

**17 January 2017**Minto Communities Inc.  
200-160 Kent Street  
Ottawa, ON K1P 0B6Our REF: 476189 10000  
BY EMAIL: [SMurphy@minto.com](mailto:SMurphy@minto.com)Attention: Susan Murphy  
Vice-President, Land Development

Dear Susan:

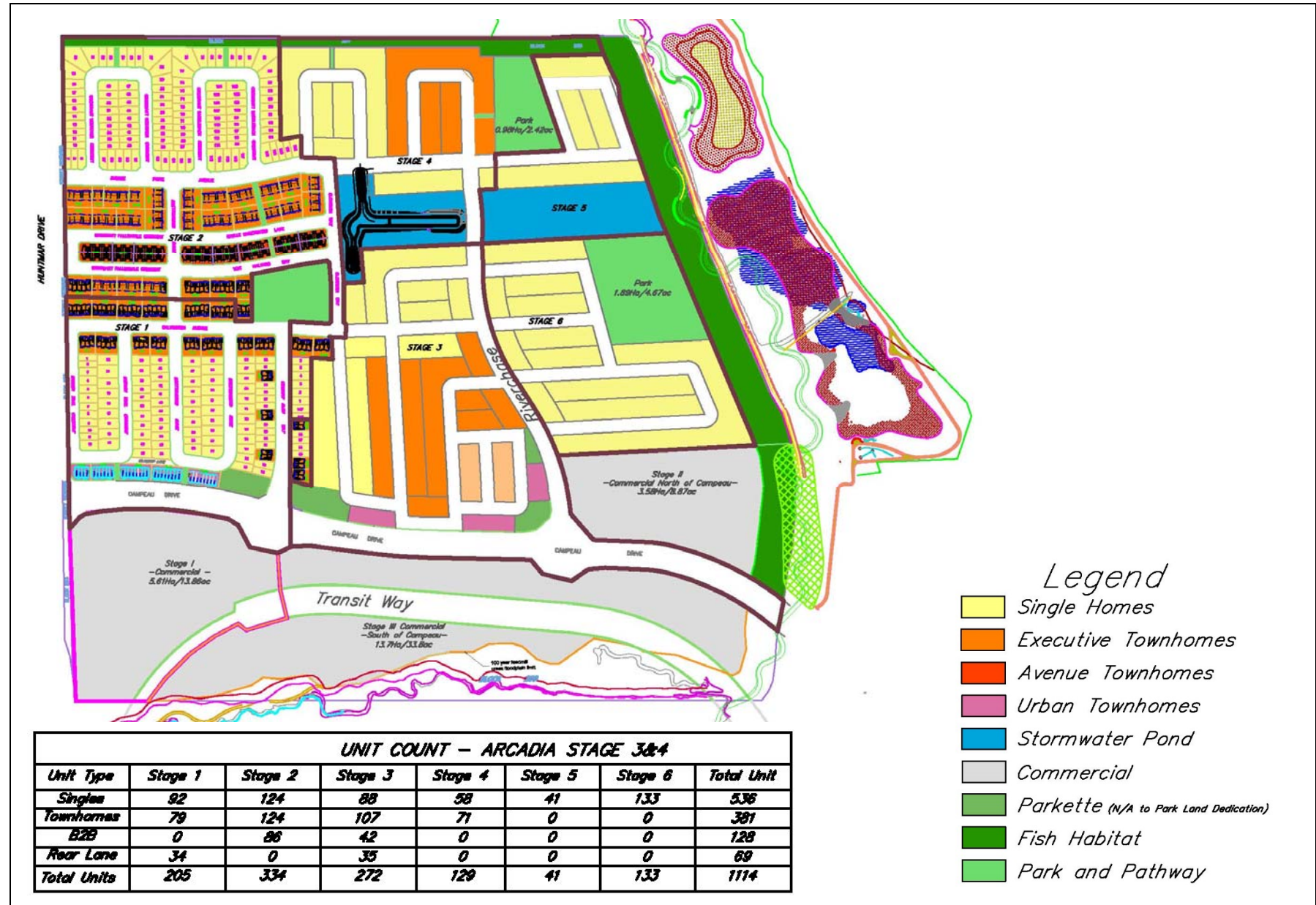
RE: **Arcadia Subdivision, Kanata: Stages 3 and 4  
Transportation Brief**

## 1. Introduction

Minto's Arcadia community is a significant mixed-use site located north of Highway 417 in Kanata West. It is bounded by Huntmar Drive on the west, the Carp River on the east and Feedmill Creek on the south. The site's local context is shown on Figure 1 and the overall Concept Plan is shown on Figure 2. The southern portion of the lands adjacent to the planned Campeau Drive Extension are commercial lands (Stages I, II and III), and the larger portion of the lands north of Campeau Drive are predominantly residential. The residential sector has six stages and Stages 1 and 2 are built. Stage 1 of the commercial south of Campeau Drive has been Site Plan Approved. The Transportation Brief herein is to address the transportation implications and requirements of the next phase of residential development, which is Stages 3 and 4, as depicted in Figure 2.

**Figure 1: Site Context**

Figure 2: Concept Plan



## 2. Scope of Work

As background, Parsons has done all recent transportation planning work in the immediate area including:

- The Transportation Briefs for Arcadia Stages 1 and 2 residential;
- The Traffic Impact Study for Arcadia Stage 1 commercial;
- The EA for the adjacent Transitway;
- The traffic projections (for the City) for the Campeau Drive Extension used to finalize the lane requirements and the design of the Campeau Drive Extension; and
- The all-encompassing Traffic Study for all undeveloped lands in Kanata West located north of Highway 417 and west of Terry Fox Drive. The resultant peak hour traffic projections were the basis for all recent road design and construction for Palladium Drive, Huntmar Drive and Campeau Drive including access points to adjacent lands. This all-encompassing study included all the Arcadia lands as envisioned at the time.

As the design of the Campeau Drive Extension has been finalized and the location of its intersections (roundabouts) with the Arcadia development phases confirmed, and as the residential Stage 1 and Stage 2 traffic briefs have been approved by the City, it was agreed in discussion with Asad Yousfani of the City that the scope of work done for the previous Traffic Brief was also suitable and appropriate for the residential Stages 3 and 4 Traffic Brief provided herein. As such, this brief does not readdress off-site traffic impacts and requirements, except at the Huntmar/Paine intersection, but focuses primarily on the multi-modal internal design and integration with the adjacent development phases.

## 3. Study Area Transportation Network

In recent years, there has been significant changes to the transportation network adjacent to and in close proximity to the subject lands.

- The adjacent Highway 417 has been widened to 8 lanes;
- The Palladium-Campeau link north of Highway 417 has been realigned and widened with both roads being four-lane divided roads from the highway off-ramp northeast to Huntmar Drive;
- Roundabouts exist at the Palladium/Campeau and Campeau/Huntmar intersections and traffic signal control is provided at the Campeau/Tanger intersection;
- Two lanes of Campeau Drive have been constructed east of Huntmar to serve Stages 1 and 2 of Arcadia's residential development;
- The northbound right-turn lane on Huntmar at Paine, as recommended in the Stage 2 Transportation Brief, has been constructed;
- The City's current plan for completion of the four-lane divided Campeau Drive Extension (Huntmar to Didsbury) is approximately 2020/2021 with roundabouts at the Country Glen Way and Riverchase intersections; and
- The EA for the adjacent rapid transit corridor is complete, with the design to be initiated by the City in 2017.

As shown in the Figure 2: Concept Plan, the Stage 3 and 4 residential developments will have three road connections to the area's primary road network. There will be a direct connection to the Campeau Drive Extension via Riverchase, there will be a direct connection through Stage 2 via Paine Avenue to connect to Huntmar Drive and there will be slightly indirect connection to Campeau Drive through Stage 1 via Calvington Avenue and Country Glen Way. As Stage 3 and 4 development may precede the City's timing for a four-lane Campeau Drive extension, the initial two lanes may have to be constructed from Country Glen Way east to Riverchase similar to what was done for Stage 1 (two lanes from Huntmar to Country Glen).

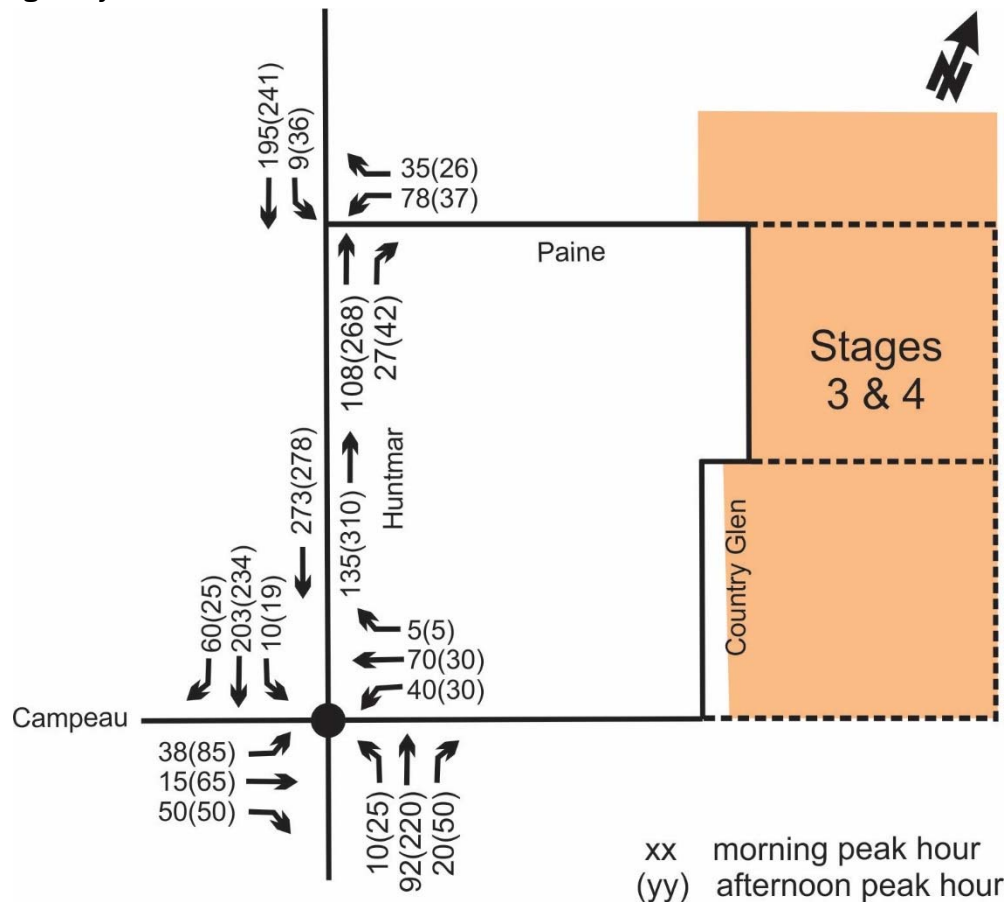


## 4. Existing Transportation Conditions

### 4.1 PEAK HOUR TRAFFIC VOLUMES

In the initial years of Stage 3 and Stage 4 development, site-generated traffic will most likely all be directed west to Huntmar Drive via either the easterly two-lane Campeau Drive extension or via Paine Avenue. To obtain the most current peak hour traffic volumes at key adjacent study area intersections, a combination of the City's 2011 count for the Huntmar/Campeau intersection, the Parsons January 2017 count at the Huntmar/Paine intersection and the Stage 1 and Stage 2 peak hour traffic projections were used. The resultant counts are summarized in Figure 3 and are included as Appendix A.

**Figure 3: Existing Study Area Traffic Volumes**



### 4.2 EXISTING TRANSIT SERVICE

Currently, transit service to the Arcadia community is provided by OC Transpo Regular Routes #92 and 162, which provide frequent all-day service. Bus stops for these routes are located adjacent to the Tanger Outlet Mall approximately 800 m west of the proposed development. At some point in 2017, OC Transpo has advised that bus service will be extended into the subdivision in a counterclockwise direction using the Paine/Conrush/Calvington/Country Glen connection. As Stages 3 and 4 build-out, bus service would also be provided on Riverchase.

## 5. Projected Peak Hour Site Traffic Generation and Assessment

### 5.1 SITE TRAFFIC GENERATION

Based on the Figure 2: Concept Plan, Stage 3 is composed of 88 single unit homes and 184 townhomes. Stage 4 is comprised of 58 singles and 71 towns. The combined total is 146 singles and 255 towns for a grand total of 401 residential units.

Appropriate trip generation rates for the proposed 255 townhomes and 146 single-family homes were obtained from the 9th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual and are summarized in Table 1.

Table 1: ITE Trip Generation Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
Single Family Detached	ITE 210	$T = 0.75(du);$ $T = 0.70(du)+9.74$	$T = 1.00(du);$ $Ln(T) = 0.90 \ln(du)+0.51$
Townhome	ITE 230	$T = 0.44(du);$ $Ln(T) = 0.80 \ln(du)+0.26$	$T = 0.52(du);$ $Ln(T) = 0.82 \ln(du)+0.32$
Notes: $T$ = Average Vehicle Trip Ends $du$ = dwell unit			

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), appropriate adjustment factors were applied to attain estimates of person trips for the proposed development.

Table 2 summarizes the total person site generated trips for the proposed site, which were then reduced by modal share values based on the site's location and proximity to other adjacent communities, employment, shopping uses and transit availability.

Table 2: Modified Person Trip Generation

Land Use	Data Source	Area	AM Peak (persons/h)			PM Peak (persons/h)		
			In	Out	Total	In	Out	Total
Stage 3								
Single Family Detached	ITE 210	88 du	23	70	93	76	46	122
Townhome	ITE 230	184 du	18	91	109	86	43	129
Total Stage 3 Person Trips			41	161	202	162	89	251
Stage 4								
Single Family Detached	ITE 210	58 du	13	40	53	44	26	70
Townhome	ITE 230	71 du	6	27	33	26	13	39
Total Stage 4 Person Trips			19	67	86	70	39	109
Total Stage 3 + 4			60	228	288	232	128	360
Note: 1.3 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%								

The following percent modal share breakdown is considered appropriate for this area.

- 60% Auto Drivers
- 10% Auto Passengers
- 25% Transit Riders
- 5% Non-motorized
- 100%

The following Table 3 is a summary of potential two-way trips, by mode, to/from the proposed development based on these percentages.

Table 3: Total Site Vehicle Trip Generation

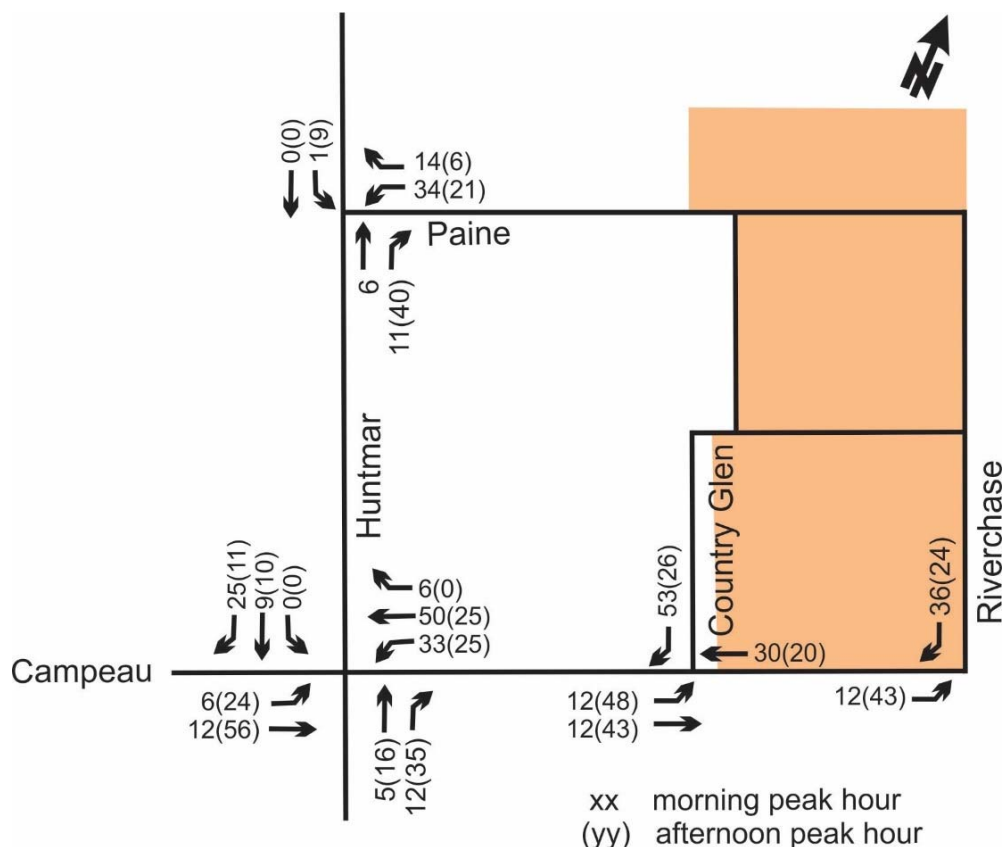
Travel Mode	Mode Share	AM Peak (Person Trips/hr)			PM Peak (Person Trips/hr)		
		In	Out	Total	In	Out	Total
Auto Driver	60%	36	137	173	140	77	217
Auto Passenger	10%	6	23	29	23	13	36
Transit	25%	15	57	72	58	32	90
Non-motorized	5%	3	11	14	11	6	17
Total Person Trips	100%	60	228	288	232	128	360
Total 'New' Auto Trips		36	137	173	140	77	217

As shown in Table 3, the resulting number of potential 'new' two-way vehicle trips for the proposed development are approximately 175 and 220 veh/h during the weekday morning and afternoon peak hours, respectively. The estimated transit ridership is in the 70 to 90 persons per hour range.

## 5.2 ASSIGNMENT OF SITE-GENERATED TRAFFIC

As mentioned, the Stage 3 and 4 Subdivision traffic will have a direct connection to Huntmar Drive via Paine Avenue (through Stage 2), a direct connection to Campeau Drive via Riverchase and indirect access to Campeau Drive via Country Glen Way (through Stage 1 development). The assignment of the Table 3 site-generated traffic to these site access points assumes that Campeau Drive is extended as two lanes from the Huntmar roundabout east to Riverchase, but that Campeau is not yet extended east across the Carp River. The resultant assignment of peak hour site-generated traffic is depicted in Figure 4.

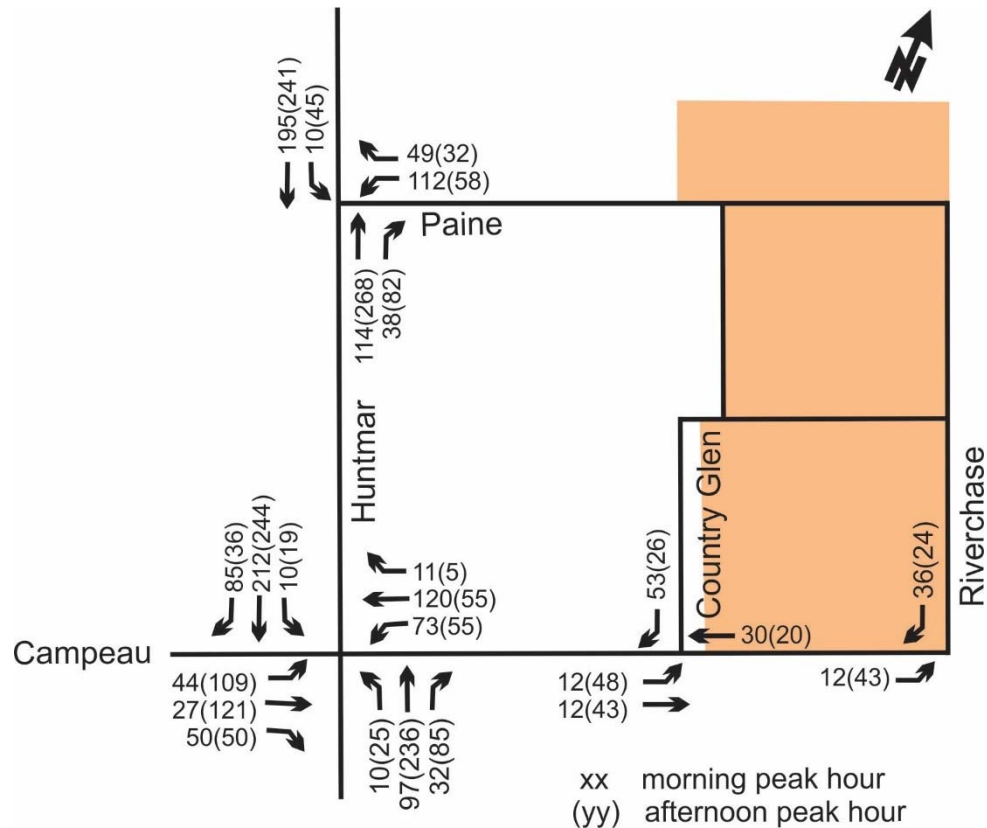
Figure 4: Assignment of Site-Generated Peak Hour Traffic



### 5.3 ASSESSMENT OF PROJECTED CONDITIONS

Projected conditions at full build-out of Stages 3 and 4 are depicted in Figure 5 which is comprised of Figure 3 volumes plus Figure 4 volumes (existing + site-generated).

**Figure 5: Total Projected Peak Hour Traffic (Existing + Stages 3 and 4)**



As the Huntmar/Campeau roundabout was built as a two-lane roundabout, there is no question that it has more than sufficient capacity to accommodate the interim traffic volumes from full build-out of Stages 3 and 4. As such, the analysis focus is on the Huntmar/Paine intersection, not the Campeau/Huntmar roundabout.

The previously approved Stage 2 Transportation Brief recommended the following with regard to the Huntmar/Paine intersection. Signals were not warranted, the Paine approach to Huntmar should be STOP sign controlled, a southbound left-turn lane was not warranted and a northbound right-turn lane was warranted (subsequently constructed). Each of these previous recommendations will now be revisited when accounting for peak hour traffic from Stages 3 and 4.

Analysis of the total projected peak hour volumes following full build-out of Stages 3 and 4 (Figure 5) for the Huntmar/Paine intersections revealed the following, with the warrant analysis included as Appendix B:

- Traffic signal warrants ..... 52%
- Northbound right-turn lane..... 30 m plus taper (recently built at 35 m plus taper)
- Southbound left-turn lane ..... not warranted

## 6. Concept Plan Review

This review looks internal to the two development stages with regard to ease of vehicle, bicycle and pedestrian circulation, traffic controls, transit service and road cross-sections.

In general terms, the Stage 3/4 road network is somewhat of a grid network with almost no curvilinear roads, similar to the Stage 1/2 network. This type of network generally results in less circuitous travel and facilitates walking and cycling. All roads have a proposed 18 m wide right-of-way, except for Riverchase and Paine, which as collector roads (and potential transit routes) which will have a 22 m right-of-way. It is assumed for the 18 m local streets have sidewalks on one side of the road and the 22 m collector streets will have sidewalks on both sides.

With regard to park or parkette access, most are located directly adjacent to local streets for ease of public access. The park located north of Paine Avenue in Stage 4 also has a pathway connection to it from the adjacent neighbourhood. It is assumed this pathway is 4 m wide, similar to the Stage 2 internal pathways.

At the very northwest corner of Stage 4, there is also a pathway connection through to the greenway system that forms the community's north boundary. Similar to Stage 2, it is assumed this pathway is 6 m wide.

There does not appear to be a designated cycling facilities with Stages 3 and 4, but when Stages 5 and 6 are built, consideration should be given to accommodating bicycle connections to a potential multi-use pathway (MUP) located in the Carp River corridor.

With regard to internal traffic control, it is recommended that all intersections be STOP sign controlled on the local or 'T' intersection approach only. Four-way STOPs could be considered at the Paine/Riverchase intersection and the Calvington/Riverchase intersection. As previously noted, the Riverchase/Huntmar intersection will ultimately be a roundabout.

Within Stages 3 and 4, both Paine and Riverchase will ultimately be transit routes and hence the 22 m right-of-way and sidewalks on both sides.

## 7. Findings, Conclusions and Recommendations

Based on the foregoing analysis, the Findings, Conclusions and Recommendations of this Transportation Brief are as follows.

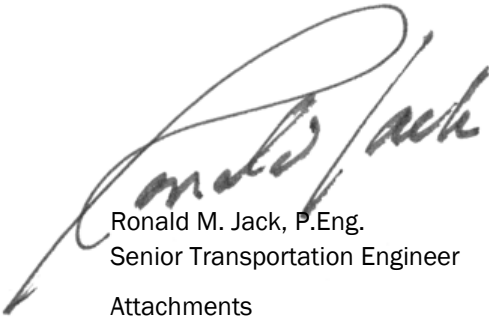
- The proposed Stage 3 and Stage 4 development consists of 401 residential units comprised of 146 singles and 255 townhomes.
- The following significant road network modifications have recently occurred, or will occur in the near future, that will accommodate traffic growth from all area development:
  - The adjacent Highway 417 has been widened to 8 lanes;
  - The Palladium-Campeau link north of Highway 417 has been realigned and widened with both roads being four-lane divided roads from the highway off-ramp north and east to Huntmar Drive;
  - Roundabouts exist at the Palladium/Campeau and Campeau/Huntmar intersections and traffic signal control is provided at the Campeau/Tanger intersection;
  - Two lanes of Campeau Drive have been constructed east of Huntmar to serve Stages 1 and 2 of Arcadia's residential development; and
  - The City's current plan for completion of the four-lane divided Campeau Drive Extension (Huntmar to Didsbury) is approximately 2020/2021 with roundabouts at the Country Glen Way and Riverchase intersections.
- As the recently constructed two-lane roundabout at the Huntmar/Campeau intersection has a great amount of spare capacity, and was designed to accommodate planned development of all of Kanata West, no analysis of this roundabout is required herein;



- As roundabouts will soon (2020/2021) be constructed at the Campeau/Country Glen Way and Campeau/Riverchase intersections, no analysis is required of these two roads interim connections to the two lane Campeau Drive (that currently does not extend across the Carp River);
- Using appropriate modal splits and vehicle occupancy factors, the proposed Stages 3/4 development is projected to generate approximately 175 vph to 220 vph during the weekday morning and afternoon peak hours respectively. Transit ridership is estimated to be 70 to 90 persons during these same time periods;
- All Stage 3/4 peak hour traffic was assumed to travel to/from the west via the Huntmar/Paine or the Huntmar/Campeau intersections as it was assumed that Campeau Drive would not yet be extended east over the Carp River to connect to Terry Fox Drive;
- For the combination of existing plus Stage 1 to 4 residential traffic, there are no additional requirements at Campeau/Huntmar intersection. For the Huntmar/Paine intersection, and similar to the Stage 2 Transportation Brief recommendations, neither traffic signals or a southbound left-turn lane are warranted;
- Internal to the Concept Plan, Stages 3 and 4 are well laid out from a transportation perspective, with the appropriate road rights-of-way, sidewalk system and multi-use pathway connections provided; and
- With Paine Avenue and Riverchase each having a 22 m rights-of-way, sidewalks on both sides, and a 8.5 m pavement width, they are designed to be transit routes, when necessary.

Based on the foregoing analysis, findings and conclusions, the proposed Stage 3 and 4 plans are recommended from a transportation perspective. Please call if there are any questions.

Sincerely,



Ronald M. Jack, P.Eng.  
Senior Transportation Engineer  
Attachments



# **APPENDIX A**

## **Current Traffic Counts**

- Huntmar/Paine
- Huntmar/Campeau



Public Works and Services Department

Count ID 2946

PALLADIUM DR E and HUNTMAR DR E

(ULRS Listing RR- 88 & HUNTMR-N)

Survey Date: Thursday 7 July 2011

Conditions: dry

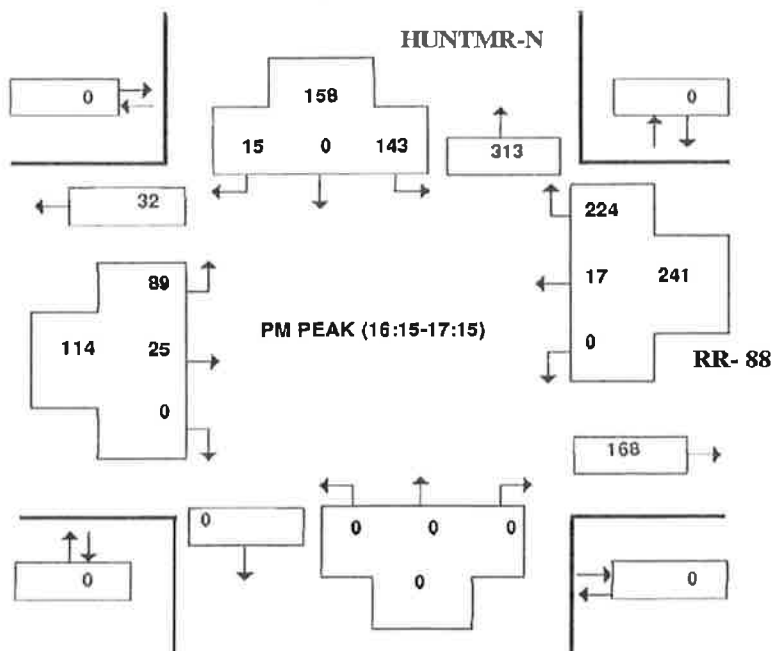
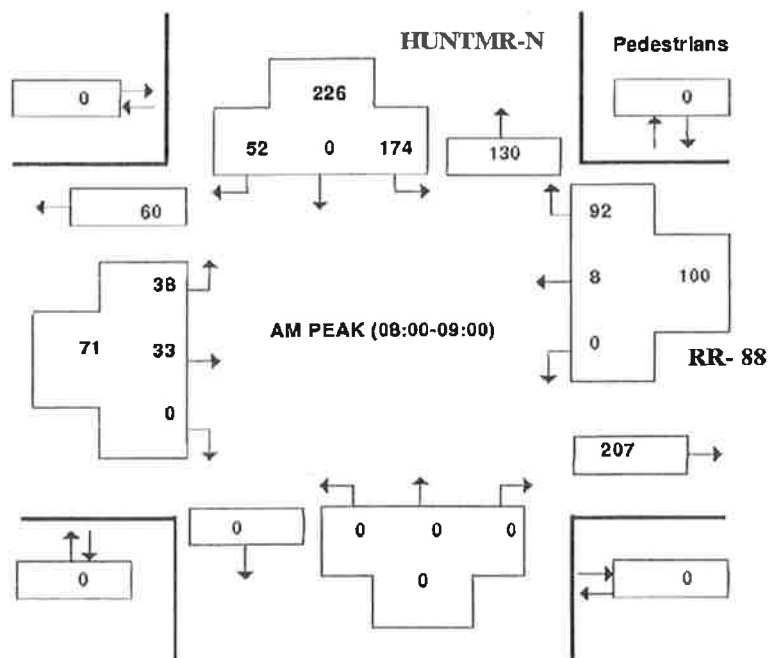
Start Time: 0700

Total Observed U-Turns

Northbound: 0 Southbound: 0  
Eastbound: 0 Westbound: 0

AADT Factor

Thursday in July is  
9





Public Works and Services Department

Count ID 2946

PALLADIUM DR E and HUNTMAR DR E

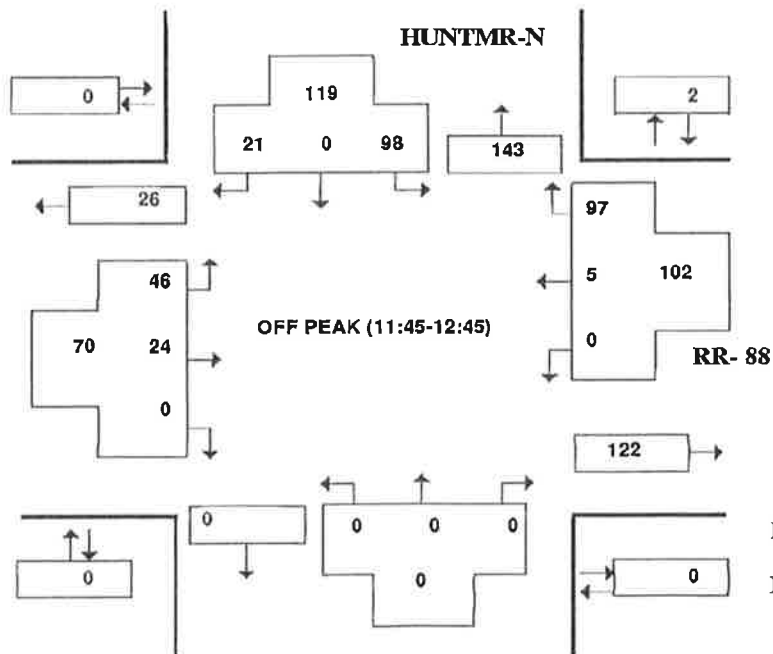
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Total Observed U-Turns  
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AADT Factor  
Thursday in July is  
9

HUNTMR-N					Pedestrians
0	1202				7
	204	0	998	1189	
291					876
313					87 963
482	169	8.0 HR TOTAL			0
	0				RR- 88
					1167
	0	0	0	0	
0		0			0



Refer to Summary  
Page for Survey  
Hours.

# DIRECTIONAL TRAFFIC FLOW

Intersection: Huntmar Dr. at Paine Ave.

DATE: Day: 10 Month: Jan Year: 2017 Day of Week: Tuesday

Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 6:45 AM To: 7:00 AM

Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period.

N



<p>Street Name: _____</p>	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%;"></div> </div>	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%; text-align: center;">42</div> </div>	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%; text-align: center;">4</div> </div>	<p>Street Name: <u>Huntmar</u></p>
<p>Bus Trks Pass. Vehicles</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%;"></div> </div>	<p>R</p>	<p>S</p>	<p>L</p>	<p>Pass. Vehicles</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%; text-align: center;">9</div> </div>
<p>Bus Trks Pass. Vehicles</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%;"></div> </div>	<p>R</p>	<p>S</p>	<p>S</p>	<p>Pass. Vehicles</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%;"></div> </div>
<p>Bus Trks Pass. Vehicles</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%;"></div> </div>	<p>R</p>	<p>L</p>	<p>S</p>	<p>Pass. Vehicles</p> <div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%; text-align: center;">21</div> </div>
<p>Street Name: _____</p>	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%;"></div> </div>	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%; text-align: center;">15</div> </div>	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <div style="border: 1px solid black; width: 100px; height: 100px; margin: 0 auto; border-radius: 50%; text-align: center;">6</div> </div>	<p>Street Name: <u>Paine Ave.</u></p>



# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 10 Month: Jan Year: 2017 Day of Week: Tuesday

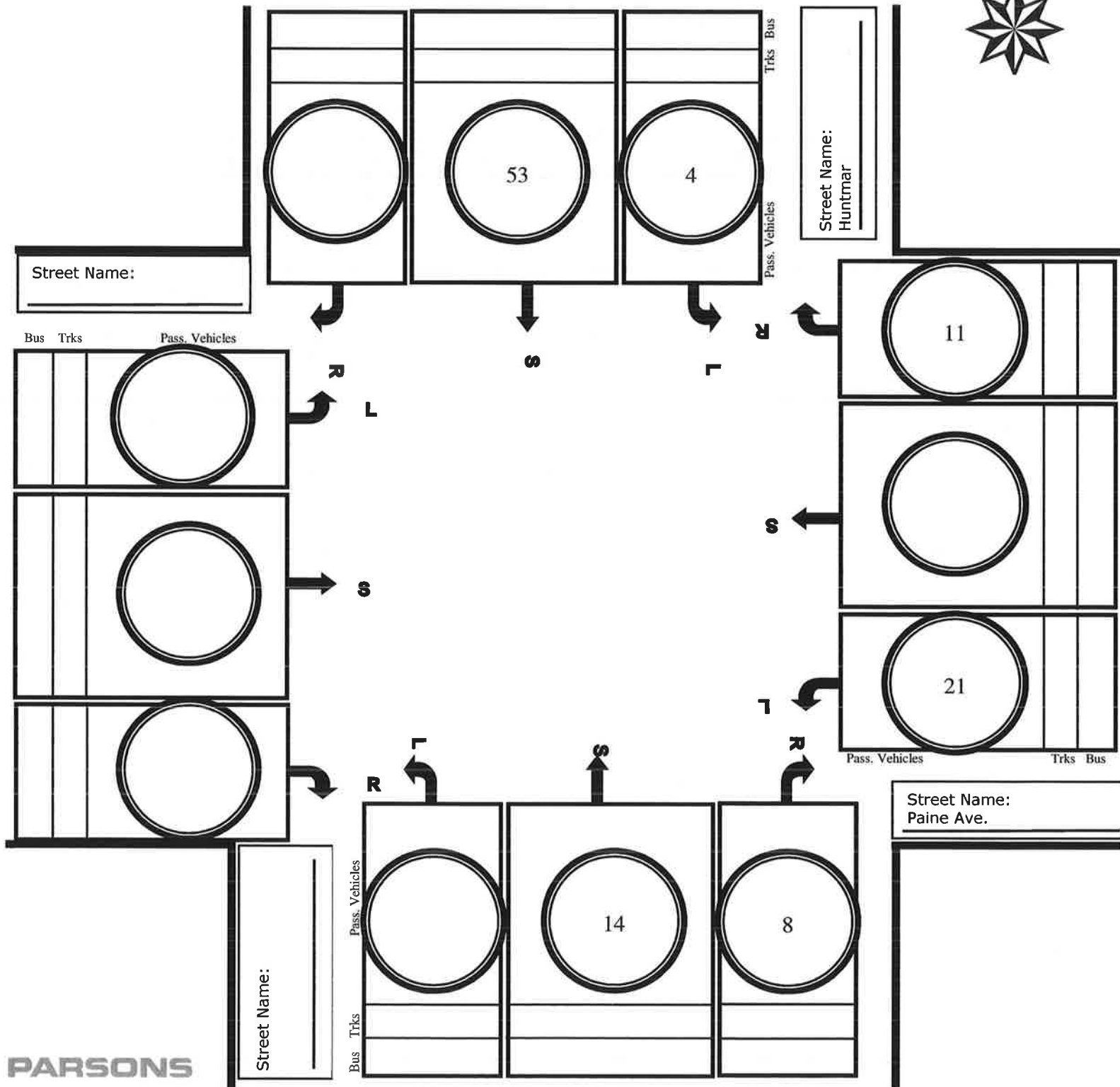
Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 7:00 AM To: 7:15 AM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

N



# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 10 Month: Jan Year: 2017 Day of Week: Tuesday

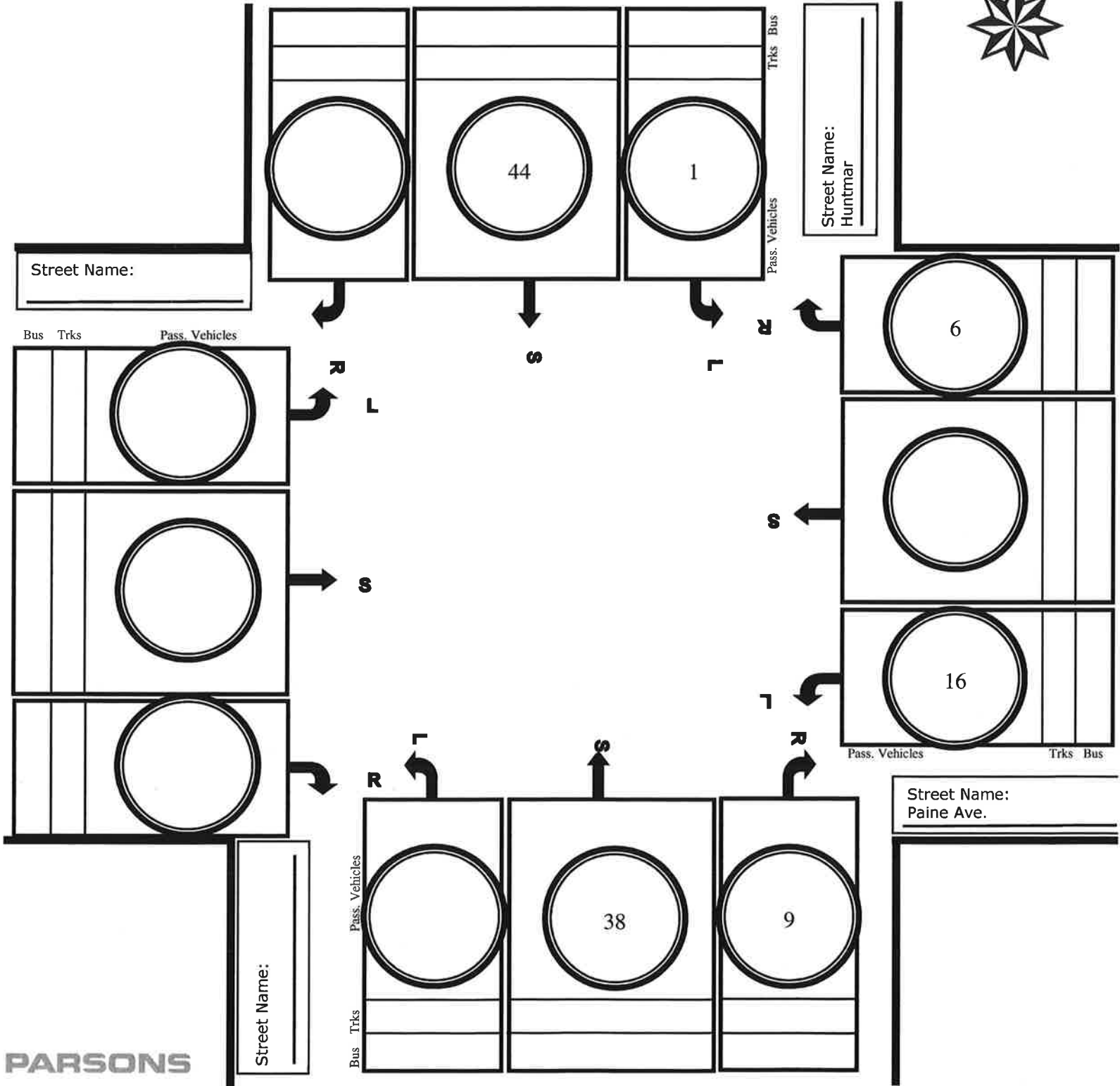
Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 7:15 AM To: 7:30 AM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

N



# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 10 Month: Jan Year: 2017 Day of Week: Tuesday

Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 7:30 AM To: 7:45 AM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

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<p>Street Name: _____</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; height: 100px; vertical-align: middle; text-align: center;"> <div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto;"></div> </td> <td style="width: 33%; height: 100px; vertical-align: middle; text-align: center;"> <div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">56</div> </td> <td style="width: 33%; height: 100px; vertical-align: middle; text-align: center;"> <div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">0</div> </td> </tr> </table>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto;"></div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">56</div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">0</div>	<p>Street Name: <u>Huntmar</u></p>						
<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto;"></div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">56</div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">0</div>									
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# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 10 Month: Jan Year: 2017 Day of Week: Tuesday

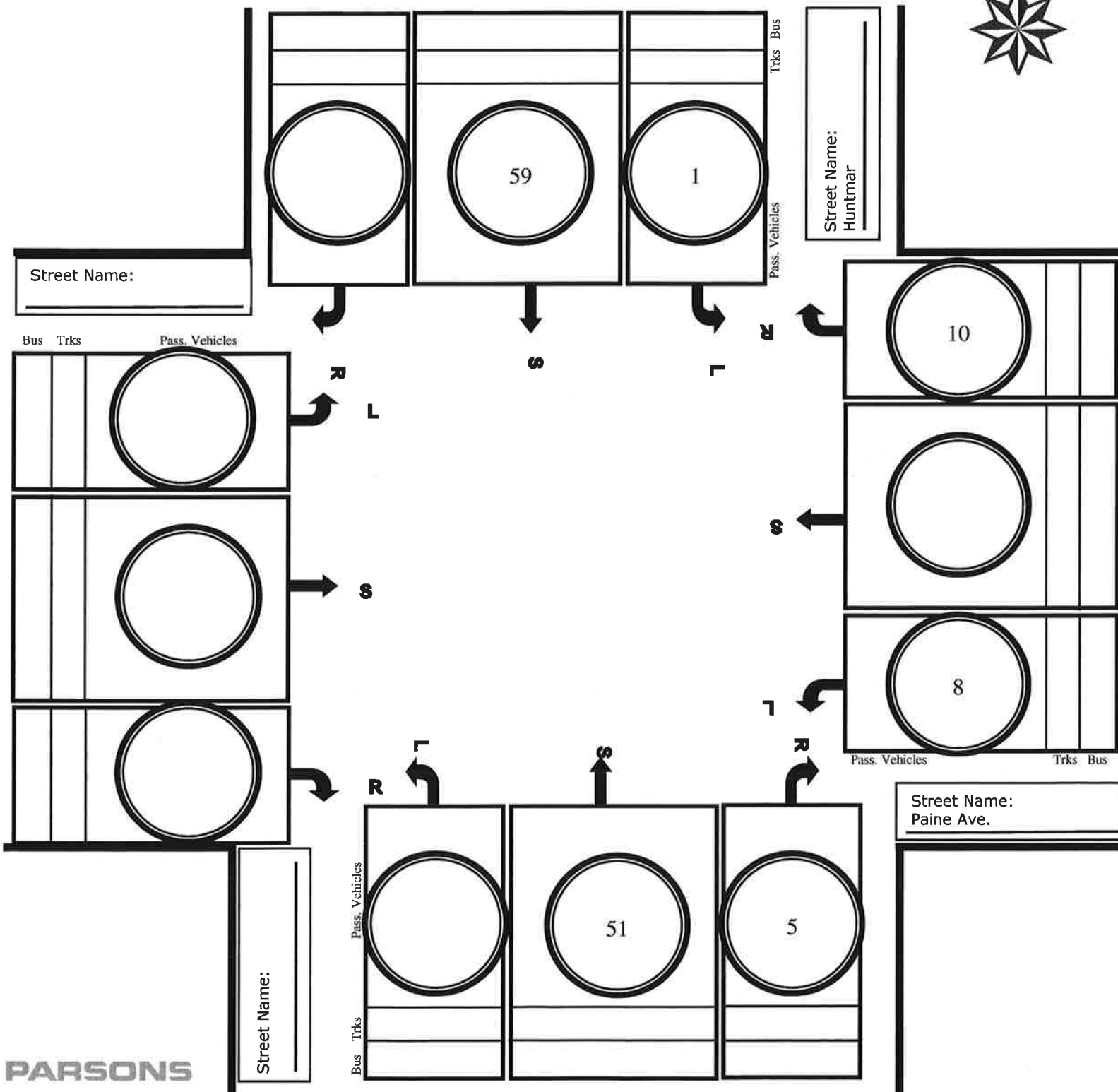
Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 7:45 AM To: 8:00 AM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

N



# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 9 Month: Jan Year: 2017 Day of Week: Monday

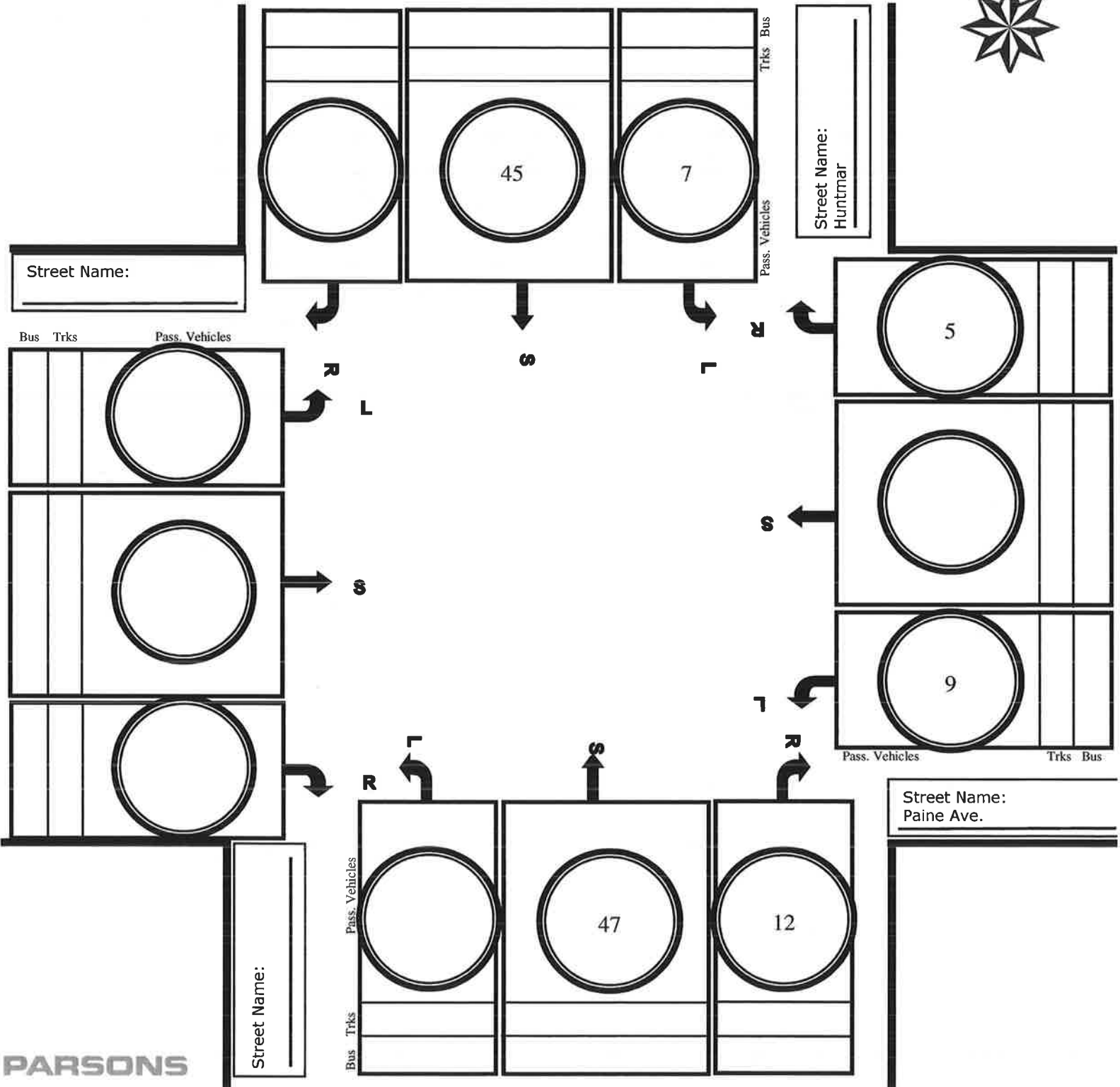
Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 4:00 PM To: 4:15PM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

N





# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 9 Month: Jan Year: 2017 Day of Week: Monday

Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 4:30 PM To: 4:45PM

N

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period



Street Name:

Trks Bus

63

Trks Bus

14

Street Name:  
Huntmar

Bus Trks

7

Bus Trks

10

Street Name:

Pass. Vehicles

66

Pass. Vehicles

13

Street Name:  
Paine Ave.

PARSONS

# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 9 Month: Jan Year: 2017 Day of Week: Monday

Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 4:15 PM To: 4:30PM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

N



<p>Street Name: _____</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; height: 100px; vertical-align: middle; text-align: center;"> <div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto;"></div> </td> <td style="width: 33%; height: 100px; vertical-align: middle; text-align: center;"> <div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">61</div> </td> <td style="width: 33%; height: 100px; vertical-align: middle; text-align: center;"> <div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">6</div> </td> </tr> </table> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>↙</span> <span>↓</span> <span>↘</span> </div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto;"></div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">61</div>	<div style="border: 2px solid black; border-radius: 50%; width: 80%; height: 80%; margin: auto; display: flex; align-items: center; justify-content: center;">6</div>	<p>Street Name: <u>Huntmar</u></p>			
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# DIRECTIONAL TRAFFIC FLOW

DATE: Day: 9 Month: Jan Year: 2017 Day of Week: Monday

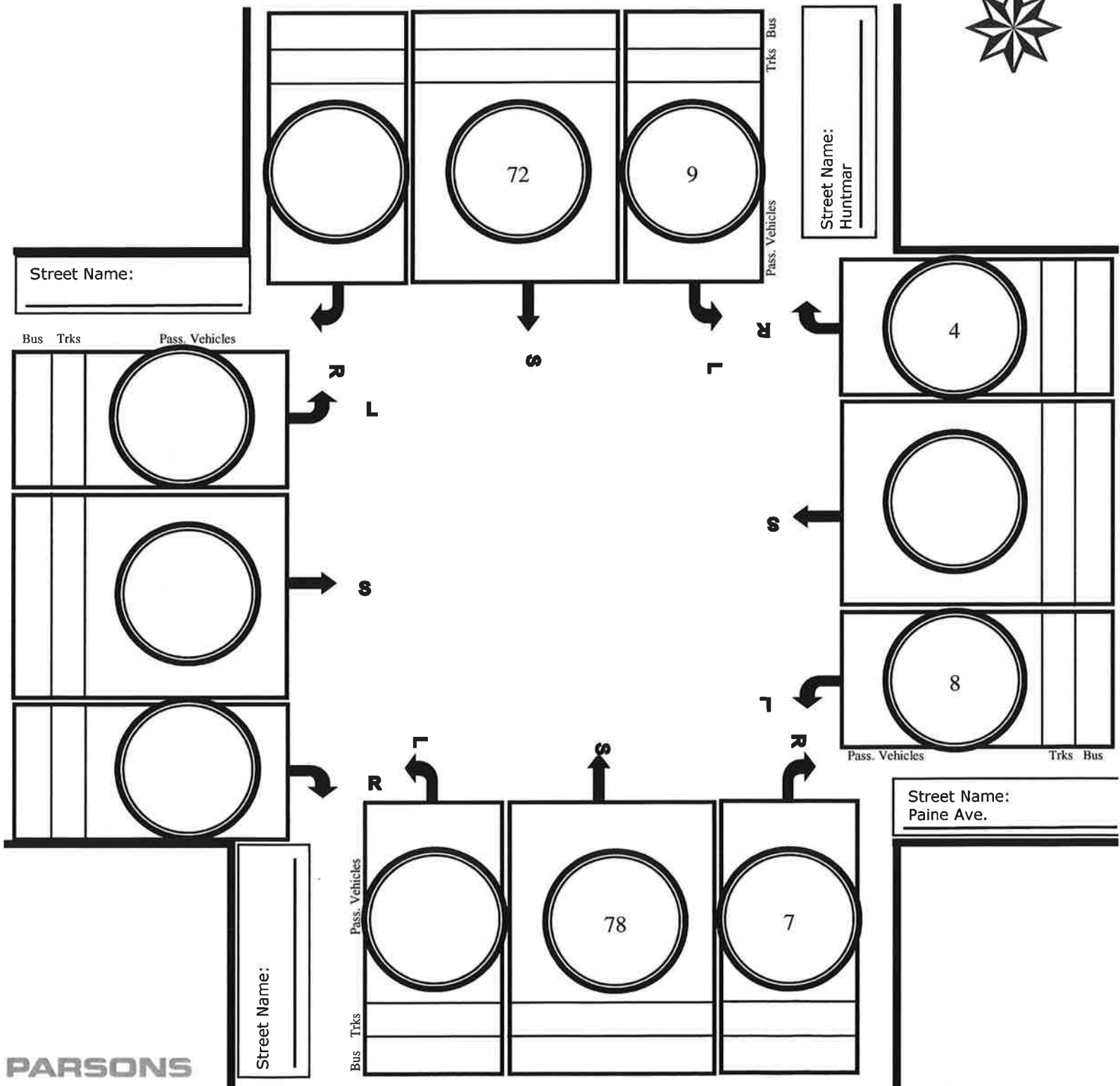
Observer: Matt Weather: Cloudy

Chkd by: \_\_\_\_\_ Date: \_\_\_\_\_

TIME PERIOD: From: 4:45 PM To: 5:00PM

- Instructions: 1) Use tally marks to indicate vehicles.  
2) Use one sheet for each 15-minute period

N



# **APPENDIX B**

## Huntmar/Paine Warrant Analysis

- Traffic control signals
- Southbound left-turn lane

### Huntmar/Paine - (peak hour signal warrant)

Signal Warrant		Description		Minimum Requirement for Two Lane Roadways	Compliance		
				Free Flow - Operating Speed Greater Than or Equal to 70 km/h	Sectional %	Entire %	Warrant
Intersection	1. Minimum Vehicular Volume	(1) A	Vehicle Volume, All Approaches for Each of the Heaviest 8 Hours of on Average Day, and	480	65%	35%	52% No
		(4) B	Vehicle Volume, Along Minor Streets for Each of the Same 8 Hours	180	35%		
	2. Delay to Cross Traffic	(1) A	Vehicle Volume, Along Major Street for Each of the Heaviest 8 Hours of an Average Day, and	480	52%	52%	
		(2) B	Combined Vehicle and Pedestrian Volume <u>Crossing</u> the Major Street for Each of the Same 8 Hours	50	86%		

#### Notes

- 1 Vehicle Volume Warrants (1A), (2A) and (5B) for Roadways Having Two or More Moving Lanes in one Direction Should Be 25% Higher Than Values Given Above
- 2 For Definition of Crossing Volume Refer to Note 4 on the Signal Warrant Analysis Form B2.03.08
- 3 The Lowest Sectional Percentage Governs the Entire Warrant
- 4 For "T" Intersections the Warrant Values for Minor Street Should be Increased by 50% (Warrant 1B only)

**No**

**Yes**

