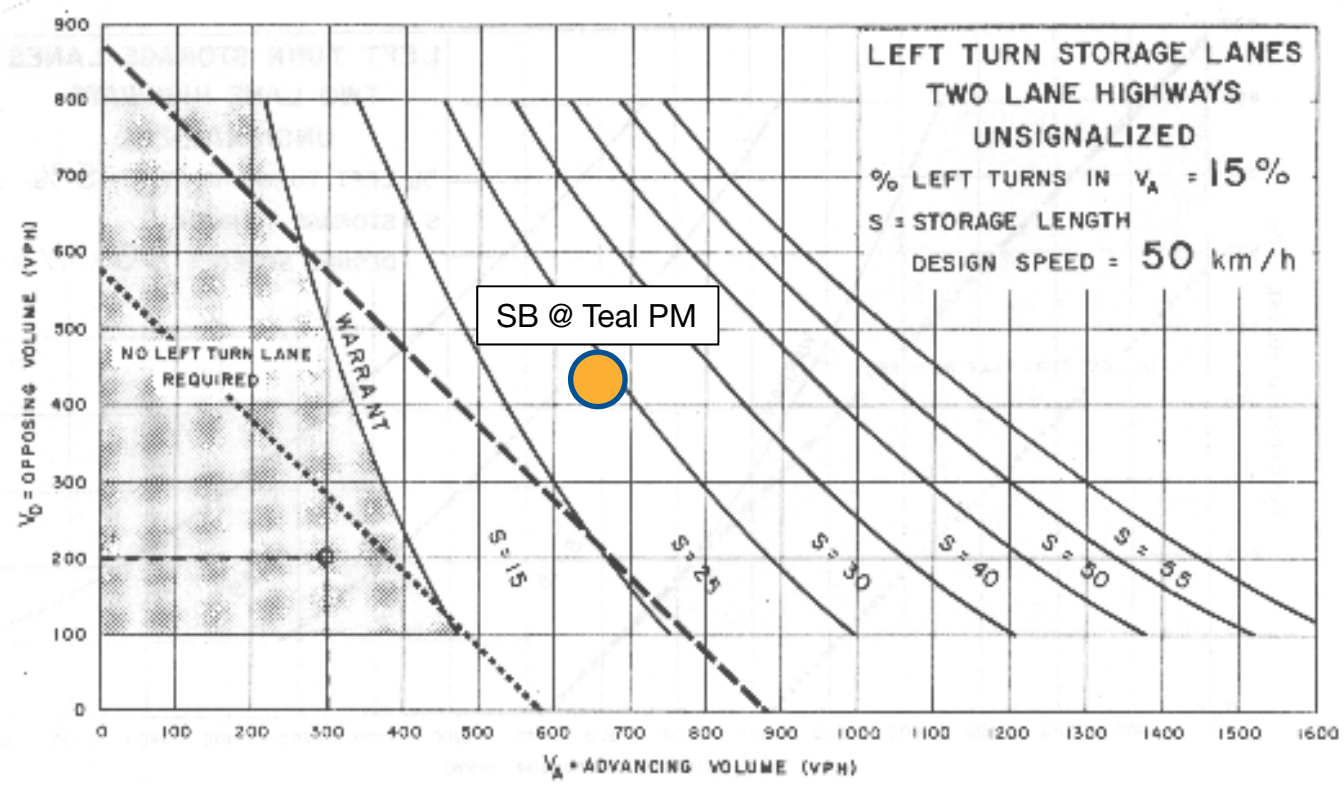


paradigm TRANSPORTATION SOLUTIONS LIMITED

Left-Turn Lane Warrants

Downey Road, Guelph – Transportation Improvement Study
150730

Figure 2.2a



paradigm TRANSPORTATION SOLUTIONS LIMITED

Left-Turn Lane Warrants

2.3 ATR Collected Data

Automated Traffic Recorders (ATR) were deployed in five locations along Downey Road between 26 April 2016 and 2 May 2016 and recorded volume, class and speed of vehicles continuously over those seven days. The locations were:

- between Hanlon Expressway and Woodland Glen Drive
- between Niska Road and Hazelwood Drive
- between Hazelwood Drive and Ptarmigan Drive,
- between Pheasant Run Drive / Quail Creek Drive and Teal Drive;
- south of Teal Drive, at the edge of the residential area.

2.3.1 Volume

Figure 2.3 shows the average weekday daily volumes on Downey Road. The surveys show that traffic volumes are higher at the north end of Downey Road, as traffic generated by the Kortright Hills neighbourhood generally goes to / comes from the north (towards Guelph and the Hanlon Expressway), as is seen in the turning movement counts presented in **Section 2.2**. Average weekday daily volumes range from 7100 vehicles at the south end of the study area to 15000 vehicles approaching the Hanlon Expressway.

The number of trucks/buses observed during the week represented between 1% and 2% of the total volume. The percentage of tractor trailers observed represented less than 0.5% of the total volume.

2.3.2 Speed

The speeds of all vehicles were recorded by the ATRs over the seven days they were deployed. The 85th percentile speed represents the speed that 85% of vehicles are traveling at or below and is the metric generally used for transportation planning purposes. **Figure 2.4** shows the observed 85th percentile speeds on Downey Road. The results show that in the residential areas, the 85th percentile speeds range from between 58 km/h and 65 km/h. To the north, approaching the Hanlon Expressway, the 85th percentile speeds were observed to be 67 km/h southbound and 69 km/h northbound. To the south, at the transition to the residential area, the 85th percentile speeds were observed to be 78 km/h southbound and 71 km/h northbound.

Within the residential area, speeds are a concern and it should be the goal of traffic calming efforts to reduce the 85th percentile speed to at least the posted speed limit of 50 km/h. When dealing with vehicle collisions involving pedestrians, the difference between 65 km/h and 50 km/h in terms

of risk of severe injury or death is significant. **Figure 2.5** shows the effect of speed on vehicle / pedestrian collisions[2].

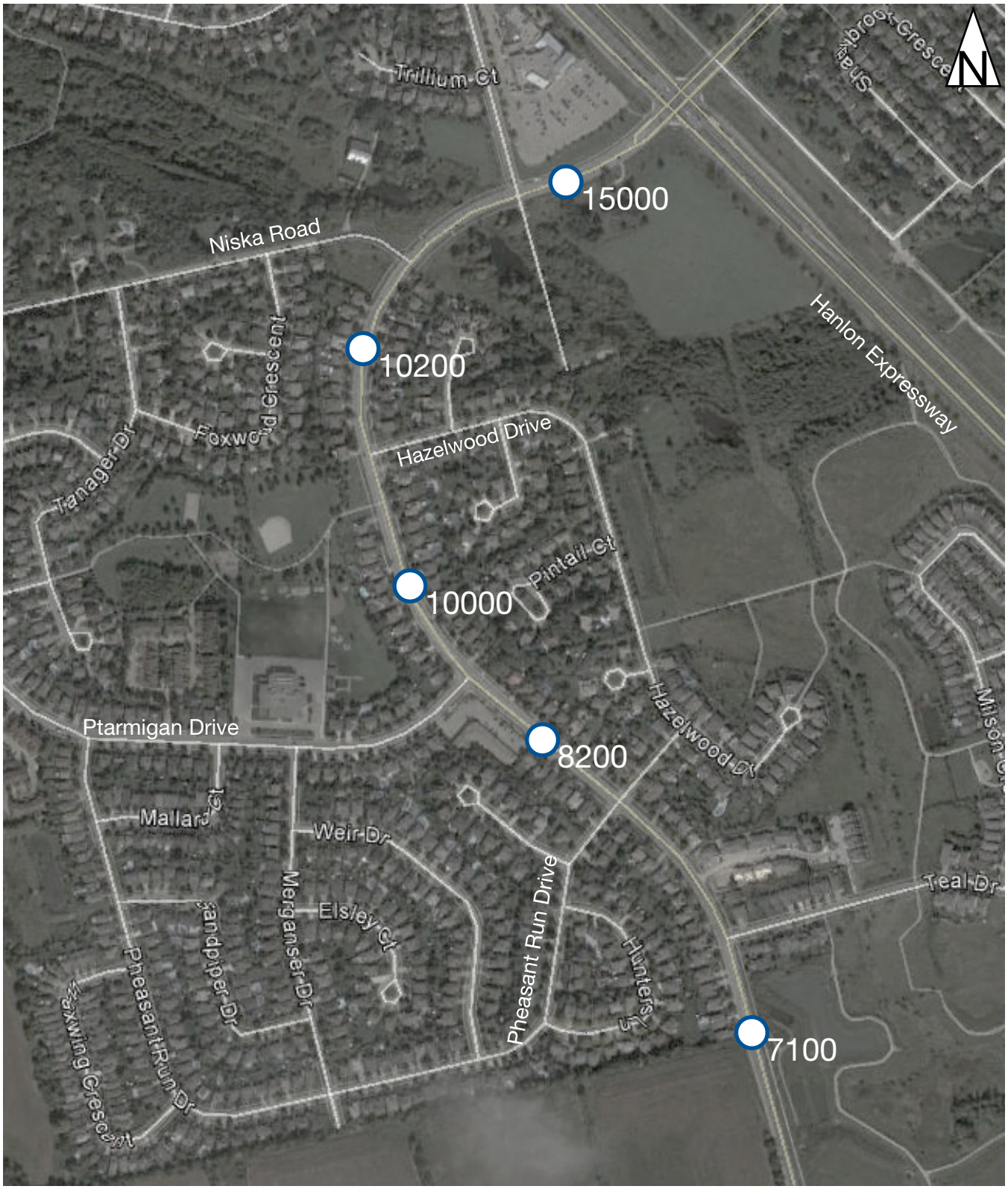
2.4 Collision History

Collision history for the past 5 years (2011 – 2015) was provided by the City of Guelph and is summarized in **Figure 2.6**. The intersection with the highest number of collisions is the signalized intersection at Ptarmigan with 8 collisions over the five-year period. The data does not indicate a concern as the number of collisions is similar or less than other roads with the same classification and volumes.

2.5 Pedestrian Crossing Data

The number of pedestrians crossing Downey Road was recorded along with the turning movement counts at the intersections within the study area. The data gathered was for 8 hours, between the hours of 7:00am – 9:00am, 11:00am – 2:00pm, and 3:00pm – 6:00pm. **Figure 2.7** shows the pedestrian volumes crossing Downey Road during the 8 hours collected. Not unexpected, the location with the most pedestrian crossings occurred at the signalized intersection at Ptarmigan Road. The most pedestrian crossings at an unsignalized intersection occurred at Pheasant Run Drive / Quail Creek Drive, followed by Hazelwood Drive. It should be noted that the weather was rainy during the morning hours, which may have impacted pedestrian volumes during the first two hours of the count. Also, midblock crossings were not counted as part of the study.

[2] Source: Impact Speed and Pedestrian's Risk of Severe Injury or Death, AAA Foundation for Traffic Safety, September 2011

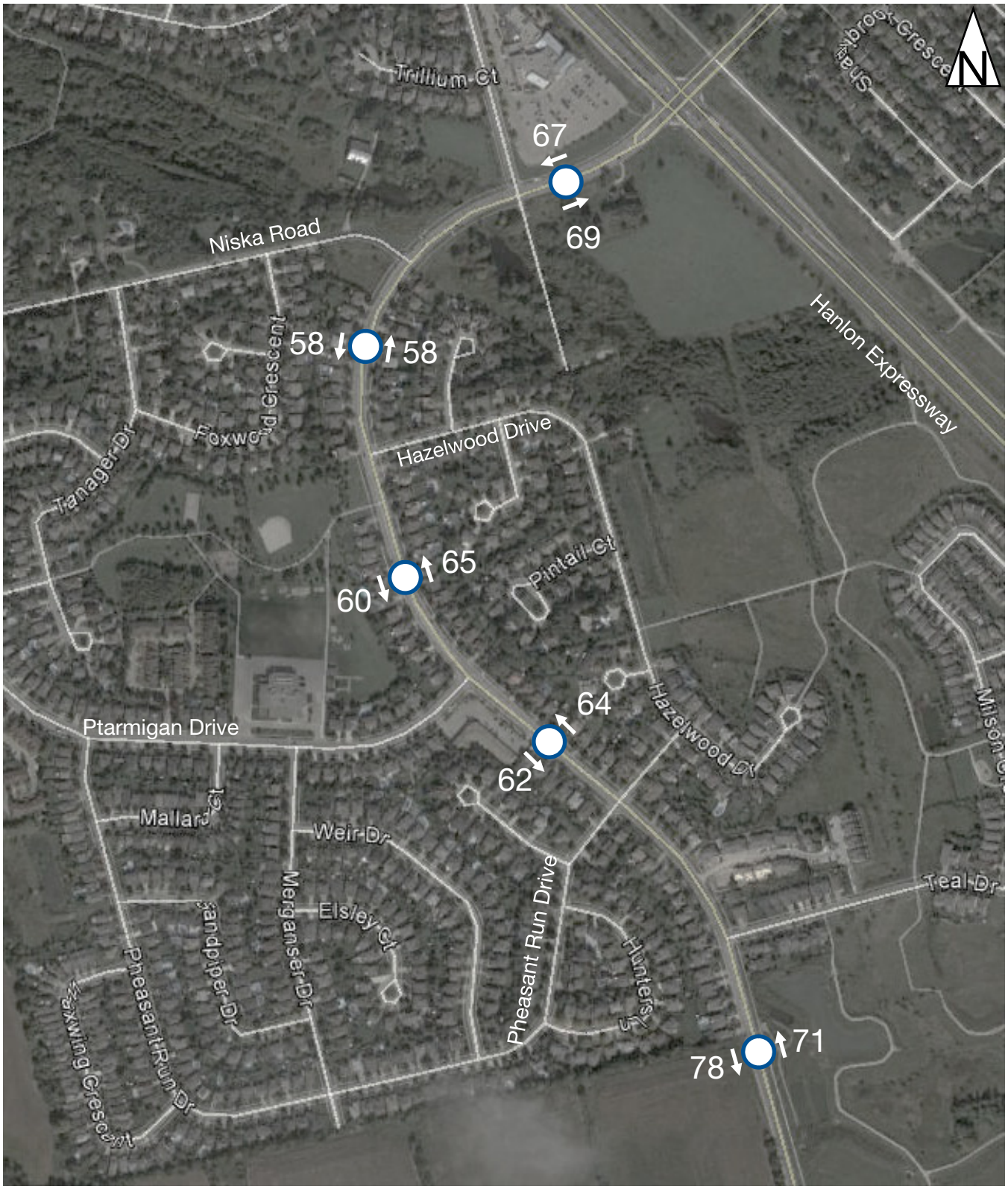


paradigm TRANSPORTATION SOLUTIONS LIMITED

Average Weekday Daily Volumes

Downey Road, Guelph – Transportation Improvement Study
150730

Figure 2.3



paradigm TRANSPORTATION SOLUTIONS LIMITED

85th Percentile Speeds

Downey Road, Guelph – Transportation Improvement Study
150730

Figure 2.4

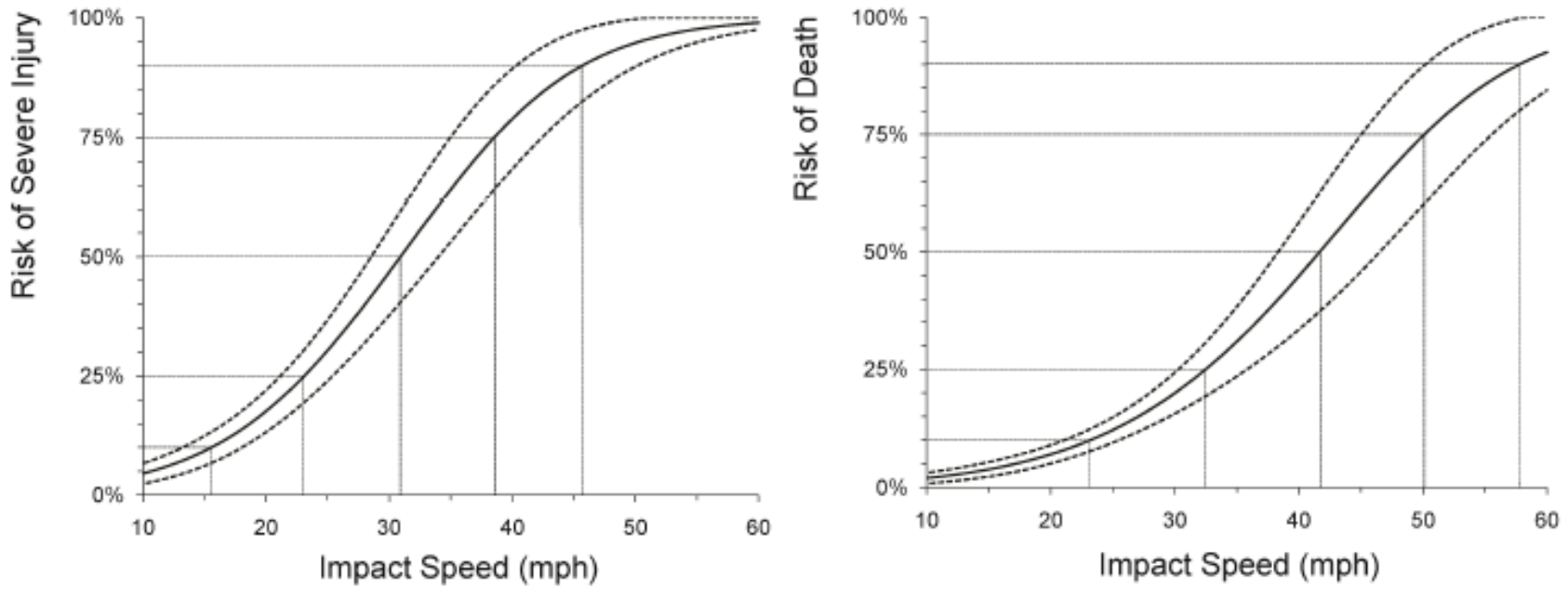


Figure 1. Risk of severe injury (left) and death (right) in relation to impact speed in a sample of 422 pedestrians aged 15+ years struck by a single forward-moving car or light truck model year 1989–1999, United States, 1994–1998. Risks are adjusted for pedestrian age, height, weight, body mass index, and type of striking vehicle, and standardized to the distribution of pedestrian age and type of striking vehicle for pedestrians struck in the United States in years 2007–2009. Dotted lines represent point-wise 95% confidence intervals. Serious injury is defined as AIS score of 4 or greater and includes death irrespective of AIS score.

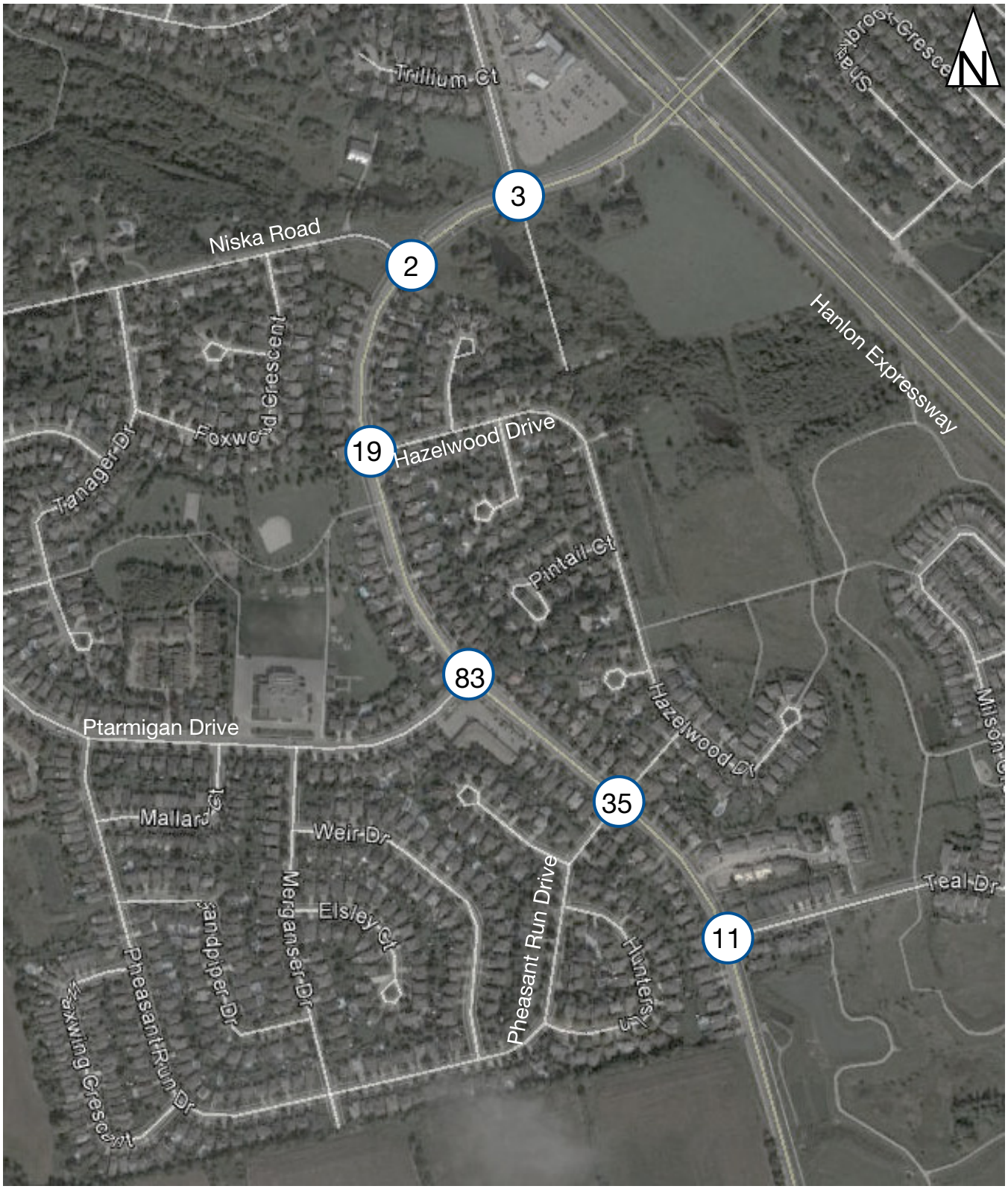
Source: Impact Speed and Pedestrian's Risk of Severe Injury or Death, AAA Foundation for Traffic Safety, September 2011

paradigm TRANSPORTATION SOLUTIONS LIMITED

Effects of Speed on Vehicle / Pedestrian Collisions

paradigm TRANSPORTATION SOLUTIONS LIMITED

Reported Collisions 2011-2015



Observed Pedestrian Crossings of Downey Road

Downey Road, Guelph – Transportation Improvement Study
150730

Figure 2.7

2.6 Classification of Downey Road

In cities and towns, street networks perform most efficiently and safely from both a traffic operations and a road safety perspective if roads are designated and operate to serve their intended purposes. This includes the efficient travel for all modes and the safety and convenience of all road users. According to the Transportation Association of Canada (TAC)[3], road classification is "the orderly grouping of roads into systems according to the type and degree of service they provide to the public."

Road classification systems designate streets into different groups according to the type of service each is intended to provide. This is a fundamental tool for urban development and road management. Grouping roads with similar functions can improve transportation planning, facility design, and traffic operations.

Equally as important, classification systems can help protect against the adverse impacts of traffic in neighbourhoods. By providing a comprehensive network of appropriately classed facilities with well-functioning operations, traffic within neighbourhoods can be minimized and limited to that which has a genuine need to be there. In the absence of such systems, the quality of urban life is negatively affected as traffic would increasingly infiltrate into neighbourhoods to avoid congestion.

Downey Road is a two-lane arterial road that runs through the City of Guelph's Kortright Hills West community, west of the Hanlon Expressway (Highway 6). Downey Road serves as a connection between the Hanlon Expressway, the Hanlon Creek Business Park to the south and Puslinch Township and beyond. Downey Road is also the continuation of the arterial road network connection to Kortright Road West.

Downey Road was designated as an arterial road in 1988. It is part of the major north-south arterial road network as outlined in the City's Official Plan, serving as one of the key linkages between the County and City. The Kortright Hills West residential community is nearly fully built-out and has been developed in phases over the past 30 years.

The location and function of Downey Road in the City's roadway system and its direct connections to the balance of the municipal arterial grid and the provincial highway network has long-established the intended arterial function for Downey Road. Renaming, or re-classifying Downey Road would be contrary to the intended function of the facility. Further, the design of the network is such that arterial traffic demands are likely to result on Downey Road regardless.

According to the Transportation Association of Canada, Arterial Streets are intended to primarily serve through traffic, usually on a continuous route. Generally, Arterial Streets distribute large volumes of traffic (people and

[3] Geometric Design Guide for Canadian Roads, Transportation Association of Canada, 1999.

goods) between other Provincial Highway, Arterial Streets and Collector Streets. The primary purpose of these streets is to provide mobility for people and goods through and within the City.

Minor Arterial Streets are characterized by uninterrupted flow (except at signalized intersections), accommodation of all vehicle types, some degree of access control and volumes between 5,000 and 20,000 vehicles per day on a two-lane cross section. Cyclists are frequently accommodated with dedicated on-road facilities. Pedestrians are supported with sidewalks on both sides of the street and appropriate crossings.

The role and function of Downey Road is consistent with its arterial designation. Current traffic volumes fall between 7,100 and 15,000 vehicles per day within the study area, on-road cycling is permitted and pedestrians are supported with sidewalks on both sides of the street with connections to collector and local streets and neighbourhood trails.

Recent advances in traffic engineering and transportation planning include the notion of "complete streets" and "context sensitive solutions"[4]. These concepts are based on the notion that roads are not explicitly built for the exclusive movement of cars, rather that they must accommodate all road users. Further, roadways and their design must reflect the environment and surrounding features through which they pass.

This process can be used on Downey Road to recognize that while it's role is to provide an arterial link to move traffic in and around Guelph, it also passes through a neighbourhood and needs to provide a safe and comfortable environment for pedestrians and cyclists within the Kortright Hills neighbourhood. In particular, the presence of school-aged children crossing Downey Road at unprotected locations must be recognized if all users are to be adequately served.

The principles of context sensitive solutions promote planning and designing transportation facilities that[5]:

- Meet the needs of users and stakeholders;
- Are compatible with their setting and preserve scenic, aesthetic, historic and environmental resources;
- Respect design objectives for safety, efficiency, multimodal mobility, capacity and maintenance; and
- Integrate community objectives and values relating to compatibility, livability, sense of place, urban design, cost and environmental impacts.

[4] Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, Institute of Transportation Engineers, 2010
[5] Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, Institute of Transportation Engineers, 2010

Various parameters contribute to the overall roadway user experience and guidelines are provided with respect to the design of roadway facilities. Downey Road is considered a "suburban arterial avenue" according to the context sensitive solutions guidelines.

Based on the characteristics of such facilities, they are defined as a walkable low-to-medium speed (40 to 55 km/h) urban arterial or collector thoroughfares, generally shorter in length, and serving access to abutting land. They also serve as primary pedestrian and bicycle routes and may serve local transit routes. They do not exceed 4 lanes, and access to land is a primary function. Goods movement is typically limited to local routes and deliveries. They may feature a raised landscaped median. They may serve commercial or mixed-use sectors and usually provide curb parking.

The process supports the notion that to provide for all road users in the neighbourhood and maintain the intended function of Downey Road it needs to be designed in a manner to support all users. This is consistent with the City of Guelph's Complete Streets Policy and its Cycling Master Plan which has identified the need for a dedicated cycling facility on Downey Road.

2.7 Potential Downey Road Closure

The closure of Downey Road has been raised as a potential solution by various parties and stakeholders in eliminating the current issues related to the conflicts between user groups on Downey Road. There are a number of important issues that relate to this as a potential solution:

- **Affect on Overall Transportation System:** Downey Road is an important arterial link in the City of Guelph Transportation Network. It provides an important link for the the local residents. Estimates prepare by the City of Guelph show that full closure will divert about 6000 vehicles per day from Downey Road between Niska Road and Ptarmigan Drive, the majority of which reappear on the Hanlon Expressway. However, the closure of Downey Road also affects Ptarmigan Drive and Hazelwood Drive as area residents use these links to connect to the balance of the network instead of Downey Road. Traffic forecasts prepared by the City of Guelph suggest that over 6,000 vehicles per day will remain on Downey Road even with its closure.

  The City of Guelph Transportation Master Plan relies on Downey Road to serve its forecast transportation needs. To fully evaluate the impact of the closure would require a Class Environmental Assessment be undertaken, as well as a Transportation Master Plan update to fully assess the impacts on the balance of the transportation network. Furthermore, a closure of Downey Road would require an Official Plan Amendment, subject to the Municipal Act of the Province of Ontario and bylaws of the City of Guelph on public notices.

- **Geometry:** The closure of Downey Road does not alter the width of Downey Road and therefore may also have no impact on the speed of traffic using Downey Road.
- **Emergency Vehicle Access:** The closure of Downey Road will potentially increase the travel time and distance the emergency vehicle will need to travel to access the residential area south of the closure. This has potentially significant community impacts.

Based on the above, the impacts of closing Downey Road outweigh the benefits and it is not recommended for further consideration.

2.8 Hanlon Expressway Interchange Reconfiguration

The Ministry of Transportation has identified in its planning that over time the Hanlon Expressway will be converted to limited access, grade-separated control. The current configuration at Kortright Road will revert to a partial interchange with access to and from the south only. Travel demands to and from the north will be diverted to the Stone Road and Laird Road interchanges.

3 Traffic Calming for Arterial Roadways

The potential traffic calming solutions for Downey Road were chosen with consideration given to the continued classification of Downey Road as an arterial road.

3.1 Potential Traffic Calming Devices

The following traffic calming devices were considered for implementation on Downey Road and were presented to the public during the consultation process. Example photos of these devices are shown in **Figure 3.1a** and **Figure 3.1b**.

3.1.1 Roundabout

A roundabout is a traffic control device with traffic calming benefits. A roundabout is a raised island located in the centre of an intersection which requires vehicles to travel around in a counter-clockwise pattern. All approaches must yield to the vehicles in the circulating lane. Traffic operations are improved by allowing multiple non-conflicting movements to occur simultaneously (e.g. southbound right-turns and eastbound left-turns) and not requiring complete stops if the circulating lane is clear. Traffic calming is provided as the central island acts as a horizontal deflection device, which slows vehicles down. Pedestrian safety is improved by the lower speeds and the shortened crossing distance between curb and splitter island.

The primary disadvantage of the roundabout is cost and property requirements.

3.1.2 Neighbourhood Traffic Circle

A neighbourhood traffic circle is similar to a roundabout in that traffic circulates around a circular centre island in a counter-clockwise direction, with entry lanes yielding to the circulating traffic. The difference is that a traffic circle requires less land than a roundabout, but also has a lower capacity. As vehicles must navigate around the centre island, a traffic circle is very effective at reducing speeds and provides opportunity for aesthetic improvements. Drawbacks include being difficult for large trucks to navigate and a lower capacity compared to roundabouts.

3.1.3 Choker or Curb Extension

A choker or curb extension is a horizontal intrusion of the curb into the roadway resulting in a narrower roadway. The curb can be extended on one or both sides to reduce the road width to as little as 6.0m for two-way traffic. The purpose of a curb extension is to help reduce vehicle speeds, improve pedestrian safety by reducing the crossing distance, improve pedestrian visibility and prevent parking in close proximity to the intersection. In

essence, this measure helps to address all of the key issues identified in this study. Additionally, chokers can have aesthetic value.

The primary disadvantage is their impact on on-street parking and ease of street maintenance. Construction cost can vary greatly depending upon how they are installed and whether drainage changes are required.

3.1.4 Pedestrian Refuge Island

A pedestrian refuge island is an elevated median constructed on the centerline of a two-way road to reduce the overall width of adjacent lanes. The purpose of a median island is to help reduce vehicle speeds and improve pedestrian safety and visibility by providing a central refuge area so that the entire street need not be crossed at once.

The primary disadvantages of centre medians are that they may require parking restrictions in the vicinity of the median, they can restrict driveway access if adjacent to residential homes and street maintenance is less convenient.

3.1.5 Speed Cushions

Speed cushions are similar to speed humps, except tracks are provided at about 1.8 metres apart to allow for wide-track vehicles (such as fire trucks and transit buses) to “straddle” the hump. The tracks are too wide for a regular passenger vehicle to straddle and therefore one side of tires must go over the raised pavement. Winter maintenance is not an issue, as plows service them like a normal speed hump and salt and friction from tires will clear out the tracks.

The disadvantage to speed cushions is that they are slightly more expensive than speed humps.

3.1.6 Raised Intersection

A raised intersection is an elevated section of pavement that spans the entire intersection, usually including crosswalks. The change in elevation is similar to what a vehicle would experience at a speed hump and therefore are as effective as a speed hump at reducing speeds. It provides traffic calming to all legs of an intersection. The disadvantage to a raised intersection is a higher cost than a regular speed hump, and that all vehicles traveling over it (including fire trucks and transit buses) experience the rough ride the device creates.

3.1.7 Speed Bars or Dragon’s Teeth

Speed bars (or Dragon’s Teeth) are pavement marking placed at regular intervals (depending on the design speed of the road, bars are placed at intervals where drivers will pass four bars per second). The rationale to using speed bars is to increase drivers’ perception of speed and cause them to reduce speed. Speed bars are effective in transition areas between

higher speeds and slower speeds by gradually reducing the spacing between bars.

The difference between speed bars and dragon's teeth is the shape of the pavement marking. Speed bars are rectangular while dragon's teeth are triangular.

3.1.8 Entrance Feature

An entrance feature is a use of a road narrowing device (e.g. islands or chokers) that is designed to create a visual change that conveys to the driver that they are entering a different traffic environment. The narrowing of the road also helps to slow driver speeds and signage can be used to reinforce the neighbourhood environment. Entrance features usually include signage and landscaping. The advantage of an entrance feature is in its aesthetic qualities and the use of the road narrowing device provides traffic calming and pedestrian crossing benefits. The primary disadvantages of entrance features are that they may require parking restrictions in the vicinity of the feature, they can restrict driveway access if adjacent to residential homes and street maintenance is less convenient.

3.2 Spacing of Traffic Calming Devices

Research of traffic calming devices has shown that the optimal spacing of devices for achieving consistent speed reduction is between 130 and 150 metres. If the space is too much, then vehicles have time to increase their speed back to what is comfortable, and in the case of Downey Road, the comfortable speed would likely be the 85th percentile speeds shown in **Section 2.3.2**.

Roundabout

Neighbourhood Traffic Circle

Choker

Pedestrian Refuge Island

paradigm TRANSPORTATION SOLUTIONS LIMITED

Examples of Traffic Calming Devices

Speed Cushion

Raised Intersection

Dragon's Teeth

Speed Bars

paradigm TRANSPORTATION SOLUTIONS LIMITED

Examples of Traffic Calming Devices

4 Public Consultation

Two sets of Public workshops were held to present information on the study to the public and community stakeholders, as well as to gather feedback on issues and potential solutions. 117 people attended the two sets of workshops and the summary of the attendees is included in **Appendix D**.

4.1 Public Workshop 1

The first set of workshops were held in the afternoon of 18 May 2016 at Guelph City Hall and in the evening of 19 May 2016 at Kortright Hills Public School.

4.1.1 Information Presented

The first PIC presented the data collected on Downey Road (as shown in Chapter 2) and introduced the concept of traffic calming and potential traffic calming options that are suitable for Downey Road. After the presentation, residents and community stakeholders were asked to mark up maps of the Downey Road study area with their ideas for traffic calming.

Eight traffic calming devices were discussed in detail during the PIC presentations:

- Roundabouts
- Neighbourhood Traffic Circles
- Mid-Block or Intersection Chokers
- Pedestrain Refuge Islands
- Speed Cushions
- Raised Intersections
- Lane Striping
- Speed Bars or Dragon's Teeth

4.1.2 Public Feedback

Workshop 1 was attended by at least 76 individuals over the two sessions; participants worked in groups of 4-8 peers to mark up the study area maps. Additional input was collected online using MindMixer, for those who were unable to attend the Workshops. The City received 40 additional interactions online for Workshop 1.

Of the eight traffic calming devices specifically mentioned in the presentation, the most popular devices were speed cushions (included on 8 plans), chokers (7), traffic circles (6), pedestrian refuge islands (6), and speed bars / dragon's teeth (6). A summary of all the devices used by workshop attendees on the workshop maps is shown in **Table 4.1**.

TABLE 4.1: DEVICES USED ON WORKSHOP MAPS

Devices Shown in Presentation	Total
Speed Cushion	8
Choker	7
Traffic Circle	6
Pedestrian Refuge Island	6
Dragon/Speed Bars	6
Raised Intersection	5
Roundabout	4
Lane Striping	1
Devices Not Shown in Presentation	**Total**
Crosswalk	6
Traffic Signal @ Niska	5
Keep Onstreet Parking	4
Centre Median (Entry Feature)	2
Keep Centre Turning Lane	2
Electronic Speed Sign	2
No Bike Lanes	2
Rumble Strips	2
Entrance Feature	1
Multi-use Path (in lieu of bike lanes)	1
Remove Centre LT Lane	1
Crosswalk	1
Retime Signal @ Ptarmigan	1
Traffic Signal @ Woodland Glen	1
Traffic Signal @ Phesant Run	1
Change Classification	1
Close Downey	1
Speed Humps	1
All Way Stop	1
Parking Lot w/ EV Charging	1

The locations which were mentioned the most included the intersections of Downey Road with Niska Road, Hazelwood Drive, and Teal Drive, and the section of Downey Road south of Teal Drive at the beginning of the residential area.

At Niska Road, the predominant type of solution that the public indicated was an improved form of traffic control, either roundabout, traffic circle or traffic control signals.

At Hazelwood, the focus was on pedestrian crossings with a generic “crosswalk” label being used at this location as well as pedestrian island refuges.

At Pheasant Run Drive / Quail Creek Drive, the suggestions of the public were varied and included chokers, raised intersections, and generic "crosswalk" labels.

South of Teal Drive, speed bars or dragon's teeth was a popular suggestion, along with speed humps, an "entrance feature", and speed cushions.

4.2 Public Workshop 2

The second set of public workshops were held in the evening of 23 June 2016 at Kortright Hills Public School and in the afternoon of 28 June 2016 at Guelph City Hall.

4.2.1 Information Presented

The second workshop presented the participants with three conceptual options for traffic calming on Downey Road. The workshop asked participants what they liked best and didn't like about each option, according to criteria pulled out from the decision-making criteria agreed upon by the Study Team. It was made clear that these concepts were not meant as a "choose one or the others" type of evaluation, but rather it was intended that the public comment on what they liked and disliked about each concept.

The first concept had an emphasis on horizontal deflection, which takes vehicles out of their straight path and also narrows the roadway and creates "visual friction" to slow down the natural speed of drivers. This concept included a roundabout, pedestrian refuge islands and chokers. It also included speed cushions in mid-block locations to keep to the ideal distance between devices.

The second concept had an emphasis on vertical deflection, which creates a raised portion of pavement and requires drivers to slow down to pass over them comfortably. This concept included speed cushions and raised intersections.

Both the first and second concepts included an entry feature / pedestrian refuge island at the south end of the study area south of Teal Drive. Speed bars or dragon's teeth were included leading into the neighbourhood at the south end of the study area.

The third concept focussed mainly on a pavement markings solution and represented a minimal intervention concept. It included narrow travel lanes, bike lanes and on-street parking along with speed bars or dragon's teeth at both ends of the study area.

4.2.2 Public Feedback

Workshop 2 collected input from at least 42 participants, plus an additional 41 interactions online.

As part of the feedback for Workshop 2, residents and community stakeholders were asked to rate each concept according to how well it met their expectations, how much they think it would encourage them to drive more slowly, and how comfortable they would feel as a driver, a pedestrian and a cyclist. **Table 4.2** summarizes these responses.

The results of the feedback indicated that the first and second concept rated higher than the third concept, and while the ratings for the first and second concept were close, the first concept rated slightly higher or equal to the second concept in each question posed to the public.

This indicated that the in general, the public desired a plan with a higher level of intervention, which focussed on not just on vehicles speeds but also on pedestrian crossing safety.

TABLE 4.2: SUMMARY OF WORKSHOP 2 RESPONSES

Question: How does this design option align with your expectations?			
Response	**Concept A**	**Concept B**	**Concept C**
Exceeds expectations	0%	4%	0%
Meets most expectations	**54%**	32%	10%
Meets some expectations	42%	**36%**	29%
Does not meet expectations	4%	28%	**62%**

Statement: I would be encouraged to drive more slowly.			
Response	**Concept A**	**Concept B**	**Concept C**
Strongly Agree	32%	24%	0%
Somewhat Agree	**61%**	**56%**	25%
Somewhat Disagree	4%	12%	25%
Strongly Disagree	4%	8%	**50%**

Statement: I would feel more comfortable turning at intersections along Downey Road.			
Response	**Concept A**	**Concept B**	**Concept C**
Strongly Agree	17%	12%	0%
Somewhat Agree	**62%**	**52%**	27%
Somewhat Disagree	14%	12%	18%
Strongly Disagree	7%	24%	**55%**

Statement: I would feel more comfortable crossing the street on foot.			
Response	**Concept A**	**Concept B**	**Concept C**
Strongly Agree	29%	19%	0%
Somewhat Agree	**54%**	**54%**	14%
Somewhat Disagree	13%	12%	27%
Strongly Disagree	4%	15%	**59%**

Statement: I would feel more comfortable with bicycle riders using Downey Road.			
Response	**Concept A**	**Concept B**	**Concept C**
Strongly Agree	34%	25%	**29%**
Somewhat Agree	**48%**	**46%**	**29%**
Somewhat Disagree	10%	8%	14%
Strongly Disagree	7%	21%	**29%**

Statement: There would be sufficient parking near the			
Response	**Concept A**	**Concept B**	**Concept C**
Strongly Agree	30%	33%	30%
Somewhat Agree	**61%**	**57%**	**40%**
Somewhat Disagree	4%	5%	5%
Strongly Disagree	4%	5%	25%

5 Recommended Plan

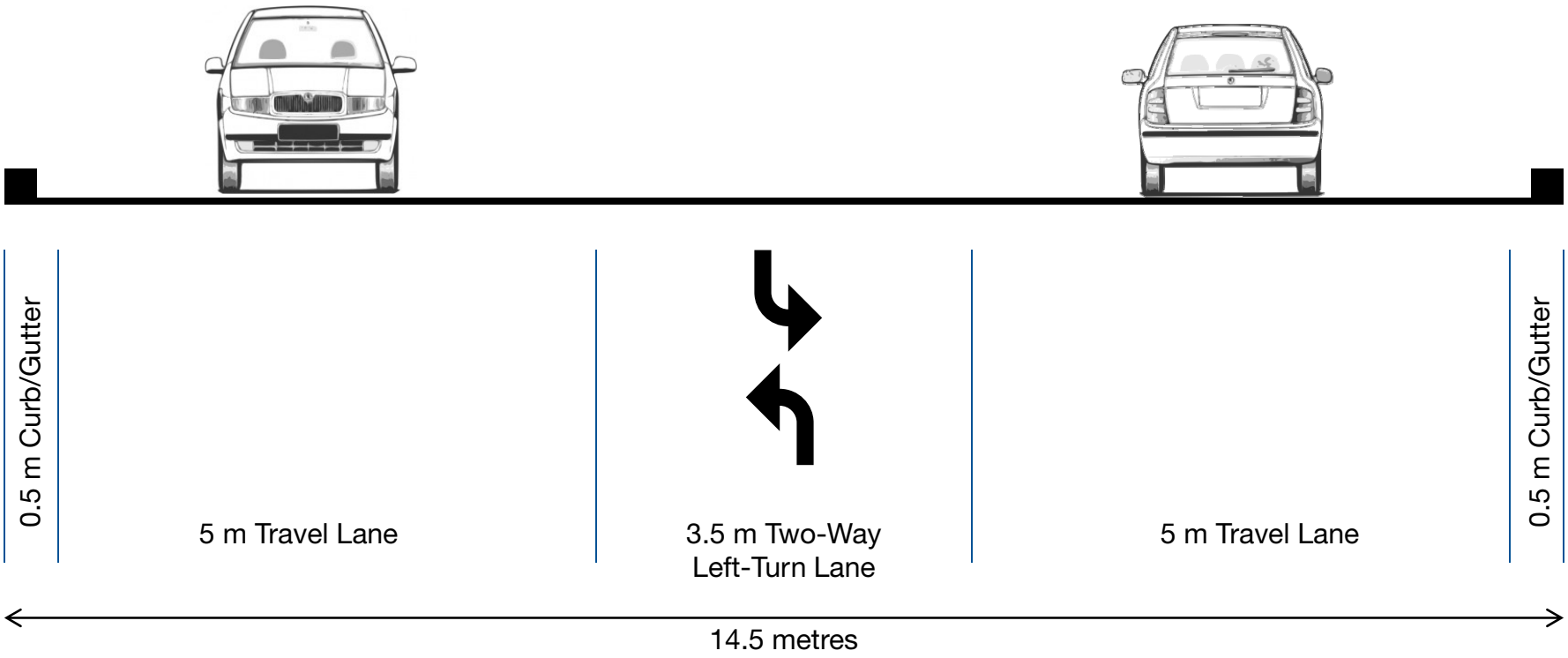
Based on analysis of the available data, feedback from residents and community stakeholders and consultations with City of Guelph staff, a recommended improvement plan for Downey Road was developed and is presented in this chapter. The focus of the plan was to:

- Calm Traffic (speed reductions)
- Improve safety for all road users
- Facilitate pedestrian crossing opportunities
- Implement bike lanes, as recommended by the City of Guelph Official Plan.
- Minimize construction by working within the current road width.

5.1 Cross-Section

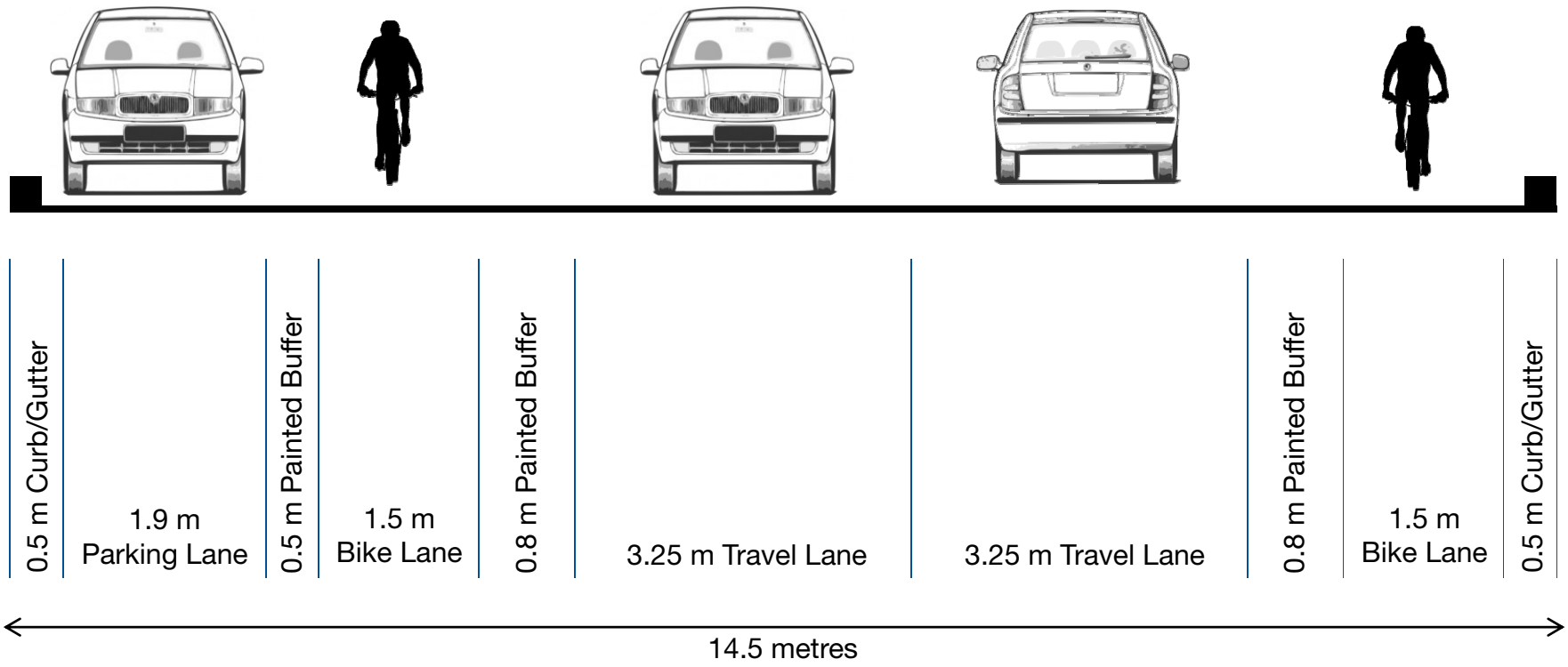
The curb to curb width of Downey Road measures 14.5 metres and has two travel lanes with a continuous centre two-way left-turn lane. **Figure 5.1** illustrates the current cross section.

The recommended cross-section includes two travel lanes measuring 3.25 metres wide. A standard travel lane is usually approximately 3.3 metres wide, so a slight narrowing was recommended for a traffic calming effect. The cross-section also includes 1.5 metre bike lanes on both directions and a single 1.9 metre parking lane (which when combined with the 0.5 metres of curb and gutter space, is effectively 2.4 metres). Buffer lanes are used to fill out the rest of the 14.5 metre width of Downey Road; a 0.5 metre buffer lane between the parking lane and bike lane and 0.8 metre buffer lanes between the bike lanes and travel lanes. **Figure 5.2** illustrates the recommended cross-section.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Current Downey Road Cross-Section



Recommended Downey Road Cross-Section

5.2 Recommended Traffic Calming Devices

5.2.1 Midblock Speed Cushions

Speed cushions are vertical deflection devices, similar to speed humps except that grooves are designed into the humps that allow large vehicles (such as fire trucks and transit buses) to traverse without significant disruption, but are too wide to allow passenger vehicles to traverse without travelling over portion of the raised pavement.

The speed cushions are recommended in locations that allow the distance between devices to be maintained at approximately 130 to 150 metres and are not in front of existing driveways.

In addition to the speed cushions, a curb choker should be installed to narrow the width on the side of the road to prevent vehicles from bypassing the cushions if there are no cars parked on-street. **Figure 5.3** shows the recommended cross section at the speed cushion locations.

The recommended locations for speed cushions are:

- Between the driveways of 62 and 66 Downey Road (between Niska Road and Hazelwood Drive),
- Between the driveways of 94 and 96 Downey Road (between Hazelwood Drive and Ptarmigan Drive),
- Between the driveways of 120 and 122 Downey Road (between Ptarmigan Drive and Pheasant Run Drive / Quail Creek Drive), and
- Between the driveway of 141 and 143 Downey Road (between Pheasant Run Drive / Quail Creek Drive and Teal Drive).

5.2.2 Roundabout at Niska Road

The residential area of the Kortright Hills neighbourhood begins at Niska Road and is a transition between the 2 lanes per direction cross-section leading to the Hanlon Expressway and the single lane per direction cross-section along the residential area portion. As such, it is an ideal location to introduce a dramatic change of road characteristic which alerts drivers that they are entering a residential area from a higher speed section, which can also be seen as an “entry feature” to the neighbourhood.

As discussed in **Chapter 2**, side street delays on Niska are very high for both the AM and PM peak hours and the intersection nearly warrants a signal at current volumes. In addition, signal or roundabout control was recommended for this intersection in the Niska Road Improvement Study[6], as it too came to the conclusion that the continued unsignalized control at

[6] Niska Road Improvements Schedule C Municipal Class Environmental Assessment Environmental Study Report, R.J. Burnside & Associates Limited, February 2016.

this intersection will further degrade as natural background traffic growth will contribute to higher delays.

A roundabout provides traffic calming by causing vertical deflection in the vehicle path. The suggested operating speed in a roundabout is generally 30 km/h, and vehicles will need to slow down compared to the straight through movement that currently exists. Given the volumes at this intersection, it is anticipated that a single lane roundabout with a westbound (southbound) right-turn bypass lane from Downey Road onto Niska Road would be sufficient to accommodate the traffic.

Challenges would be presented in the design of a roundabout at this location, as there is an elevation change down from west to east and drainage considerations would need to be made with more land being required than a conventional intersection. Access to driveways must also be maintained, which would require the roundabout to be located northeast of the current intersection.

If a roundabout is not ultimately chosen as a solution at this intersection, it is recommended that this intersection be signalized. However, as signals do not provide any traffic calming benefit, further traffic calming devices should be considered at this intersection, such as speed cushions between Niska Road and Woodland Glen Drive, and a centre island located on the north leg opposite of a northbound left-turn lane.

5.2.3 Pedestrian Refuge Island at Hazelwood Drive

A pedestrian refuge island is recommended for the south leg of the intersection of Downey Road and Hazelwood Drive. On the west side of this crossing is the community mailbox and this is a logical walking path for residents to access Mollison Park. A pedestrian refuge island provides a safer crossing opportunity for pedestrians, as crossing happens in two stages and only a single direction of traffic must be crossed at a time. This effectively reduces the crossing distance from 14.5 metres to two crossings of 5.75 metres. An island in the centre of the road also provides traffic calming by causing horizontal deflection and a visual narrowing of the roadway. As well, a southbound left-turn lane is warranted at the intersection of Downey Road and Hazelwood Drive, creating a shadow lane on the south leg of the intersection, opposite of the turn lane, which provides an ideal location for the island.

Figure 5.4 shows the recommended cross-section at the pedestrian refuge island and left-turn lane locations.

5.2.4 Enhanced Pedestrian Crosswalk Pavement Marking at Ptarmigan

The intersection of Downey Road and Ptarmigan Drive is currently signalized and this study does not recommend any change to that form of traffic control. Providing traffic calming at signalized intersection is challenging. Therefore, the only change recommended at this intersection is to enhance the current crosswalks with ladder crossing pavement markings. While the

traffic calming effect is expected to be minimal by itself, it will reinforce the theme that Downey Road is a residential area and is shared by all users.

5.2.5 Pedestrian Refuge Island at Pheasant Run Drive / Quail Creek Drive

Similar to Hazelwood Drive, a northbound left-turn lane is warranted at this intersection. A shadow lane on the north leg of the intersection is an ideal location for a pedestrian refuge island.

5.2.6 Raised Intersection at Teal Drive

A raised intersection is an elevated section of pavement that spans the entire intersection, usually including crosswalks. The change in elevation is similar to what a vehicle would experience at a speed hump. The reasons of using speed cushions in other areas of the study area are not as much of a concern at this location, as there is no transit route along this portion of Downey Road, and with this intersection being at the south end of the residential area, the impact on emergency services would be kept to a minimal.

A southbound left-turn lane on Downey Road is warranted at this location.

5.2.7 Entry Feature south of Teal Drive

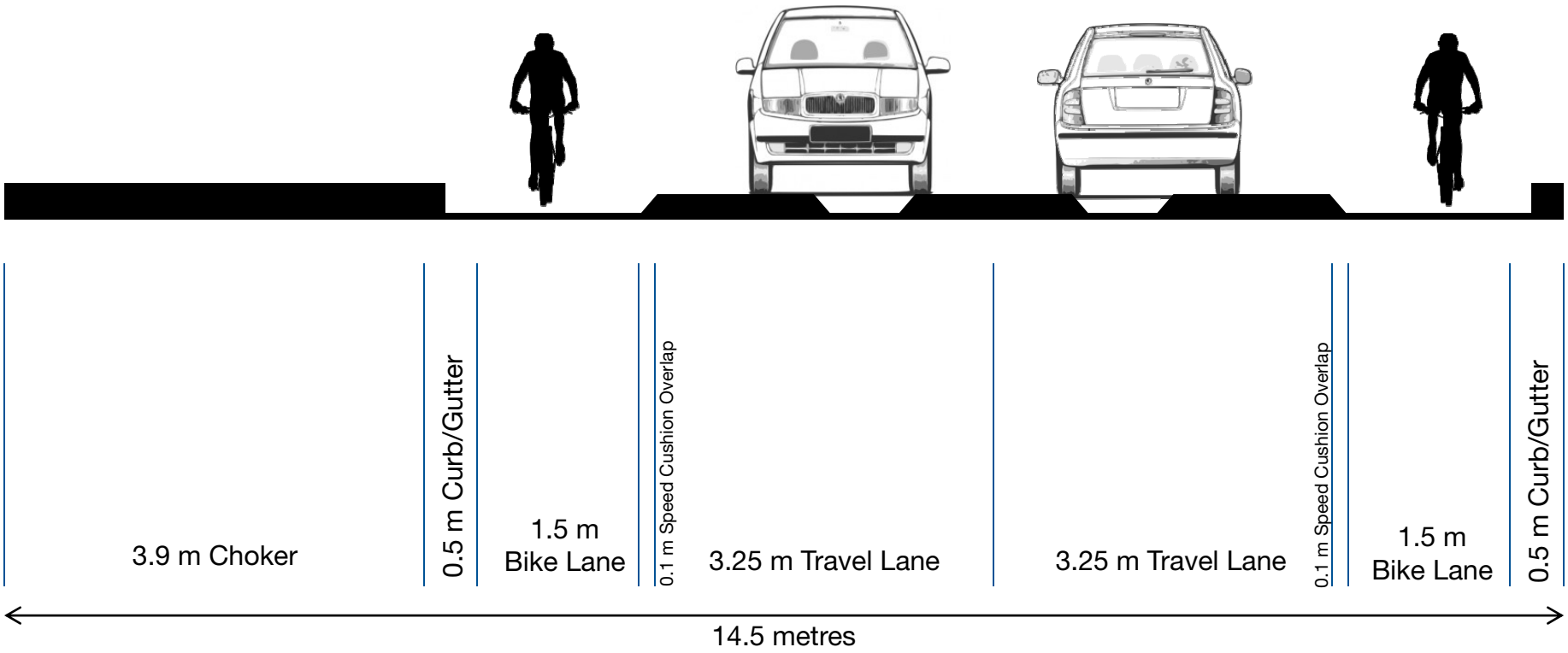
Downey Road, south of Teal Drive, transitions between residential characteristics and a higher speed rural characteristic. The speed limit south of the residential area is 70 km/h and the road profile is rural (shoulders with no curbs), which encourages drivers to travel at a higher speed. The purpose of the traffic calming device at this location would be to alert the drivers in the change of road characteristics and to reduce travel speed.

A series of speed bars (or “dragons teeth”) is recommended leading up to the residential area. Speed bars are pavement markings along the sides of a lane which create visual cues for a driver to give the impression of how fast they are travelling. These bars are gradually spaced closer together to give the impression of increasing speed, to encourage the driver to reduce their speed.

At the end of the speed bars, just immediately south of the southernmost house on Downey Road, a centre island is recommended. The purpose of this island is twofold: it provides opportunity to create an entry feature (landscaping or signage indicating a residential area) and it acts as a pedestrian refuge island, as currently a trail crossing is on the east side of Downey Road in this location. To complete the crossing, a sidewalk connection should be made on the west side of Downey Road.

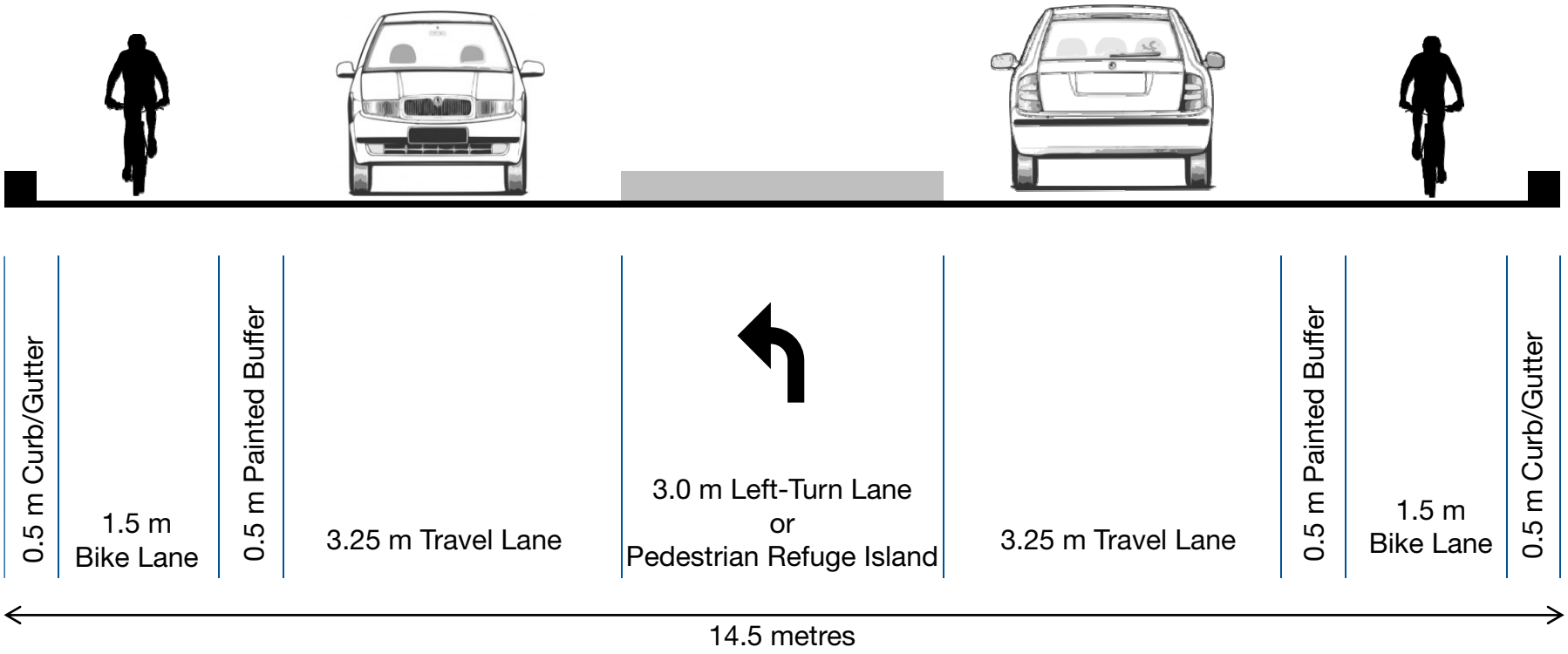
5.3 Recommended Plan Concept

Figure 5.5 shows an overall concept of the recommended plan. **Figures 5.6a** though **Figure 5.6j** show detailed sections of the recommended plan concept.



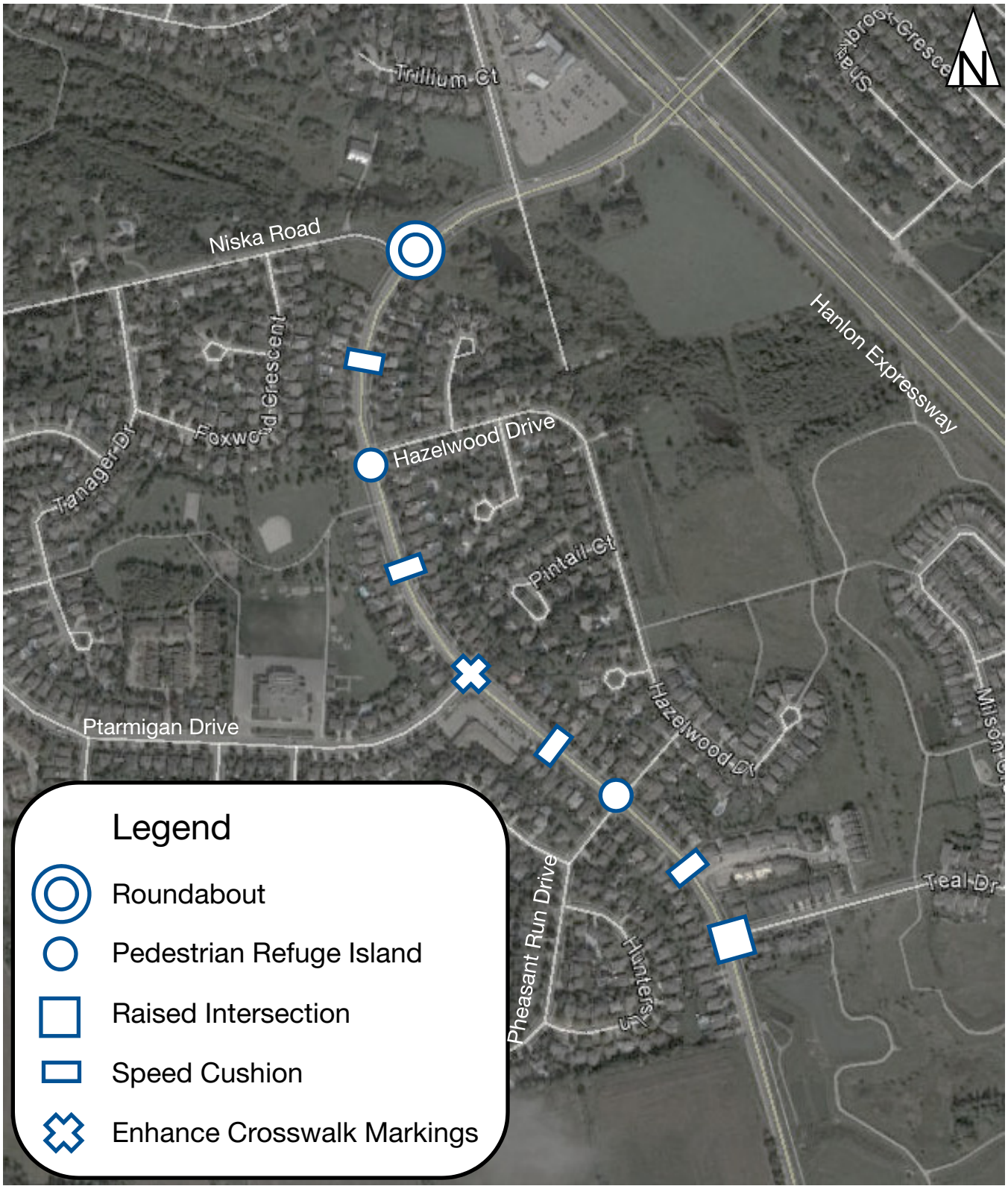
paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Downey Road Cross-Section with Speed Cushions and Choker



paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Downey Road Cross-Section with Left-Turn Lane or Pedestrian Island Refuge



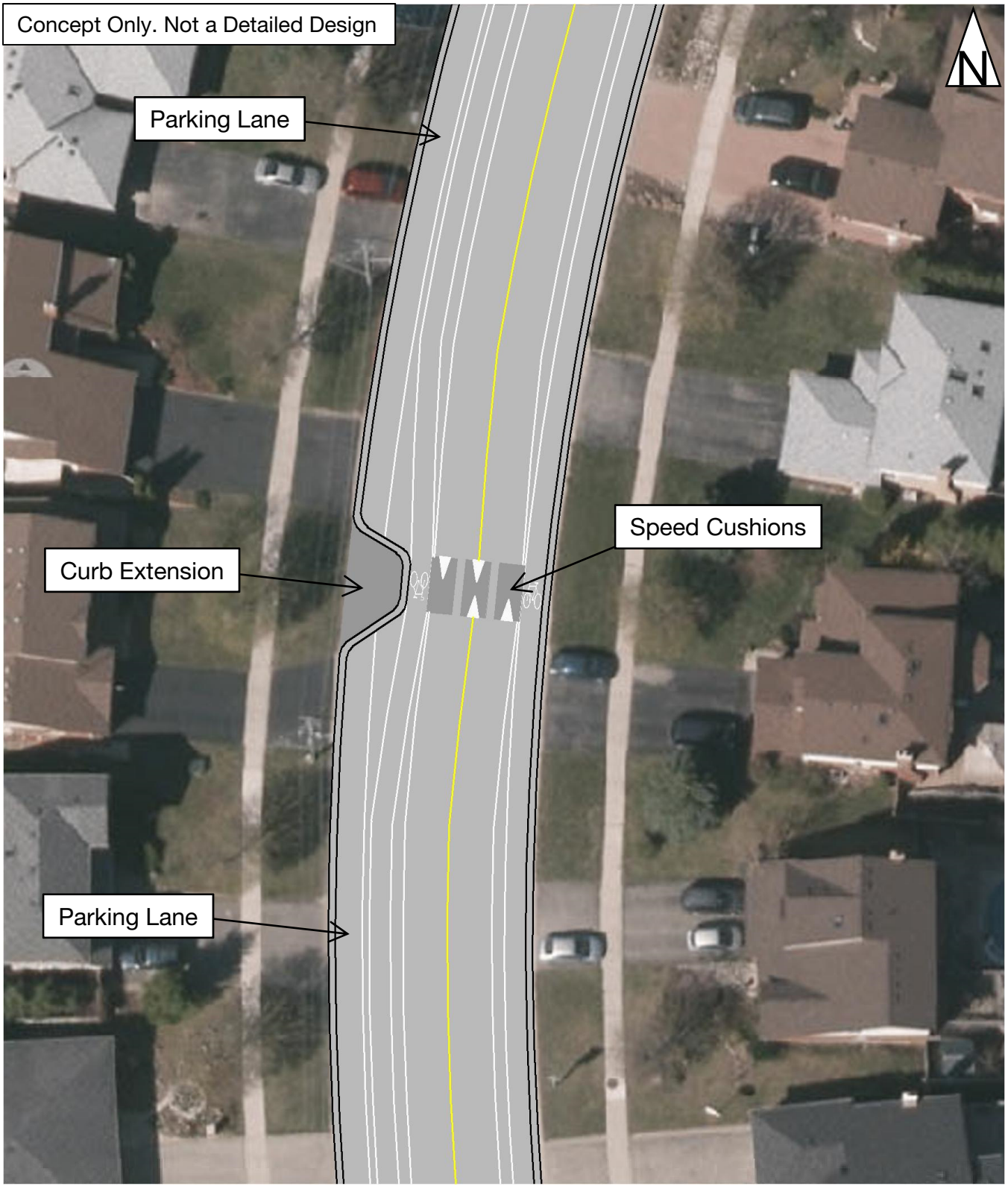
paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Plan

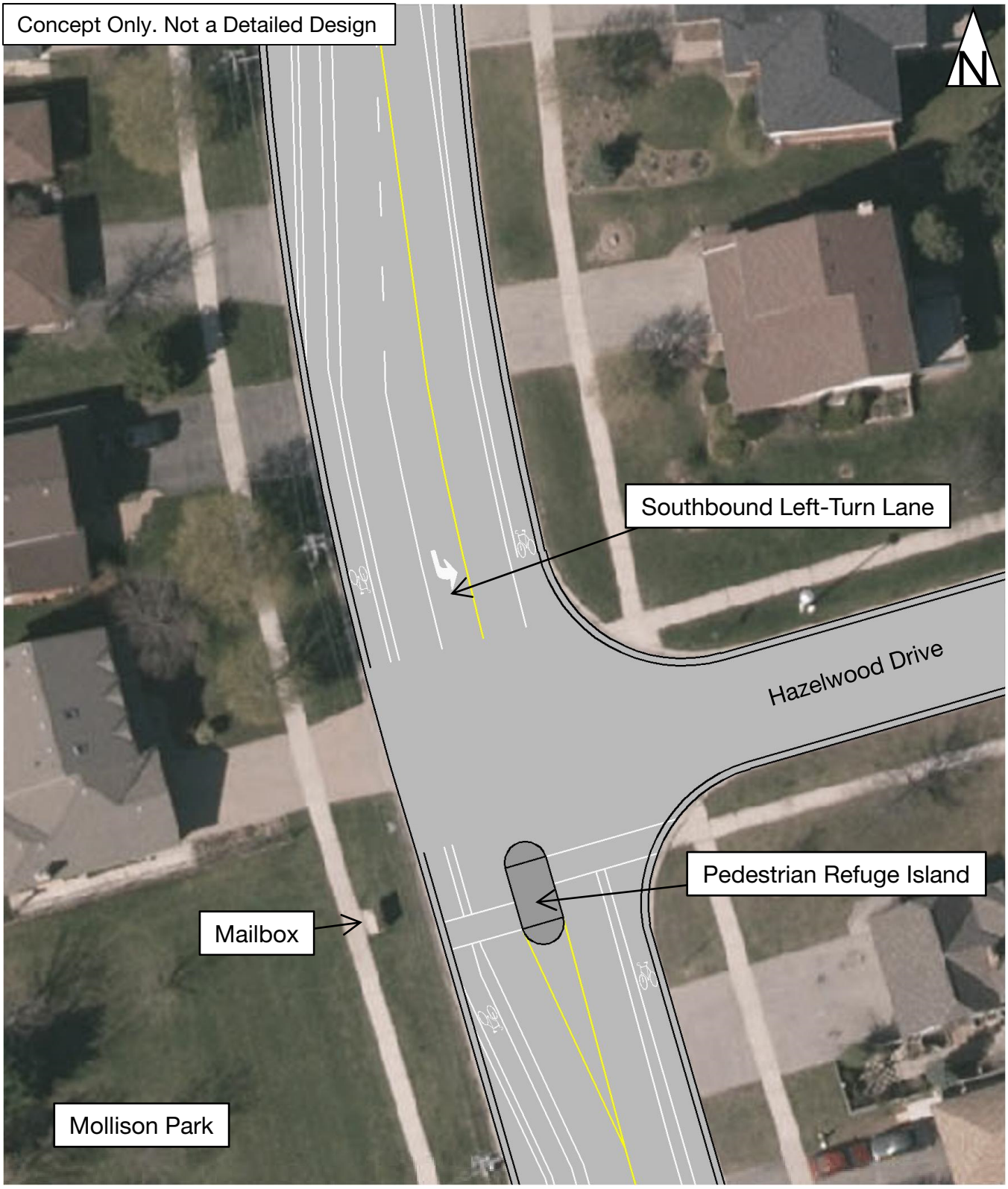
Downey Road, Guelph – Transportation Improvement Study
150730

Figure 5.5

Recommended Plan Concept at Niska Road



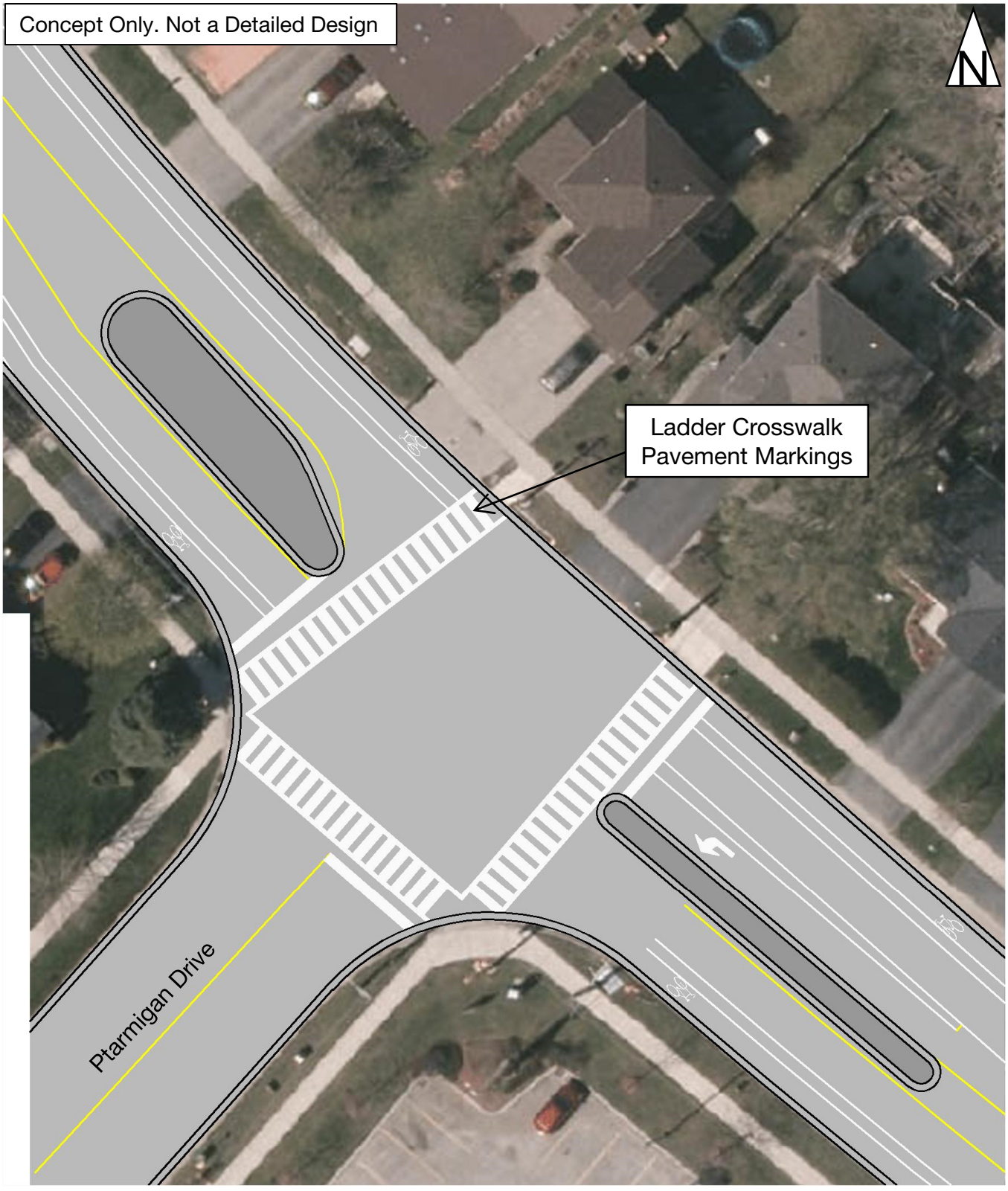
Recommended Plan Concept between Niska and Hazelwood



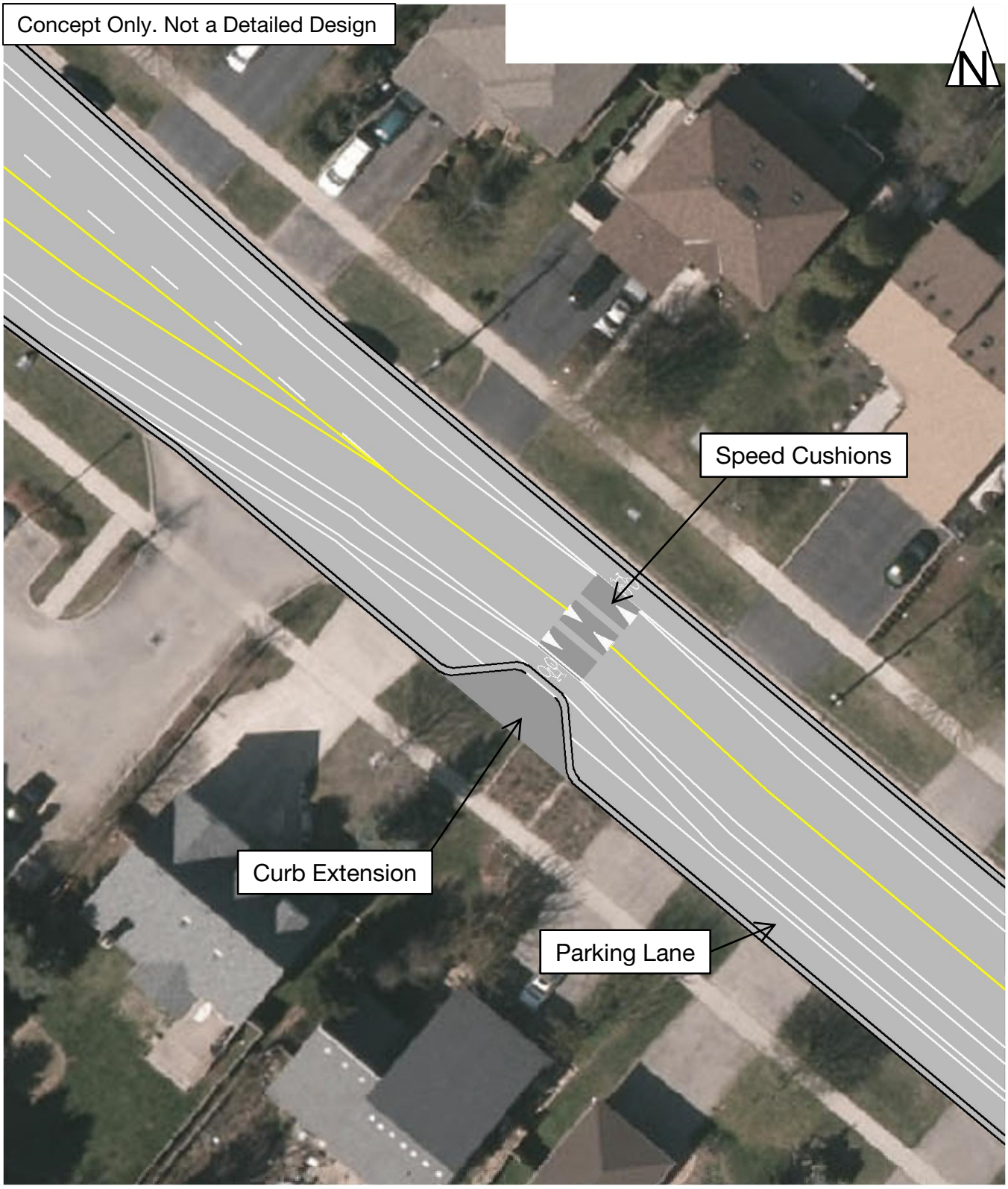
paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Plan Concept at Hazelwood Drive

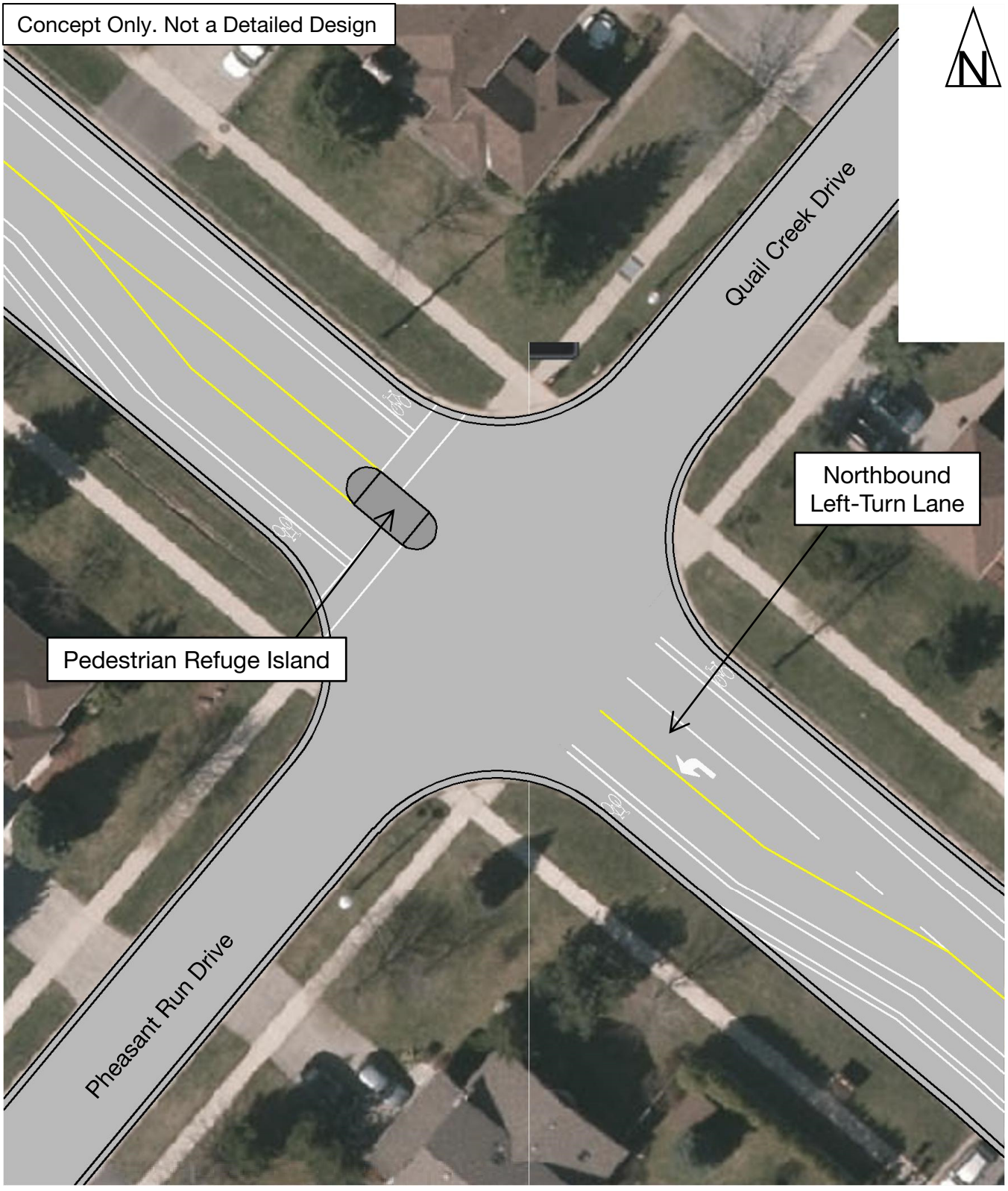
Recommended Plan Concept between Hazelwood and Ptarmigan



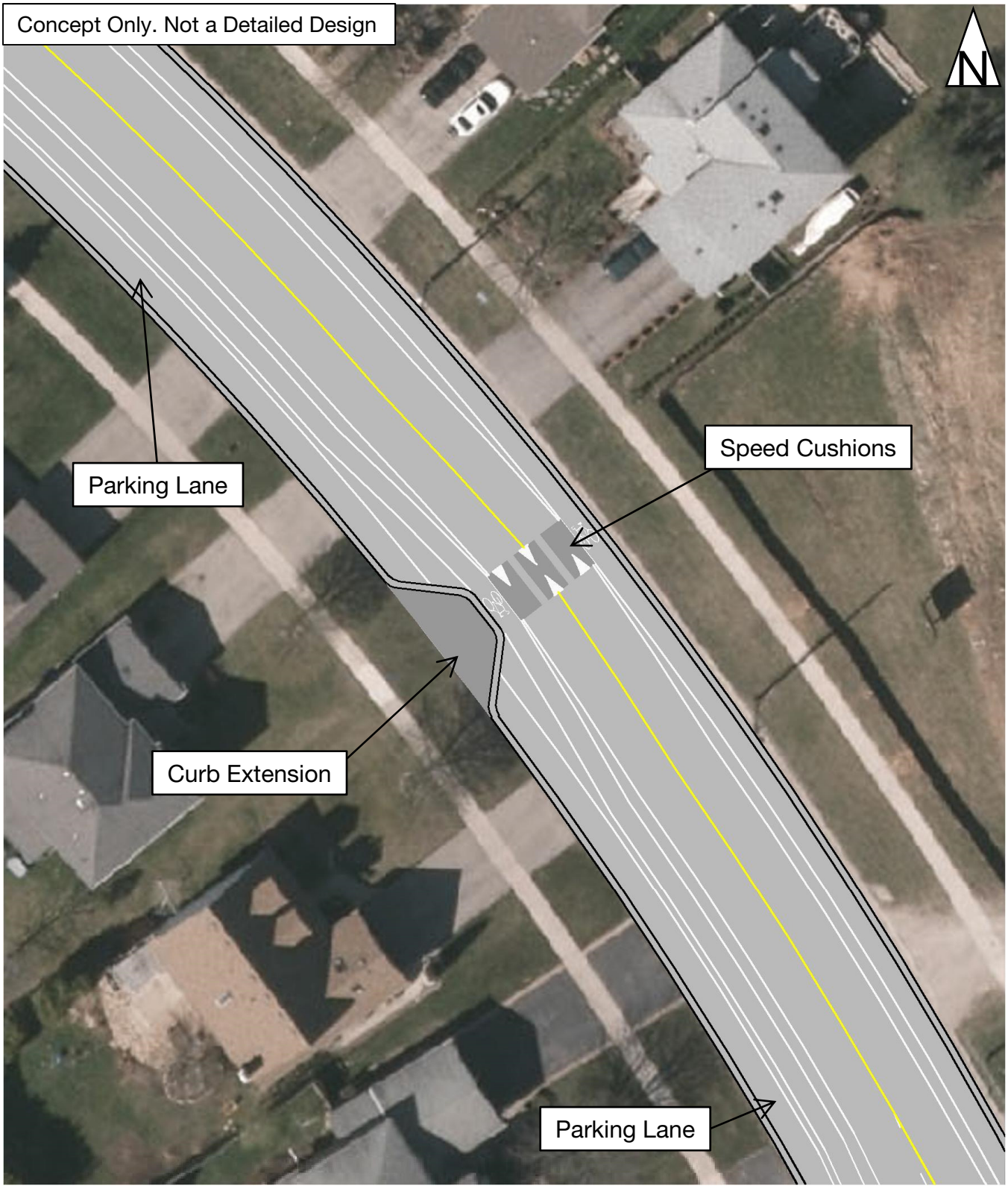
Recommended Plan Concept at Ptarmigan Drive



Recommended Plan Concept between Ptarmigan and Pheasant Run

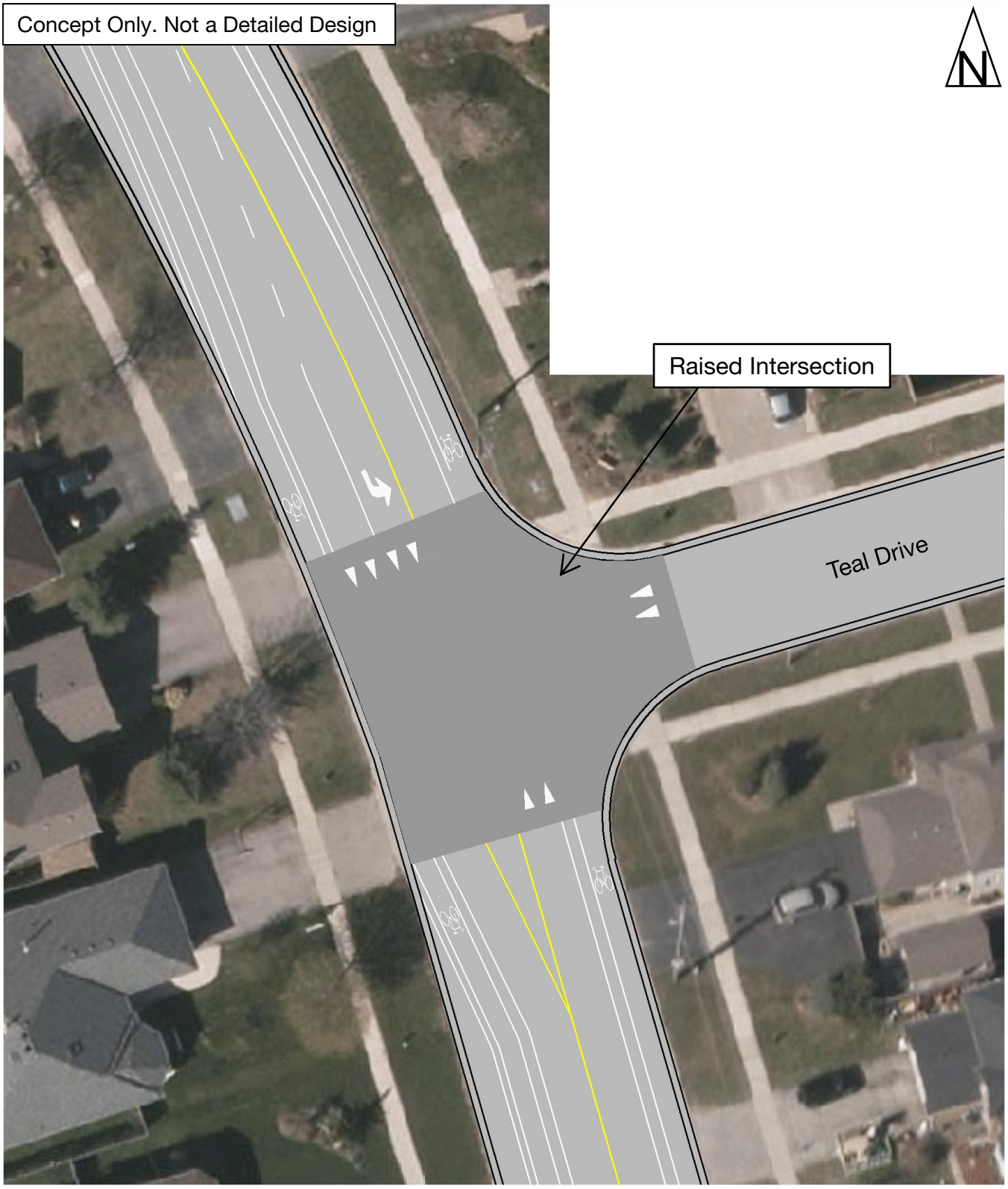


Recommended Plan Concept
at Pheasant Run Drive / Quail Creek Drive

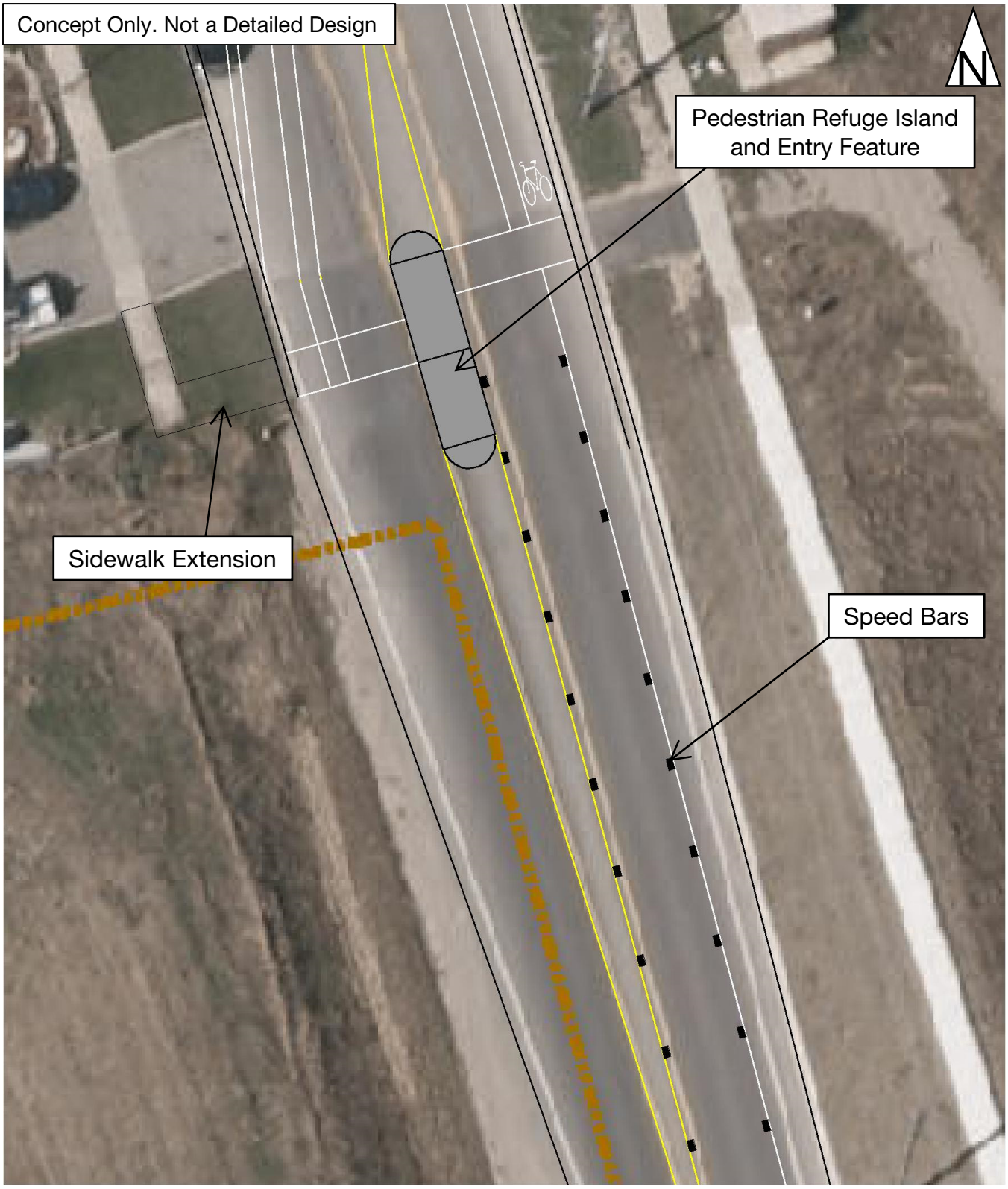


paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Plan Concept between Pheasant Run and Teal



Recommended Plan Concept at Teal Drive



paradigm TRANSPORTATION SOLUTIONS LIMITED

Recommended Plan Concept south of Teal Drive

6 Conclusions and Recommendations

6.1 Conclusions

As a result of the study, the following conclusions were made:

- Speeding is an issue of concern on Downey Road. 85th percentile speeds are as high as 65 km/h within the residential area, and even higher just outside the residential areas. Speeding is at least partially attributable to the width of Downey Road (14.5 metres).
- There is high support from the residents and community stakeholders for some form of traffic calming on Downey Road.
- Changing of the classification of Downey Road from an arterial road is not justified.
- Traffic calming devices, bike lanes and travel lanes can all be accommodated within the current width of Downey Road.
- On-Street parking can be accommodated on a single side of the road only.
- A signal or roundabout should be installed at the intersection of Downey Road and Niska Road, despite the volumes not technically meeting the threshold for signalization as the stop-controlled leg operates well over capacity and the volumes were only slightly under the threshold during the mid-day peak.
- A roundabout at the Niska Road intersection would serve a dual purpose of traffic control and traffic calming.
- Left-turn lanes are warranted on Downey Road at Hazelwood Drive (southbound), Pheasant Run Drive (northbound), and Teal Drive (southbound).

6.2 Recommendations

The recommended traffic calming plan includes:

- Reduction of the travel lane width to 3.25 metres.
- Inclusion of bike lanes along entirety of Downey Road.
- Single sided on-street parking where feasible.
- Roundabout at the intersection of Downey Road and Niska Road.
- Pedestrian Refuge Island on the south leg of the intersection of Downey Road and Hazelwood Drive.
- Enhanced pedestrian crosswalk pavements markings at the signalized intersection of Downey Road and Ptarmigan Drive.
- Pedestrian Refuge Island on the north leg of the intersection of Downey Road and Pheasant Run Drive / Quail Creek Drive.

- Raised intersection at Downey Road and Teal Drive.
- Centre Island Pedestrian Refuge / Entry Feature along with Speed Bars on the northbound lane leading from the higher speed rural section of Downey Road to the residential area.
- 4 sets of Speed Cushions with Chokers.

Appendix A

Traffic Counts

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016

Turning Movement Data

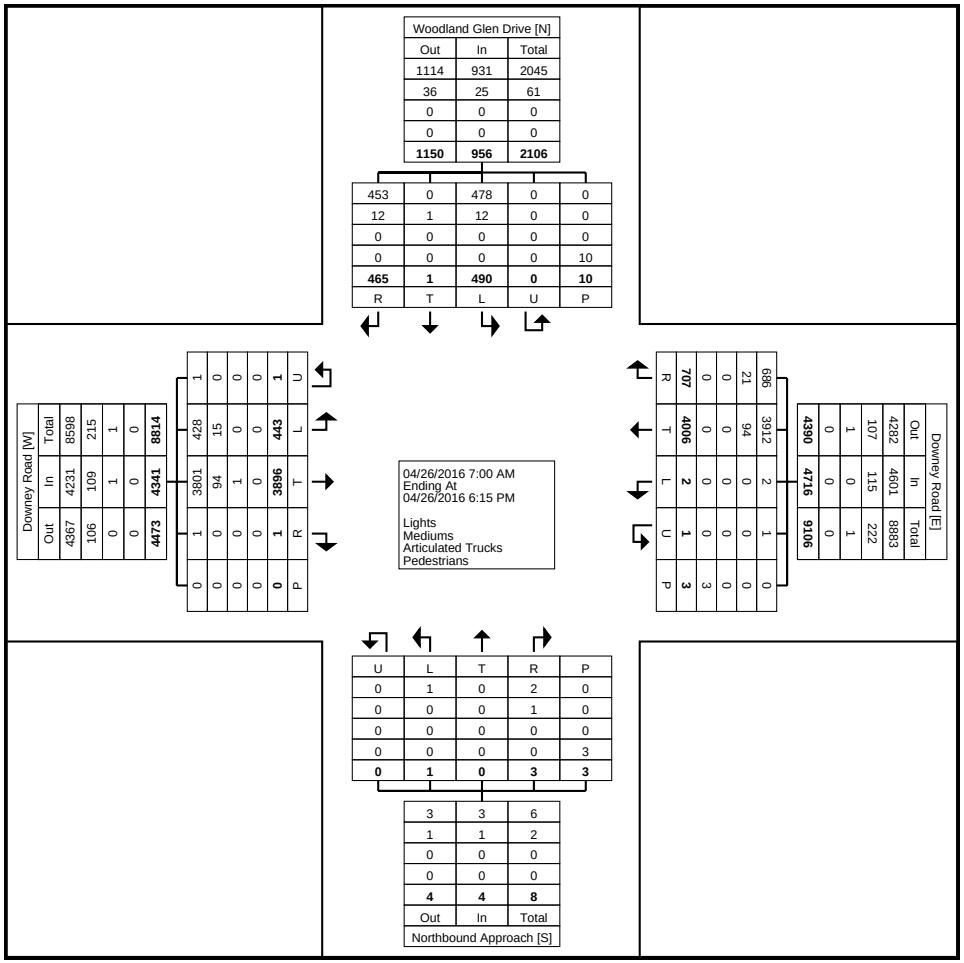
Start Time	Downey Road Eastbound						Downey Road Westbound						Northbound Approach Northbound						Woodland Glen Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	8	88	0	0	0	96	0	50	9	0	0	59	0	0	0	0	0	0	17	0	9	0	0	26	181
7:15 AM	10	123	0	0	0	133	0	110	13	0	0	123	0	0	0	0	0	0	13	0	18	0	0	31	287
7:30 AM	13	158	0	0	0	171	0	123	6	0	0	129	0	0	0	0	0	0	17	0	13	0	1	30	330
7:45 AM	12	171	0	0	0	183	0	134	13	0	0	147	0	0	0	0	0	0	12	0	13	0	1	25	355
Hourly Total	43	540	0	0	0	583	0	417	41	0	0	458	0	0	0	0	0	0	59	0	53	0	2	112	1153
8:00 AM	16	152	0	0	0	168	0	118	19	0	0	137	0	0	0	0	0	0	10	0	20	0	0	30	335
8:15 AM	21	229	0	0	0	250	0	109	19	0	0	128	0	0	0	0	0	0	12	0	21	0	0	33	411
8:30 AM	37	199	0	0	0	236	0	113	38	0	0	151	0	0	0	0	0	0	16	0	26	0	0	42	429
8:45 AM	36	187	0	0	0	223	0	98	48	0	2	146	0	0	0	0	2	0	18	0	26	0	0	44	413
Hourly Total	110	767	0	0	0	877	0	438	124	0	2	562	0	0	0	0	2	0	56	0	93	0	0	149	1588
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	6	66	0	0	0	72	0	72	10	0	0	82	0	0	0	0	0	0	9	0	6	0	0	15	169
11:15 AM	6	80	0	0	0	86	0	75	22	0	0	97	0	0	0	0	0	0	20	0	6	0	1	26	209
11:30 AM	5	67	0	0	0	72	0	89	16	0	0	105	0	0	0	0	0	0	17	0	7	0	0	24	201
11:45 AM	6	94	1	0	0	101	0	71	13	0	0	84	0	0	0	0	0	0	19	0	4	0	0	23	208
Hourly Total	23	307	1	0	0	331	0	307	61	0	0	368	0	0	0	0	0	0	65	0	23	0	1	88	787
12:00 PM	11	77	0	0	0	88	0	97	14	0	0	111	0	0	1	0	0	1	26	0	7	0	0	33	233
12:15 PM	9	87	0	0	0	96	0	86	12	0	1	98	0	0	0	0	1	0	16	0	7	0	0	23	217
12:30 PM	4	95	0	0	0	99	1	67	17	0	0	85	0	0	1	0	0	1	12	0	6	0	1	18	203
12:45 PM	2	71	0	0	0	73	0	83	20	0	0	103	0	0	0	0	0	0	17	0	8	0	0	25	201
Hourly Total	26	330	0	0	0	356	1	333	63	0	1	397	0	0	2	0	1	2	71	0	28	0	1	99	854
1:00 PM	8	86	0	0	0	94	0	79	5	0	0	84	0	0	0	0	0	0	13	0	8	0	0	21	199
1:15 PM	3	76	0	0	0	79	0	73	16	0	0	89	0	0	0	0	0	0	15	0	6	0	0	21	189
1:30 PM	10	79	0	0	0	89	0	83	16	0	0	99	0	0	0	0	0	0	17	0	6	0	0	23	211
1:45 PM	4	98	0	1	0	103	0	76	22	0	0	98	0	0	1	0	0	1	15	1	2	0	0	18	220
Hourly Total	25	339	0	1	0	365	0	311	59	0	0	370	0	0	1	0	0	1	60	1	22	0	0	83	819
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	11	99	0	0	0	110	0	120	20	0	0	140	0	0	0	0	0	0	12	0	11	0	0	23	273
3:15 PM	16	97	0	0	0	113	0	164	17	0	0	181	0	0	0	0	0	0	9	0	24	0	1	33	327
3:30 PM	14	116	0	0	0	130	0	170	25	0	0	195	0	0	0	0	0	0	5	0	22	0	1	27	352
3:45 PM	19	114	0	0	0	133	1	135	26	0	0	162	1	0	0	0	0	1	12	0	12	0	2	24	320
Hourly Total	60	426	0	0	0	486	1	589	88	0	0	678	1	0	0	0	0	1	38	0	69	0	4	107	1272
4:00 PM	12	134	0	0	0	146	0	180	24	0	0	204	0	0	0	0	0	0	13	0	19	0	1	32	382

4:15 PM	19	120	0	0	0	139	0	210	23	0	0	233	0	0	0	0	0	0	16	0	18	0	1	34	406
4:30 PM	14	139	0	0	0	153	0	219	37	0	0	256	0	0	0	0	0	0	19	0	22	0	0	41	450
4:45 PM	32	150	0	0	0	182	0	221	33	0	0	254	0	0	0	0	0	0	22	0	31	0	0	53	489
Hourly Total	77	543	0	0	0	620	0	830	117	0	0	947	0	0	0	0	0	0	70	0	90	0	2	160	1727
5:00 PM	18	145	0	0	0	163	0	223	34	0	0	257	0	0	0	0	0	0	22	0	26	0	0	48	468
5:15 PM	19	171	0	0	0	190	0	234	44	1	0	279	0	0	0	0	0	0	12	0	23	0	0	35	504
5:30 PM	20	169	0	0	0	189	0	175	39	0	0	214	0	0	0	0	0	0	14	0	17	0	0	31	434
5:45 PM	22	159	0	0	0	181	0	149	37	0	0	186	0	0	0	0	0	0	23	0	21	0	0	44	411
Hourly Total	79	644	0	0	0	723	0	781	154	1	0	936	0	0	0	0	0	0	71	0	87	0	0	158	1817
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	443	3896	1	1	0	4341	2	4006	707	1	3	4716	1	0	3	0	3	4	490	1	465	0	10	956	10017
Approach %	10.2	89.7	0.0	0.0	-	-	0.0	84.9	15.0	0.0	-	-	25.0	0.0	75.0	0.0	-	-	51.3	0.1	48.6	0.0	-	-	-
Total %	4.4	38.9	0.0	0.0	-	43.3	0.0	40.0	7.1	0.0	-	47.1	0.0	0.0	0.0	0.0	-	0.0	4.9	0.0	4.6	0.0	-	9.5	-
Lights	428	3801	1	1	-	4231	2	3912	686	1	-	4601	1	0	2	0	-	3	478	0	453	0	-	931	9766
% Lights	96.6	97.6	100.0	100.0	-	97.5	100.0	97.7	97.0	100.0	-	97.6	100.0	-	66.7	-	-	75.0	97.6	0.0	97.4	-	-	97.4	97.5
Mediums	15	94	0	0	-	109	0	94	21	0	-	115	0	0	1	0	-	1	12	1	12	0	-	25	250
% Mediums	3.4	2.4	0.0	0.0	-	2.5	0.0	2.3	3.0	0.0	-	2.4	0.0	-	33.3	-	-	25.0	2.4	100.0	2.6	-	-	2.6	2.5
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016

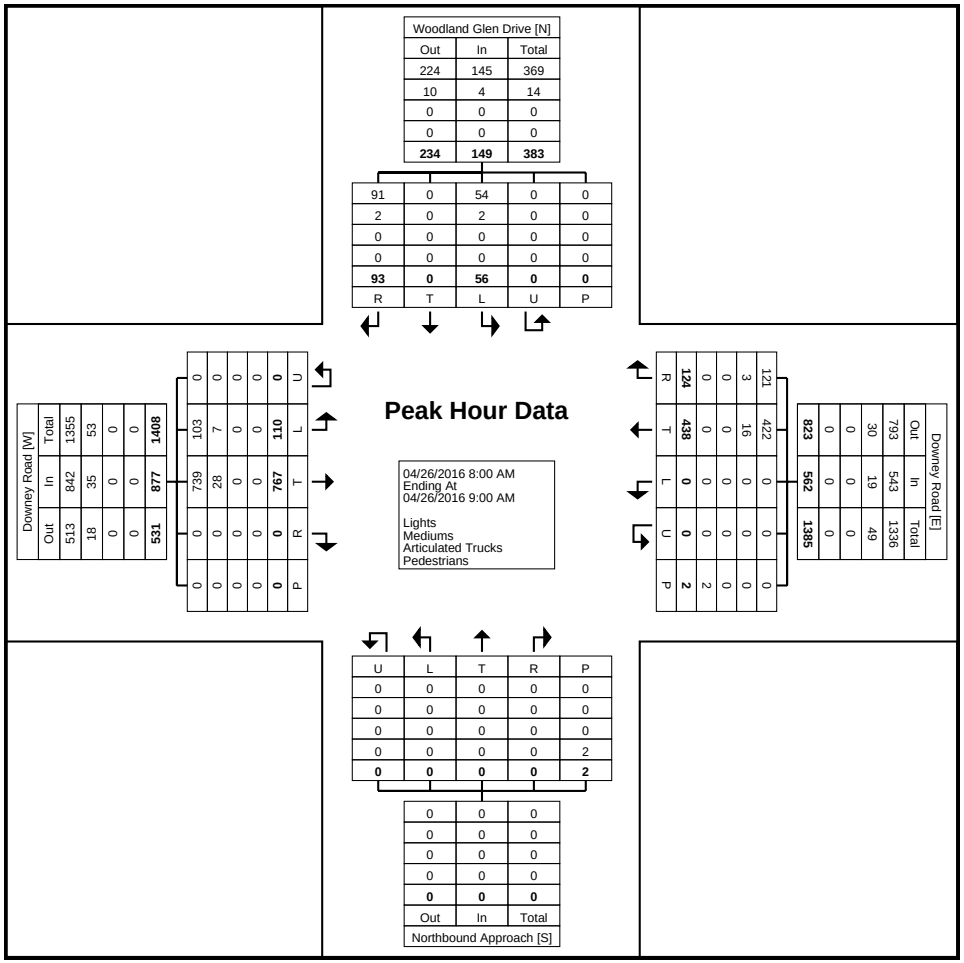
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Downey Road Eastbound						Downey Road Westbound						Northbound Approach Northbound						Woodland Glen Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	16	152	0	0	0	168	0	118	19	0	0	137	0	0	0	0	0	0	10	0	20	0	0	30	335
8:15 AM	21	229	0	0	0	250	0	109	19	0	0	128	0	0	0	0	0	0	12	0	21	0	0	33	411
8:30 AM	37	199	0	0	0	236	0	113	38	0	0	151	0	0	0	0	0	0	16	0	26	0	0	42	429
8:45 AM	36	187	0	0	0	223	0	98	48	0	2	146	0	0	0	0	2	0	18	0	26	0	0	44	413
Total	110	767	0	0	0	877	0	438	124	0	2	562	0	0	0	0	2	0	56	0	93	0	0	149	1588
Approach %	12.5	87.5	0.0	0.0	-	-	0.0	77.9	22.1	0.0	-	-	NaN	NaN	NaN	NaN	-	-	37.6	0.0	62.4	0.0	-	-	-
Total %	6.9	48.3	0.0	0.0	-	55.2	0.0	27.6	7.8	0.0	-	35.4	0.0	0.0	0.0	0.0	-	0.0	3.5	0.0	5.9	0.0	-	9.4	-
PHF	0.743	0.837	0.000	0.000	-	0.877	0.000	0.928	0.646	0.000	-	0.930	0.000	0.000	0.000	0.000	-	0.000	0.778	0.000	0.894	0.000	-	0.847	0.925
Lights	103	739	0	0	-	842	0	422	121	0	-	543	0	0	0	0	-	0	54	0	91	0	-	145	1530
% Lights	93.6	96.3	-	-	-	96.0	-	96.3	97.6	-	-	96.6	-	-	-	-	-	-	96.4	-	97.8	-	-	97.3	96.3
Mediums	7	28	0	0	-	35	0	16	3	0	-	19	0	0	0	0	-	0	2	0	2	0	-	4	58
% Mediums	6.4	3.7	-	-	-	4.0	-	3.7	2.4	-	-	3.4	-	-	-	-	-	-	3.6	-	2.2	-	-	2.7	3.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	-	-	-	-	-	0.0	-	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016

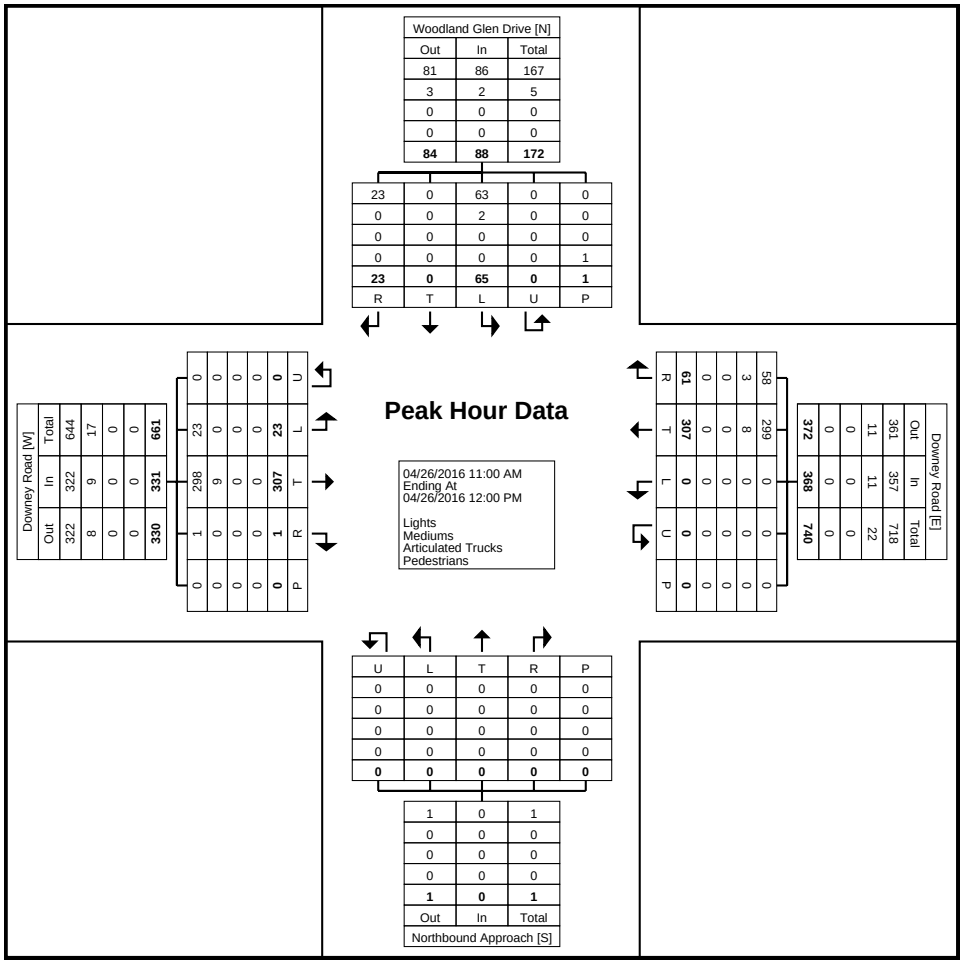
Turning Movement Peak Hour Data (11:00 AM)

Start Time	Downey Road Eastbound						Downey Road Westbound						Northbound Approach Northbound						Woodland Glen Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	6	66	0	0	0	72	0	72	10	0	0	82	0	0	0	0	0	0	9	0	6	0	0	15	169
11:15 AM	6	80	0	0	0	86	0	75	22	0	0	97	0	0	0	0	0	0	20	0	6	0	1	26	209
11:30 AM	5	67	0	0	0	72	0	89	16	0	0	105	0	0	0	0	0	0	17	0	7	0	0	24	201
11:45 AM	6	94	1	0	0	101	0	71	13	0	0	84	0	0	0	0	0	0	19	0	4	0	0	23	208
Total	23	307	1	0	0	331	0	307	61	0	0	368	0	0	0	0	0	0	65	0	23	0	1	88	787
Approach %	6.9	92.7	0.3	0.0	-	-	0.0	83.4	16.6	0.0	-	-	NaN	NaN	NaN	NaN	-	-	73.9	0.0	26.1	0.0	-	-	-
Total %	2.9	39.0	0.1	0.0	-	42.1	0.0	39.0	7.8	0.0	-	46.8	0.0	0.0	0.0	0.0	-	0.0	8.3	0.0	2.9	0.0	-	11.2	-
PHF	0.958	0.816	0.250	0.000	-	0.819	0.000	0.862	0.693	0.000	-	0.876	0.000	0.000	0.000	0.000	-	0.000	0.813	0.000	0.821	0.000	-	0.846	0.941
Lights	23	298	1	0	-	322	0	299	58	0	-	357	0	0	0	0	-	0	63	0	23	0	-	86	765
% Lights	100.0	97.1	100.0	-	-	97.3	-	97.4	95.1	-	-	97.0	-	-	-	-	-	-	96.9	-	100.0	-	-	97.7	97.2
Mediums	0	9	0	0	-	9	0	8	3	0	-	11	0	0	0	0	-	0	2	0	0	0	-	2	22
% Mediums	0.0	2.9	0.0	-	-	2.7	-	2.6	4.9	-	-	3.0	-	-	-	-	-	-	3.1	-	0.0	-	-	2.3	2.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	-	-	-	-	-	0.0	-	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

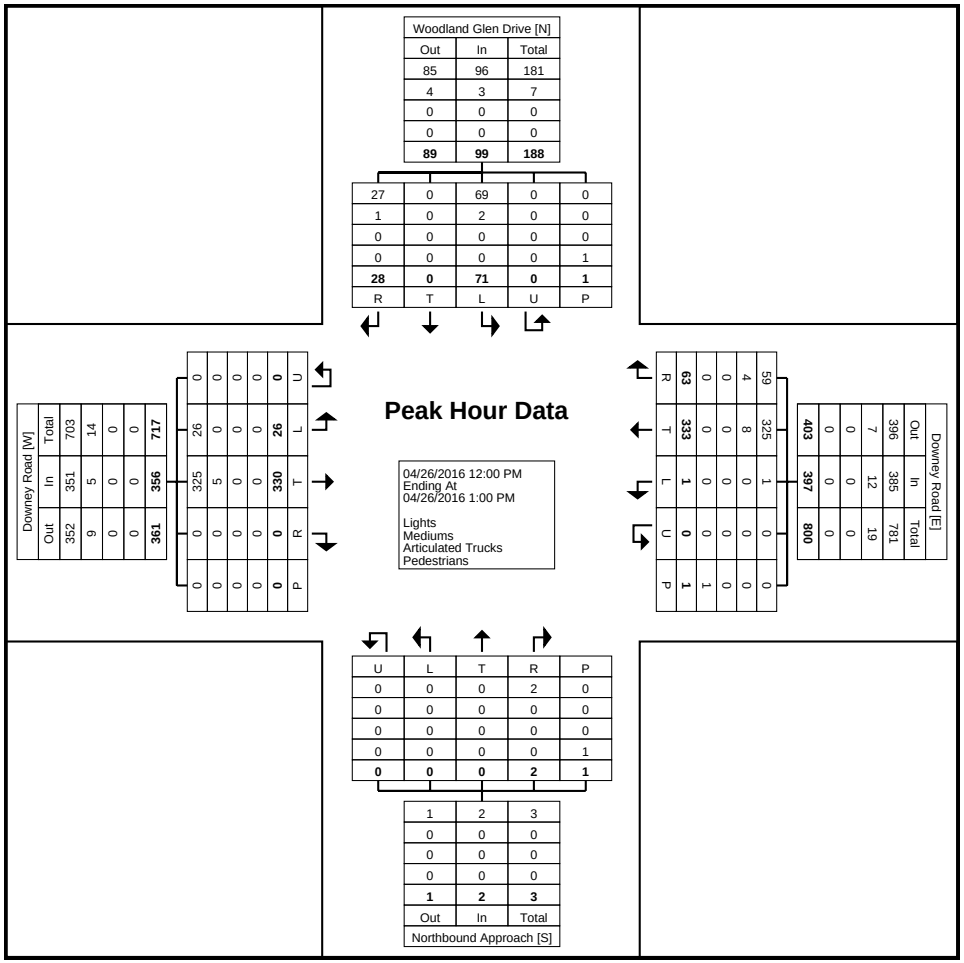
Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Downey Road Eastbound						Downey Road Westbound						Northbound Approach Northbound						Woodland Glen Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	11	77	0	0	0	88	0	97	14	0	0	111	0	0	1	0	0	1	26	0	7	0	0	33	233
12:15 PM	9	87	0	0	0	96	0	86	12	0	1	98	0	0	0	0	1	0	16	0	7	0	0	23	217
12:30 PM	4	95	0	0	0	99	1	67	17	0	0	85	0	0	1	0	0	1	12	0	6	0	1	18	203
12:45 PM	2	71	0	0	0	73	0	83	20	0	0	103	0	0	0	0	0	0	17	0	8	0	0	25	201
Total	26	330	0	0	0	356	1	333	63	0	1	397	0	0	2	0	1	2	71	0	28	0	1	99	854
Approach %	7.3	92.7	0.0	0.0	-	-	0.3	83.9	15.9	0.0	-	-	0.0	0.0	100.0	0.0	-	-	71.7	0.0	28.3	0.0	-	-	-
Total %	3.0	38.6	0.0	0.0	-	41.7	0.1	39.0	7.4	0.0	-	46.5	0.0	0.0	0.2	0.0	-	0.2	8.3	0.0	3.3	0.0	-	11.6	-
PHF	0.591	0.868	0.000	0.000	-	0.899	0.250	0.858	0.788	0.000	-	0.894	0.000	0.000	0.500	0.000	-	0.500	0.683	0.000	0.875	0.000	-	0.750	0.916
Lights	26	325	0	0	-	351	1	325	59	0	-	385	0	0	2	0	-	2	69	0	27	0	-	96	834
% Lights	100.0	98.5	-	-	-	98.6	100.0	97.6	93.7	-	-	97.0	-	-	100.0	-	-	100.0	97.2	-	96.4	-	-	97.0	97.7
Mediums	0	5	0	0	-	5	0	8	4	0	-	12	0	0	0	0	-	0	2	0	1	0	-	3	20
% Mediums	0.0	1.5	-	-	-	1.4	0.0	2.4	6.3	-	-	3.0	-	-	0.0	-	-	0.0	2.8	-	3.6	-	-	3.0	2.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016

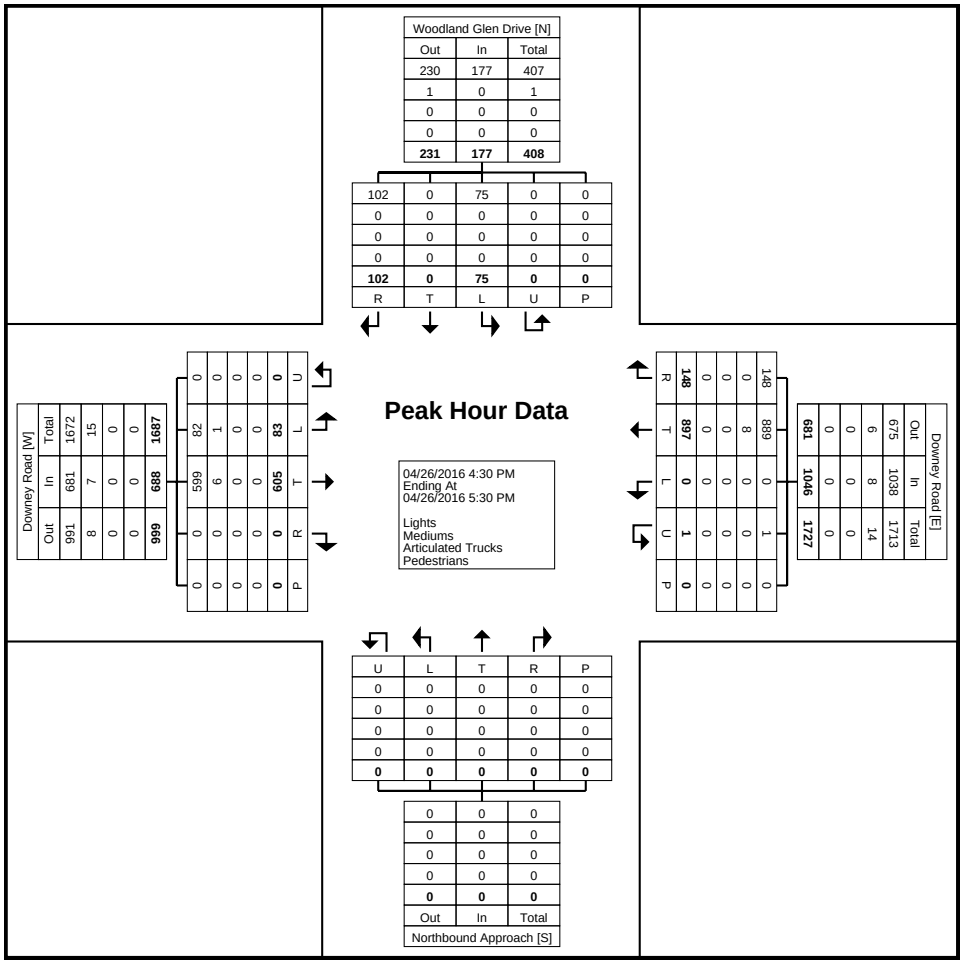
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Downey Road Eastbound						Downey Road Westbound						Northbound Approach Northbound						Woodland Glen Drive Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	14	139	0	0	0	153	0	219	37	0	0	256	0	0	0	0	0	0	19	0	22	0	0	41	450
4:45 PM	32	150	0	0	0	182	0	221	33	0	0	254	0	0	0	0	0	0	22	0	31	0	0	53	489
5:00 PM	18	145	0	0	0	163	0	223	34	0	0	257	0	0	0	0	0	0	22	0	26	0	0	48	468
5:15 PM	19	171	0	0	0	190	0	234	44	1	0	279	0	0	0	0	0	0	12	0	23	0	0	35	504
Total	83	605	0	0	0	688	0	897	148	1	0	1046	0	0	0	0	0	0	75	0	102	0	0	177	1911
Approach %	12.1	87.9	0.0	0.0	-	-	0.0	85.8	14.1	0.1	-	-	NaN	NaN	NaN	NaN	-	-	42.4	0.0	57.6	0.0	-	-	-
Total %	4.3	31.7	0.0	0.0	-	36.0	0.0	46.9	7.7	0.1	-	54.7	0.0	0.0	0.0	0.0	-	0.0	3.9	0.0	5.3	0.0	-	9.3	-
PHF	0.648	0.885	0.000	0.000	-	0.905	0.000	0.958	0.841	0.250	-	0.937	0.000	0.000	0.000	0.000	-	0.000	0.852	0.000	0.823	0.000	-	0.835	0.948
Lights	82	599	0	0	-	681	0	889	148	1	-	1038	0	0	0	0	-	0	75	0	102	0	-	177	1896
% Lights	98.8	99.0	-	-	-	99.0	-	99.1	100.0	100.0	-	99.2	-	-	-	-	-	-	100.0	-	100.0	-	-	100.0	99.2
Mediums	1	6	0	0	-	7	0	8	0	0	-	8	0	0	0	0	-	0	0	0	0	0	-	0	15
% Mediums	1.2	1.0	-	-	-	1.0	-	0.9	0.0	0.0	-	0.8	-	-	-	-	-	-	0.0	-	0.0	-	-	0.0	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	-	0.0	-	0.0	0.0	0.0	-	0.0	-	-	-	-	-	-	0.0	-	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Woodland Glen Drive
Site Code:
Start Date: 04/26/2016

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016

Turning Movement Data

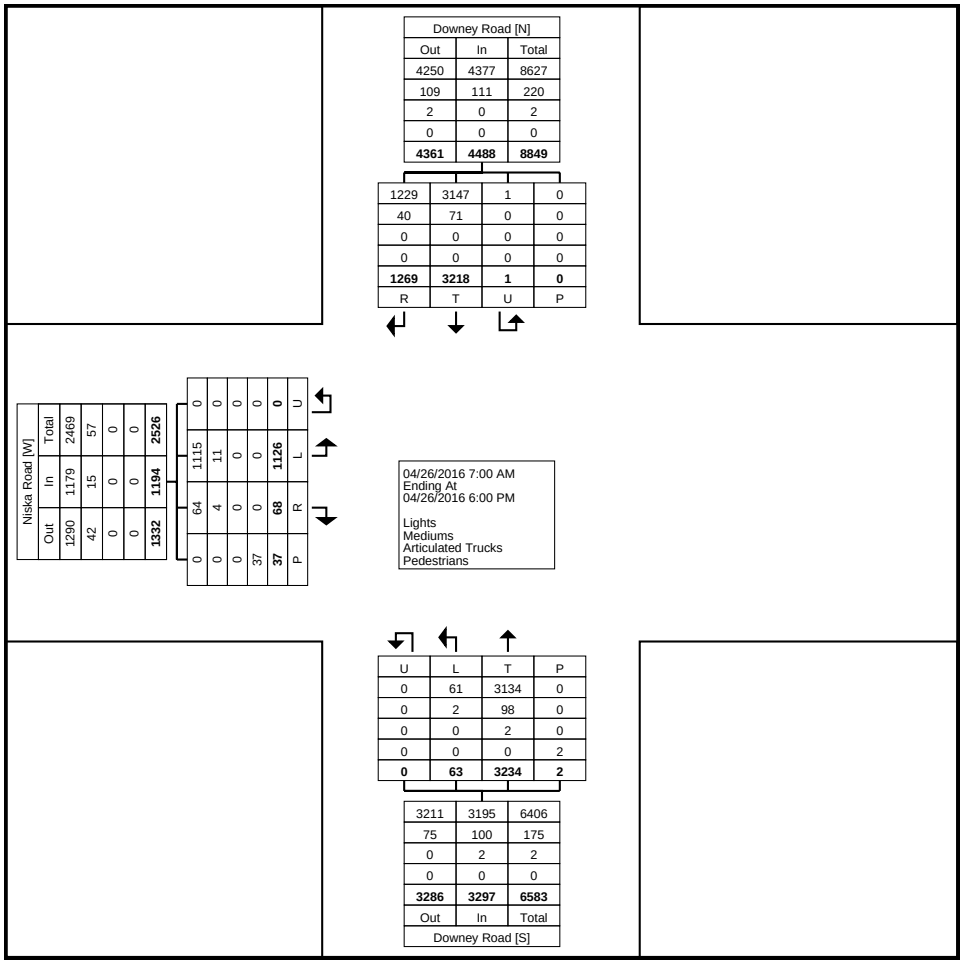
Start Time	Niska Road Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	12	2	0	0	14	1	80	0	0	81	34	27	0	0	61	156
7:15 AM	20	0	0	0	20	3	116	0	0	119	78	47	1	0	126	265
7:30 AM	20	1	0	1	21	2	156	0	0	158	95	52	0	0	147	326
7:45 AM	37	2	0	0	39	1	149	0	0	150	90	48	0	0	138	327
Hourly Total	89	5	0	1	94	7	501	0	0	508	297	174	1	0	472	1074
8:00 AM	23	4	0	1	27	1	146	0	0	147	82	54	0	0	136	310
8:15 AM	44	1	0	6	45	2	208	0	0	210	91	45	0	0	136	391
8:30 AM	48	2	0	1	50	3	190	0	0	193	94	41	0	0	135	378
8:45 AM	44	1	0	0	45	5	172	0	0	177	82	39	0	0	121	343
Hourly Total	159	8	0	8	167	11	716	0	0	727	349	179	0	0	528	1422
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	15	0	0	0	15	1	58	0	0	59	45	32	0	0	77	151
11:15 AM	23	1	0	1	24	2	63	0	0	65	51	35	0	0	86	175
11:30 AM	22	1	0	0	23	1	49	0	0	50	63	29	0	0	92	165
11:45 AM	37	4	0	0	41	3	72	0	0	75	52	25	0	0	77	193
Hourly Total	97	6	0	1	103	7	242	0	0	249	211	121	0	0	332	684
12:00 PM	29	3	0	1	32	3	56	0	0	59	73	32	0	0	105	196
12:15 PM	28	1	0	0	29	0	68	0	0	68	64	27	0	0	91	188
12:30 PM	27	2	0	1	29	2	69	0	0	71	51	21	0	0	72	172
12:45 PM	14	0	0	0	14	1	62	0	0	63	61	29	0	0	90	167
Hourly Total	98	6	0	2	104	6	255	0	0	261	249	109	0	0	358	723
1:00 PM	20	0	0	0	20	2	74	0	0	76	66	23	0	0	89	185
1:15 PM	24	1	0	0	25	1	55	0	0	56	51	27	0	0	78	159
1:30 PM	29	2	0	0	31	1	67	0	0	68	54	35	0	0	89	188
1:45 PM	33	2	0	0	35	2	63	0	0	65	64	21	0	0	85	185
Hourly Total	106	5	0	0	111	6	259	0	0	265	235	106	0	0	341	717
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	31	3	0	0	34	2	81	0	0	83	98	33	0	0	131	248
3:15 PM	42	1	0	2	43	4	72	0	0	76	145	44	0	0	189	308
3:30 PM	43	4	0	3	47	1	87	0	0	88	138	58	0	0	196	331
3:45 PM	41	2	0	6	43	1	91	0	0	92	109	35	0	0	144	279
Hourly Total	157	10	0	11	167	8	331	0	0	339	490	170	0	0	660	1166
4:00 PM	46	2	0	0	48	4	98	0	2	102	149	54	0	0	203	353
4:15 PM	49	5	0	3	54	3	95	0	0	98	176	49	0	0	225	377
4:30 PM	46	5	0	1	51	0	103	0	0	103	195	47	0	0	242	396
4:45 PM	55	5	0	3	60	1	133	0	0	134	199	53	0	0	252	446
Hourly Total	196	17	0	7	213	8	429	0	2	437	719	203	0	0	922	1572
5:00 PM	45	6	0	0	51	1	119	0	0	120	203	56	0	0	259	430

5:15 PM	55	2	0	0	57	3	132	0	0	135	186	67	0	0	253	445
5:30 PM	58	0	0	2	58	1	132	0	0	133	149	42	0	0	191	382
5:45 PM	66	3	0	5	69	5	118	0	0	123	130	42	0	0	172	364
Hourly Total	224	11	0	7	235	10	501	0	0	511	668	207	0	0	875	1621
Grand Total	1126	68	0	37	1194	63	3234	0	2	3297	3218	1269	1	0	4488	8979
Approach %	94.3	5.7	0.0	-	-	1.9	98.1	0.0	-	-	71.7	28.3	0.0	-	-	-
Total %	12.5	0.8	0.0	-	13.3	0.7	36.0	0.0	-	36.7	35.8	14.1	0.0	-	50.0	-
Lights	1115	64	0	-	1179	61	3134	0	-	3195	3147	1229	1	-	4377	8751
% Lights	99.0	94.1	-	-	98.7	96.8	96.9	-	-	96.9	97.8	96.8	100.0	-	97.5	97.5
Mediums	11	4	0	-	15	2	98	0	-	100	71	40	0	-	111	226
% Mediums	1.0	5.9	-	-	1.3	3.2	3.0	-	-	3.0	2.2	3.2	0.0	-	2.5	2.5
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.1	-	-	0.1	0.0	0.0	0.0	-	0.0	0.0
Pedestrians	-	-	-	37	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016

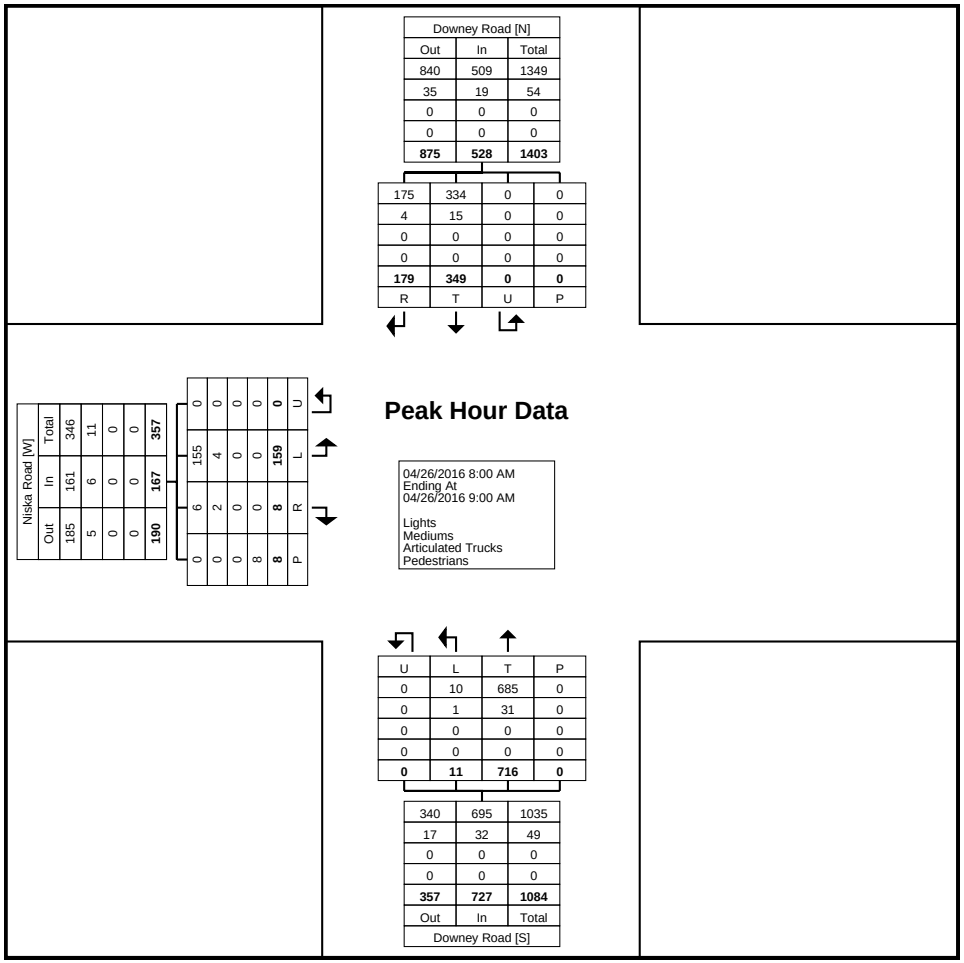
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Niska Road Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	23	4	0	1	27	1	146	0	0	147	82	54	0	0	136	310
8:15 AM	44	1	0	6	45	2	208	0	0	210	91	45	0	0	136	391
8:30 AM	48	2	0	1	50	3	190	0	0	193	94	41	0	0	135	378
8:45 AM	44	1	0	0	45	5	172	0	0	177	82	39	0	0	121	343
Total	159	8	0	8	167	11	716	0	0	727	349	179	0	0	528	1422
Approach %	95.2	4.8	0.0	-	-	1.5	98.5	0.0	-	-	66.1	33.9	0.0	-	-	-
Total %	11.2	0.6	0.0	-	11.7	0.8	50.4	0.0	-	51.1	24.5	12.6	0.0	-	37.1	-
PHF	0.828	0.500	0.000	-	0.835	0.550	0.861	0.000	-	0.865	0.928	0.829	0.000	-	0.971	0.909
Lights	155	6	0	-	161	10	685	0	-	695	334	175	0	-	509	1365
% Lights	97.5	75.0	-	-	96.4	90.9	95.7	-	-	95.6	95.7	97.8	-	-	96.4	96.0
Mediums	4	2	0	-	6	1	31	0	-	32	15	4	0	-	19	57
% Mediums	2.5	25.0	-	-	3.6	9.1	4.3	-	-	4.4	4.3	2.2	-	-	3.6	4.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	8	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016

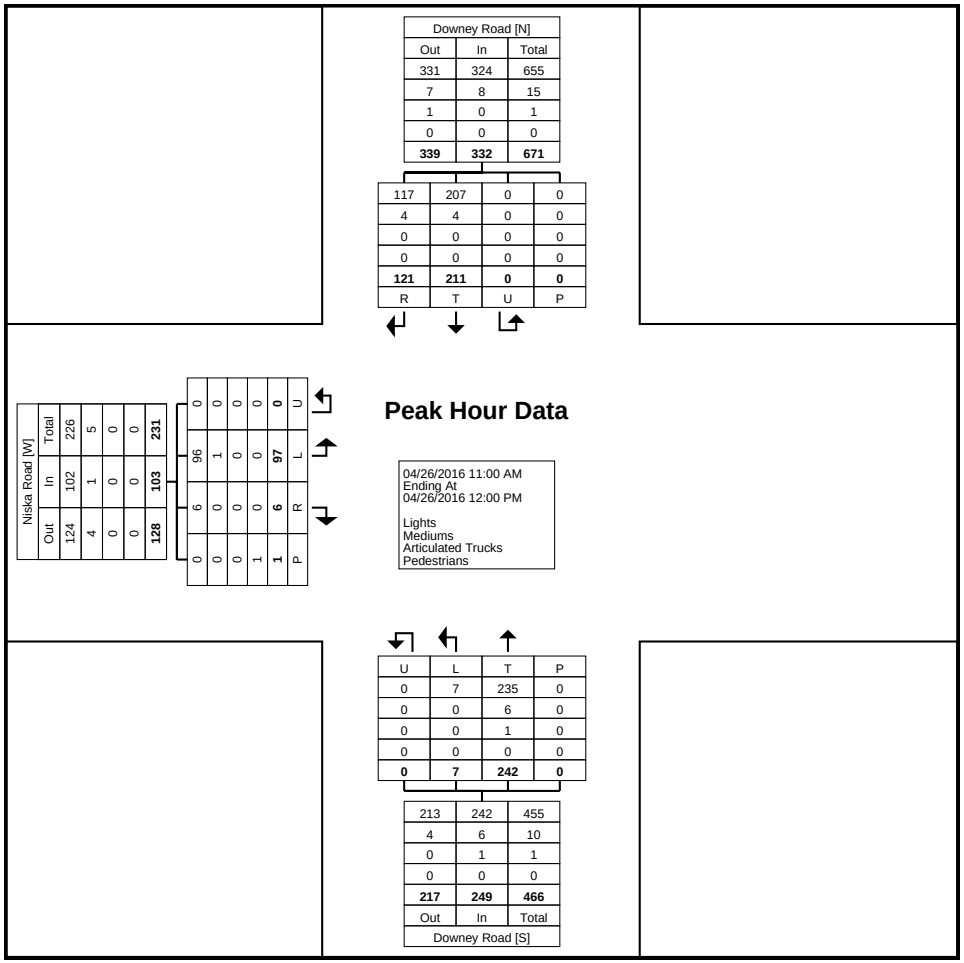
Turning Movement Peak Hour Data (11:00 AM)

Start Time	Niska Road Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:00 AM	15	0	0	0	15	1	58	0	0	59	45	32	0	0	77	151
11:15 AM	23	1	0	1	24	2	63	0	0	65	51	35	0	0	86	175
11:30 AM	22	1	0	0	23	1	49	0	0	50	63	29	0	0	92	165
11:45 AM	37	4	0	0	41	3	72	0	0	75	52	25	0	0	77	193
Total	97	6	0	1	103	7	242	0	0	249	211	121	0	0	332	684
Approach %	94.2	5.8	0.0	-	-	2.8	97.2	0.0	-	-	63.6	36.4	0.0	-	-	-
Total %	14.2	0.9	0.0	-	15.1	1.0	35.4	0.0	-	36.4	30.8	17.7	0.0	-	48.5	-
PHF	0.655	0.375	0.000	-	0.628	0.583	0.840	0.000	-	0.830	0.837	0.864	0.000	-	0.902	0.886
Lights	96	6	0	-	102	7	235	0	-	242	207	117	0	-	324	668
% Lights	99.0	100.0	-	-	99.0	100.0	97.1	-	-	97.2	98.1	96.7	-	-	97.6	97.7
Mediums	1	0	0	-	1	0	6	0	-	6	4	4	0	-	8	15
% Mediums	1.0	0.0	-	-	1.0	0.0	2.5	-	-	2.4	1.9	3.3	-	-	2.4	2.2
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.4	-	-	0.4	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016

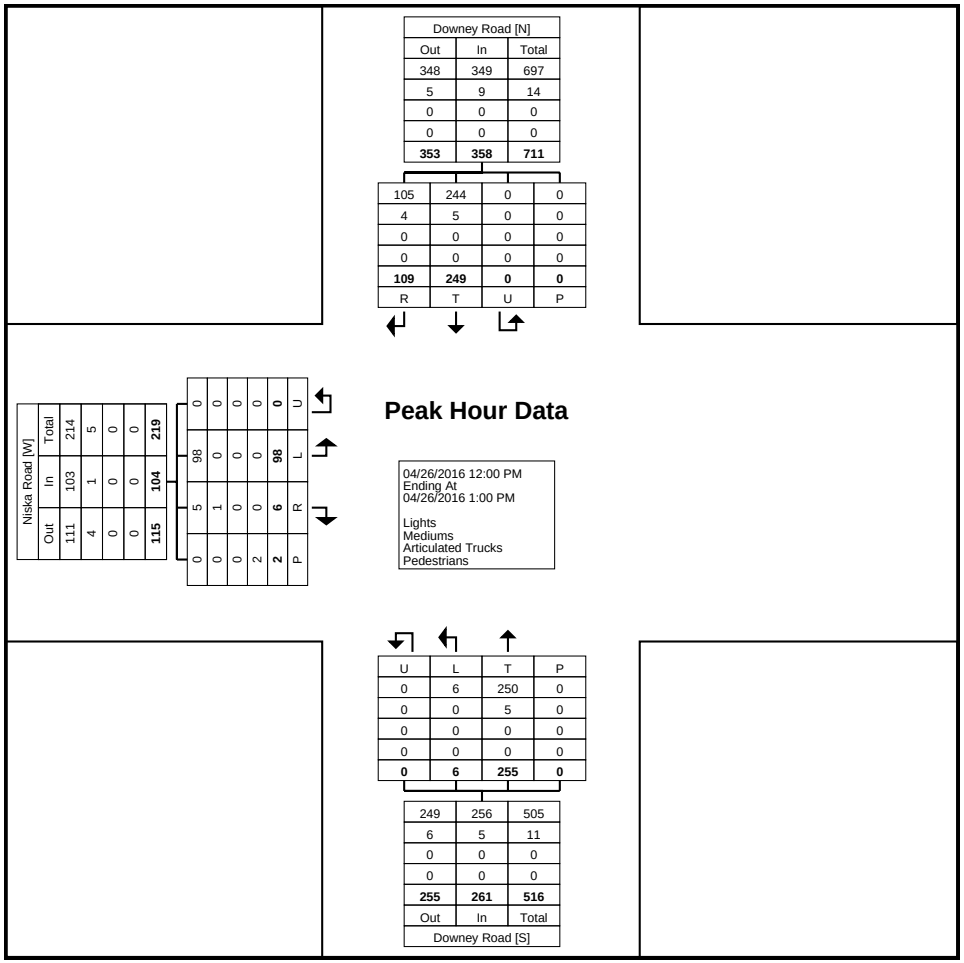
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Niska Road Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	29	3	0	1	32	3	56	0	0	59	73	32	0	0	105	196
12:15 PM	28	1	0	0	29	0	68	0	0	68	64	27	0	0	91	188
12:30 PM	27	2	0	1	29	2	69	0	0	71	51	21	0	0	72	172
12:45 PM	14	0	0	0	14	1	62	0	0	63	61	29	0	0	90	167
Total	98	6	0	2	104	6	255	0	0	261	249	109	0	0	358	723
Approach %	94.2	5.8	0.0	-	-	2.3	97.7	0.0	-	-	69.6	30.4	0.0	-	-	-
Total %	13.6	0.8	0.0	-	14.4	0.8	35.3	0.0	-	36.1	34.4	15.1	0.0	-	49.5	-
PHF	0.845	0.500	0.000	-	0.813	0.500	0.924	0.000	-	0.919	0.853	0.852	0.000	-	0.852	0.922
Lights	98	5	0	-	103	6	250	0	-	256	244	105	0	-	349	708
% Lights	100.0	83.3	-	-	99.0	100.0	98.0	-	-	98.1	98.0	96.3	-	-	97.5	97.9
Mediums	0	1	0	-	1	0	5	0	-	5	5	4	0	-	9	15
% Mediums	0.0	16.7	-	-	1.0	0.0	2.0	-	-	1.9	2.0	3.7	-	-	2.5	2.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016

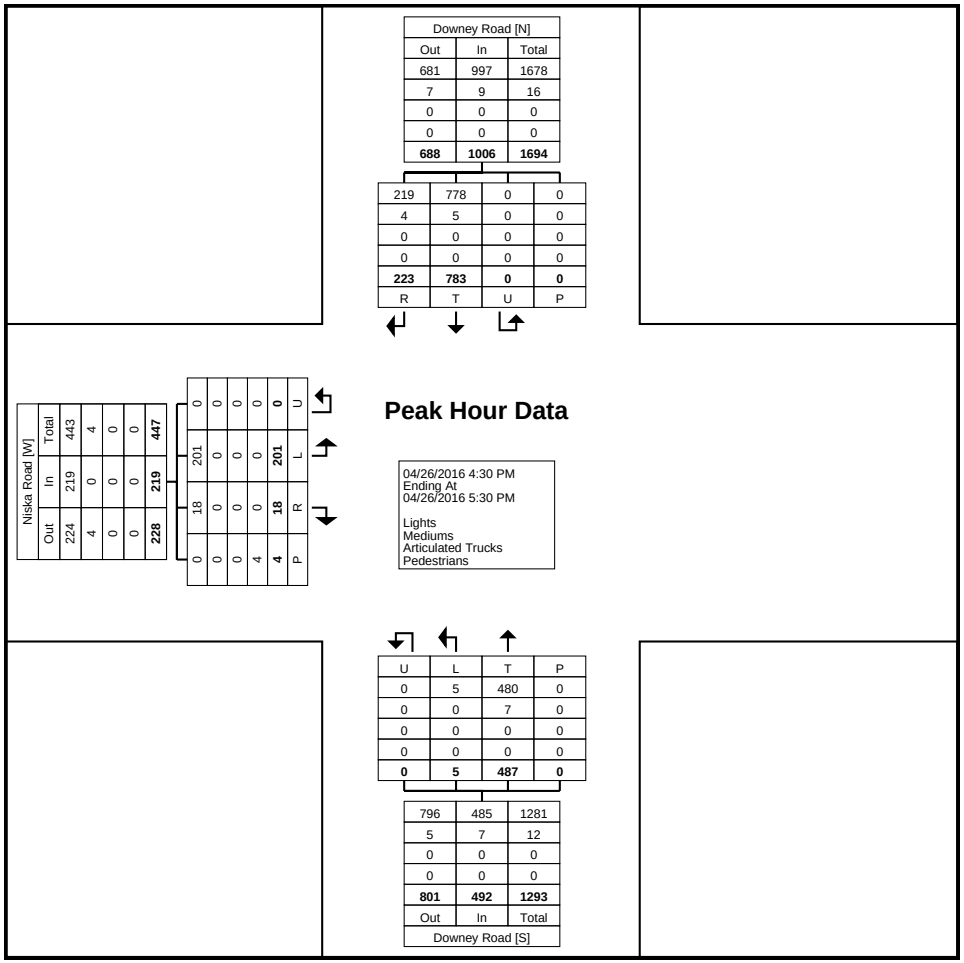
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Niska Road Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	46	5	0	1	51	0	103	0	0	103	195	47	0	0	242	396
4:45 PM	55	5	0	3	60	1	133	0	0	134	199	53	0	0	252	446
5:00 PM	45	6	0	0	51	1	119	0	0	120	203	56	0	0	259	430
5:15 PM	55	2	0	0	57	3	132	0	0	135	186	67	0	0	253	445
Total	201	18	0	4	219	5	487	0	0	492	783	223	0	0	1006	1717
Approach %	91.8	8.2	0.0	-	-	1.0	99.0	0.0	-	-	77.8	22.2	0.0	-	-	-
Total %	11.7	1.0	0.0	-	12.8	0.3	28.4	0.0	-	28.7	45.6	13.0	0.0	-	58.6	-
PHF	0.914	0.750	0.000	-	0.913	0.417	0.915	0.000	-	0.911	0.964	0.832	0.000	-	0.971	0.962
Lights	201	18	0	-	219	5	480	0	-	485	778	219	0	-	997	1701
% Lights	100.0	100.0	-	-	100.0	100.0	98.6	-	-	98.6	99.4	98.2	-	-	99.1	99.1
Mediums	0	0	0	-	0	0	7	0	-	7	5	4	0	-	9	16
% Mediums	0.0	0.0	-	-	0.0	0.0	1.4	-	-	1.4	0.6	1.8	-	-	0.9	0.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Niska Road
Site Code:
Start Date: 04/26/2016

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016

Turning Movement Data

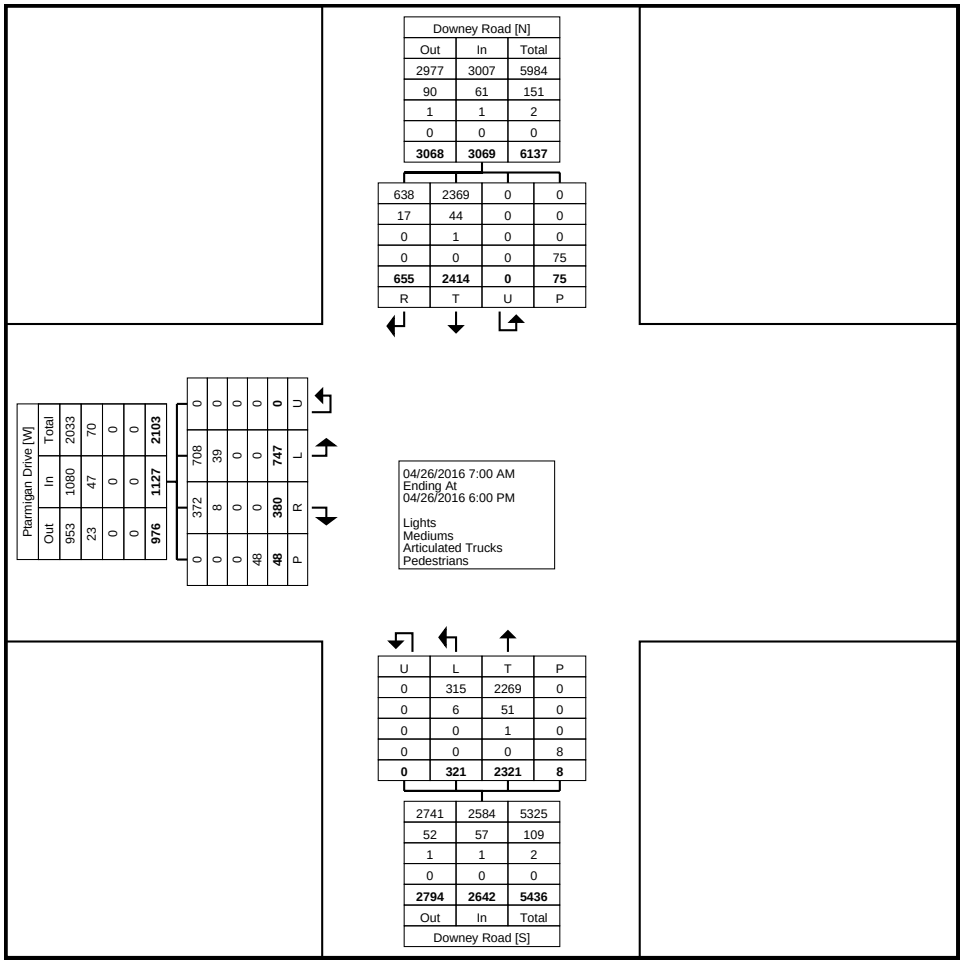
Start Time	Ptarmigan Drive Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
7:00 AM	14	13	0	0	27	7	58	0	0	65	35	2	0	0	37	129
7:15 AM	25	10	0	0	35	10	87	0	0	97	70	6	0	0	76	208
7:30 AM	18	5	0	0	23	16	131	0	0	147	85	10	0	0	95	265
7:45 AM	27	10	0	0	37	14	115	0	0	129	83	10	0	0	93	259
Hourly Total	84	38	0	0	122	47	391	0	0	438	273	28	0	0	301	861
8:00 AM	25	6	0	1	31	9	113	0	1	122	76	8	0	1	84	237
8:15 AM	47	18	0	1	65	25	147	0	0	172	65	18	0	7	83	320
8:30 AM	56	15	0	9	71	31	131	0	3	162	67	24	0	21	91	324
8:45 AM	53	24	0	0	77	30	99	0	0	129	56	25	0	5	81	287
Hourly Total	181	63	0	11	244	95	490	0	4	585	264	75	0	34	339	1168
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	12	5	0	1	17	1	37	0	0	38	34	14	0	0	48	103
11:15 AM	18	6	0	0	24	3	47	0	1	50	32	14	0	0	46	120
11:30 AM	11	4	0	0	15	3	37	0	0	40	43	14	0	0	57	112
11:45 AM	13	6	0	0	19	5	44	0	0	49	30	17	0	0	47	115
Hourly Total	54	21	0	1	75	12	165	0	1	177	139	59	0	0	198	450
12:00 PM	15	10	0	0	25	6	38	0	0	44	53	16	0	0	69	138
12:15 PM	16	2	0	0	18	4	48	0	0	52	49	12	0	0	61	131
12:30 PM	15	6	0	1	21	5	47	0	0	52	32	12	0	0	44	117
12:45 PM	14	8	0	1	22	5	44	0	0	49	39	19	0	0	58	129
Hourly Total	60	26	0	2	86	20	177	0	0	197	173	59	0	0	232	515
1:00 PM	18	6	0	1	24	6	44	0	0	50	40	17	0	0	57	131
1:15 PM	10	11	0	0	21	3	37	0	0	40	39	11	0	0	50	111
1:30 PM	14	6	0	2	20	4	48	0	0	52	38	13	0	0	51	123
1:45 PM	18	8	0	0	26	2	46	0	0	48	43	16	0	0	59	133
Hourly Total	60	31	0	3	91	15	175	0	0	190	160	57	0	0	217	498
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	17	5	0	2	22	15	63	0	0	78	62	34	0	1	96	196
3:15 PM	24	24	0	11	48	9	39	0	1	48	90	40	0	33	130	226
3:30 PM	35	17	0	9	52	9	53	0	0	62	105	33	0	4	138	252
3:45 PM	23	10	0	1	33	10	61	0	0	71	91	20	0	1	111	215
Hourly Total	99	56	0	23	155	43	216	0	1	259	348	127	0	39	475	889
4:00 PM	21	18	0	0	39	5	78	0	0	83	104	32	0	0	136	258
4:15 PM	20	17	0	0	37	8	75	0	0	83	146	25	0	0	171	291
4:30 PM	24	18	0	0	42	15	77	0	0	92	147	35	0	1	182	316
4:45 PM	26	21	0	0	47	10	101	0	0	111	163	32	0	0	195	353

Hourly Total	91	74	0	0	165	38	331	0	0	369	560	124	0	1	684	1218
5:00 PM	28	13	0	3	41	15	89	0	1	104	138	45	0	0	183	328
5:15 PM	25	28	0	0	53	17	111	0	1	128	156	30	0	1	186	367
5:30 PM	35	14	0	5	49	9	84	0	0	93	111	25	0	0	136	278
5:45 PM	30	16	0	0	46	10	92	0	0	102	92	26	0	0	118	266
Hourly Total	118	71	0	8	189	51	376	0	2	427	497	126	0	1	623	1239
Grand Total	747	380	0	48	1127	321	2321	0	8	2642	2414	655	0	75	3069	6838
Approach %	66.3	33.7	0.0	-	-	12.1	87.9	0.0	-	-	78.7	21.3	0.0	-	-	-
Total %	10.9	5.6	0.0	-	16.5	4.7	33.9	0.0	-	38.6	35.3	9.6	0.0	-	44.9	-
Lights	708	372	0	-	1080	315	2269	0	-	2584	2369	638	0	-	3007	6671
% Lights	94.8	97.9	-	-	95.8	98.1	97.8	-	-	97.8	98.1	97.4	-	-	98.0	97.6
Mediums	39	8	0	-	47	6	51	0	-	57	44	17	0	-	61	165
% Mediums	5.2	2.1	-	-	4.2	1.9	2.2	-	-	2.2	1.8	2.6	-	-	2.0	2.4
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	48	-	-	-	-	8	-	-	-	-	75	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016

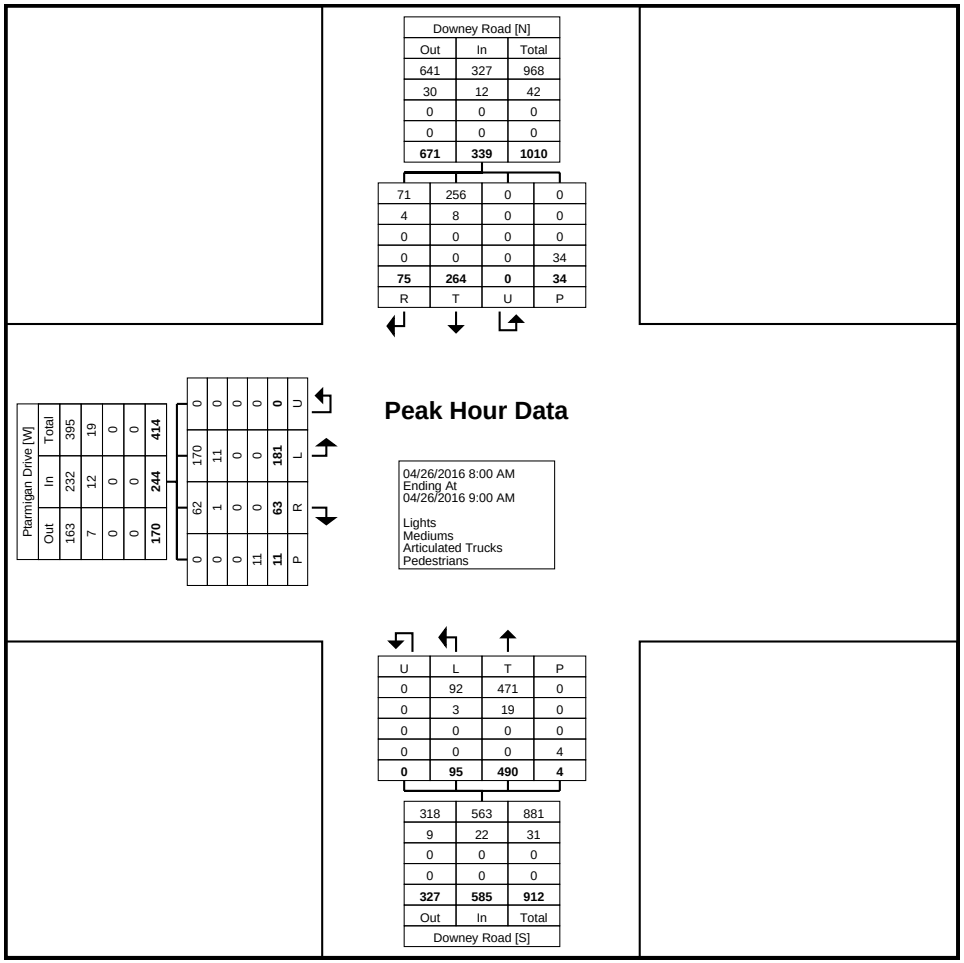
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Ptarmigan Drive Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	25	6	0	1	31	9	113	0	1	122	76	8	0	1	84	237
8:15 AM	47	18	0	1	65	25	147	0	0	172	65	18	0	7	83	320
8:30 AM	56	15	0	9	71	31	131	0	3	162	67	24	0	21	91	324
8:45 AM	53	24	0	0	77	30	99	0	0	129	56	25	0	5	81	287
Total	181	63	0	11	244	95	490	0	4	585	264	75	0	34	339	1168
Approach %	74.2	25.8	0.0	-	-	16.2	83.8	0.0	-	-	77.9	22.1	0.0	-	-	-
Total %	15.5	5.4	0.0	-	20.9	8.1	42.0	0.0	-	50.1	22.6	6.4	0.0	-	29.0	-
PHF	0.808	0.656	0.000	-	0.792	0.766	0.833	0.000	-	0.850	0.868	0.750	0.000	-	0.931	0.901
Lights	170	62	0	-	232	92	471	0	-	563	256	71	0	-	327	1122
% Lights	93.9	98.4	-	-	95.1	96.8	96.1	-	-	96.2	97.0	94.7	-	-	96.5	96.1
Mediums	11	1	0	-	12	3	19	0	-	22	8	4	0	-	12	46
% Mediums	6.1	1.6	-	-	4.9	3.2	3.9	-	-	3.8	3.0	5.3	-	-	3.5	3.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	11	-	-	-	-	4	-	-	-	-	34	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016

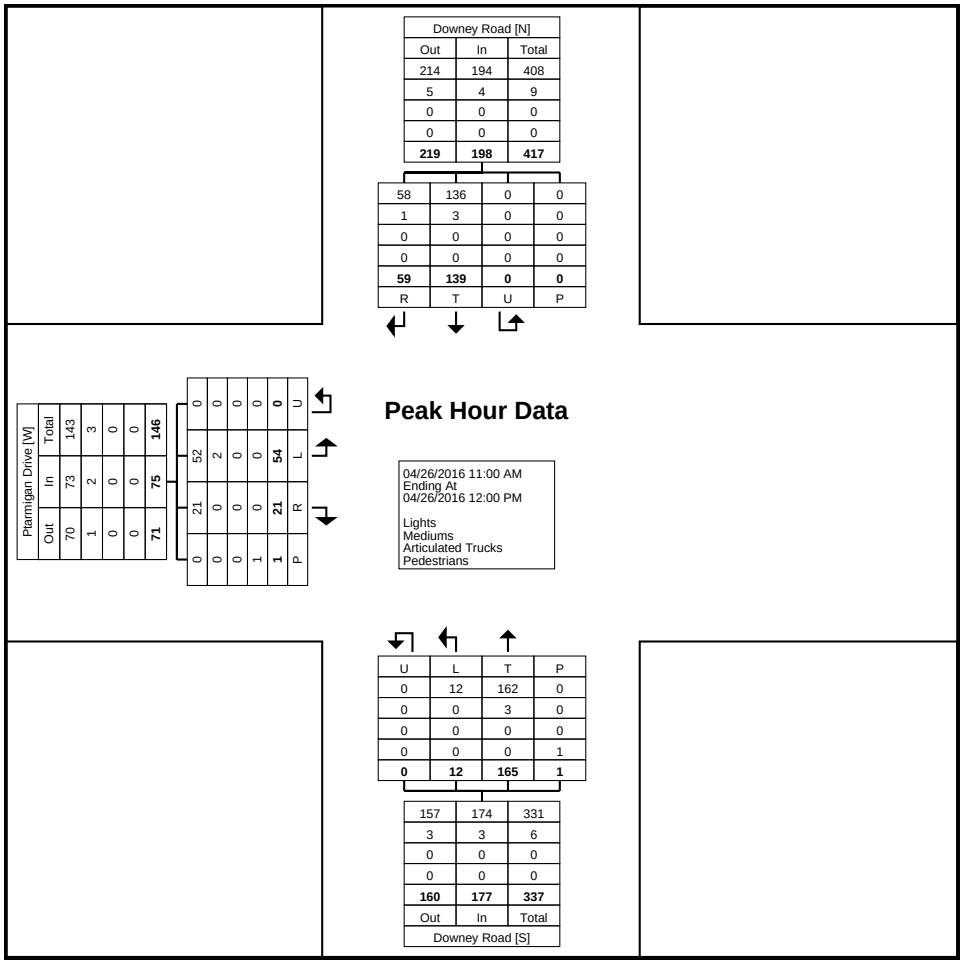
Turning Movement Peak Hour Data (11:00 AM)

Start Time	Ptarmigan Drive Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:00 AM	12	5	0	1	17	1	37	0	0	38	34	14	0	0	48	103
11:15 AM	18	6	0	0	24	3	47	0	1	50	32	14	0	0	46	120
11:30 AM	11	4	0	0	15	3	37	0	0	40	43	14	0	0	57	112
11:45 AM	13	6	0	0	19	5	44	0	0	49	30	17	0	0	47	115
Total	54	21	0	1	75	12	165	0	1	177	139	59	0	0	198	450
Approach %	72.0	28.0	0.0	-	-	6.8	93.2	0.0	-	-	70.2	29.8	0.0	-	-	-
Total %	12.0	4.7	0.0	-	16.7	2.7	36.7	0.0	-	39.3	30.9	13.1	0.0	-	44.0	-
PHF	0.750	0.875	0.000	-	0.781	0.600	0.878	0.000	-	0.885	0.808	0.868	0.000	-	0.868	0.938
Lights	52	21	0	-	73	12	162	0	-	174	136	58	0	-	194	441
% Lights	96.3	100.0	-	-	97.3	100.0	98.2	-	-	98.3	97.8	98.3	-	-	98.0	98.0
Mediums	2	0	0	-	2	0	3	0	-	3	3	1	0	-	4	9
% Mediums	3.7	0.0	-	-	2.7	0.0	1.8	-	-	1.7	2.2	1.7	-	-	2.0	2.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016

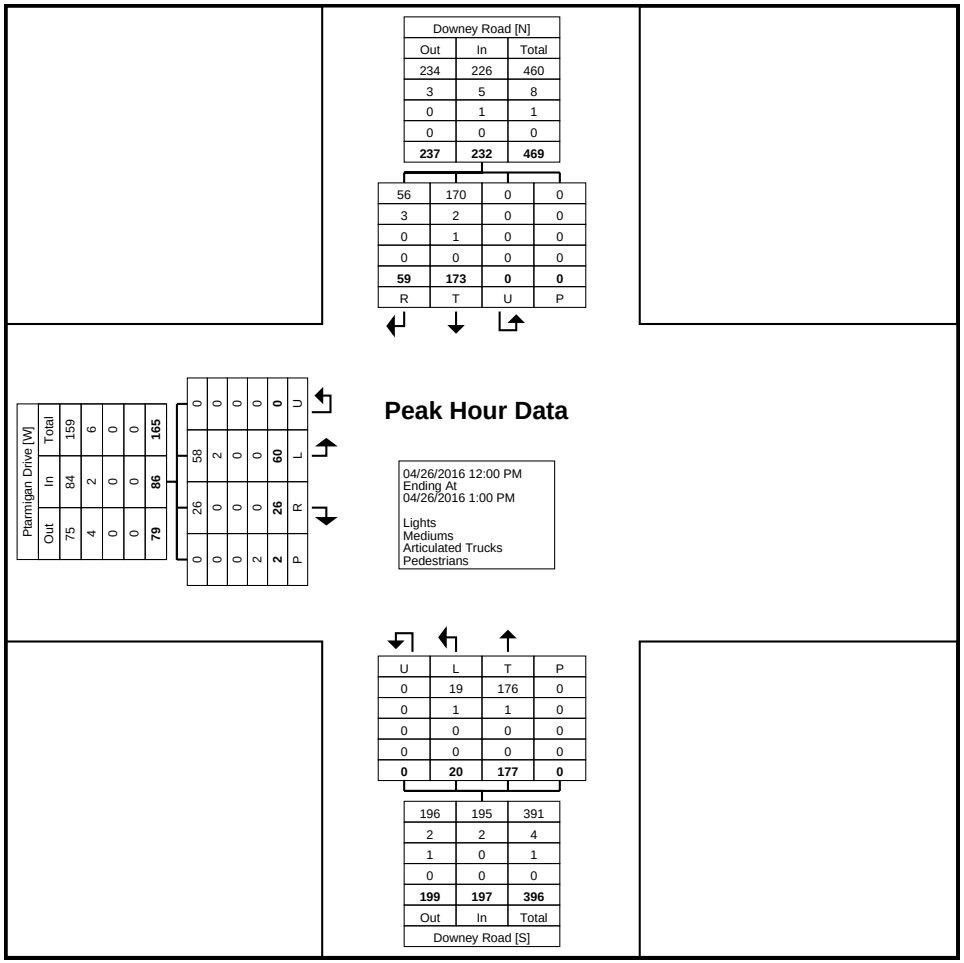
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Ptarmigan Drive Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	15	10	0	0	25	6	38	0	0	44	53	16	0	0	69	138
12:15 PM	16	2	0	0	18	4	48	0	0	52	49	12	0	0	61	131
12:30 PM	15	6	0	1	21	5	47	0	0	52	32	12	0	0	44	117
12:45 PM	14	8	0	1	22	5	44	0	0	49	39	19	0	0	58	129
Total	60	26	0	2	86	20	177	0	0	197	173	59	0	0	232	515
Approach %	69.8	30.2	0.0	-	-	10.2	89.8	0.0	-	-	74.6	25.4	0.0	-	-	-
Total %	11.7	5.0	0.0	-	16.7	3.9	34.4	0.0	-	38.3	33.6	11.5	0.0	-	45.0	-
PHF	0.938	0.650	0.000	-	0.860	0.833	0.922	0.000	-	0.947	0.816	0.776	0.000	-	0.841	0.933
Lights	58	26	0	-	84	19	176	0	-	195	170	56	0	-	226	505
% Lights	96.7	100.0	-	-	97.7	95.0	99.4	-	-	99.0	98.3	94.9	-	-	97.4	98.1
Mediums	2	0	0	-	2	1	1	0	-	2	2	3	0	-	5	9
% Mediums	3.3	0.0	-	-	2.3	5.0	0.6	-	-	1.0	1.2	5.1	-	-	2.2	1.7
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.6	0.0	-	-	0.4	0.2
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016

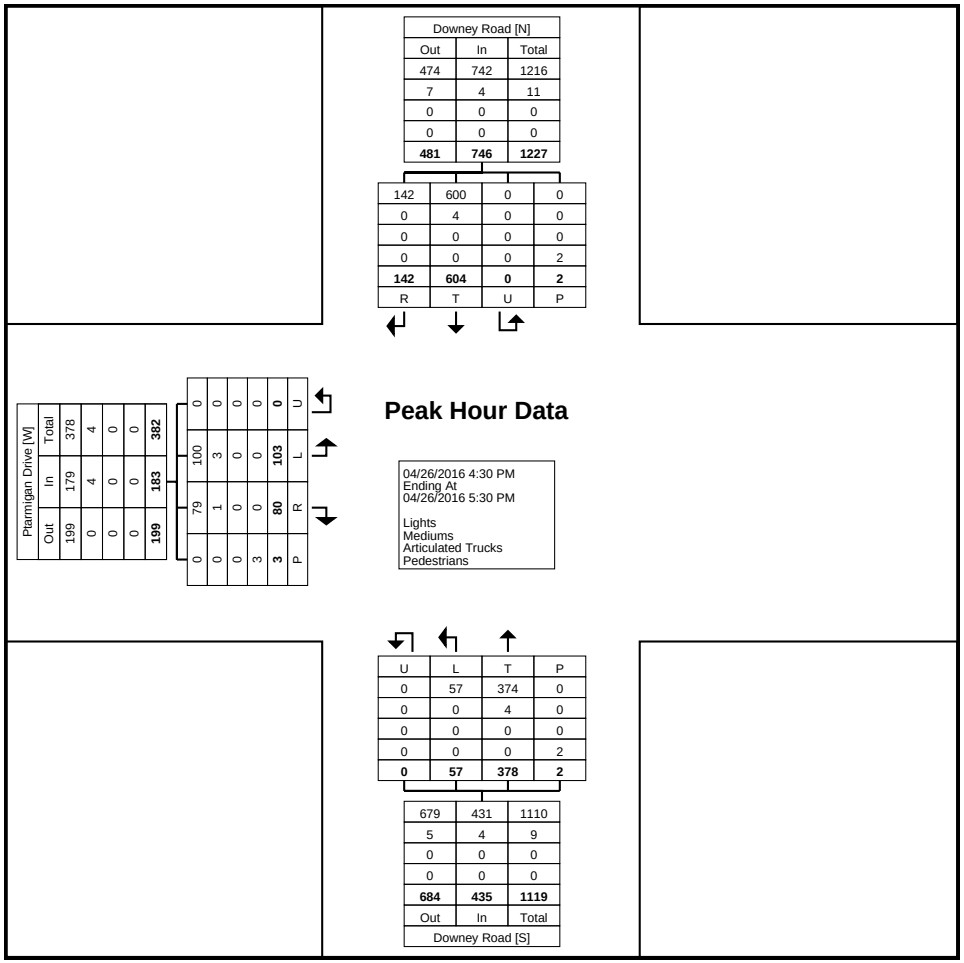
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Ptarmigan Drive Eastbound					Downey Road Northbound					Downey Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	24	18	0	0	42	15	77	0	0	92	147	35	0	1	182	316
4:45 PM	26	21	0	0	47	10	101	0	0	111	163	32	0	0	195	353
5:00 PM	28	13	0	3	41	15	89	0	1	104	138	45	0	0	183	328
5:15 PM	25	28	0	0	53	17	111	0	1	128	156	30	0	1	186	367
Total	103	80	0	3	183	57	378	0	2	435	604	142	0	2	746	1364
Approach %	56.3	43.7	0.0	-	-	13.1	86.9	0.0	-	-	81.0	19.0	0.0	-	-	-
Total %	7.6	5.9	0.0	-	13.4	4.2	27.7	0.0	-	31.9	44.3	10.4	0.0	-	54.7	-
PHF	0.920	0.714	0.000	-	0.863	0.838	0.851	0.000	-	0.850	0.926	0.789	0.000	-	0.956	0.929
Lights	100	79	0	-	179	57	374	0	-	431	600	142	0	-	742	1352
% Lights	97.1	98.8	-	-	97.8	100.0	98.9	-	-	99.1	99.3	100.0	-	-	99.5	99.1
Mediums	3	1	0	-	4	0	4	0	-	4	4	0	0	-	4	12
% Mediums	2.9	1.3	-	-	2.2	0.0	1.1	-	-	0.9	0.7	0.0	-	-	0.5	0.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	3	-	-	-	-	2	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Ptarmigan Drive
Site Code:
Start Date: 04/26/2016

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016

Turning Movement Data

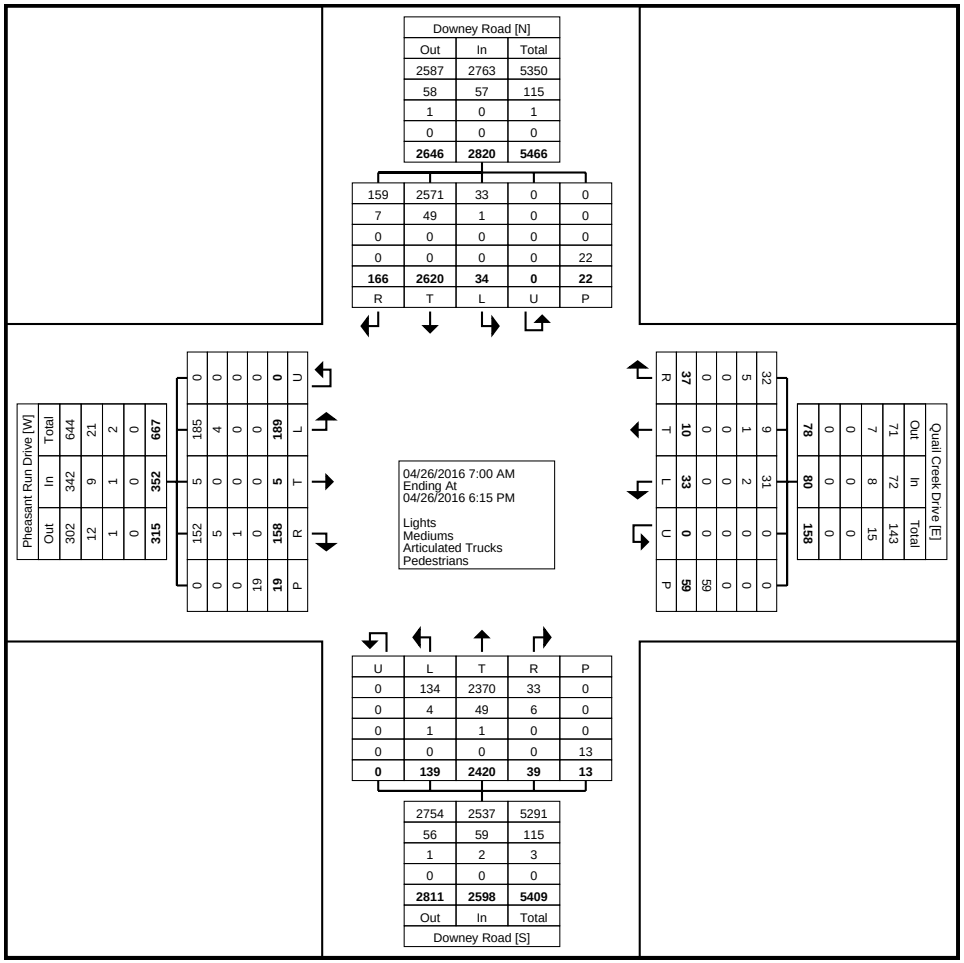
Start Time	Pheasant Run Drive Eastbound						Quail Creek Drive Westbound						Downey Road Northbound						Downey Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	3	0	4	0	1	7	2	1	0	0	0	3	0	66	1	0	0	67	0	50	0	0	0	50	127
7:15 AM	8	0	11	0	1	19	3	0	0	0	0	3	3	95	0	0	0	98	0	75	1	0	0	76	196
7:30 AM	12	0	7	0	0	19	4	1	2	0	0	7	1	126	1	0	0	128	1	90	2	0	0	93	247
7:45 AM	8	0	7	0	0	15	1	1	1	0	0	3	1	123	1	0	0	125	0	98	2	0	0	100	243
Hourly Total	31	0	29	0	2	60	10	3	3	0	0	16	5	410	3	0	0	418	1	313	5	0	0	319	813
8:00 AM	3	0	14	0	0	17	0	0	1	0	14	1	1	117	0	0	1	118	0	78	4	0	6	82	218
8:15 AM	12	0	5	0	1	17	2	0	2	0	8	4	2	159	0	0	3	161	0	79	3	0	1	82	264
8:30 AM	10	0	15	0	0	25	3	0	4	0	4	7	4	155	0	0	0	159	2	78	2	0	0	82	273
8:45 AM	11	1	14	0	0	26	0	0	2	0	2	2	2	119	0	0	0	121	1	77	5	0	0	83	232
Hourly Total	36	1	48	0	1	85	5	0	9	0	28	14	9	550	0	0	4	559	3	312	14	0	7	329	987
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	4	0	1	0	0	5	0	0	0	0	0	0	2	31	0	0	1	33	0	35	2	0	0	37	75
11:15 AM	1	0	3	0	0	4	1	1	0	0	0	2	1	47	0	0	0	48	0	37	2	0	0	39	93
11:30 AM	6	0	5	0	0	11	1	0	1	0	1	2	5	32	0	0	1	37	3	32	7	0	0	42	92
11:45 AM	6	0	2	0	0	8	0	1	1	0	0	2	3	43	1	0	0	47	2	29	5	0	0	36	93
Hourly Total	17	0	11	0	0	28	2	2	2	0	1	6	11	153	1	0	2	165	5	133	16	0	0	154	353
12:00 PM	3	0	2	0	0	5	2	0	0	0	0	2	5	41	1	0	0	47	1	53	7	0	1	61	115
12:15 PM	3	0	0	0	0	3	3	0	0	0	0	3	6	45	6	0	0	57	1	49	3	0	0	53	116
12:30 PM	6	0	4	0	2	10	1	0	1	0	0	2	2	47	0	0	0	49	0	32	3	0	0	35	96
12:45 PM	6	0	4	0	0	10	0	0	1	0	0	1	1	38	2	0	0	41	1	42	2	0	0	45	97
Hourly Total	18	0	10	0	2	28	6	0	2	0	0	8	14	171	9	0	0	194	3	176	15	0	1	194	424
1:00 PM	6	0	1	0	0	7	0	0	0	0	0	0	3	43	1	0	0	47	1	44	3	0	0	48	102
1:15 PM	4	0	3	0	0	7	0	1	0	0	0	1	3	34	3	0	0	40	0	42	4	0	0	46	94
1:30 PM	2	1	2	0	0	5	1	1	3	0	0	5	1	47	0	0	0	48	0	36	1	0	0	37	95
1:45 PM	5	1	1	0	0	7	2	2	3	0	0	7	4	38	3	0	0	45	1	47	5	0	1	53	112
Hourly Total	17	2	7	0	0	26	3	4	6	0	0	13	11	162	7	0	0	180	2	169	13	0	1	184	403
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	5	0	2	0	1	7	1	1	1	0	2	3	1	72	3	0	0	76	1	58	9	0	0	68	154
3:15 PM	5	0	9	0	1	14	1	0	1	0	8	2	2	48	1	0	0	51	4	106	10	0	5	120	187
3:30 PM	5	0	3	0	2	8	0	0	4	0	14	4	3	44	1	0	0	48	0	107	12	0	0	119	179
3:45 PM	5	0	5	0	3	10	0	0	2	0	1	2	6	68	2	0	1	76	2	95	4	0	5	101	189
Hourly Total	20	0	19	0	7	39	2	1	8	0	25	11	12	232	7	0	1	251	7	366	35	0	10	408	709
4:00 PM	5	0	3	0	0	8	1	0	0	0	0	1	8	71	0	0	2	79	0	114	9	0	0	123	211

4:15 PM	4	0	3	0	0	7	1	0	1	0	0	2	5	80	2	0	0	87	1	156	8	0	0	165	261
4:30 PM	8	2	6	0	1	16	0	0	2	0	0	2	15	78	4	0	0	97	1	159	11	0	0	171	286
4:45 PM	6	0	4	0	6	10	0	0	0	0	2	0	5	102	2	0	2	109	3	184	9	0	2	196	315
Hourly Total	23	2	16	0	7	41	2	0	3	0	2	5	33	331	8	0	4	372	5	613	37	0	2	655	1073
5:00 PM	3	0	3	0	0	6	2	0	1	0	1	3	11	109	1	0	2	121	1	150	6	0	1	157	287
5:15 PM	4	0	2	0	0	6	0	0	1	0	2	1	8	123	1	0	0	132	2	169	9	0	0	180	319
5:30 PM	11	0	7	0	0	18	1	0	1	0	0	2	21	86	0	0	0	107	2	120	11	0	0	133	260
5:45 PM	9	0	6	0	0	15	0	0	1	0	0	1	4	93	2	0	0	99	3	99	5	0	0	107	222
Hourly Total	27	0	18	0	0	45	3	0	4	0	3	7	44	411	4	0	2	459	8	538	31	0	1	577	1088
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	189	5	158	0	19	352	33	10	37	0	59	80	139	2420	39	0	13	2598	34	2620	166	0	22	2820	5850
Approach %	53.7	1.4	44.9	0.0	-	-	41.3	12.5	46.3	0.0	-	-	5.4	93.1	1.5	0.0	-	-	1.2	92.9	5.9	0.0	-	-	-
Total %	3.2	0.1	2.7	0.0	-	6.0	0.6	0.2	0.6	0.0	-	1.4	2.4	41.4	0.7	0.0	-	44.4	0.6	44.8	2.8	0.0	-	48.2	-
Lights	185	5	152	0	-	342	31	9	32	0	-	72	134	2370	33	0	-	2537	33	2571	159	0	-	2763	5714
% Lights	97.9	100.0	96.2	-	-	97.2	93.9	90.0	86.5	-	-	90.0	96.4	97.9	84.6	-	-	97.7	97.1	98.1	95.8	-	-	98.0	97.7
Mediums	4	0	5	0	-	9	2	1	5	0	-	8	4	49	6	0	-	59	1	49	7	0	-	57	133
% Mediums	2.1	0.0	3.2	-	-	2.6	6.1	10.0	13.5	-	-	10.0	2.9	2.0	15.4	-	-	2.3	2.9	1.9	4.2	-	-	2.0	2.3
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	1	1	0	0	-	2	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	0.6	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.7	0.0	0.0	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	-	19	-	-	-	-	-	59	-	-	-	-	-	13	-	-	-	-	-	22	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016

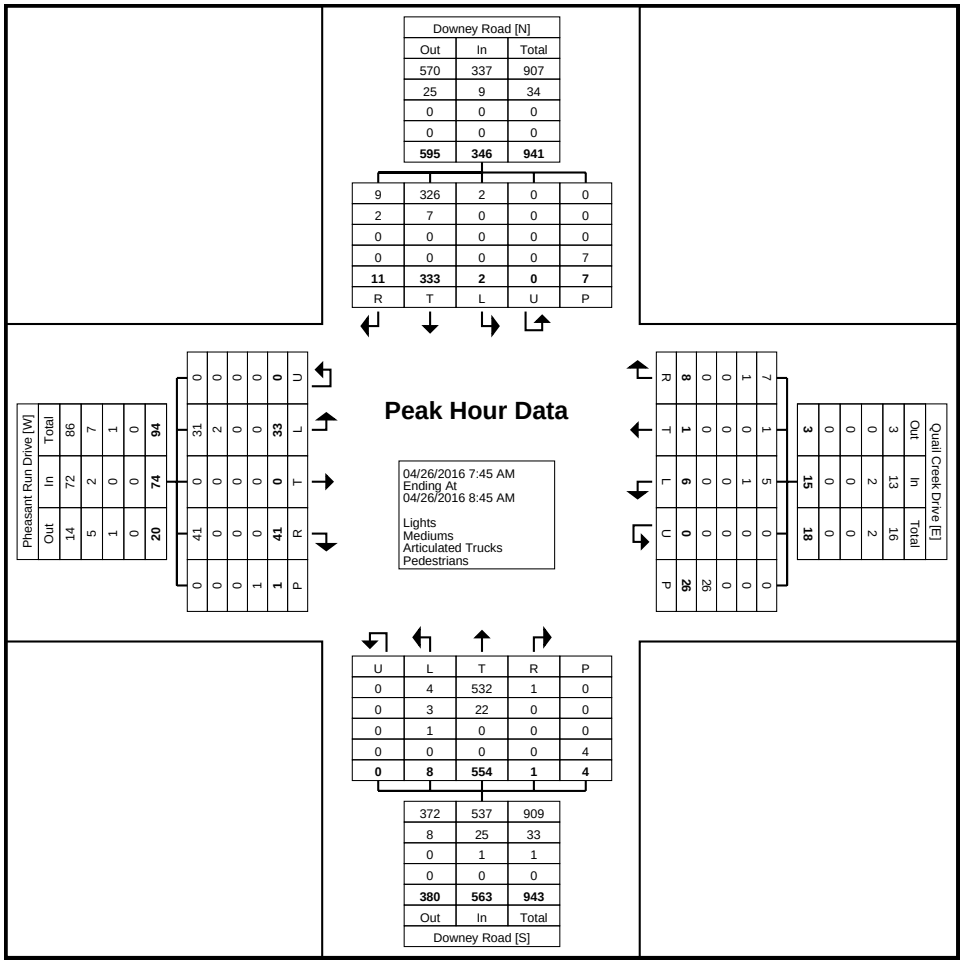
Turning Movement Peak Hour Data (7:45 AM)

Start Time	Pheasant Run Drive Eastbound						Quail Creek Drive Westbound						Downey Road Northbound						Downey Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:45 AM	8	0	7	0	0	15	1	1	1	0	0	3	1	123	1	0	0	125	0	98	2	0	0	100	243
8:00 AM	3	0	14	0	0	17	0	0	1	0	14	1	1	117	0	0	1	118	0	78	4	0	6	82	218
8:15 AM	12	0	5	0	1	17	2	0	2	0	8	4	2	159	0	0	3	161	0	79	3	0	1	82	264
8:30 AM	10	0	15	0	0	25	3	0	4	0	4	7	4	155	0	0	0	159	2	78	2	0	0	82	273
Total	33	0	41	0	1	74	6	1	8	0	26	15	8	554	1	0	4	563	2	333	11	0	7	346	998
Approach %	44.6	0.0	55.4	0.0	-	-	40.0	6.7	53.3	0.0	-	-	1.4	98.4	0.2	0.0	-	-	0.6	96.2	3.2	0.0	-	-	-
Total %	3.3	0.0	4.1	0.0	-	7.4	0.6	0.1	0.8	0.0	-	1.5	0.8	55.5	0.1	0.0	-	56.4	0.2	33.4	1.1	0.0	-	34.7	-
PHF	0.688	0.000	0.683	0.000	-	0.740	0.500	0.250	0.500	0.000	-	0.536	0.500	0.871	0.250	0.000	-	0.874	0.250	0.849	0.688	0.000	-	0.865	0.914
Lights	31	0	41	0	-	72	5	1	7	0	-	13	4	532	1	0	-	537	2	326	9	0	-	337	959
% Lights	93.9	-	100.0	-	-	97.3	83.3	100.0	87.5	-	-	86.7	50.0	96.0	100.0	-	-	95.4	100.0	97.9	81.8	-	-	97.4	96.1
Mediums	2	0	0	0	-	2	1	0	1	0	-	2	3	22	0	0	-	25	0	7	2	0	-	9	38
% Mediums	6.1	-	0.0	-	-	2.7	16.7	0.0	12.5	-	-	13.3	37.5	4.0	0.0	-	-	4.4	0.0	2.1	18.2	-	-	2.6	3.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	12.5	0.0	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	-	1	-	-	-	-	-	26	-	-	-	-	-	4	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016

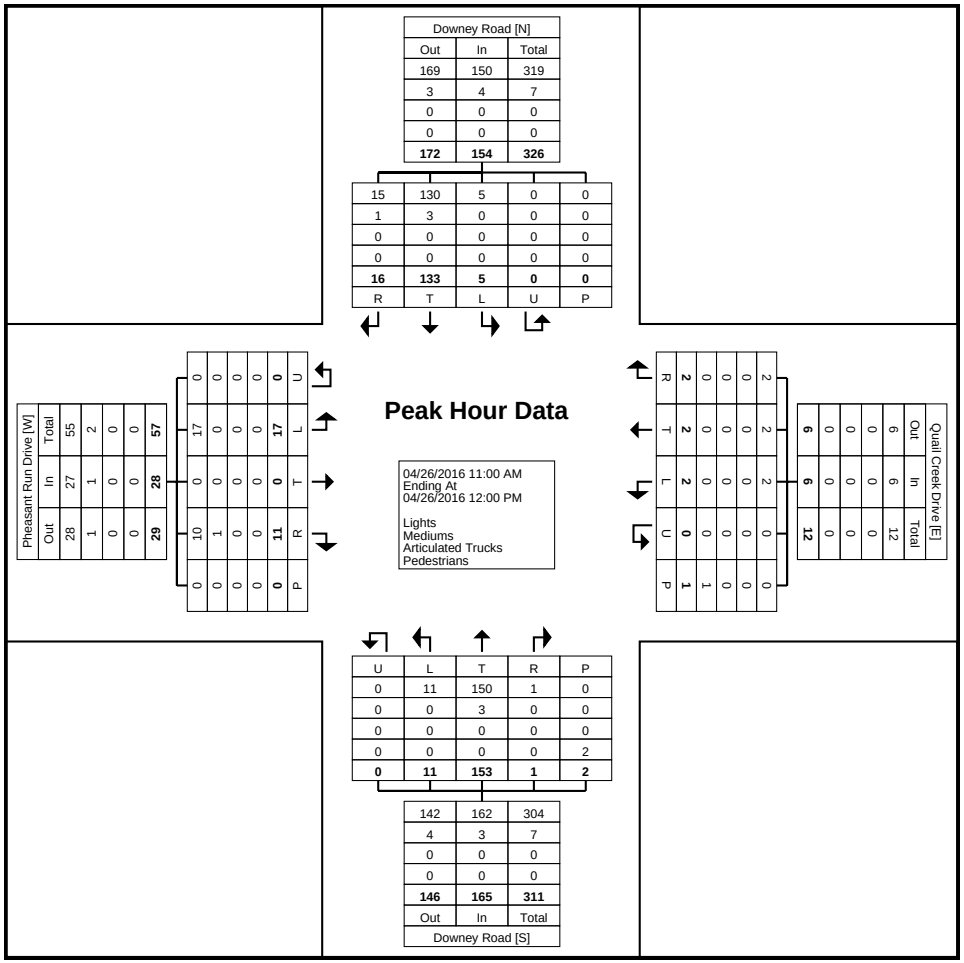
Turning Movement Peak Hour Data (11:00 AM)

Start Time	Pheasant Run Drive Eastbound						Quail Creek Drive Westbound						Downey Road Northbound						Downey Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	4	0	1	0	0	5	0	0	0	0	0	0	2	31	0	0	1	33	0	35	2	0	0	37	75
11:15 AM	1	0	3	0	0	4	1	1	0	0	0	2	1	47	0	0	0	48	0	37	2	0	0	39	93
11:30 AM	6	0	5	0	0	11	1	0	1	0	1	2	5	32	0	0	1	37	3	32	7	0	0	42	92
11:45 AM	6	0	2	0	0	8	0	1	1	0	0	2	3	43	1	0	0	47	2	29	5	0	0	36	93
Total	17	0	11	0	0	28	2	2	2	0	1	6	11	153	1	0	2	165	5	133	16	0	0	154	353
Approach %	60.7	0.0	39.3	0.0	-	-	33.3	33.3	33.3	0.0	-	-	6.7	92.7	0.6	0.0	-	-	3.2	86.4	10.4	0.0	-	-	-
Total %	4.8	0.0	3.1	0.0	-	7.9	0.6	0.6	0.6	0.0	-	1.7	3.1	43.3	0.3	0.0	-	46.7	1.4	37.7	4.5	0.0	-	43.6	-
PHF	0.708	0.000	0.550	0.000	-	0.636	0.500	0.500	0.500	0.000	-	0.750	0.550	0.814	0.250	0.000	-	0.859	0.417	0.899	0.571	0.000	-	0.917	0.949
Lights	17	0	10	0	-	27	2	2	2	0	-	6	11	150	1	0	-	162	5	130	15	0	-	150	345
% Lights	100.0	-	90.9	-	-	96.4	100.0	100.0	100.0	-	-	100.0	100.0	98.0	100.0	-	-	98.2	100.0	97.7	93.8	-	-	97.4	97.7
Mediums	0	0	1	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	0	3	1	0	-	4	8
% Mediums	0.0	-	9.1	-	-	3.6	0.0	0.0	0.0	-	-	0.0	0.0	2.0	0.0	-	-	1.8	0.0	2.3	6.3	-	-	2.6	2.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016

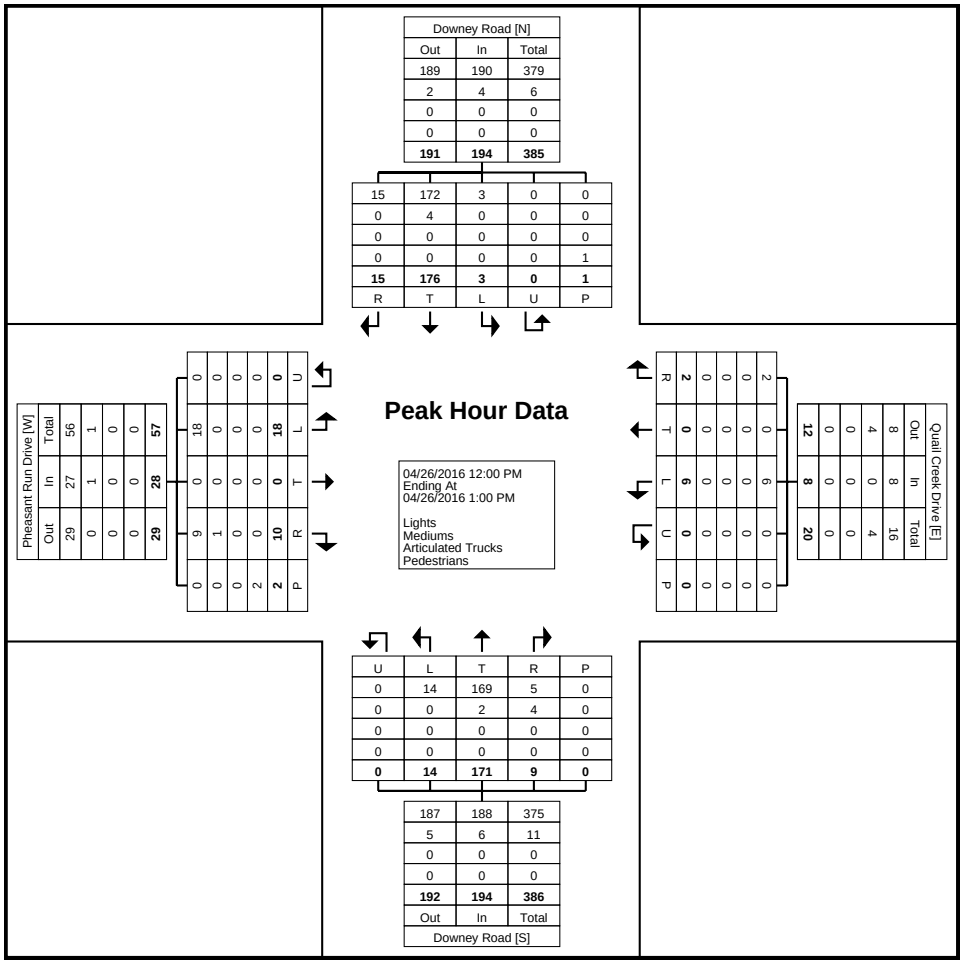
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Pheasant Run Drive Eastbound						Quail Creek Drive Westbound						Downey Road Northbound						Downey Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	3	0	2	0	0	5	2	0	0	0	0	2	5	41	1	0	0	47	1	53	7	0	1	61	115
12:15 PM	3	0	0	0	0	3	3	0	0	0	0	3	6	45	6	0	0	57	1	49	3	0	0	53	116
12:30 PM	6	0	4	0	2	10	1	0	1	0	0	2	2	47	0	0	0	49	0	32	3	0	0	35	96
12:45 PM	6	0	4	0	0	10	0	0	1	0	0	1	1	38	2	0	0	41	1	42	2	0	0	45	97
Total	18	0	10	0	2	28	6	0	2	0	0	8	14	171	9	0	0	194	3	176	15	0	1	194	424
Approach %	64.3	0.0	35.7	0.0	-	-	75.0	0.0	25.0	0.0	-	-	7.2	88.1	4.6	0.0	-	-	1.5	90.7	7.7	0.0	-	-	-
Total %	4.2	0.0	2.4	0.0	-	6.6	1.4	0.0	0.5	0.0	-	1.9	3.3	40.3	2.1	0.0	-	45.8	0.7	41.5	3.5	0.0	-	45.8	-
PHF	0.750	0.000	0.625	0.000	-	0.700	0.500	0.000	0.500	0.000	-	0.667	0.583	0.910	0.375	0.000	-	0.851	0.750	0.830	0.536	0.000	-	0.795	0.914
Lights	18	0	9	0	-	27	6	0	2	0	-	8	14	169	5	0	-	188	3	172	15	0	-	190	413
% Lights	100.0	-	90.0	-	-	96.4	100.0	-	100.0	-	-	100.0	100.0	98.8	55.6	-	-	96.9	100.0	97.7	100.0	-	-	97.9	97.4
Mediums	0	0	1	0	-	1	0	0	0	0	-	0	0	2	4	0	-	6	0	4	0	0	-	4	11
% Mediums	0.0	-	10.0	-	-	3.6	0.0	-	0.0	-	-	0.0	0.0	1.2	44.4	-	-	3.1	0.0	2.3	0.0	-	-	2.1	2.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016

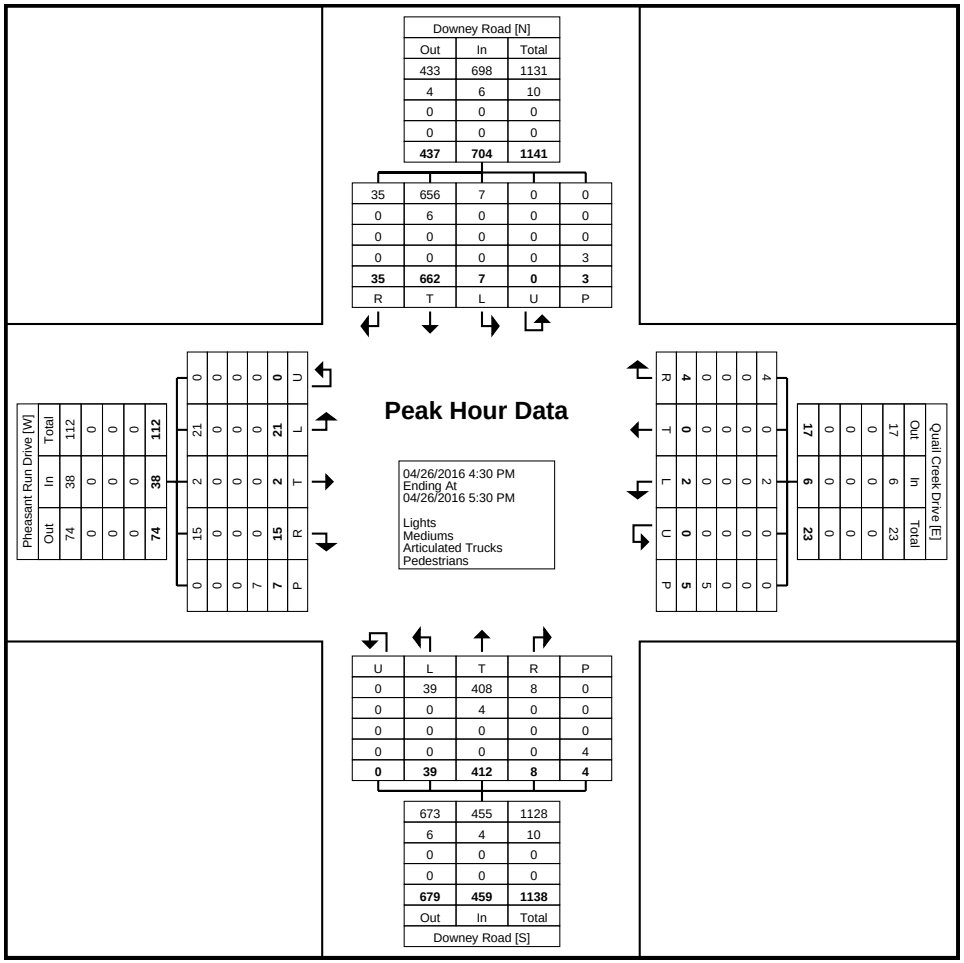
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Pheasant Run Drive Eastbound						Quail Creek Drive Westbound						Downey Road Northbound						Downey Road Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	8	2	6	0	1	16	0	0	2	0	0	2	15	78	4	0	0	97	1	159	11	0	0	171	286
4:45 PM	6	0	4	0	6	10	0	0	0	0	2	0	5	102	2	0	2	109	3	184	9	0	2	196	315
5:00 PM	3	0	3	0	0	6	2	0	1	0	1	3	11	109	1	0	2	121	1	150	6	0	1	157	287
5:15 PM	4	0	2	0	0	6	0	0	1	0	2	1	8	123	1	0	0	132	2	169	9	0	0	180	319
Total	21	2	15	0	7	38	2	0	4	0	5	6	39	412	8	0	4	459	7	662	35	0	3	704	1207
Approach %	55.3	5.3	39.5	0.0	-	-	33.3	0.0	66.7	0.0	-	-	8.5	89.8	1.7	0.0	-	-	1.0	94.0	5.0	0.0	-	-	-
Total %	1.7	0.2	1.2	0.0	-	3.1	0.2	0.0	0.3	0.0	-	0.5	3.2	34.1	0.7	0.0	-	38.0	0.6	54.8	2.9	0.0	-	58.3	-
PHF	0.656	0.250	0.625	0.000	-	0.594	0.250	0.000	0.500	0.000	-	0.500	0.650	0.837	0.500	0.000	-	0.869	0.583	0.899	0.795	0.000	-	0.898	0.946
Lights	21	2	15	0	-	38	2	0	4	0	-	6	39	408	8	0	-	455	7	656	35	0	-	698	1197
% Lights	100.0	100.0	100.0	-	-	100.0	100.0	-	100.0	-	-	100.0	100.0	99.0	100.0	-	-	99.1	100.0	99.1	100.0	-	-	99.1	99.2
Mediums	0	0	0	0	-	0	0	0	0	0	-	0	0	4	0	0	-	4	0	6	0	0	-	6	10
% Mediums	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	1.0	0.0	-	-	0.9	0.0	0.9	0.0	-	-	0.9	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	4	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Pheasant Run Drive Quail Creek Drive
Site Code:
Start Date: 04/26/2016

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016

Turning Movement Data

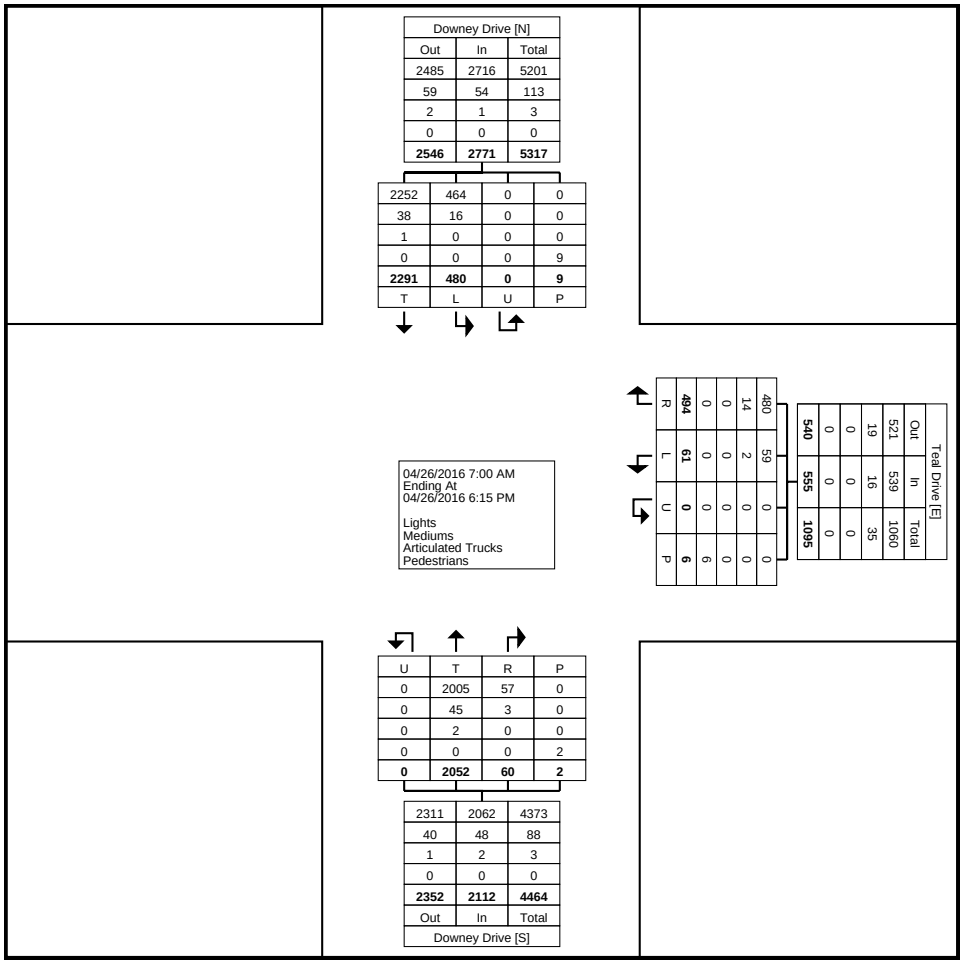
Start Time	Teal Drive Westbound					Downey Drive Northbound					Downey Drive Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
7:00 AM	5	12	0	0	17	55	0	0	0	55	4	55	0	0	59	131
7:15 AM	4	18	0	0	22	77	1	0	0	78	9	79	0	0	88	188
7:30 AM	6	29	0	0	35	101	0	0	0	101	4	100	0	0	104	240
7:45 AM	3	23	0	0	26	97	0	0	0	97	6	101	0	0	107	230
Hourly Total	18	82	0	0	100	330	1	0	0	331	23	335	0	0	358	789
8:00 AM	5	25	0	1	30	89	2	0	0	91	6	80	0	0	86	207
8:15 AM	4	23	0	1	27	139	2	0	0	141	11	78	0	1	89	257
8:30 AM	4	44	0	3	48	106	0	0	0	106	13	84	0	0	97	251
8:45 AM	3	29	0	0	32	86	0	0	0	86	25	66	0	0	91	209
Hourly Total	16	121	0	5	137	420	4	0	0	424	55	308	0	1	363	924
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	1	6	0	0	7	26	0	0	0	26	8	25	0	0	33	66
11:15 AM	0	9	0	0	9	37	0	0	0	37	9	31	0	0	40	86
11:30 AM	1	13	0	0	14	23	0	0	0	23	8	28	0	0	36	73
11:45 AM	1	10	0	0	11	45	1	0	0	46	4	28	0	0	32	89
Hourly Total	3	38	0	0	41	131	1	0	0	132	29	112	0	0	141	314
12:00 PM	0	7	0	0	7	39	0	0	0	39	12	44	0	0	56	102
12:15 PM	0	6	0	0	6	50	0	0	0	50	15	37	0	1	52	108
12:30 PM	0	11	0	0	11	36	1	0	0	37	13	24	0	1	37	85
12:45 PM	0	12	0	0	12	28	3	0	0	31	14	28	0	0	42	85
Hourly Total	0	36	0	0	36	153	4	0	0	157	54	133	0	2	187	380
1:00 PM	3	11	0	0	14	38	1	0	0	39	6	35	0	0	41	94
1:15 PM	1	8	0	0	9	29	0	0	0	29	8	35	0	0	43	81
1:30 PM	1	14	0	0	15	31	1	0	0	32	8	31	0	0	39	86
1:45 PM	1	5	0	0	6	35	4	0	0	39	17	32	0	0	49	94
Hourly Total	6	38	0	0	44	133	6	0	0	139	39	133	0	0	172	355
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	20	0	0	20	52	2	0	0	54	6	55	0	0	61	135
3:15 PM	2	13	0	0	15	34	4	0	0	38	37	77	0	0	114	167
3:30 PM	2	11	0	0	13	33	3	0	0	36	27	80	0	0	107	156
3:45 PM	1	18	0	0	19	58	2	0	0	60	14	81	0	0	95	174
Hourly Total	5	62	0	0	67	177	11	0	0	188	84	293	0	0	377	632
4:00 PM	1	10	0	0	11	70	2	0	1	72	21	94	0	1	115	198
4:15 PM	0	14	0	0	14	70	3	0	1	73	17	151	0	0	168	255

4:30 PM	2	15	0	0	17	85	6	0	0	91	19	139	0	3	158	266
4:45 PM	2	14	0	0	16	92	4	0	0	96	38	147	0	1	185	297
Hourly Total	5	53	0	0	58	317	15	0	2	332	95	531	0	5	626	1016
5:00 PM	2	15	0	0	17	112	4	0	0	116	23	129	0	1	152	285
5:15 PM	3	15	0	1	18	109	5	0	0	114	32	134	0	0	166	298
5:30 PM	2	14	0	0	16	95	5	0	0	100	26	105	0	0	131	247
5:45 PM	1	20	0	0	21	75	4	0	0	79	20	78	0	0	98	198
Hourly Total	8	64	0	1	72	391	18	0	0	409	101	446	0	1	547	1028
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	61	494	0	6	555	2052	60	0	2	2112	480	2291	0	9	2771	5438
Approach %	11.0	89.0	0.0	-	-	97.2	2.8	0.0	-	-	17.3	82.7	0.0	-	-	-
Total %	1.1	9.1	0.0	-	10.2	37.7	1.1	0.0	-	38.8	8.8	42.1	0.0	-	51.0	-
Lights	59	480	0	-	539	2005	57	0	-	2062	464	2252	0	-	2716	5317
% Lights	96.7	97.2	-	-	97.1	97.7	95.0	-	-	97.6	96.7	98.3	-	-	98.0	97.8
Mediums	2	14	0	-	16	45	3	0	-	48	16	38	0	-	54	118
% Mediums	3.3	2.8	-	-	2.9	2.2	5.0	-	-	2.3	3.3	1.7	-	-	1.9	2.2
Articulated Trucks	0	0	0	-	0	2	0	0	-	2	0	1	0	-	1	3
% Articulated Trucks	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	6	-	-	-	-	2	-	-	-	-	9	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016

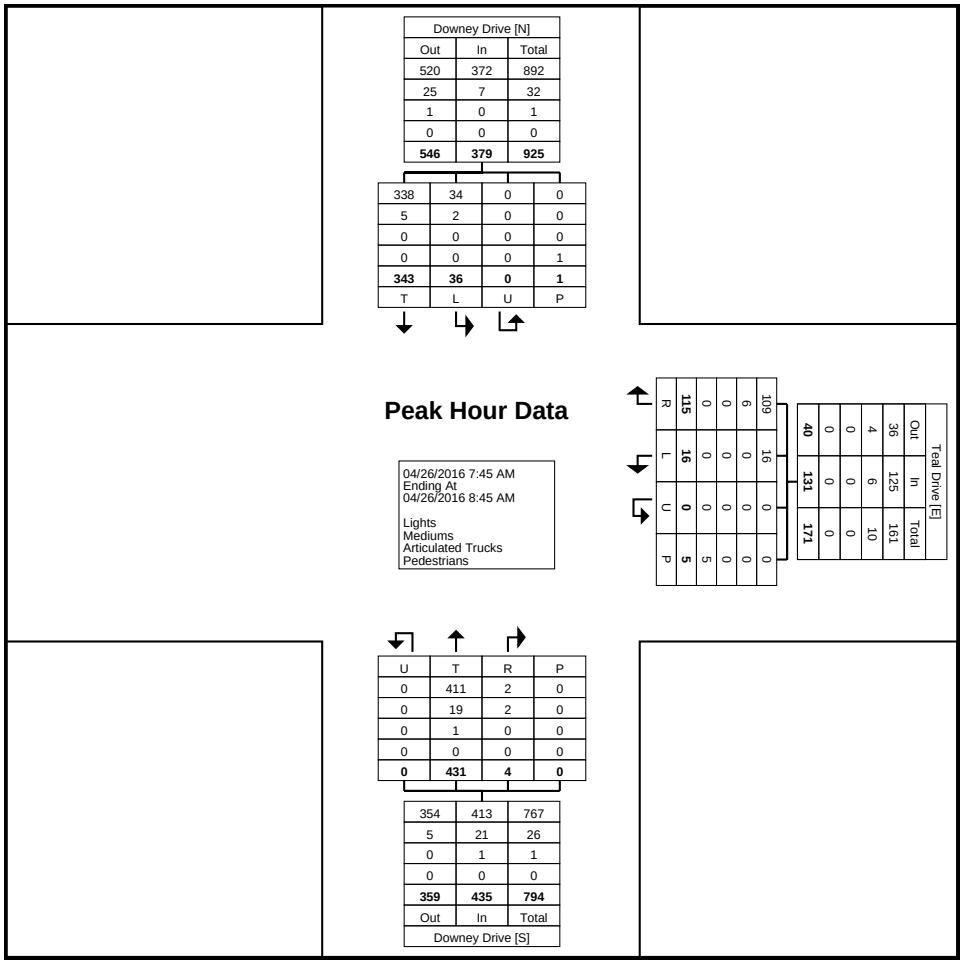
Turning Movement Peak Hour Data (7:45 AM)

Start Time	Teal Drive Westbound					Downey Drive Northbound					Downey Drive Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
7:45 AM	3	23	0	0	26	97	0	0	0	97	6	101	0	0	107	230
8:00 AM	5	25	0	1	30	89	2	0	0	91	6	80	0	0	86	207
8:15 AM	4	23	0	1	27	139	2	0	0	141	11	78	0	1	89	257
8:30 AM	4	44	0	3	48	106	0	0	0	106	13	84	0	0	97	251
Total	16	115	0	5	131	431	4	0	0	435	36	343	0	1	379	945
Approach %	12.2	87.8	0.0	-	-	99.1	0.9	0.0	-	-	9.5	90.5	0.0	-	-	-
Total %	1.7	12.2	0.0	-	13.9	45.6	0.4	0.0	-	46.0	3.8	36.3	0.0	-	40.1	-
PHF	0.800	0.653	0.000	-	0.682	0.775	0.500	0.000	-	0.771	0.692	0.849	0.000	-	0.886	0.919
Lights	16	109	0	-	125	411	2	0	-	413	34	338	0	-	372	910
% Lights	100.0	94.8	-	-	95.4	95.4	50.0	-	-	94.9	94.4	98.5	-	-	98.2	96.3
Mediums	0	6	0	-	6	19	2	0	-	21	2	5	0	-	7	34
% Mediums	0.0	5.2	-	-	4.6	4.4	50.0	-	-	4.8	5.6	1.5	-	-	1.8	3.6
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Pedestrians	-	-	-	5	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016

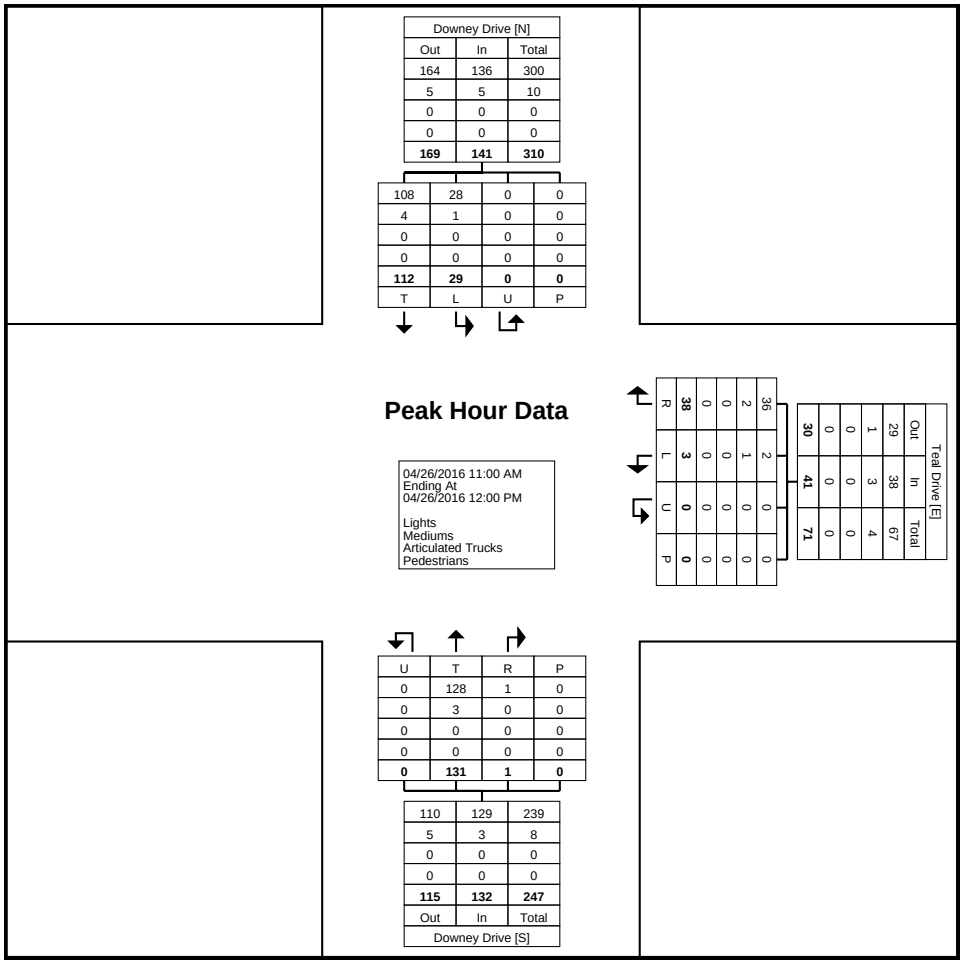
Turning Movement Peak Hour Data (11:00 AM)

Start Time	Teal Drive Westbound					Downey Drive Northbound					Downey Drive Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
11:00 AM	1	6	0	0	7	26	0	0	0	26	8	25	0	0	33	66
11:15 AM	0	9	0	0	9	37	0	0	0	37	9	31	0	0	40	86
11:30 AM	1	13	0	0	14	23	0	0	0	23	8	28	0	0	36	73
11:45 AM	1	10	0	0	11	45	1	0	0	46	4	28	0	0	32	89
Total	3	38	0	0	41	131	1	0	0	132	29	112	0	0	141	314
Approach %	7.3	92.7	0.0	-	-	99.2	0.8	0.0	-	-	20.6	79.4	0.0	-	-	-
Total %	1.0	12.1	0.0	-	13.1	41.7	0.3	0.0	-	42.0	9.2	35.7	0.0	-	44.9	-
PHF	0.750	0.731	0.000	-	0.732	0.728	0.250	0.000	-	0.717	0.806	0.903	0.000	-	0.881	0.882
Lights	2	36	0	-	38	128	1	0	-	129	28	108	0	-	136	303
% Lights	66.7	94.7	-	-	92.7	97.7	100.0	-	-	97.7	96.6	96.4	-	-	96.5	96.5
Mediums	1	2	0	-	3	3	0	0	-	3	1	4	0	-	5	11
% Mediums	33.3	5.3	-	-	7.3	2.3	0.0	-	-	2.3	3.4	3.6	-	-	3.5	3.5
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016

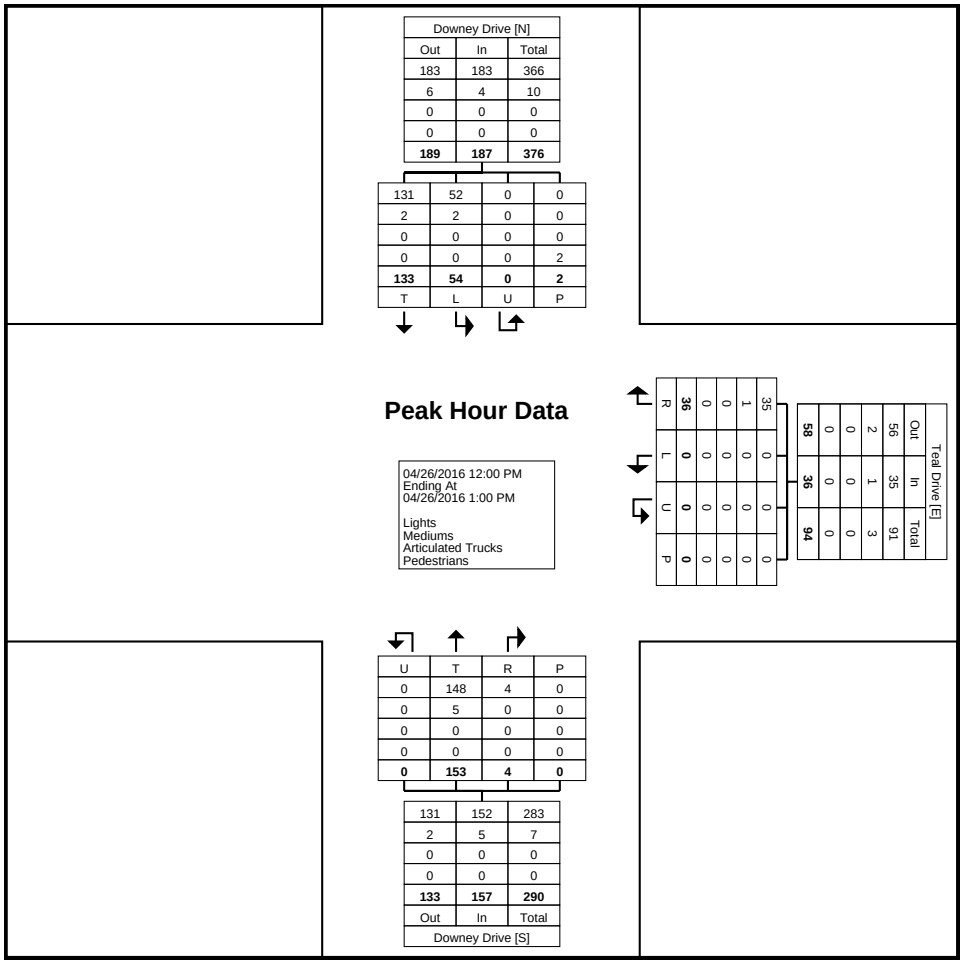
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Teal Drive Westbound					Downey Drive Northbound					Downey Drive Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
12:00 PM	0	7	0	0	7	39	0	0	0	39	12	44	0	0	56	102
12:15 PM	0	6	0	0	6	50	0	0	0	50	15	37	0	1	52	108
12:30 PM	0	11	0	0	11	36	1	0	0	37	13	24	0	1	37	85
12:45 PM	0	12	0	0	12	28	3	0	0	31	14	28	0	0	42	85
Total	0	36	0	0	36	153	4	0	0	157	54	133	0	2	187	380
Approach %	0.0	100.0	0.0	-	-	97.5	2.5	0.0	-	-	28.9	71.1	0.0	-	-	-
Total %	0.0	9.5	0.0	-	9.5	40.3	1.1	0.0	-	41.3	14.2	35.0	0.0	-	49.2	-
PHF	0.000	0.750	0.000	-	0.750	0.765	0.333	0.000	-	0.785	0.900	0.756	0.000	-	0.835	0.880
Lights	0	35	0	-	35	148	4	0	-	152	52	131	0	-	183	370
% Lights	-	97.2	-	-	97.2	96.7	100.0	-	-	96.8	96.3	98.5	-	-	97.9	97.4
Mediums	0	1	0	-	1	5	0	0	-	5	2	2	0	-	4	10
% Mediums	-	2.8	-	-	2.8	3.3	0.0	-	-	3.2	3.7	1.5	-	-	2.1	2.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016

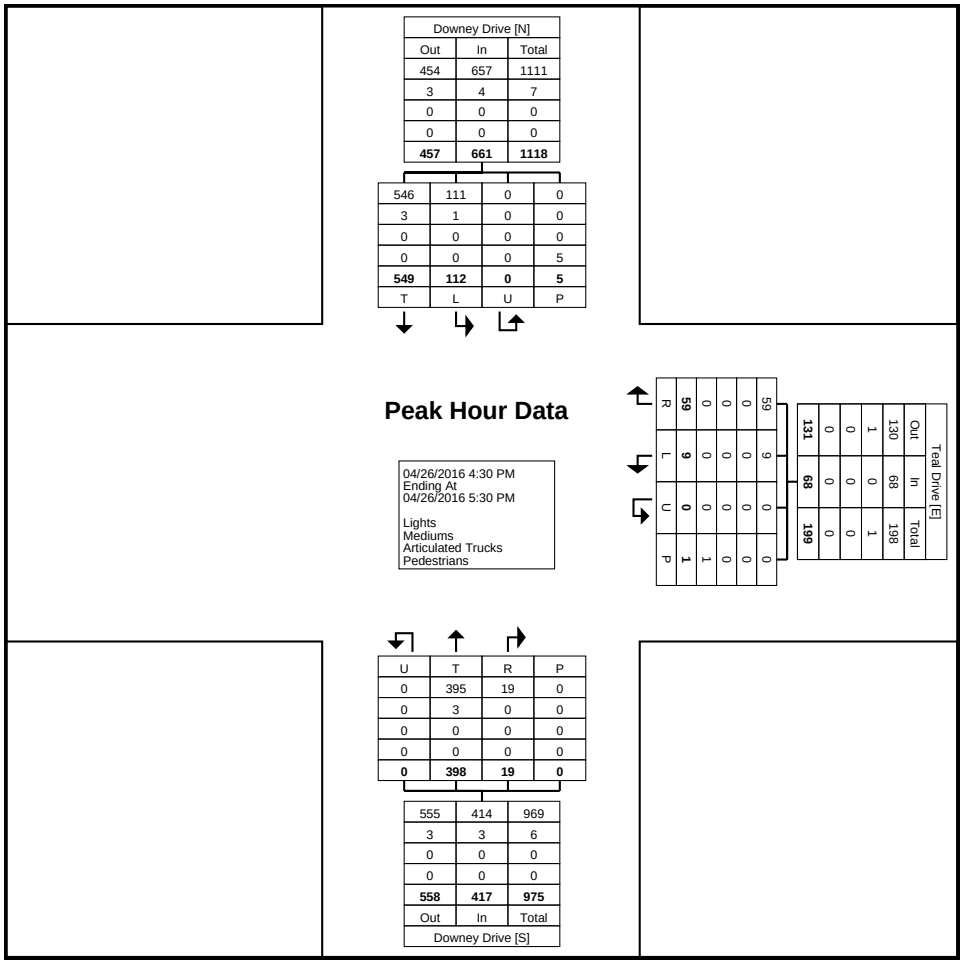
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Teal Drive Westbound					Downey Drive Northbound					Downey Drive Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
4:30 PM	2	15	0	0	17	85	6	0	0	91	19	139	0	3	158	266
4:45 PM	2	14	0	0	16	92	4	0	0	96	38	147	0	1	185	297
5:00 PM	2	15	0	0	17	112	4	0	0	116	23	129	0	1	152	285
5:15 PM	3	15	0	1	18	109	5	0	0	114	32	134	0	0	166	298
Total	9	59	0	1	68	398	19	0	0	417	112	549	0	5	661	1146
Approach %	13.2	86.8	0.0	-	-	95.4	4.6	0.0	-	-	16.9	83.1	0.0	-	-	-
Total %	0.8	5.1	0.0	-	5.9	34.7	1.7	0.0	-	36.4	9.8	47.9	0.0	-	57.7	-
PHF	0.750	0.983	0.000	-	0.944	0.888	0.792	0.000	-	0.899	0.737	0.934	0.000	-	0.893	0.961
Lights	9	59	0	-	68	395	19	0	-	414	111	546	0	-	657	1139
% Lights	100.0	100.0	-	-	100.0	99.2	100.0	-	-	99.3	99.1	99.5	-	-	99.4	99.4
Mediums	0	0	0	-	0	3	0	0	-	3	1	3	0	-	4	7
% Mediums	0.0	0.0	-	-	0.0	0.8	0.0	-	-	0.7	0.9	0.5	-	-	0.6	0.6
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Downey Road & Teal Drive
Site Code:
Start Date: 04/26/2016

Downey Road & Hazelwood Drive

Date: 26-Apr-16 **Counted By: CB**

Major Street: N/S **Minor Street: E/W**

Project #: 150730

Time Ending	Downey Road															Hazelwood Drive												15 MIN SUM	60 MIN SUM
	Northbound								Southbound							Westbound							Eastbound							
	CAR			HV			PED	CYC	CAR			HV			PED	CYC	CAR			HV		PED	CYC	CAR			HV			PED	CYC		
	L	T	R	L	T	R			L	T	R	L	T	R			L	T	R	L	T	R			0	T	R	L	T	R				
7:15:00 AM		73	0		1	0	0	0	0	35		0	0		0	0	0		9	0		0	0	0								118	
7:30:00 AM		105	0		2	0	0	0	2	64		0	3		1	0	0		7	0		0	2	0								186	
7:45:00 AM		147	0		2	0	0	0	1	96		0	3		0	0	1		6	0		0	0	0								256	
8:00:00 AM		139	0		3	0	0	0	0	90		1	1		0	0	1		3	1		0	0	0								239	799
8:15:00 AM		133	0		2	0	0	0	2	82		0	3		0	0	0		9	0		2	1	0								234	915
8:30:00 AM		188	0		12	0	0	0	3	86		1	0		0	0	0		10	0		0	0	0								300	1029
8:45:00 AM		169	0		11	0	1	0	3	82		1	7		1	0	2		12	0		1	0	0								290	1063
9:00:00 AM		160	2		2	0	0	0	5	76		0	1		1	0	2		10	0		1	0	0								260	1084
AM Peak Hour		**650**	**2**		**27**	**0**	**1**	**0**	**13**	**326**		**2**	**11**		**2**	**0**	**4**		**41**	**0**		**4**	**1**	**0**									
3:15:00 PM		78	0		6	0	1	0	3	86		0	4		1	0	0		2	0		0	1	0								182	
3:30:00 PM		66	1		2	0	1	0	5	133		1	5		1	0	1		6	0		0	3	0								225	
3:45:00 PM		79	0		7	0	6	0	6	131		1	4		1	0	0		3	0		0	0	0								238	
4:00:00 PM		82	1		4	0	0	0	5	101		1	6		0	0	0		3	0		1	0	0								204	849
4:15:00 PM		99	0		3	1	1	0	8	136		0	3		0	0	1		4	0		0	0	0								256	923
4:30:00 PM		87	0		3	0	0	0	10	163		0	2		0	0	0		5	0		0	0	0								270	968
4:45:00 PM		102	0		3	0	0	0	11	185		0	1		0	0	1		4	0		0	1	0								308	1038
5:00:00 PM		121	1		1	0	1	0	11	195		0	2		0	0	0		5	0		0	0	0								337	1171
5:15:00 PM		106	2		1	0	0	0	11	190		0	0		0	0	1		5	0		0	0	0								316	1231
5:30:00 PM		139	0		2	0	0	0	4	181		0	0		0	0	0		1	0		0	0	0								327	1288
5:45:00 PM		120	1		2	0	1	0	10	148		1	0		1	0	0		7	0		1	3	0								295	1275
6:00:00 PM		114	0		1	0	0	0	6	116		0	0		0	0	0		3	0		0	0	0								240	1178
PM Peak Hour		**468**	**3**		**7**	**0**	**1**	**0**	**37**	**751**		**0**	**3**		**0**	**0**	**2**		**15**	**0**		**0**	**1**	**0**									

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - EB
Location: 1

A study of vehicle traffic was conducted with the device having serial number 134592. The study was done in the EB lane at Downey Rd - EB in Guelph, ON in btwn Hwy 6 & Woodland Glen Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 46,816 vehicles passed through the location with a peak volume of 216 on 2016-04-27 at [08:15 AM-08:30 AM] and a minimum volume of 0 on 2016-04-26 at [02:30 AM-02:45 AM]. The AADT count for this study was 6,688.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 55 KM/H with 71.68% vehicles exceeding the posted speed of 50 KM/H. 2.24% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 67.22 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
1	94	887	4046	7773	17492	11264	2638	696	318	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 44385 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 232 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 486 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 106 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
26627	17758	232	486	75	21	8	2							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-27 at [08:15 AM-08:30 AM] the average headway between vehicles was 4.147 seconds. During the slowest traffic period, on 2016-04-26 at [02:30 AM-02:45 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 1.00 and 33.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - WB
Location: 1

A study of vehicle traffic was conducted with the device having serial number 134618. The study was done in the WB lane at Downey Rd - WB in Guelph, ON in btwn Hwy 6 & Woodland Glen Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 50,962 vehicles passed through the location with a peak volume of 280 on 2016-04-28 at [05:15 PM-05:30 PM] and a minimum volume of 0 on 2016-04-27 at [03:00 AM-03:15 AM]. The AADT count for this study was 7,280.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 59 KM/H with 80.66% vehicles exceeding the posted speed of 50 KM/H. 3.62% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 69.02 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
3	73	358	1294	7470	18120	14531	3995	1153	569	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 46195 which represents 97 percent of the total classified vehicles. The number of Small Trucks in the study was 631 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 527 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 213 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
23160	23035	631	527	142	40	22	9							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-28 at [05:15 PM-05:30 PM] the average headway between vehicles was 3.203 seconds. During the slowest traffic period, on 2016-04-27 at [03:00 AM-03:15 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 1.00 and 34.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - NB
Location: 2

A study of vehicle traffic was conducted with the device having serial number 134589. The study was done in the NB lane at Downey Rd - NB in Guelph, ON in btwn Niska Rd & Hazelwood Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 32,985 vehicles passed through the location with a peak volume of 197 on 2016-04-26 at [08:15 AM-08:30 AM] and a minimum volume of 0 on 2016-05-01 at [11:30 PM-11:45 PM]. The AADT count for this study was 4,712.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 50 KM/H with 50.69% vehicles exceeding the posted speed of 50 KM/H. 0.99% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 58.30 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
2	76	364	2356	12867	13666	1727	394	194	121	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 30979 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 238 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 422 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 128 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
21259	9720	238	422	87	32	7	2							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-26 at [08:15 AM-08:30 AM] the average headway between vehicles was 4.545 seconds. During the slowest traffic period, on 2016-05-01 at [11:30 PM-11:45 PM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 2.00 and 32.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - SB
Location: 2

A study of vehicle traffic was conducted with the device having serial number 132472. The study was done in the SB lane at Downey Rd - SB in Guelph, ON in btwn Niska Rd & Hazelwood Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 33,298 vehicles passed through the location with a peak volume of 215 on 2016-05-02 at [05:00 PM-05:15 PM] and a minimum volume of 0 on 2016-04-26 at [03:45 AM-04:00 AM]. The AADT count for this study was 4,757.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 52 KM/H with 60.02% vehicles exceeding the posted speed of 50 KM/H. 0.90% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 58.72 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
0	37	182	1329	11259	16532	2029	377	157	132	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 31481 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 228 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 214 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 111 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
20771	10710	228	214	58	41	9	3							

CHART 2

HEADWAY

During the peak traffic period, on 2016-05-02 at [05:00 PM-05:15 PM] the average headway between vehicles was 4.167 seconds. During the slowest traffic period, on 2016-04-26 at [03:45 AM-04:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 2.00 and 33.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - NB
Location: 3

A study of vehicle traffic was conducted with the device having serial number 134623. The study was done in the NB lane at Downey Rd - NB in Guelph, ON in btwn Hazelwood Dr & Ptarmigan Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 32,363 vehicles passed through the location with a peak volume of 182 on 2016-04-27 at [08:15 AM-08:30 AM] and a minimum volume of 0 on 2016-04-26 at [03:15 AM-03:30 AM]. The AADT count for this study was 4,623.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 56 KM/H with 79.05% vehicles exceeding the posted speed of 50 KM/H. 1.66% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 65.39 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
3	48	220	866	5405	16545	6396	1221	335	182	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 30353 which represents 97 percent of the total classified vehicles. The number of Small Trucks in the study was 232 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 482 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 154 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
16512	13841	232	482	102	38	12	2							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-27 at [08:15 AM-08:30 AM] the average headway between vehicles was 4.918 seconds. During the slowest traffic period, on 2016-04-26 at [03:15 AM-03:30 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 2.00 and 32.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - SB
Location: 3

A study of vehicle traffic was conducted with the device having serial number 123726. The study was done in the SB lane at Downey Rd - SB in Guelph, ON in btwn Hazelwood Dr & Ptarmigan Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 32,060 vehicles passed through the location with a peak volume of 204 on 2016-05-02 at [05:00 PM-05:15 PM] and a minimum volume of 0 on 2016-04-26 at [01:45 AM-02:00 AM]. The AADT count for this study was 4,580.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 54 KM/H with 72.57% vehicles exceeding the posted speed of 50 KM/H. 1.60% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 59.78 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
1	31	156	676	7577	18111	3100	626	289	202	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 30216 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 228 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 200 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 125 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
22218	7998	228	200	78	38	7	2							

CHART 2

HEADWAY

During the peak traffic period, on 2016-05-02 at [05:00 PM-05:15 PM] the average headway between vehicles was 4.39 seconds. During the slowest traffic period, on 2016-04-26 at [01:45 AM-02:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 2.00 and 34.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - NB
Location: 4

A study of vehicle traffic was conducted with the device having serial number 135575. The study was done in the NB lane at Downey Rd - NB in Guelph, ON in btwn Ptarmigan Dr & Pheasant Run county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 24,981 vehicles passed through the location with a peak volume of 166 on 2016-04-29 at [08:30 AM-08:45 AM] and a minimum volume of 0 on 2016-04-29 at [12:00 PM-12:15 PM]. The AADT count for this study was 3,569.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 55 KM/H with 75.59% vehicles exceeding the posted speed of 50 KM/H. 1.51% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 64.23 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
5	46	199	784	4863	12788	4380	732	245	121	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 23723 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 229 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 158 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 53 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
11995	11728	229	158	35	11	7	0							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-29 at [08:30 AM-08:45 AM] the average headway between vehicles was 5.389 seconds. During the slowest traffic period, on 2016-04-29 at [12:00 PM-12:15 PM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 2.00 and 31.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - SB
Location: 4

A study of vehicle traffic was conducted with the device having serial number 123901. The study was done in the SB lane at Downey Rd - SB in Guelph, ON in btwn Ptarmigan Dr & Pheasant Run county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 28,032 vehicles passed through the location with a peak volume of 192 on 2016-04-27 at [05:15 PM-05:30 PM] and a minimum volume of 0 on 2016-04-26 at [01:45 AM-02:00 AM]. The AADT count for this study was 4,005.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 54 KM/H with 73.64% vehicles exceeding the posted speed of 50 KM/H. 0.95% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 62.77 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
2	51	986	928	5185	14721	4305	702	166	91	0	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 26751 which represents 99 percent of the total classified vehicles. The number of Small Trucks in the study was 135 which represents 0 percent of the total classified vehicles. The number of Trucks/Buses in the study was 180 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 71 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
18170	8581	135	180	37	22	9	3							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-27 at [05:15 PM-05:30 PM] the average headway between vehicles was 4.663 seconds. During the slowest traffic period, on 2016-04-26 at [01:45 AM-02:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 2.00 and 33.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - NB
Location: 5

A study of vehicle traffic was conducted with the device having serial number 113543. The study was done in the NB lane at Downey Rd - NB in Guelph, ON in south of Teal Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 22,199 vehicles passed through the location with a peak volume of 135 on 2016-04-27 at [08:00 AM-08:15 AM] and a minimum volume of 0 on 2016-04-26 at [11:30 PM-11:45 PM]. The AADT count for this study was 3,171.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 50 - 60 KM/H range or lower. The average speed for all classifed vehicles was 62 KM/H with 94.81% vehicles exceeding the posted speed of 50 KM/H. 3.21% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 50KM/H and the 85th percentile was 70.58 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
2	4	38	88	1003	8877	8406	2737	483	155	64	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.

Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 21509 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 126 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 176 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 46 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
13845	7664	126	176	29	10	4	3							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-27 at [08:00 AM-08:15 AM] the average headway between vehicles was 6.618 seconds. During the slowest traffic period, on 2016-04-26 at [11:30 PM-11:45 PM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 1.00 and 33.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Guelph
Street: Downey Rd - SB
Location: 5

A study of vehicle traffic was conducted with the device having serial number 113559. The study was done in the SB lane at Downey Rd - SB in Guelph, ON in south of Teal Dr county. The study began on 2016-04-26 at 12:00 AM and concluded on 2016-05-03 at 12:00 AM, lasting a total of 168.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 22,359 vehicles passed through the location with a peak volume of 161 on 2016-04-27 at [05:15 PM-05:30 PM] and a minimum volume of 0 on 2016-04-26 at [12:45 AM-01:00 AM]. The AADT count for this study was 3,194.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 60 - 70 KM/H range or lower. The average speed for all classifed vehicles was 68 KM/H with 97.70% vehicles exceeding the posted speed of 50 KM/H. 9.90% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 60KM/H and the 85th percentile was 78.08 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
0	3	44	99	351	3718	9502	5747	1559	442	138	0	0	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 21259 which represents 98 percent of the total classified vehicles. The number of Small Trucks in the study was 131 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 169 which represents 1 percent of the total classified vehicles. The number of Tractor Trailers in the study was 44 which represents 0 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
13000	8259	131	169	30	6	5	3							

CHART 2

HEADWAY

During the peak traffic period, on 2016-04-27 at [05:15 PM-05:30 PM] the average headway between vehicles was 5.556 seconds. During the slowest traffic period, on 2016-04-26 at [12:45 AM-01:00 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 1.00 and 32.00 degrees C.

Appendix B

Traffic Operation Reports

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	93	110	767	438	124
Future Volume (vph)	56	93	110	767	438	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.916				0.967	
Flt Protected	0.982			0.994		
Satd. Flow (prot)	1709	0	0	3588	3491	0
Flt Permitted	0.982			0.994		
Satd. Flow (perm)	1709	0	0	3588	3491	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	140.4			153.5	184.5	
Travel Time (s)	10.1			11.1	13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	101	120	834	476	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	0	0	954	611	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	93	110	767	438	124
Future Volume (Veh/h)	56	93	110	767	438	124
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	101	120	834	476	135
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	1200	306	611			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1200	306	611			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	85	88			
cM capacity (veh/h)	158	696	978			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	162	398	556	317	294
Volume Left	61	120	0	0	0
Volume Right	101	0	0	0	135
cSH	306	978	1700	1700	1700
Volume to Capacity	0.53	0.12	0.33	0.19	0.17
Queue Length 95th (m)	23.3	3.3	0.0	0.0	0.0
Control Delay (s)	29.3	3.7	0.0	0.0	0.0
Lane LOS	D	A			
Approach Delay (s)	29.3	1.5		0.0	
Approach LOS	D				

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	59.3%	ICU Level of Service		B
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	159	8	11	716	349	179
Future Volume (vph)	159	8	11	716	349	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.993					0.850
Flt Protected	0.955		0.950			
Satd. Flow (prot)	1802	0	1805	1900	1900	1615
Flt Permitted	0.955		0.950			
Satd. Flow (perm)	1802	0	1805	1900	1900	1615
Link Speed (k/h)	50			50	50	
Link Distance (m)	103.8			243.3	153.5	
Travel Time (s)	7.5			17.5	11.1	
Confl. Peds. (#/hr)			8			8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	9	12	778	379	195
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	0	12	778	379	195
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	159	8	11	716	349	179
Future Volume (Veh/h)	159	8	11	716	349	179
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	173	9	12	778	379	195
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1189	387	582			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1189	387	582			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	16	99	99			
cM capacity (veh/h)	206	661	996			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	182	12	778	379	195
Volume Left	173	12	0	0	0
Volume Right	9	0	0	0	195
cSH	213	996	1700	1700	1700
Volume to Capacity	0.85	0.01	0.46	0.22	0.11
Queue Length 95th (m)	52.4	0.3	0.0	0.0	0.0
Control Delay (s)	76.2	8.7	0.0	0.0	0.0
Lane LOS	F	A			
Approach Delay (s)	76.2	0.1		0.0	
Approach LOS	F				

Intersection Summary				
Average Delay	9.0			
Intersection Capacity Utilization	53.6%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	4	45	677	2	15	337
Future Volume (vph)	4	45	677	2	15	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	15.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.875					
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1656	0	1900	0	1805	1900
Flt Permitted	0.996				0.950	
Satd. Flow (perm)	1656	0	1900	0	1805	1900
Link Speed (k/h)	50		50			50
Link Distance (m)	117.7		292.5			243.3
Travel Time (s)	8.5		21.1			17.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	49	736	2	16	366
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	0	738	0	16	366
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	45	677	2	15	337
Future Volume (Veh/h)	4	45	677	2	15	337
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	49	736	2	16	366
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			293			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1135	737			738	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1064	588			590	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	89			98	
cM capacity (veh/h)	204	429			833	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	53	738	16	366
Volume Left	4	0	16	0
Volume Right	49	2	0	0
cSH	396	1700	833	1700
Volume to Capacity	0.13	0.43	0.02	0.22
Queue Length 95th (m)	3.7	0.0	0.5	0.0
Control Delay (s)	15.5	0.0	9.4	0.0
Lane LOS	C		A	
Approach Delay (s)	15.5	0.0	0.4	
Approach LOS	C			

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		45.8%	ICU Level of Service	A
Analysis Period (min)		15		

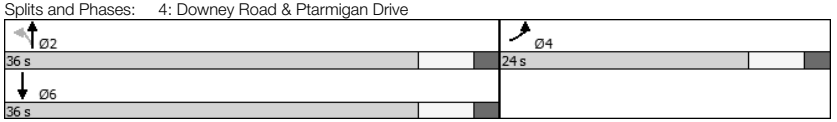
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	181	63	95	490	264	75
Future Volume (vph)	181	63	95	490	264	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	25.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.965				0.970	
Flt Protected	0.964		0.950			
Satd. Flow (prot)	1767	0	1805	1900	1843	0
Flt Permitted	0.964		0.535			
Satd. Flow (perm)	1767	0	1016	1900	1843	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	30				34	
Link Speed (k/h)	50			50	50	
Link Distance (m)	163.1			236.0	292.5	
Travel Time (s)	11.7			17.0	21.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	68	103	533	287	82
Shared Lane Traffic (%)						
Lane Group Flow (vph)	265	0	103	533	369	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	
Minimum Split (s)	24.0		24.0	24.0	24.0	
Total Split (s)	24.0		36.0	36.0	36.0	
Total Split (%)	40.0%		60.0%	60.0%	60.0%	
Maximum Green (s)	18.0		30.0	30.0	30.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Max	Max	Max	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	12.7		32.2	32.2	32.2	
Actuated g/C Ratio	0.22		0.57	0.57	0.57	
v/c Ratio	0.64		0.18	0.50	0.35	
Control Delay	24.2		8.3	10.4	8.0	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	24.2		8.3	10.4	8.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C		A	B	A	
Approach Delay	24.2			10.1	8.0	
Approach LOS	C			B	A	
Queue Length 50th (m)	21.7		4.7	30.4	16.8	
Queue Length 95th (m)	41.1		14.1	65.4	39.0	
Internal Link Dist (m)	139.1			212.0	268.5	
Turn Bay Length (m)			25.0			
Base Capacity (vph)	581		574	1074	1056	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.46		0.18	0.50	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 56.9
Natural Cycle: 50
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 52.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: Downey Road & Ptarmigan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	0	41	6	1	8	8	554	1	2	333	11
Future Volume (vph)	33	0	41	6	1	8	8	554	1	2	333	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.925			0.929						0.995	
Flt Protected		0.978			0.980		0.950			0.950		
Satd. Flow (prot)	0	1719	0	0	1730	0	1805	1900	0	1715	1796	0
Flt Permitted		0.978			0.980		0.950			0.950		
Satd. Flow (perm)	0	1719	0	0	1730	0	1805	1900	0	1715	1796	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.9			85.3			211.0			236.0	
Travel Time (s)		6.7			6.1			15.2			17.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	0	45	7	1	9	9	602	1	2	362	12
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	81	0	0	17	0	9	603	0	2	374	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	0	41	6	1	8	8	554	1	2	333	11
Future Volume (Veh/h)	33	0	41	6	1	8	8	554	1	2	333	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	0	45	7	1	9	9	602	1	2	362	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											236	
pX, platoon unblocked												
vC, conflicting volume	1002	993	368	1032	998	602	374			603		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1002	993	368	1032	998	602	374			603		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	100	93	96	100	98	99			100		
cM capacity (veh/h)	217	245	682	198	243	503	1196			984		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	17	9	603	1	375
Volume Left	36	7	9	0	1	1
Volume Right	45	9	0	1	0	12
cSH	349	296	1196	1700	984	984
Volume to Capacity	0.23	0.06	0.01	0.35	0.00	0.00
Queue Length 95th (m)	7.1	1.5	0.2	0.0	0.0	0.0
Control Delay (s)	18.4	17.9	8.0	0.0	8.7	0.0
Lane LOS	C	C	A		A	A
Approach Delay (s)	18.4	17.9	0.1		0.1	
Approach LOS	C	C				

Intersection Summary					
Average Delay	1.7				
Intersection Capacity Utilization	41.7%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	115	431	4	36	343
Future Volume (vph)	16	115	431	4	36	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.881		0.999			
Flt Protected	0.994				0.950	
Satd. Flow (prot)	1664	0	1898	0	1805	1900
Flt Permitted	0.994				0.950	
Satd. Flow (perm)	1664	0	1898	0	1805	1900
Link Speed (k/h)	50		50			50
Link Distance (m)	126.2		141.1			211.0
Travel Time (s)	9.1		10.2			15.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	125	468	4	39	373
Shared Lane Traffic (%)						
Lane Group Flow (vph)	142	0	472	0	39	373
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	115	431	4	36	343
Future Volume (Veh/h)	16	115	431	4	36	343
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	125	468	4	39	373
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	921	470			472	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	921	470			472	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	79			96	
cM capacity (veh/h)	292	598			1100	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	142	472	39	373
Volume Left	17	0	39	0
Volume Right	125	4	0	0
cSH	531	1700	1100	1700
Volume to Capacity	0.27	0.28	0.04	0.22
Queue Length 95th (m)	8.6	0.0	0.9	0.0
Control Delay (s)	14.2	0.0	8.4	0.0
Lane LOS	B		A	
Approach Delay (s)	14.2	0.0	0.8	
Approach LOS	B			

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	75	102	83	605	897	148
Future Volume (vph)	75	102	83	605	897	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt	0.922				0.979	
Flt Protected	0.979			0.994		
Satd. Flow (prot)	1715	0	0	3588	3534	0
Flt Permitted	0.979			0.994		
Satd. Flow (perm)	1715	0	0	3588	3534	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	140.4			153.5	184.5	
Travel Time (s)	10.1			11.1	13.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	111	90	658	975	161
Shared Lane Traffic (%)						
Lane Group Flow (vph)	193	0	0	748	1136	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	102	83	605	897	148
Future Volume (Veh/h)	75	102	83	605	897	148
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	111	90	658	975	161
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				397		
pX, platoon unblocked						
vC, conflicting volume	1564	568	1136			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1564	568	1136			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	8	76	86			
cM capacity (veh/h)	89	471	622			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	193	309	439	650	486
Volume Left	82	90	0	0	0
Volume Right	111	0	0	0	161
cSH	167	622	1700	1700	1700
Volume to Capacity	1.16	0.14	0.26	0.38	0.29
Queue Length 95th (m)	82.3	4.0	0.0	0.0	0.0
Control Delay (s)	172.9	4.8	0.0	0.0	0.0
Lane LOS	F	A			
Approach Delay (s)	172.9	2.0		0.0	
Approach LOS	F				

Intersection Summary				
Average Delay	16.8			
Intersection Capacity Utilization	69.1%	ICU Level of Service		C
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	201	18	5	487	783	223
Future Volume (vph)	201	18	5	487	783	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.989					0.850
Flt Protected	0.956		0.950			
Satd. Flow (prot)	1796	0	1805	1900	1900	1615
Flt Permitted	0.956		0.950			
Satd. Flow (perm)	1796	0	1805	1900	1900	1615
Link Speed (k/h)	50			50	50	
Link Distance (m)	103.8			243.3	153.5	
Travel Time (s)	7.5			17.5	11.1	
Confl. Peds. (#/hr)			8			8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	218	20	5	529	851	242
Shared Lane Traffic (%)						
Lane Group Flow (vph)	238	0	5	529	851	242
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.1%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	201	18	5	487	783	223
Future Volume (Veh/h)	201	18	5	487	783	223
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	218	20	5	529	851	242
Pedestrians	8					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				243		
pX, platoon unblocked						
vC, conflicting volume	1398	859	1101			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1398	859	1101			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	94	99			
cM capacity (veh/h)	154	357	637			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	238	5	529	851	242
Volume Left	218	5	0	0	0
Volume Right	20	0	0	0	242
cSH	162	637	1700	1700	1700
Volume to Capacity	1.47	0.01	0.31	0.50	0.14
Queue Length 95th (m)	122.5	0.2	0.0	0.0	0.0
Control Delay (s)	292.8	10.7	0.0	0.0	0.0
Lane LOS	F	B			
Approach Delay (s)	292.8	0.1		0.0	
Approach LOS	F				

Intersection Summary				
Average Delay		37.4		
Intersection Capacity Utilization		60.1%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	15	475	3	37	754
Future Volume (vph)	2	15	475	3	37	754
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	15.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.880		0.999			
Flt Protected	0.994				0.950	
Satd. Flow (prot)	1662	0	1898	0	1805	1900
Flt Permitted	0.994				0.950	
Satd. Flow (perm)	1662	0	1898	0	1805	1900
Link Speed (k/h)	50		50			50
Link Distance (m)	117.7		292.5			243.3
Travel Time (s)	8.5		21.1			17.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	16	516	3	40	820
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	519	0	40	820
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	15	475	3	37	754
Future Volume (Veh/h)	2	15	475	3	37	754
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	16	516	3	40	820
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			293			
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	1418	518			519	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1414	473			475	
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	97			96	
cM capacity (veh/h)	141	570			1050	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	18	519	40	820
Volume Left	2	0	40	0
Volume Right	16	3	0	0
cSH	426	1700	1050	1700
Volume to Capacity	0.04	0.31	0.04	0.48
Queue Length 95th (m)	1.1	0.0	0.9	0.0
Control Delay (s)	13.8	0.0	8.6	0.0
Lane LOS	B		A	
Approach Delay (s)	13.8	0.0	0.4	
Approach LOS	B			

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		49.7%	ICU Level of Service	A
Analysis Period (min)		15		

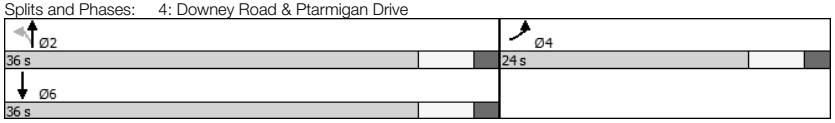
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	103	80	57	378	604	142
Future Volume (vph)	103	80	57	378	604	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	25.0			0.0
Storage Lanes	1	0	1			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.941				0.974	
Flt Protected	0.973		0.950			
Satd. Flow (prot)	1740	0	1805	1900	1851	0
Flt Permitted	0.973		0.234			
Satd. Flow (perm)	1740	0	445	1900	1851	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	67				28	
Link Speed (k/h)	50			50	50	
Link Distance (m)	163.1			236.0	292.5	
Travel Time (s)	11.7			17.0	21.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	87	62	411	657	154
Shared Lane Traffic (%)						
Lane Group Flow (vph)	199	0	62	411	811	0
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	5.0		5.0	5.0	5.0	
Minimum Split (s)	24.0		24.0	24.0	24.0	
Total Split (s)	24.0		36.0	36.0	36.0	
Total Split (%)	40.0%		60.0%	60.0%	60.0%	
Maximum Green (s)	18.0		30.0	30.0	30.0	
Yellow Time (s)	4.0		4.0	4.0	4.0	
All-Red Time (s)	2.0		2.0	2.0	2.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0		6.0	6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	None		Max	Max	Max	
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	9.7		33.7	33.7	33.7	
Actuated g/C Ratio	0.18		0.61	0.61	0.61	
v/c Ratio	0.56		0.23	0.36	0.71	
Control Delay	18.8		9.0	7.3	13.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.8		9.0	7.3	13.5	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	B		A	A	B	
Approach Delay	18.8			7.5	13.5	
Approach LOS	B			A	B	
Queue Length 50th (m)	11.4		2.4	17.9	46.9	
Queue Length 95th (m)	26.9		10.0	40.2	#130.0	
Internal Link Dist (m)	139.1			212.0	268.5	
Turn Bay Length (m)			25.0			
Base Capacity (vph)	613		270	1155	1136	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.32		0.23	0.36	0.71	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 55.4
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 12.3 Intersection LOS: B
Intersection Capacity Utilization 68.0% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Downey Road & Ptarmigan Drive



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	2	15	2	0	4	39	412	8	7	662	35
Future Volume (vph)	21	2	15	2	0	4	39	412	8	7	662	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.947			0.910			0.997			0.992	
Flt Protected		0.973			0.984		0.950			0.950		
Satd. Flow (prot)	0	1751	0	0	1701	0	1805	1894	0	1715	1791	0
Flt Permitted		0.973			0.984		0.950			0.950		
Satd. Flow (perm)	0	1751	0	0	1701	0	1805	1894	0	1715	1791	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		92.9			85.3			211.0			236.0	
Travel Time (s)		6.7			6.1			15.2			17.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	2	16	2	0	4	42	448	9	8	720	38
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	41	0	0	6	0	42	457	0	7	759	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	2	15	2	0	4	39	412	8	7	662	35
Future Volume (Veh/h)	21	2	15	2	0	4	39	412	8	7	662	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	2	16	2	0	4	42	448	9	8	720	38
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								211			236	
pX, platoon unblocked	0.73	0.73	0.73	0.73	0.73		0.73					
vC, conflicting volume	1291	1296	739	1290	1310	452	758			457		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1212	1219	451	1210	1239	452	478			457		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	79	98	96	98	100	99	95			99		
cM capacity (veh/h)	110	124	444	106	121	611	795			1114		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	41	6	42	457	5	761
Volume Left	23	2	42	0	5	3
Volume Right	16	4	0	9	0	38
cSH	157	236	795	1700	1114	1114
Volume to Capacity	0.26	0.03	0.05	0.27	0.01	0.01
Queue Length 95th (m)	7.9	0.6	1.3	0.0	0.2	0.2
Control Delay (s)	35.7	20.6	9.8	0.0	8.3	0.1
Lane LOS	E	C	A		A	A
Approach Delay (s)	35.7	20.6	0.8		0.2	
Approach LOS	E	C				

Intersection Summary					
Average Delay	1.6				
Intersection Capacity Utilization	42.7%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	59	398	19	112	549
Future Volume (vph)	9	59	398	19	112	549
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.883		0.994			
Flt Protected	0.993				0.950	
Satd. Flow (prot)	1666	0	1889	0	1805	1900
Flt Permitted	0.993				0.950	
Satd. Flow (perm)	1666	0	1889	0	1805	1900
Link Speed (k/h)	50		50			50
Link Distance (m)	126.2		141.1			211.0
Travel Time (s)	9.1		10.2			15.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	64	433	21	122	597
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	454	0	122	597
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	59	398	19	112	549
Future Volume (Veh/h)	9	59	398	19	112	549
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	64	433	21	122	597
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	1284	444			454	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1284	444			454	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	90			89	
cM capacity (veh/h)	164	619			1117	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	74	454	122	597
Volume Left	10	0	122	0
Volume Right	64	21	0	0
cSH	450	1700	1117	1700
Volume to Capacity	0.16	0.27	0.11	0.35
Queue Length 95th (m)	4.7	0.0	2.9	0.0
Control Delay (s)	14.6	0.0	8.6	0.0
Lane LOS	B		A	
Approach Delay (s)	14.6	0.0	1.5	
Approach LOS	B			

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		42.4%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix C

Signal Justification Worksheets

Signal Justification Calculation
(OTM Book 12 - Justifications 1, 2, 3)

Horizon Year: 2016
Region/City/Township: Guelph

Major Street: Downey Road
Minor Street: Niska Road

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection? Y
Flow Conditions: Restricted

	Major Street						Minor Street						
	Downey Road						Niska Road						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Hour	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
7:00 - 8:00	7	501			297	174	89		5				0
8:00 - 9:00	11	716			349	179	159		8				0
9:00 - 10:00	7	242			211	121	97		6				0
12:00 - 13:00	6	255			249	109	98		6				0
13:00 - 14:00	6	259			235	106	106		5				0
15:00 - 16:00	8	331			490	170	157		10				0
16:00 - 17:00	8	429			719	203	196		17				2
17:00 - 18:00	10	501			668	207	224		11				0

	1A		1B		2A		2B	
Hour	All Approach Lanes		Minor Street Both Approaches		Major Street Both Approaches		Traffic Crossing Major Street	
Threshold	720		255		720		75	
1	1073	100%	94	37%	979	100%	89	100%
2	1422	100%	167	65%	1255	100%	159	100%
3	684	95%	103	40%	581	81%	97	100%
4	723	100%	104	41%	619	86%	98	100%
5	717	100%	111	44%	606	84%	106	100%
6	1166	100%	167	65%	999	100%	157	100%
7	1572	100%	213	84%	1359	100%	198	100%
8	1621	100%	235	92%	1386	100%	224	100%
8 Hours 100% Fulfilled?		No		No		No		Yes
8 Hours 80% Fulfilled?		Yes		No		Yes		Yes

Justification Results	
Justification 1 (Minimum Vehicle Volume)	No
Justification 2 (Delay To Cross Traffic	No
Justification 3 (Volume/Delay Combination)	No

Is A Signal Justfied? No

Signal Justification Calculation
(OTM Book 12 - Justifications 1, 2, 3)

Horizon Year: 2016
Region/City/Township: Guelph

Major Street: Downey Road
Minor Street: Woodland Glen Drive
North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection? Y
Flow Conditions: Restricted

	Major Street						Minor Street						
	Downey Road						Woodland Glen Drive						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
Hour	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	Main Road
7:00 - 8:00	43	540			417	41	59		53				0
8:00 - 9:00	110	767			438	124	56		93				0
9:00 - 10:00	23	307			307	61	65		23				0
12:00 - 13:00	26	330			333	63	71		28				0
13:00 - 14:00	25	339			311	59	60		22				0
15:00 - 16:00	60	426			589	88	38		69				0
16:00 - 17:00	77	543			830	117	70		90				2
17:00 - 18:00	79	644			781	154	71		87				0

	1A		1B		2A		2B	
Hour	All Approach Lanes		Minor Street Both Approaches		Major Street Both Approaches		Traffic Crossing Major Street	
Threshold	900		255		900		75	
1	1153	100%	112	44%	1041	100%	59	79%
2	1588	100%	149	58%	1439	100%	56	75%
3	786	87%	88	35%	698	78%	65	87%
4	851	95%	99	39%	752	84%	71	95%
5	816	91%	82	32%	734	82%	60	80%
6	1270	100%	107	42%	1163	100%	38	51%
7	1727	100%	160	63%	1567	100%	72	96%
8	1816	100%	158	62%	1658	100%	71	95%
8 Hours 100% Fulfilled?		No		No		No		No
8 Hours 80% Fulfilled?		Yes		No		No		No

Justification Results	
Justification 1 (Minimum Vehicle Volume)	No
Justification 2 (Delay To Cross Traffic	No
Justification 3 (Volume/Delay Combination)	No

Is A Signal Justfied? No

Appendix D

Workshop Participation Summary

Type of Workshop Attendee	Number of Attendees	Percentage
Lives directly on Downey Road	30	26%
Lives within Kortright Hills West Community	69	59%
No address given	3	3%
Stakeholder	11	9%
Councillors	4	3%
Total	**117**	**100%**