

**King Mountain
Access Analysis**

July 27, 2010

Prepared for:

Alliance Properties
&
City of Bellingham

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Introduction

This report summarizes an evaluation of existing and forecasted traffic conditions in the King Mountain neighborhood of the City of Bellingham. Its purpose is to provide a quantitative basis for establishing a recommended road network to support development within the area and accommodate non-development traffic volumes that would likely use this road network to by-pass congestion on Guide Meridian Road (SR 539).

Potential future development within the area over a 20-year period could include up to 860 residential units and 10,000 to 20,000 SF of retail space. This scale of development will require a new road network within the development area with extensions of that network to connect with local arterials and the regional road network. It is anticipated that the combination of project impacts and growth in background traffic volumes will require some improvements to existing intersections and at least one new connection to Guide Meridian Road. Comprehensive Plan requirements for the area identify the need to provide an arterial connection between the intersections of Van Wyck Road/ Guide Meridian Road and James Street Road/ Bakerview Road. The extension of James Street Road to Van Wyck Road would at minimum require that James Street Road be improved and a new segment constructed to meet full standard secondary arterial requirements on the project site and minimum and minimum standard secondary arterial requirements between the project site and Kellogg Road. Van Wyck Road would need to be improved to meet full standard collector arterial requirements on the project site and minimum standard collector arterial requirements between the property and Guide Meridian.

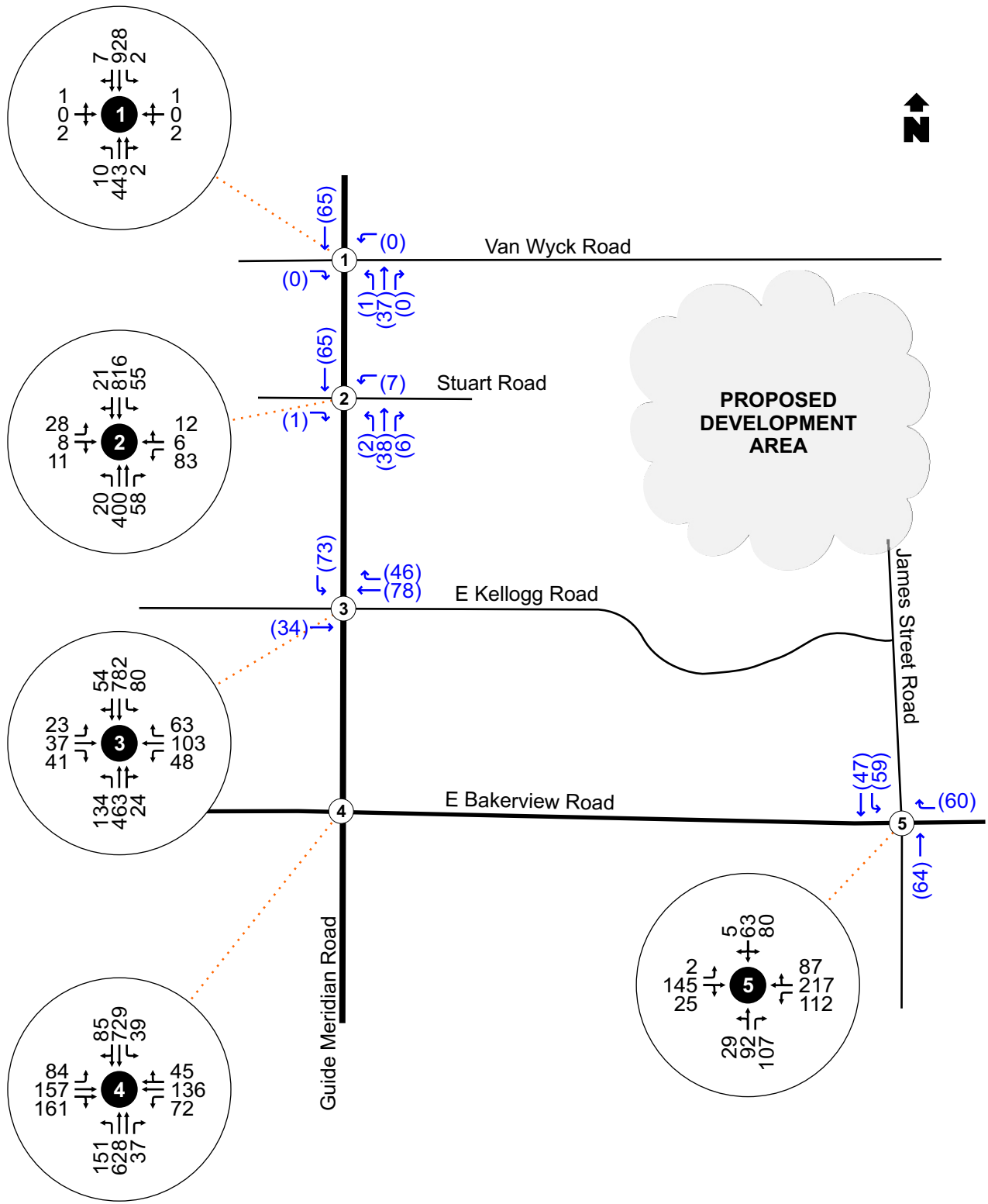
This report is organized to first present an evaluation of existing conditions to establish a baseline against which future conditions without and with the proposed development can be evaluated. The evaluation of forecasted conditions includes recommendations for intersection and roadway improvements to achieve acceptable levels of service.

Traffic Analysis

Existing Conditions

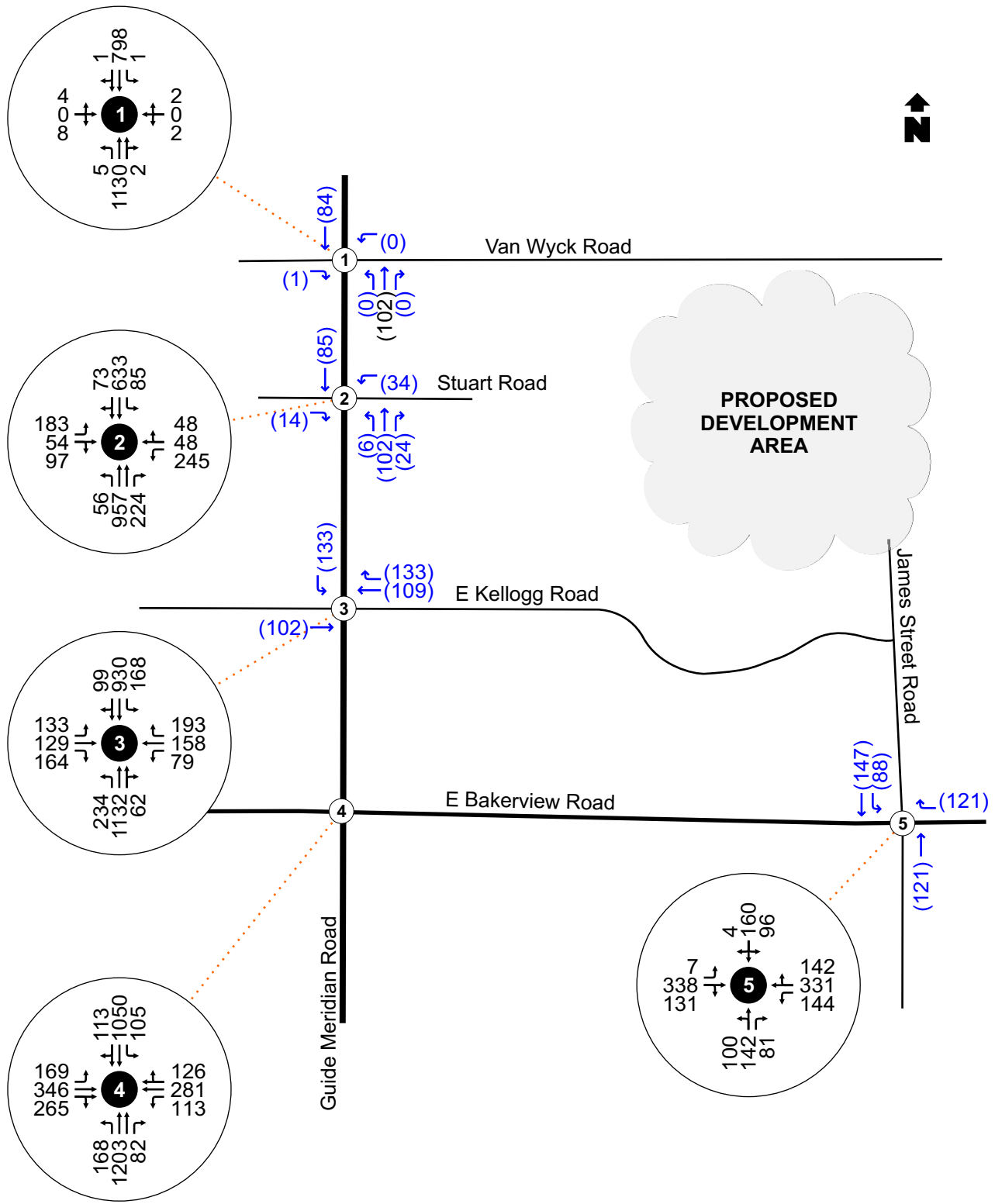
Five intersections were selected for analysis of AM and PM peak hour conditions. These intersections (See Table 1) represent the primary intersections that would be affected by development as well as potential future connection points to Guide Meridian Road. Turning movement counts were made at these intersections on

June 9, 2010, a Wednesday. All of the intersections are signalized except for Van Wyck Road/ Guide Meridian Road which is stop controlled on the Van Wyck approaches. Figure 1 illustrates the general location of the proposed development, the local road network, and existing AM peak hour turning movement volumes at analyzed intersections. Existing PM peak hour turning movements are illustrated in Figure 2. The figures also illustrate existing channelization at the analyzed intersections.



(##) Cut-Through Trips

**FIGURE 1:
AM PEAK HOUR TRAFFIC VOLUMES -
EXISTING (2010)**



(##) Cut-Through Trips

**FIGURE 2:
PM PEAK HOUR TRAFFIC VOLUMES -
EXISTING (2010)**

Table 1: Analyzed intersections

Intersection	Control
1. Van Wyck Rd/ Guide Meridian Rd	Signalized
2. Stuart Rd/ Guide Meridian Rd	Signalized
3. E Kellogg Rd/ Guide Meridian Rd	Signalized
4. E Bakerview Rd/ Guide Meridian Rd	Signalized
5. E Bakerview Rd/ James St Rd	Two-Way Stop (EB/WB)

Level of Service

Intersections generally limit the capacity of street networks because they create focused locations where most conflicting traffic movements must share available road space. Therefore, intersection performance serves as the primary measure of traffic flow quality. Level of service (LOS) is a measure of an intersection’s ability to accommodate the traffic that it serves. The Transportation Research Board developed the LOS methodology used in making this evaluation and it is summarized in the 2000 Highway Capacity Manual (HCM).

The 2000 HCM methodology is based on total seconds of delay due to the presence of intersection controls, or “control delay.” Level of service is defined by seconds of average vehicle delay. Intersection performance is divided into six grades ranging from “A,” which is very good, to “F,” which reflects a breakdown in traffic flow. The level of service category breakdown by control delay is summarized in Table 2.

Table 2: Intersection Level of Service Categories

Level of Service Grade	Traffic Signal Control Intersections Delay (sec)	Minor Approach Control Intersections Delay (sec)
A	<10	<10
B	10-20	10-15
C	20-35	15-25
D	35-55	25-35
E	55-80	35-50
F	>80	>50

Table 3 summarizes the AM peak hour levels of service for existing conditions while Table 4 summarizes PM peak hour levels of service. All intersections were found to operate at LOS-C or better during the AM peak hour and LOS-D or better during the PM peak hour.

Table 3: AM Peak Hour Level of Service – Existing (2010)

Intersection	Approach	2010 Existing		
		LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	C	20	0.01
	WB	C	19	0.01
Stuart Rd/ Guide Meridian Rd	Avg	B	13	0.35
W Kellogg Rd/ Guide Meridian Rd	Avg	B	14	0.38
W Bakerview Rd/ Guide Meridian Rd	Avg	C	21	0.48
W Bakerview Rd/ James St Rd	Avg	B	12	0.52

Table 4: PM Peak Hour Level of Service – Existing (2010)

Intersection	Approach	2010 Existing		
		LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	C	20	0.05
	WB	D	31	0.03
Stuart Rd/ Guide Meridian Rd	Avg	D	34	0.58
W Kellogg Rd/ Guide Meridian Rd	Avg	D	37	0.66
W Bakerview Rd/ Guide Meridian Rd	Avg	D	47	0.76
W Bakerview Rd/ James St Rd	Avg	C	22	0.82

Mitigation for the completed Spring Creek development within the King Mountain neighborhood included extending E. Kellogg Road from the project site to establish a new connection between E. James Street Road and Guide Meridian Road. This connection provides an alternative route for commuters wanting to by-pass congestion on Guide Meridian to the south of Bakerview Road.

Because the potential for additional cut-through traffic will increase with the addition of a new route between Guide Meridian and James Road via Van Wyck Road, it is important that we quantify the impact of cut-through traffic volumes to ensure that the future road network is designed to accommodate forecasted volumes while minimizing impacts to nearby residents.

Because there are only two intersections (Guide Meridian/ Kellogg and Bakerview/James) serving the area it is possible to estimate cut-through traffic volumes by removing traffic generated by existing land uses from the total traffic volumes entering and exiting the project area at the two intersections. This was accomplished by estimating the trips generated by existing land uses in the project site. There are approximately 155 developed parcels in the area that are predominantly single family homes. These homes would generate 118 AM peak hour and 155 PM peak hour trips. Using a distribution pattern based on observed turning movement counts, these trips were removed from the total entering and exiting traffic volumes. The remaining volumes could be considered as cut-through traffic. However, with the removal of residential traffic volumes from the total traffic

volumes it was found that the remaining entering volumes did not balance with the remaining exiting traffic volumes. To maintain a conservative analysis, the lower entering and exiting volumes were used to establish adjusted cut-through traffic volumes. Table 3 summarizes the calculations for the AM and PM peak hours. The difference between ‘total volumes’ and the sum of ‘residential volumes’ and ‘adjusted cut-through’ represents traffic that is circulating in the development area that is not accounted for by existing land uses or cut-through traffic. For purposes of this analysis it will remain as part of the background traffic volumes.

Table 5: Cut-Through Traffic Volume Calculations

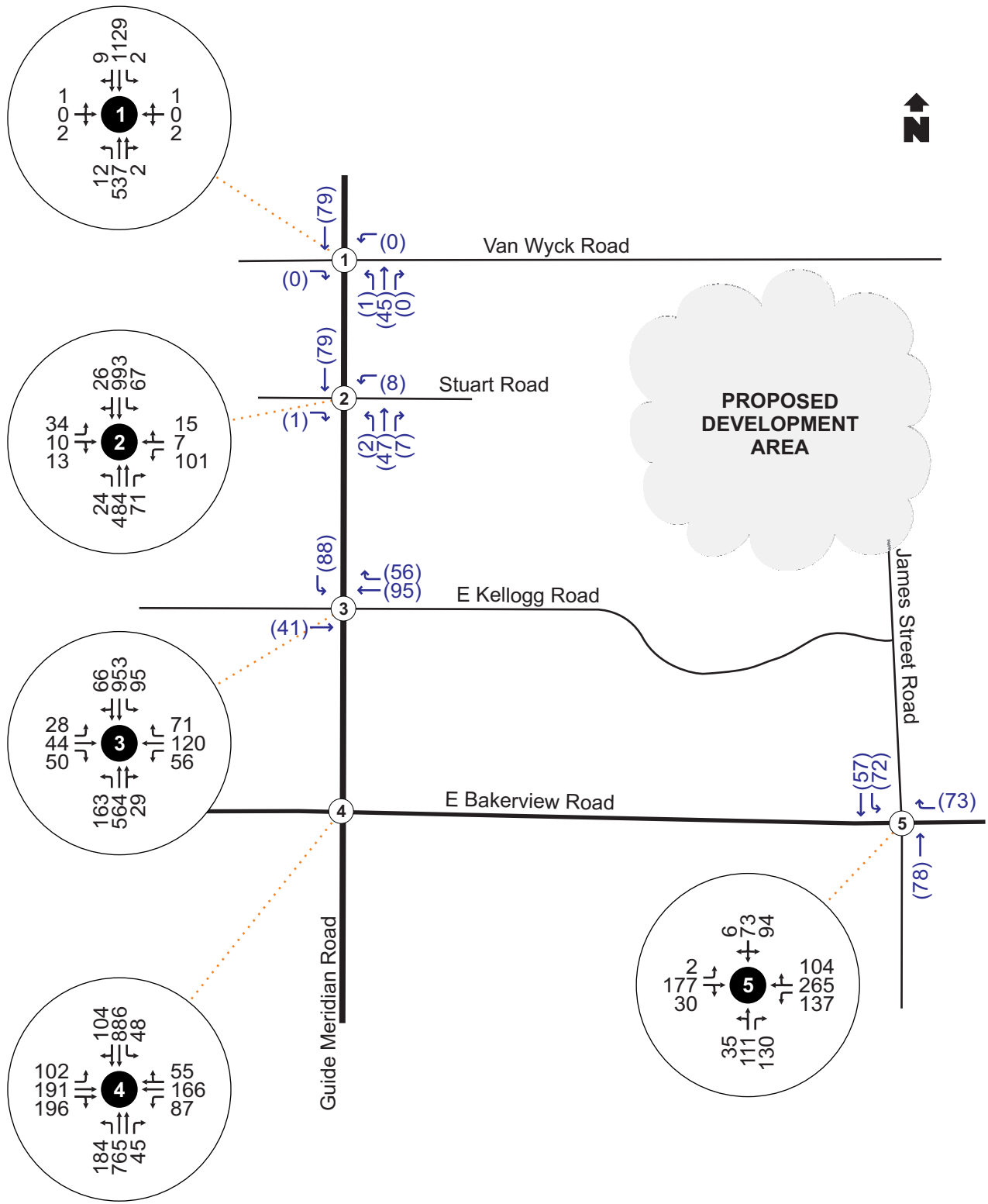
Peak Hour	Total Volumes	Residential Volumes	Calculated Cut-Through	Adjusted Cut-Through
AM Peak Hour				
Entering	322	-30	=292	230
Exiting	360	-88	=272	230
Total	682	- 118	=564	460
PM Peak Hour				
Entering	650	-98	=552	477
Exiting	690	-58	=632	477
Total	1,340	-156	=1,184	954

The turning movement volumes for existing cut-through traffic are included in Figure 1 (AM peak hour) and Figure 2 (PM peak hour).

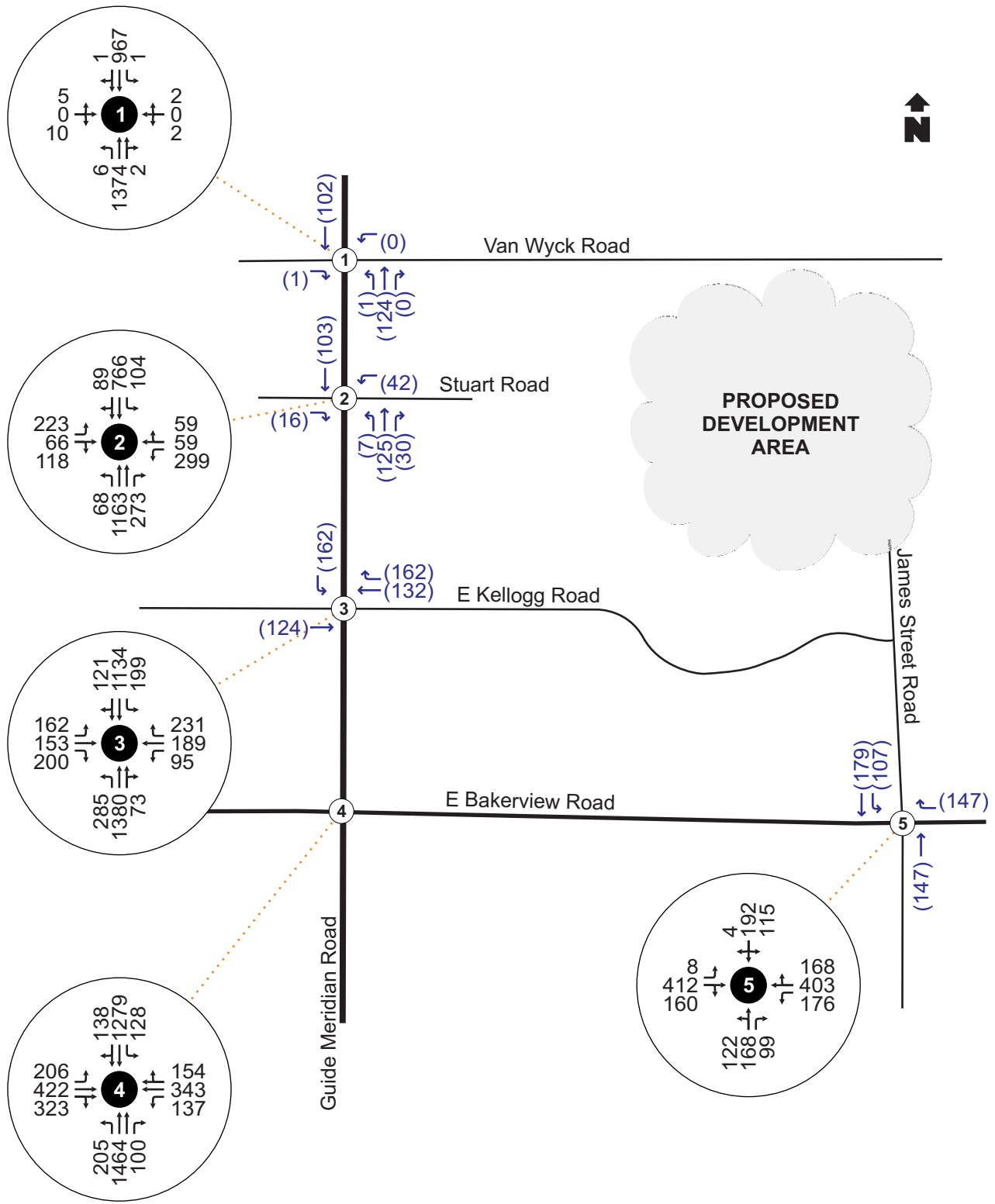
Future Conditions without the Proposed Development

To establish a future baseline against which future project generated traffic volumes can be compared, existing 2010 traffic volumes were increased by 2% per year to establish a baseline for 2020 and 2030. The annual 2% growth rate was not applied to trips generated by the existing residential land uses that use Kellogg or James to access the local road network. The effect of a 2% annual growth rate over a 20 year period is that traffic volumes will increase by approximately 50%. Forecasted traffic volumes for 2020 and 2030 without the proposed development are illustrated in the following figures:

- Figure 3: AM Peak Hour Traffic Volumes – Without Project (2020)
- Figure 4: PM Peak Hour Traffic Volumes – Without Project (2020)
- Figure 5: AM Peak Hour Traffic Volumes – Without Project (2030)
- Figure 6: PM Peak Hour Traffic Volumes – Without Project (2030)

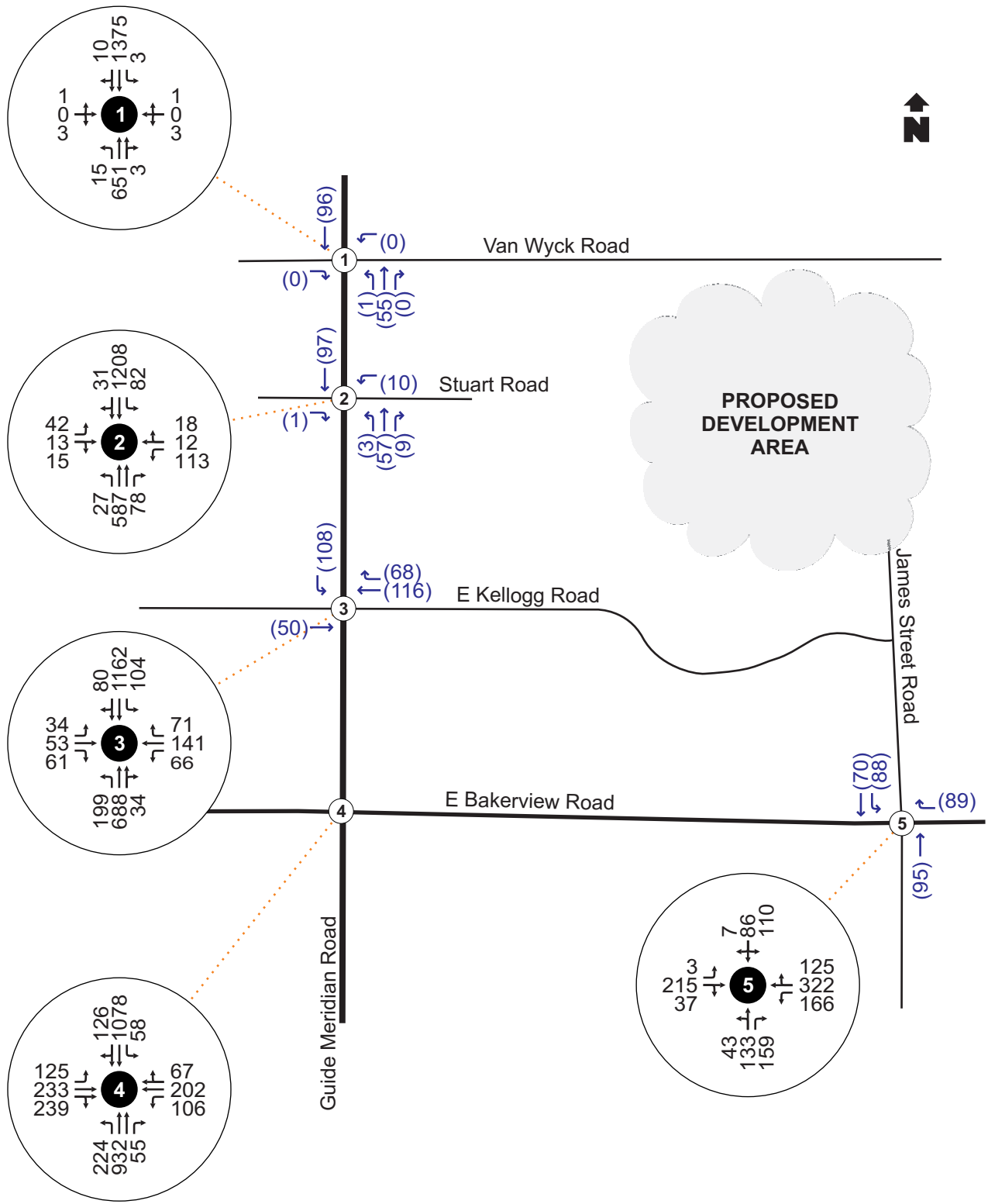


**FIGURE 3:
AM PEAK HOUR TRAFFIC VOLUMES -
WITHOUT PROJECT (2020)**



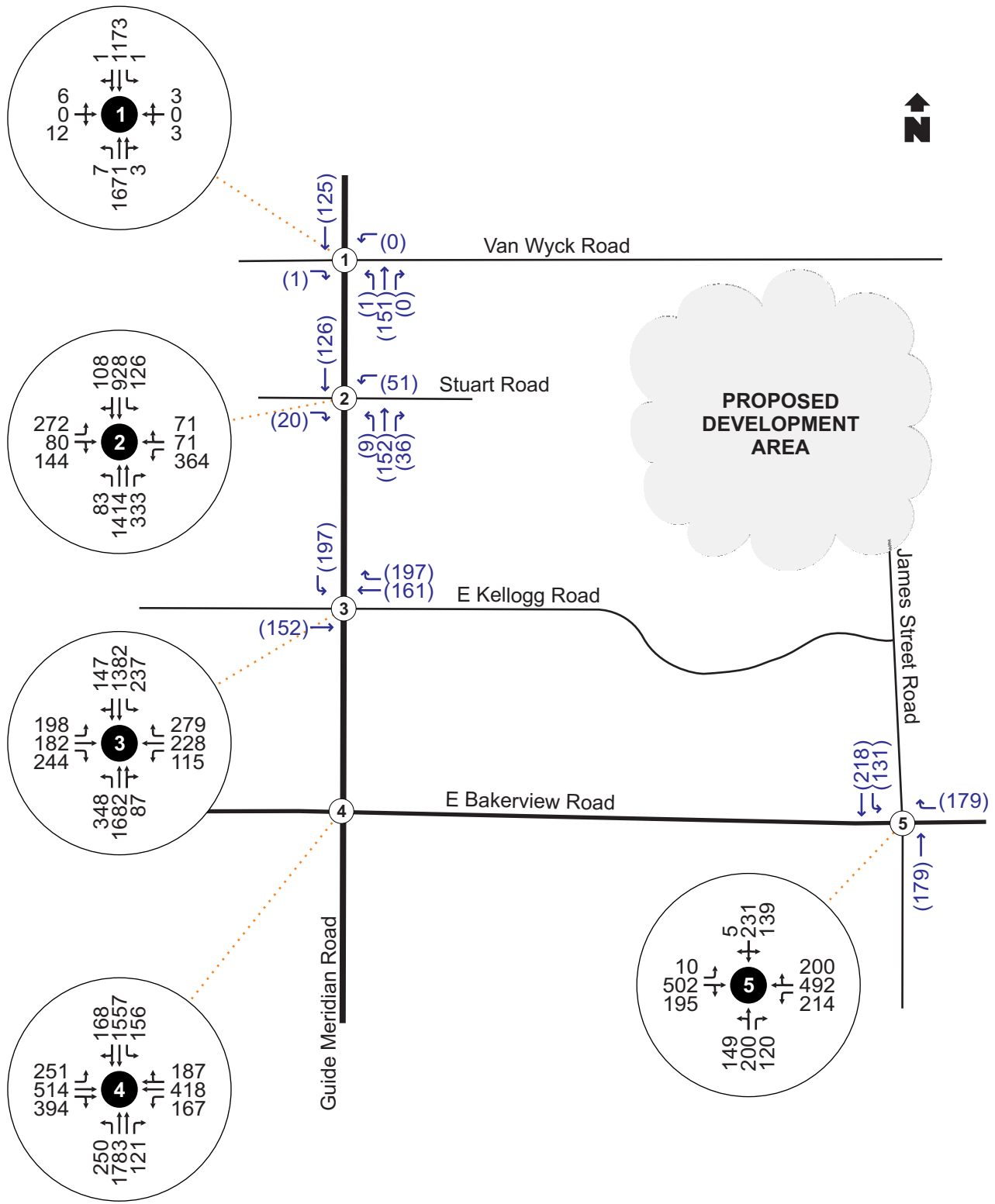
(##) Cut-Through Trips

**FIGURE 4:
PM PEAK HOUR TRAFFIC VOLUMES -
WITHOUT PROJECT (2020)**



(##) Cut-Through Trips

**FIGURE 5:
AM PEAK HOUR TRAFFIC VOLUMES -
WITHOUT PROJECT (2030)**



(##) Cut-Through Trips

**FIGURE 6:
PM PEAK HOUR TRAFFIC VOLUMES -
WITHOUT PROJECT (2030)**

Traffic Operations

For the purposes of analyzing 2020 and 2030 without development conditions, it is assumed that intersection channelization, intersection controls, and the existing road network remain unchanged.

Table 6: AM Peak Hour Level of Service – Without Project (2020)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	E	35	0.06
	WB	D	32	0.05
Stuart Rd/ Guide Meridian Rd	Avg	B	15	0.62
W Kellogg Rd/ Guide Meridian Rd	Avg	C	24	0.66
W Bakerview Rd/ Guide Meridian Rd	Avg	C	29	0.67
W Bakerview Rd/ James St Rd	Avg	B	13	0.66

Table 7: PM Peak Hour Level of Service – Without Project (2020)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	C	23	0.13
	WB	E	43	0.1
Stuart Rd/ Guide Meridian Rd	Avg	D	40	1.0
W Kellogg Rd/ Guide Meridian Rd	Avg	D	38	0.92
W Bakerview Rd/ Guide Meridian Rd	Avg	E	75	0.92
W Bakerview Rd/ James St Rd	Avg	D	41	0.93

Table 8: AM Peak Hour Level of Service – Without Project (2030)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	F	50	0.12
	WB	F	54	0.12
Stuart Rd/ Guide Meridian Rd	Avg	B	20	0.96
W Kellogg Rd/ Guide Meridian Rd	Avg	C	33	0.77
W Bakerview Rd/ Guide Meridian Rd	Avg	D	50	0.85
W Bakerview Rd/ James St Rd	Avg	B	16	0.78

Table 9: PM Peak Hour Level of Service – Without Project (2030)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	E	43	0.27
	WB	F	137	0.31
Stuart Rd/ Guide Meridian Rd	Avg	D	55	1.06
W Kellogg Rd/ Guide Meridian Rd	Avg	E	74	1.06
W Bakerview Rd/ Guide Meridian Rd	Avg	F	142	1.17
W Bakerview Rd/ James St Rd	Avg	F	88	1.08

In 2020 without the development, all signalized intersections are forecasted to operate at LOS-C or better during the AM peak hour and LOS-D or better during the PM peak hour with the exception of W Bakerview Road/ Guide Meridian Road, which is forecasted to drop to LOS-E. At the two-way stop controlled intersection of Van Wyck/ Guide Meridian Road, the increase in through traffic volumes reduces the frequency of adequate gaps for vehicles entering from the controlled approaches resulting in a drop in level of service. This drop in level of service affects very few vehicles and it is likely that vehicles will alter their route in order to avoid the increase in delay.

In 2030 without the development, all signalized intersections are forecasted to operate at the same level of service as 2020 conditions during the AM peak hour with increases in delay except for the intersection of W Bakerview Road/ Guide Meridian Road which would drop to LOS-D. During the PM peak hour increases in delay between 2020 and 2030 will cause a drop in level of service at the signalized intersections of: Kellogg Rd/ Guide Meridian Rd (LOS-E), Bakerview Rd/ Guide Meridian Rd (LOS-F), and Bakerview Rd/ James St Rd (LOS-F). At the two-way stop controlled intersection of Van Wyck/ Guide Meridian Road, increases in through traffic volumes that are forecasted to materialize between 2020 and 2030 will further decrease the available gaps for vehicles entering from the controlled approaches resulting in a drop in level of service on the controlled approaches.

Future Conditions with the Proposed Development

Project Description and Trip Generation Forecast

Development within the King Mountain neighborhood is anticipated to occur in phases over a 20-year period (2030). This analysis evaluates traffic conditions for future conditions in 10 years (2020) when approximately half of the development would be completed and in 20 years (2030) when the project should be fully complete. Table 10 summarizes the anticipated development program.

Table 10: Development Program

Development	2020	2030
Single Family Homes	250	500
Town Homes or Condominium Units	120	240
Apartment Units	60	120
Commercial Retail	10,000 SF	20,000 SF

The trip generation forecast for these land uses is summarized in Table 11 (weekday), Table 12 (AM peak hour), and Table 13 (PM peak hour) below.

TABLE 11: DAILY TRIP GENERATION FORECAST

Land Use	Units	Avg. Rate	Size		Daily Trips Generated	
			2020	2030	2020	2030
Single Family Homes (LUC 210)	Dwellings	9.57	250 DU	500 DU	2,393	4,785
Town Homes/ Condominiums (LUC 230)	Dwellings	5.81	120 DU	240 DU	697	1,394
Apartments (LUC 220)	Dwellings	6.65	60 DU	120 DU	399	798
Specialty Retail (LUC 814)	1,000 SF	44.32	10 K SF	20K SF	443	886
<i>Retail with Pass-by Adjustment (-25%)</i>					332	665
Totals with Retail Pass-by Adjustment					3,821	7,642

TABLE 12: AM PEAK HOUR TRIP GENERATION FORECAST

Land Use	Units	Avg. Rate	Size		AM Peak Hour Trips Generated					
			2020	2030	2020			2030		
					Total	In	Out	Total	In	Out
Single Family Homes (LUC 210)	Dwellings	0.75	250 DU	500 DU	188	58	130	375	116	259
Town Homes/ Condominiums (LUC 230)	Dwellings	0.44	120 DU	240 DU	53	9	44	106	17	89
Apartments (LUC 220)	Dwellings	0.51	60 DU	120 DU	31	6	25	61	12	49
Specialty Retail (LUC 814)	1,000 SF	0.73 ¹	10 K SF	20K SF	7	3	4	15	7	8
<i>Retail with Pass-by Adjustment (-25%)</i>					5	2	3	11	5	6
Totals with Retail Pass-by Adjustment					277	75	202	553	150	403

Source: ITE Trip Generation Manual, 8th Edition

¹AM rate not included in ITE Manual. AM rate calculated by comparing the PM peak hour rate to the ratio of AM/ PM peak hour rates for a Shopping Center (LUC 820).

TABLE 13: PM PEAK HOUR TRIP GENERATION FORECAST

Land Use	Units	Avg. Rate	Size		PM Peak Hour Trips Generated					
			2020	2030	2020			2030		
					Total	In	Out	Total	In	Out
Single Family Homes (LUC 210)	Dwellings	1.01	250 DU	500 DU	253	167	86	505	333	172
Town Homes/ Condominiums (LUC 230)	Dwellings	0.52	120 DU	240 DU	62	42	20	125	84	41
Apartments (LUC 220)	Dwellings	0.62	60 DU	120 DU	37	24	13	74	48	26
Specialty Retail (LUC 814)	1,000 SF	2.70	10 K SF	20K SF	27	12	15	54	24	30
<i>Retail with Pass-by Adjustment (-25%)</i>					20	9	11	41	18	23
Totals with Retail Pass-by Adjustment					372	242	130	745	483	262

Trip Distribution and Assignment

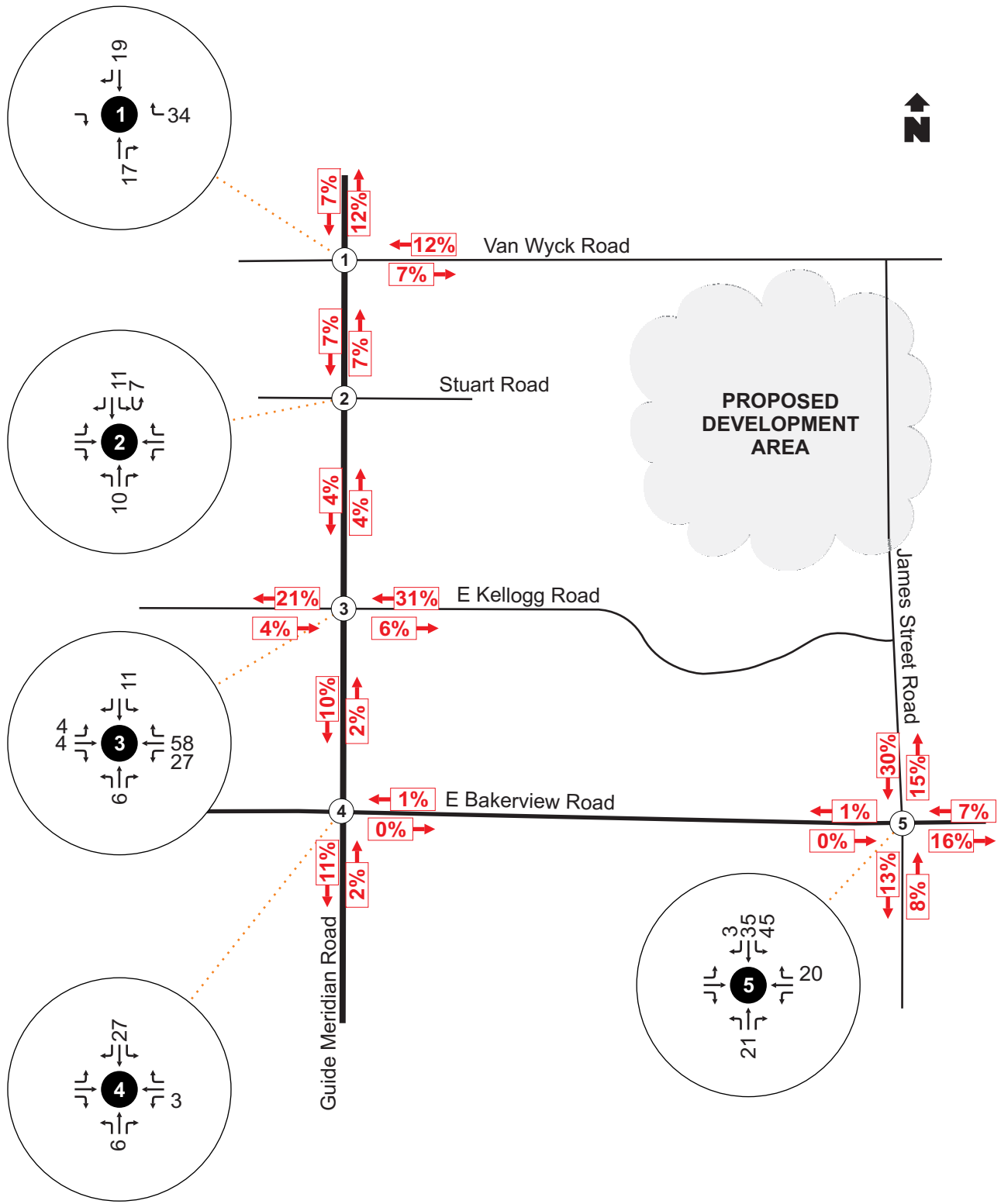
The assignment of peak hour project generated trips is based on the distribution of existing traffic volumes where volumes are heaviest southbound as people travel from home to work during the AM peak hour. The volumes are reversed and somewhat greater during the PM peak hour as motorists primarily travel northbound from work to home. The distribution and assignment of project generated peak hour traffic volumes are illustrated in the following figures:

- Figure 7: AM Peak Hour Project Trip Distribution and Assignment (2020)
- Figure 8: PM Peak Hour Project Trip Distribution and Assignment (2020)
- Figure 9: AM Peak Hour Project Trip Distribution and Assignment (2030)
- Figure 10: PM Peak Hour Project Trip Distribution and Assignment (2030)

The project trip assignments were added to the future without project forecasts to establish future with project conditions. The cumulative volumes along with assigned cut-through traffic volumes are illustrated in the following figures:

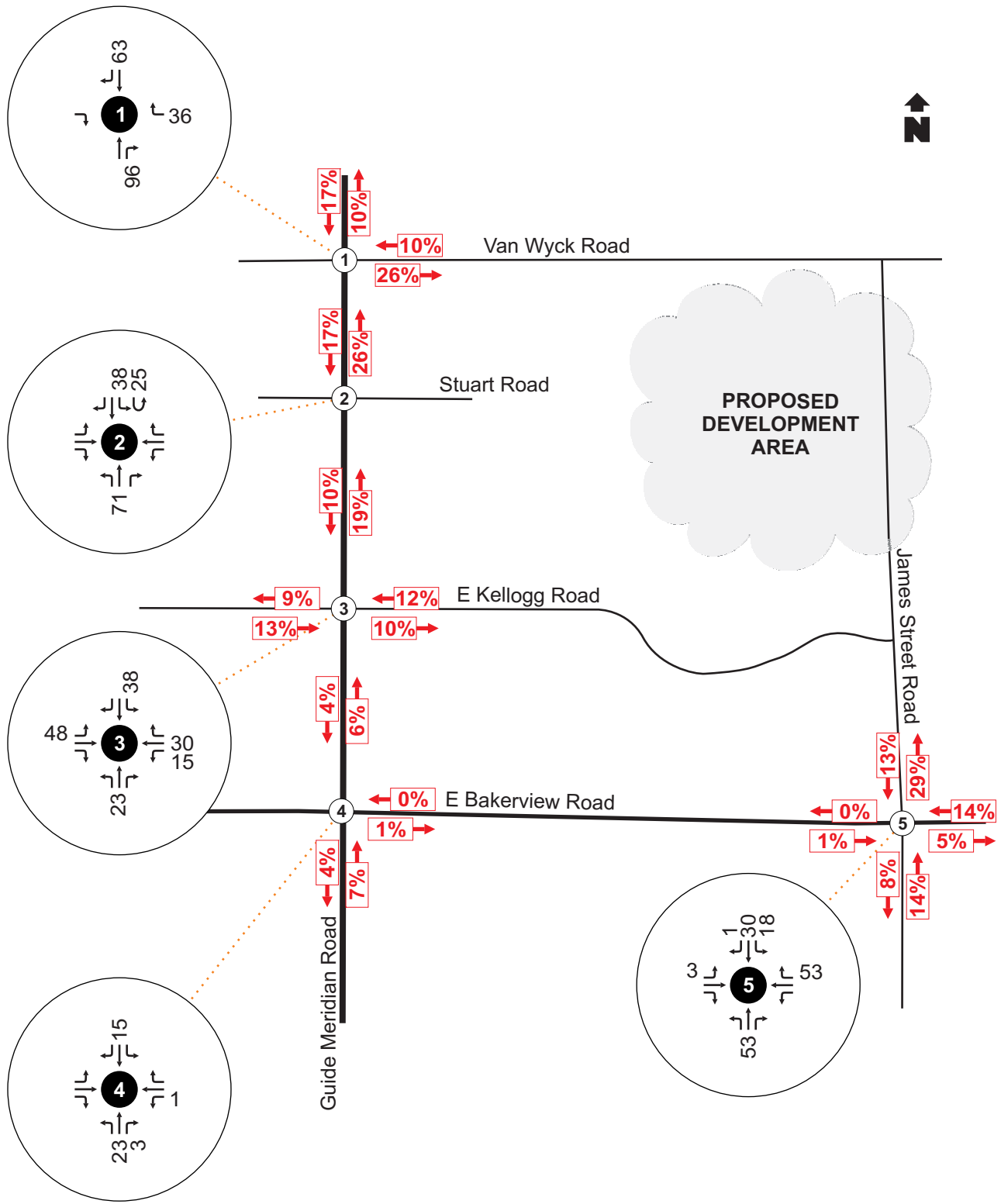
- Figure 11: AM Peak Hour Traffic Volumes – With Project (2020)
- Figure 12: PM Peak Hour Traffic Volumes – With Project (2020)
- Figure 13: AM Peak Hour Traffic Volumes – With Project (2030)
- Figure 14: PM Peak Hour Traffic Volumes – With Project (2030)

The distribution patterns for both 2020 and 2030 assume that E James Street Road will be extended northward to connect with Van Wyck Road. It also assumes that uncontrolled left turns will be prohibited on Guide Meridian and that stop controlled approaches to Guide Meridian will be restricted to right-in and right-out turning movements. These restrictions would require the U-turns be allowed at selected signalized intersections. For the purposes of this analysis it is assumed that southbound to northbound U-turns will be allowed at Stuart Road to provide access to Van Wyck Road.

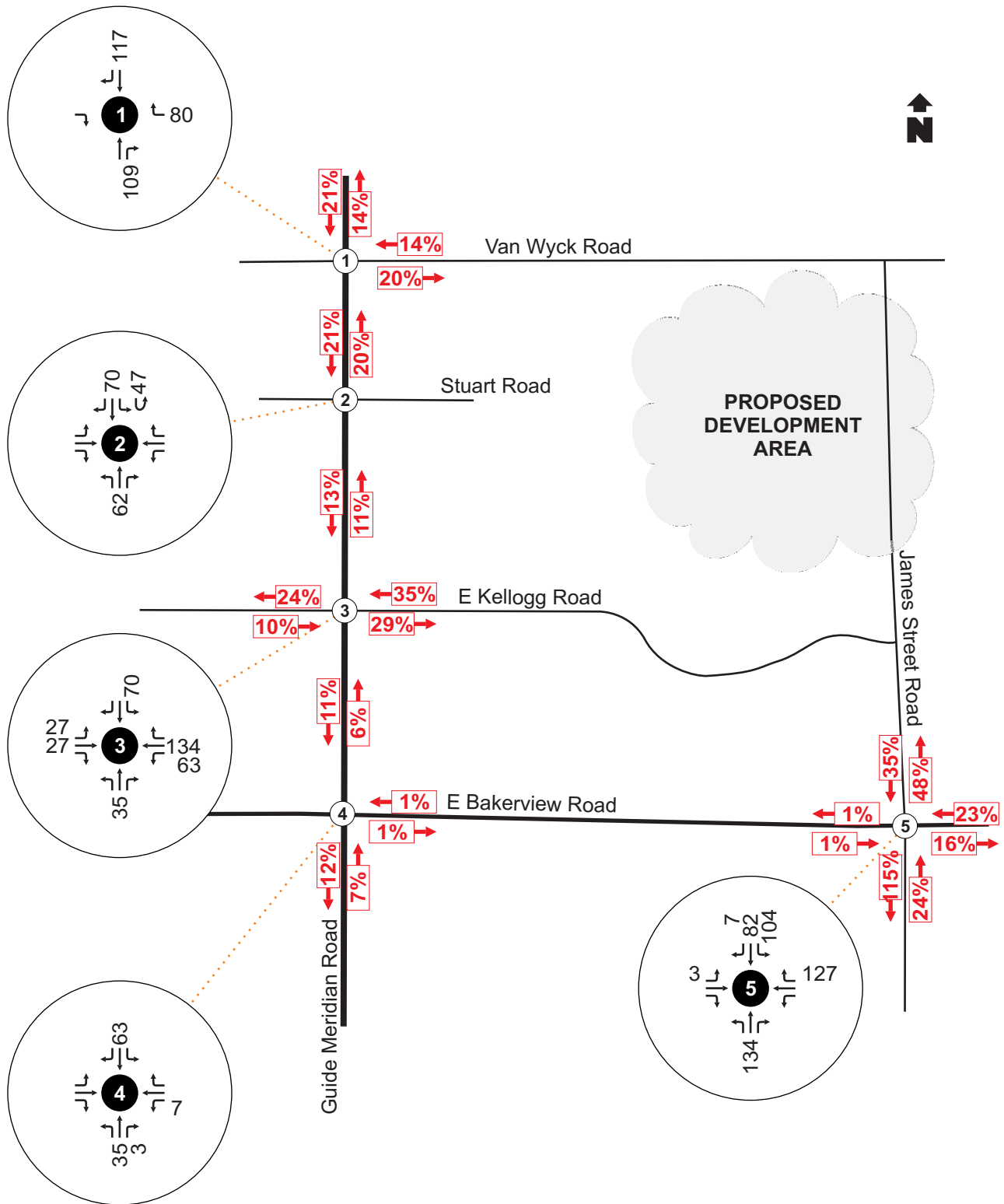


**FIGURE 7:
AM PEAK HOUR PROJECT TRIP
DISTRIBUTION AND ASSIGNMENT (2020)**

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**FIGURE 8:
PM PEAK HOUR PROJECT TRIP
DISTRIBUTION AND ASSIGNMENT (2020)**



**FIGURE 9:
 AM PEAK HOUR PROJECT TRIP
 DISTRIBUTION AND ASSIGNMENT (2030)**

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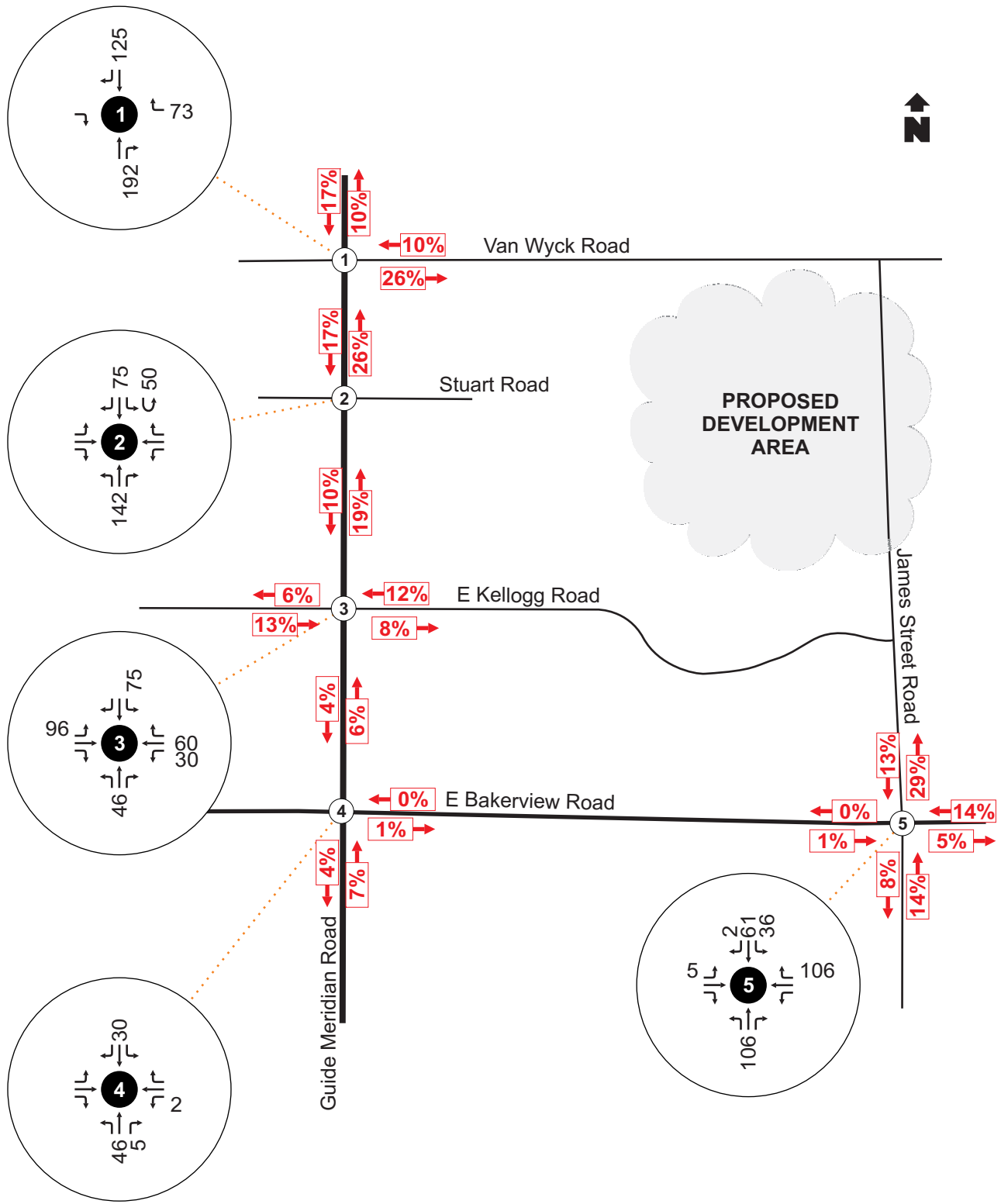
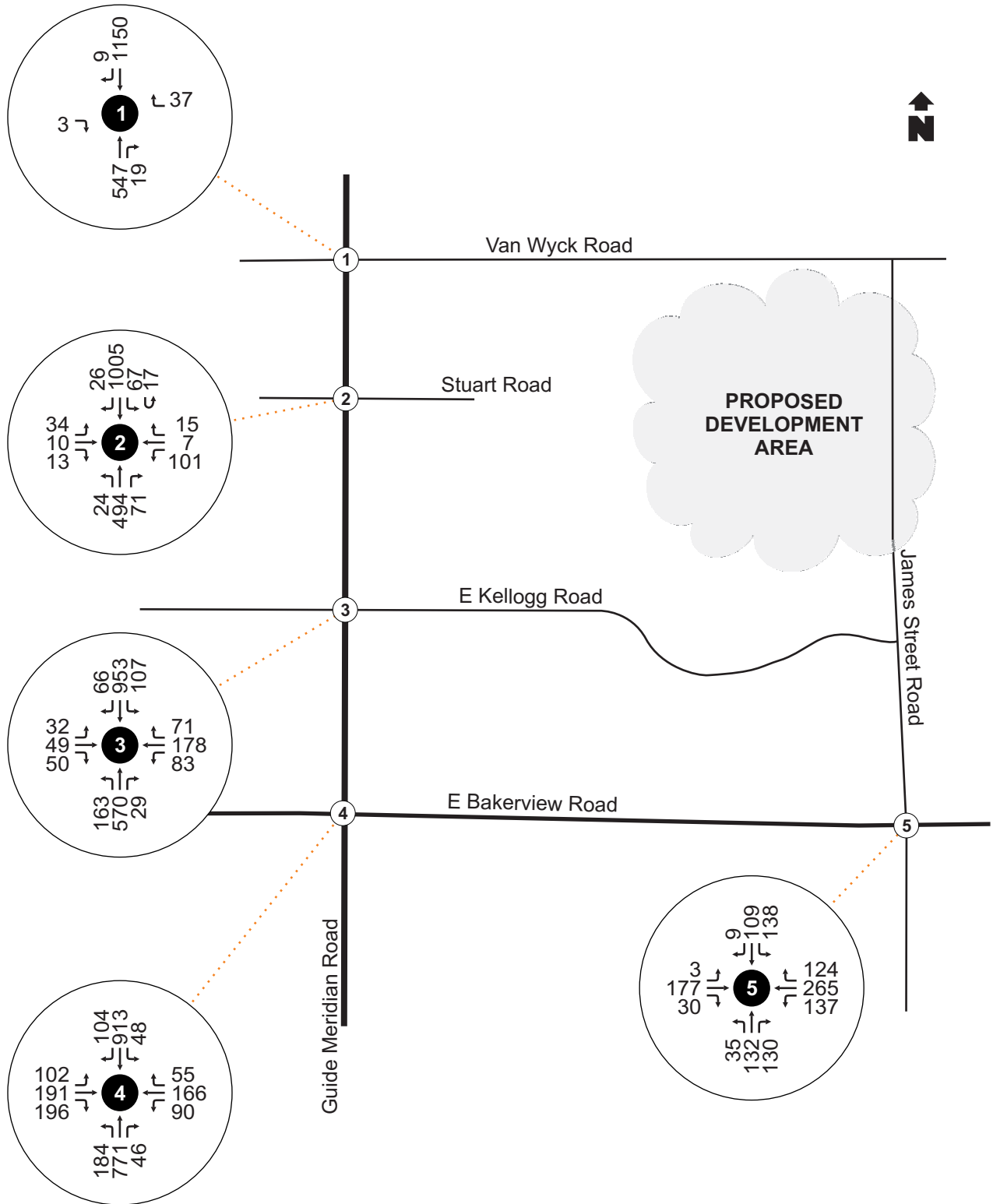


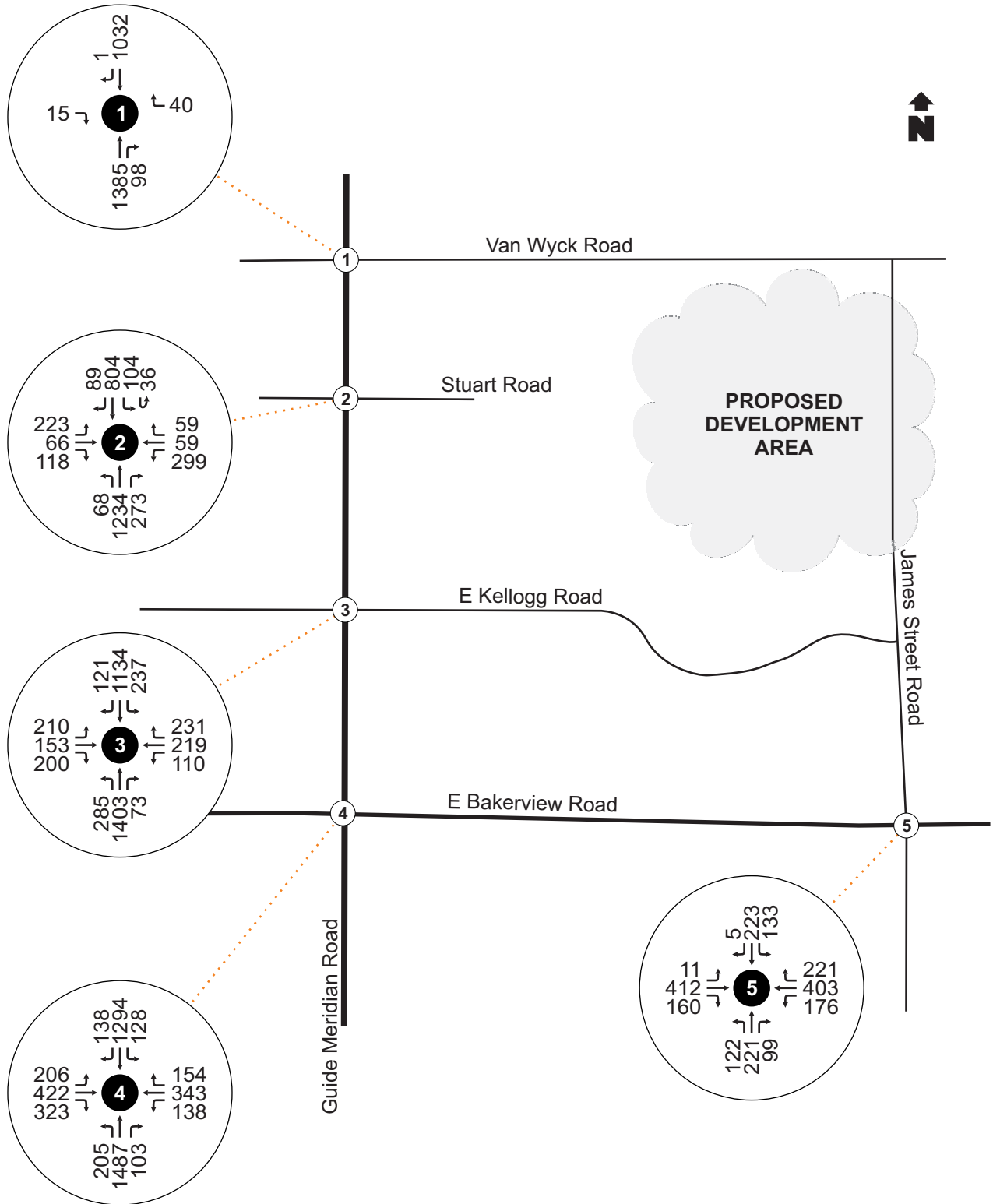
FIGURE 10:
PM PEAK HOUR PROJECT TRIP
DISTRIBUTION AND ASSIGNMENT (2030)

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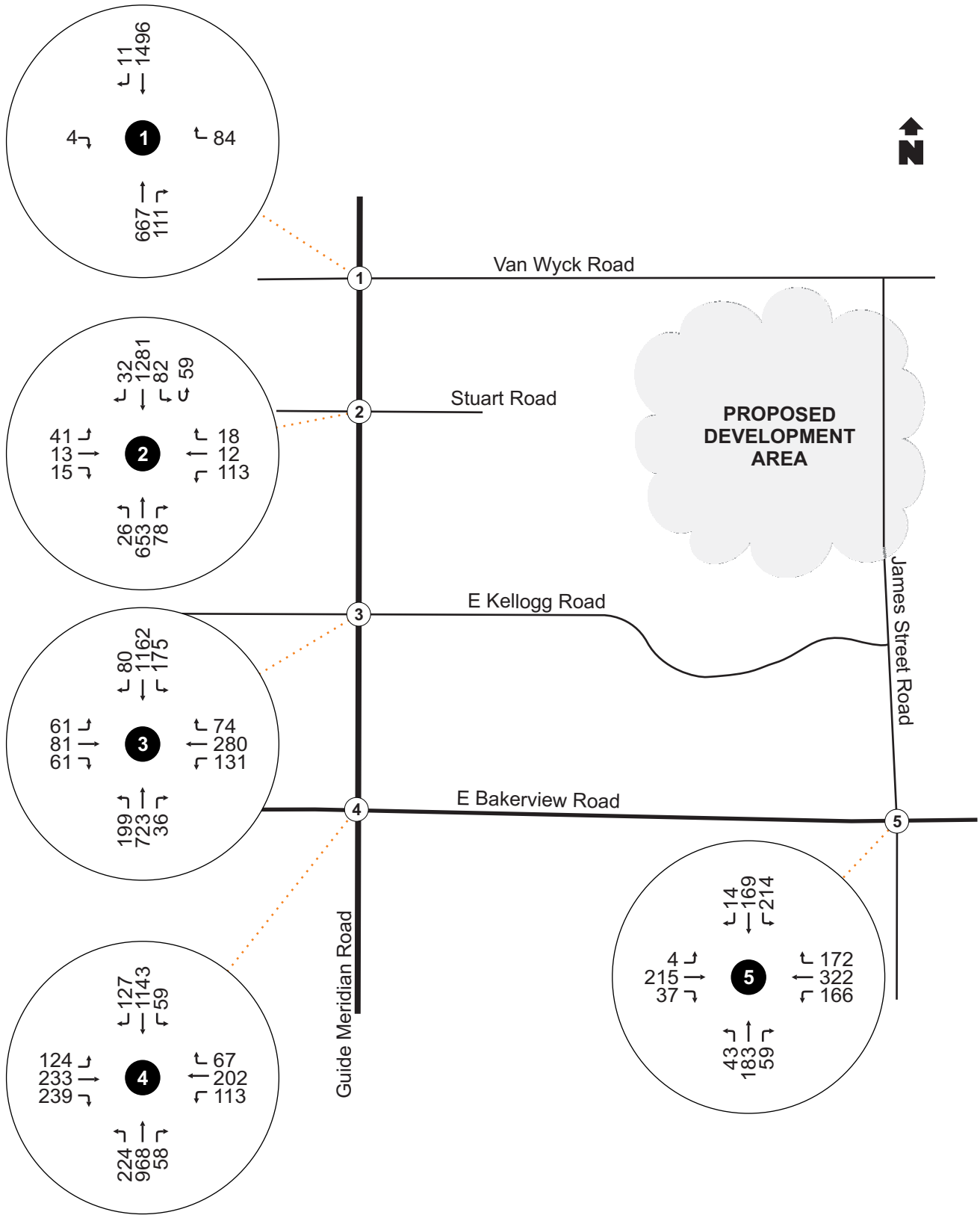
**FIGURE 11:
AM PEAK HOUR TRAFFIC VOLUMES -
WITH PROJECT (2020)**

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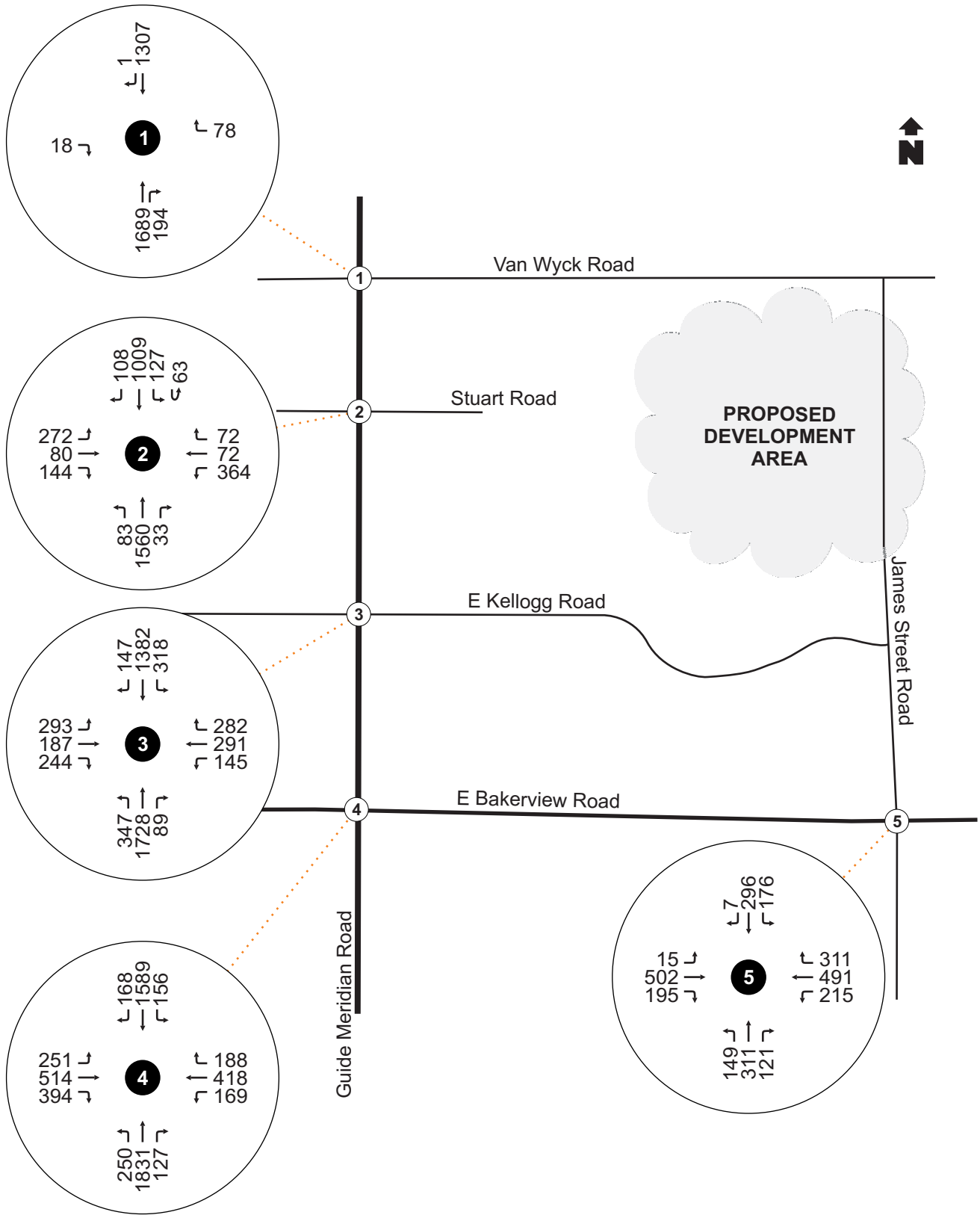


**FIGURE 12:
PM PEAK HOUR TRAFFIC VOLUMES -
WITH PROJECT (2020)**

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**FIGURE 13:
AM PEAK HOUR TRAFFIC VOLUMES -
WITH PROJECT (2030)**



**FIGURE 14:
PM PEAK HOUR TRAFFIC VOLUMES
WITH PROJECT (2030)**

Traffic Operations

For the purposes of analyzing 2020 and 2030 with development conditions, it is assumed that intersection channelization, intersection controls, and the existing road network remain unchanged with the exception that James Street Road would be extended to connect with Van Wyck Road. It is also assumed that under future with project conditions that left turn movements would be prohibited at the intersection of Van Wyck Road/ Guide Meridian Road.

Table 11: AM Peak Hour Level of Service – With Project (2020)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	B	15	0.02
	WB	B	11	0.14
Stuart Rd/ Guide Meridian Rd	Avg	B	15	0.63
W Kellogg Rd/ Guide Meridian Rd	Avg	C	28	0.71
W Bakerview Rd/ Guide Meridian Rd	Avg	C	30	0.69
W Bakerview Rd/ James St Rd	Avg	B	16	0.76

Table 12: PM Peak Hour Level of Service – With Project (2020)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	B	13	0.06
	WB	B	11	0.11
Stuart Rd/ Guide Meridian Rd	Avg	D	46	0.95
W Kellogg Rd/ Guide Meridian Rd	Avg	D	53	1.01
W Bakerview Rd/ Guide Meridian Rd	Avg	E	76	0.92
W Bakerview Rd/ James St Rd	Avg	D	54	1.02

Table 13: AM Peak Hour Level of Service – With Project (2030)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	C	19	0.40
	WB	B	11	0.25
Stuart Rd/ Guide Meridian Rd	Avg	D	42	1.34
W Kellogg Rd/ Guide Meridian Rd	Avg	D	40	0.87
W Bakerview Rd/ Guide Meridian Rd	Avg	D	48	0.91
W Bakerview Rd/ James St Rd	Avg	E	66	1.09

Table 14: PM Peak Hour Level of Service – With Project (2030)

Intersection	Approach	LOS	Delay	v/c
Van Wyck Rd/ Guide Meridian Rd	EB	B	15	0.09
	WB	B	14	0.27
Stuart Rd/ Guide Meridian Rd	Avg	E	64	1.10
W Kellogg Rd/ Guide Meridian Rd	Avg	F	132	1.34
W Bakerview Rd/ Guide Meridian Rd	Avg	F	149	1.19
W Bakerview Rd/ James St Rd	Avg	F	159	1.35

In 2020 with the addition of AM peak hour project generated trips to the road network all signalized intersections will operate at the same level of service as 2020 without project conditions. Level of service at Van Wyck/ Guide Meridian will improve when left turn movements are prohibited. Approaches to all intersections are forecasted to operate at LOS-D or better. During the PM peak hour, delays will increase under with project conditions but level of service will not degrade because of the addition of project trips. Problematic approaches include the following:

- Stuart Rd/ Guide Meridian Rd: westbound approach operates at LOS-F
- Kellogg Rd/ Guide Meridian Rd: eastbound approach operates at LOS-E
- Bakerview Rd/ Guide Meridian Rd: eastbound and westbound approaches operate at LOS-F, northbound and southbound approaches operate at LOS-E
- Bakerview Rd/ James Street Rd: southbound approach operates at LOS-F

In 2030 with the development, the addition of project trips during the AM peak hour will cause the following drops in level of service when compared to 2030 without project conditions:

- Stuart Rd/ Guide Meridian Rd is forecasted to drop from LOS-B to LOS-D. The through movements on Guide Meridian are forecasted to operate at LOS-B but the westbound approach would operate at LOS-F.
- Bakerview Rd/ Guide Meridian Rd will continue to operate at LOS-D with the eastbound and westbound approaches operating at LOS-E. The critical southbound approach would operate at LOS-D while the northbound approach would operate at LOS-C.
- Bakerview Rd/ James Street Rd is forecasted to drop from LOS-B to LOS-E due to increased volumes on the westbound and southbound approaches which are forecasted to operate at LOS-F.

In 2030 with the development, the addition of project trips during the PM peak hour will cause the following drops in level of service when compared to 2030 without project conditions:

- Stuart Rd/ Guide Meridian Rd is forecasted to drop from LOS-D to LOS-E. The northbound through movement on Guide Meridian are forecasted to operate at LOS-E while the eastbound and westbound approaches are forecasted to operate at LOSE and LOS-F respectively.
- Kellogg Rd/ Guide Meridian Rd is forecasted to remain at LOS-F with a minor increase in delay. All approaches would operate at LOS-F.
- Bakerview Rd/ Guide Meridian Rd is forecasted to drop from LOS-C to LOS-D.
- Bakerview Rd/ Guide Meridian Rd would continue to operate at LOS-F with all approaches also operating at LOS-F.
- Bakerview Rd/ James Street Rd would continue to operate at LOS-F with a significant increase in delay. All approaches would also operate at LOS-F except for the northbound approach which would operate at LOS-D.

Traffic Operations with Road and Intersection Improvements

Forecasted increases in vehicle delay and drops in level of service at the analyzed intersections are largely driven by the forecasted growth of background traffic volumes resulting in substantial increases in delay along Guide Meridian Road.

Under 2020 with project conditions, all intersections are operating at LOS-C or better during the AM peak hour and LOS-E or better during the PM peak hour. The addition of a new Van Wyck connection to link Guide Meridian Road to E Bakerview Road via James Street Road would be beneficial to relieve some of the congestion but probably not essential from a traffic operations perspective. Project generated traffic could use James Street Road and Kellogg Road as primary travel routes prior to 2020. However, in order to provide arterial access to the project site, James Street would need improvements to meet arterial standards prior to extending James to connect with Van Wyck and improving Van Wyck to meet arterial standards. As stated in the introduction:

“Comprehensive Plan requirements for the area identify the need to provide an arterial connection between the intersections of Van Wyck Road/ Guide Meridian Road and James Street Road/ Bakerview Road. The extension of James Street Road to Van Wyck Road would at minimum require that James Street Road be improved and a new segment constructed to meet full standard secondary arterial requirements on the project site and minimum and minimum standard secondary arterial requirements between the project site and Kellogg Road. Van Wyck Road would need to be improved to meet full standard collector arterial requirements on the project site and minimum standard collector arterial requirements between the property and Guide Meridian.”

The timing of these improvements in relationship to project phases will need to be negotiated and documented in the development agreement or other project document.

Improvements to the intersection of Bakerview/ James Street Road would likely be needed before 2020 to improve level of service on the James Street Road approaches. The addition of a left turn lane on the southbound approach and a left turn lane on the northbound approach would improve approach level of service and improve overall intersection level of service to LOS-C during the PM peak hour (See Table 16).

By 2030, the forecasted increases in traffic volumes present a more challenging situation. The Van Wyck connection between Grand Meridian Road James Street Road provides an alternative route that could reduce PM peak hour northbound congestion on Guide Meridian Road. To test the effect of the Van Wyck connection, 200 vehicles making a northbound through movement on Grand Meridian were shifted to the northbound through movement at Bakerview/ James and the westbound right turn movement at Van Wyck/ Guide Meridian. To accommodate this shift, channelization at Bakerview/ James was adjusted to provide separate left, through, and right turn lanes on all approaches except for the southbound approach which would have a left turn lane and a shared through and right turn lane. The findings are summarized in Table 15.













Table 15: Effect of Traffic Shift to Van Wyck - With Project (2030)









Intersection	Movement	Without Shift		With Shift	
		LOS	Delay	LOS	Delay
Van Wyck Rd/ Guide Meridian Rd	WB-RT	B	14	E	44
Stuart Rd/ Guide Meridian Rd	NB-T	E	67	D	48
W Kellogg Rd/ Guide Meridian Rd	NB-T	F	164	F	98
W Bakerview Rd/ Guide Meridian Rd	NB-T	F	159	F	99
W Bakerview Rd/ James St Rd	NB-T	D	40	D	48

In summary, the effect of this shift would be a 60 second reduction in the northbound through movements at Bakerview/ Guide Meridian and Kellogg/ Guide Meridian and a 30 second reduction in delay for the northbound through movement at Stuart/ Guide Meridian. Delay on the northbound through movement at Bakerview/ James would increase by 8 seconds while delay for the westbound right turn movement at Van Wyck/ Guide Meridian would increase by 30 seconds. These small increases in delay are relatively minor when compared against the reduced delay for northbound through movements on Guide Meridian.

There are a number of improvements that could be made to improve the operation of the intersection of Bakerview Rd/ James St Rd as project phases are completed and increases in background traffic volumes materialize. Table 16 summaries the effects of channelization changes on the operation of intersection approaches at Bakerview Rd/ James St Rd. Existing 2010 PM peak hour channelization and approach LOS are included for comparative purposes.

Table 16: Bakerview Rd/ James St Rd Channelization Changes and PM Peak Hour LOS

Approach	2010 (existing)		2020 (no change)		2020 (mitigated)	
	Channel-ization	LOS (delay)	Channel-ization	LOS (delay)	Channel-ization	LOS (delay)
Eastbound		C (31)		E (65)		D (46)
Westbound		B (16)		D (40)		C (26)
Northbound		C (23)		C (28)		D (50)
Southbound		D (45)		F (95)		C (34)
Average		C (26)		D (54)		D (37)

Approach	2030 no shift (mitigated)		2030 w/ shift (mitigated)	
	Channel-ization	LOS (delay)	Channel-ization	LOS (delay)
Eastbound		E (56)		D (46)
Westbound		D (41)		C (29)
Northbound		D (40)		D (48)
Southbound		E (68)		D (54)
Average		D (50)		D (42)

By 2020 the addition of a southbound left turn lane would improve level of service on all approaches except the northbound approach. By 2030 increases in project and background traffic volumes would indicate that the addition of a separate northbound right turn lane would be needed. If increased congestion on Guide Meridian causes a shift in northbound through traffic (200 vehicles hour) to northbound James St Rd then the addition of separated eastbound and westbound right turn lanes on Bakerview would be needed to improve intersection operations. The timing of these potential improvements should be evaluated as part of the SEPA

process for development phases to ensure that they are warranted and in place when needed.

Conclusions

This study shows that with the assumed growth in background traffic volumes that traffic congestion on Guide Meridian would increase significantly by 2030. The addition of project generated traffic as well as Comprehensive Plan requirements will necessitate connecting Van Wyck Road to James Street Road to provide a new connection between Guide Meridian Road and Bakerview Road. Both James St Rd and Van Wyck Road would have to be improved to meet arterial standards as described in this report. The presence of this connection would also provide an alternative route for existing and future increases in PM peak hour traffic that seeks to avoid congestion on Guide Meridian in the vicinity of Bakerview Road. A range of channelization improvements to the intersection of Bakerview Rd/ James St Rd could mitigate impacts resulting in project generated and increases in background traffic volumes. The timing of arterial and intersection improvements should be addressed in the development agreement or related documents and confirmed as part of the SEPA analysis for project phases.