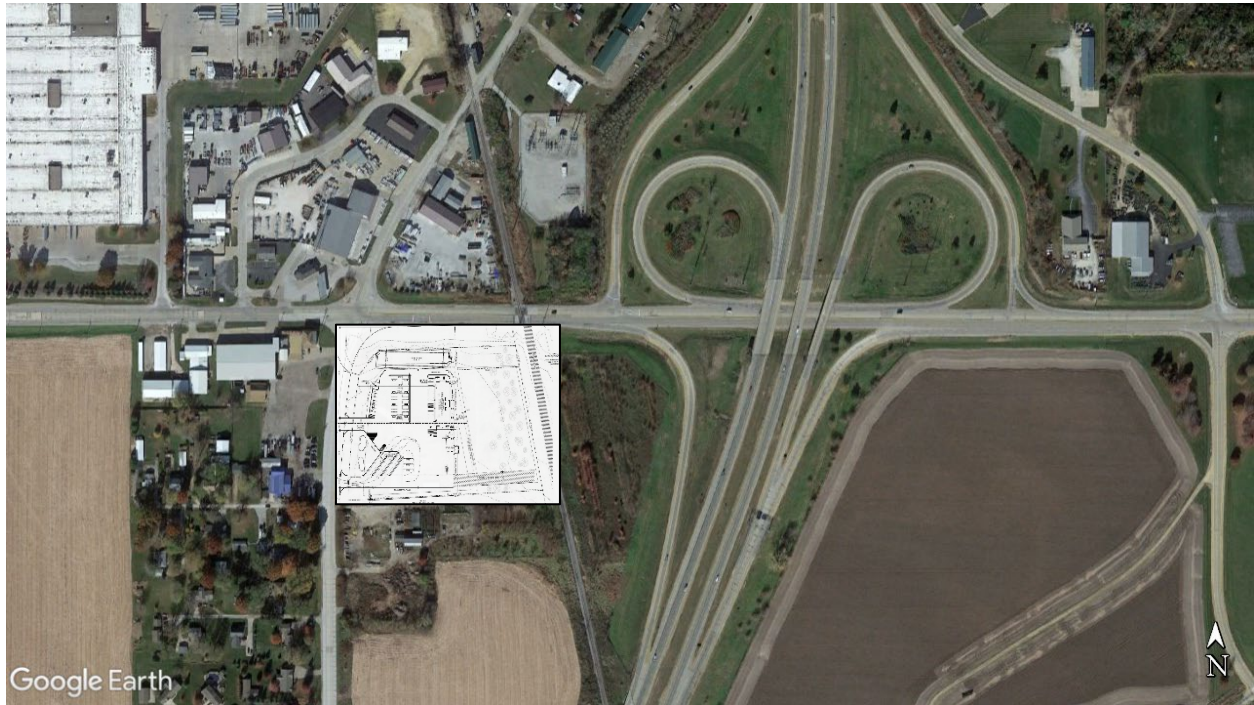


**BIG 10 MART MT JOY
N. BRADY STREET AND 210TH STREET
DAVENPORT, IOWA**

Prepared by:
Veenstra & Kimm, INC.



Prepared for:
Hodge Construction Company, Inc.
September 11, 2023

Submitted to:
Scott County, IA

REPORT

ON

**BIG 10 MART MT JOY
N. BRADY STREET & 210TH STREET
DAVENPORT, IOWA**

***Prepared by:*
Veenstra & Kimm, INC.
Coralville, Iowa**

***Prepared for:*
Hodge Construction Company, Inc.
September 11, 2023**

***Submitted to:*
Scott County, Iowa**

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signed:

Date:



09-11-2023

Leland J. Belding, III., PE, PTOE
Iowa License No. 15046

My license renewal date is December 31, 2023



Parts covered by this seal:

All

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1. Introduction

1.1 Purpose of Report

The purpose of this report is to evaluate the traffic impacts on the surrounding roadway network due to the development of 2.81 commercial acres. The development is located in the southeast quadrant of the intersection of 210th Street & Brady Street. This area is being developed by Hodge Construction, Inc. for the purpose of constructing a new Big 10 Mart convenience store and gas station that will include two entrances off Brady Street. The subject property is outlined in turquoise in Figure 1. The image is courtesy of Scott County GIS.

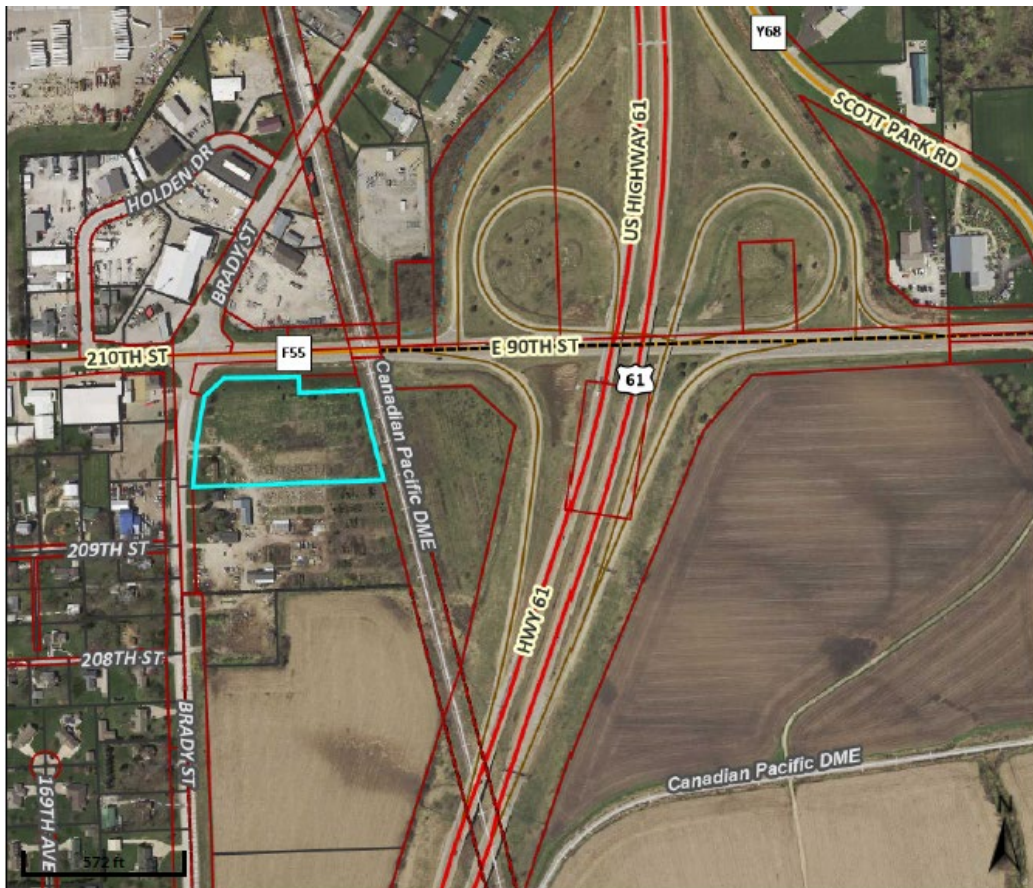


Figure 1 – Location Map

1.2 Study Objectives

The study will identify the existing traffic conditions and the impacts on the roadway network for the development of the commercial property. Scott County has requested that a traffic impact study be performed to determine if an increase in traffic from the proposed development will impact the operation of the 210th Street and Brady Street intersection. A map showing the intersection is shown in Figure 2. The County has asked for the following items to be included in the study:

1. Description of Existing Conditions including traffic data, turning movement counts, and crash history for the intersection.
2. Description of the Proposed Development.
3. Analysis of Future Conditions including trip generations, trip distributions, background traffic, and other pertinent traffic data.
4. Traffic Signal Warrant Analysis in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). The analysis shall include turning movement counts.
5. Capacity Analysis.
6. Vehicle Queuing Analysis.
7. Conclusions and Recommendations based on the analyses that were performed.
8. Appendix that includes data utilized in the study.

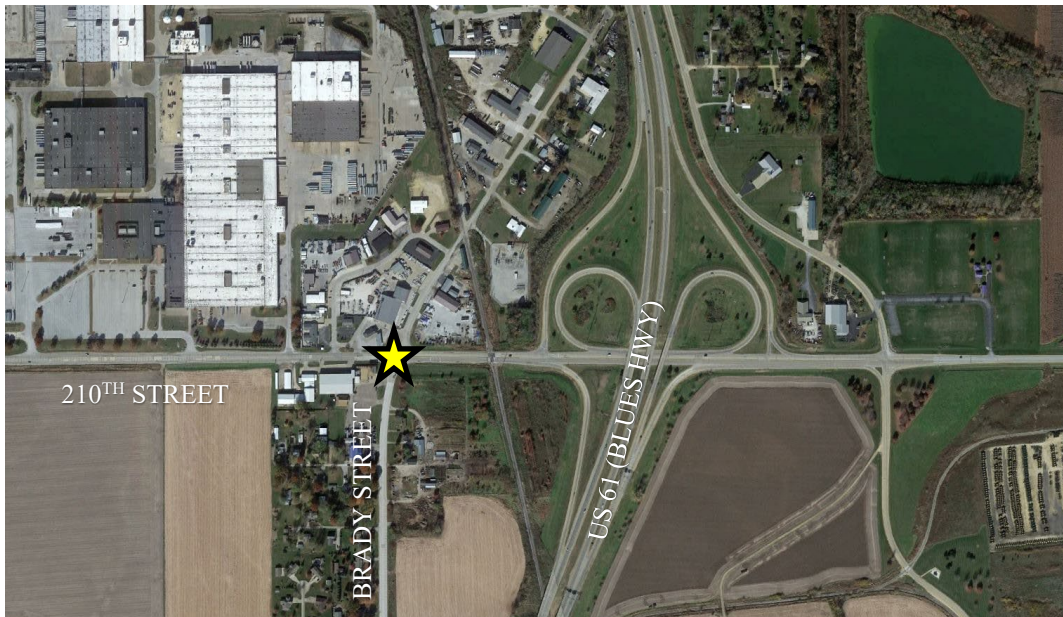


Figure 2 – Intersection Map

2. Analysis of Existing Conditions

2.1 Study Area

Land Uses

The study area is located northeast of the City of Davenport in east central Scott County. The subject property is positioned southeast of the Brady Street and 210th Street intersection. Existing railroad tracks run along the east side of the property. It is zoned C-2 commercial light industrial. The surrounding lots are zoned commercial light industrial, but there are also general agricultural zoned lots to the west and single-family residential zoned lots to the south. Figure 3 is an extract from Scott County's zoning map.

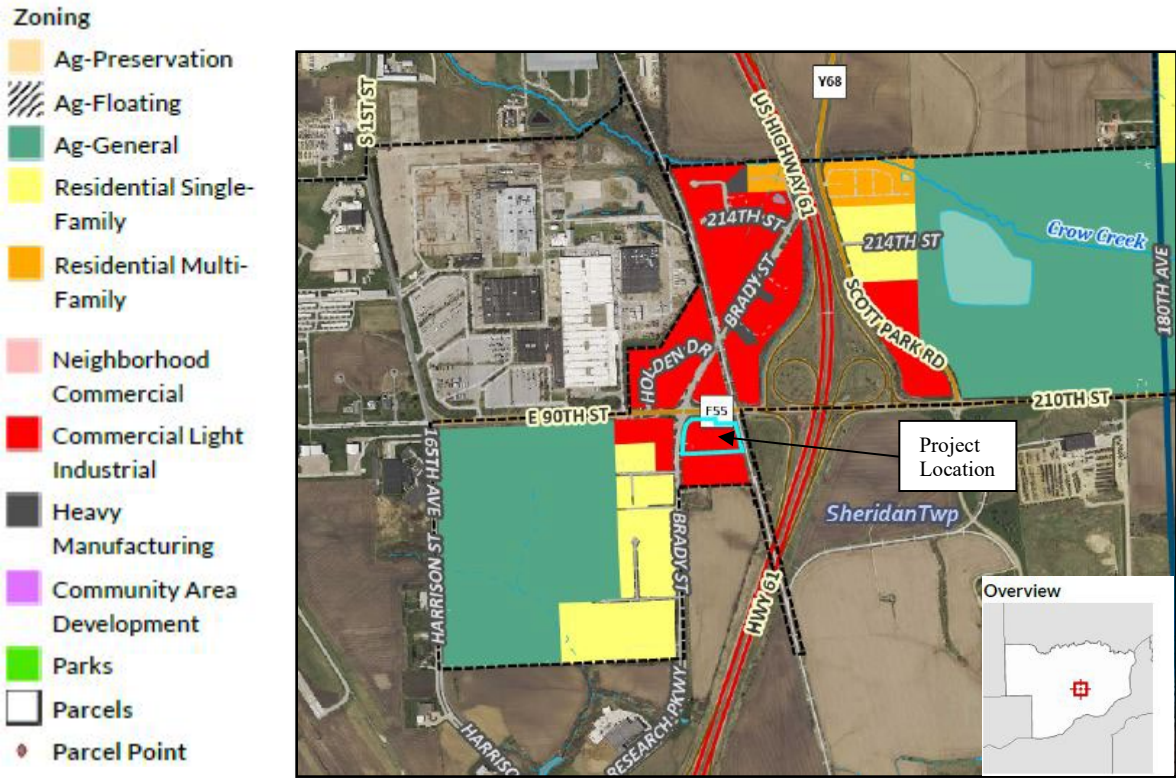


Figure 3 –Scott County Zoning Map Extract

The aerial imagery is shown below in Figure 4. The current land use is a tree farm/nursery. A residential duplex scheduled to be demolished also sits on the property.



Figure 4 – Aerial Photo of Site 2022

Anticipated Future Development

Figure 5 shows the site plan for the proposed gas station and convenience store. The eastern portion of the lot will be subdivided for a future commercial development. The south entrance to Brady Street will be utilized as a joint property entrance to serve the two developments. The future property's joint access road will tie into the SE corner of the Big 10 Mart parking lot.

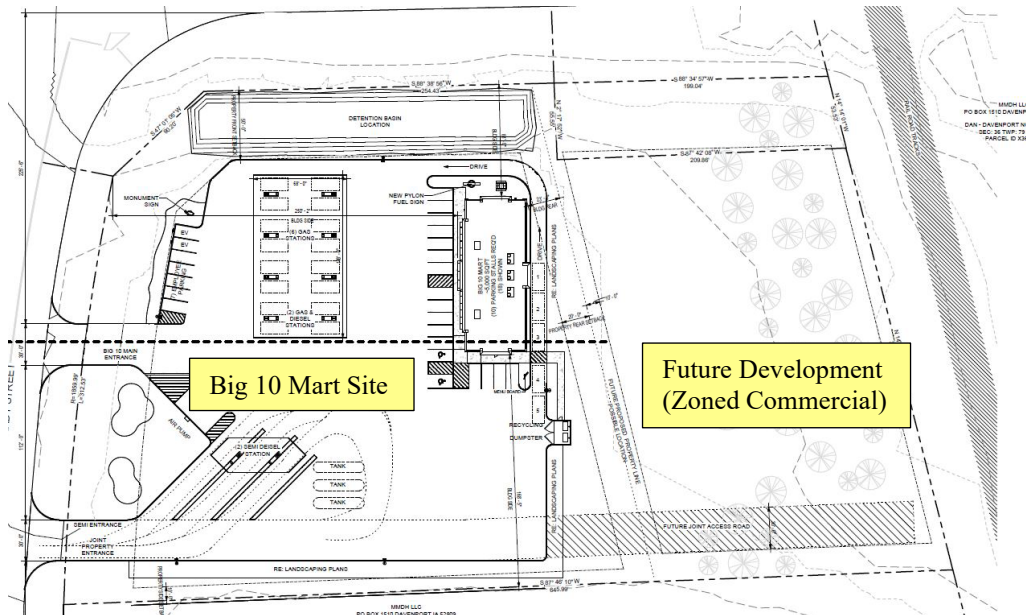


Figure 5 – Architectural Site Plan

The existing developments located immediately north, west, and northwest of the site are zoned commercial light industrial. The lots located southwest of the site have also been developed and are zoned as single family residential. Figure 5 shows an extract from the Scott County Future Land Use Map. There were no other active developments identified for this area and included in the report.

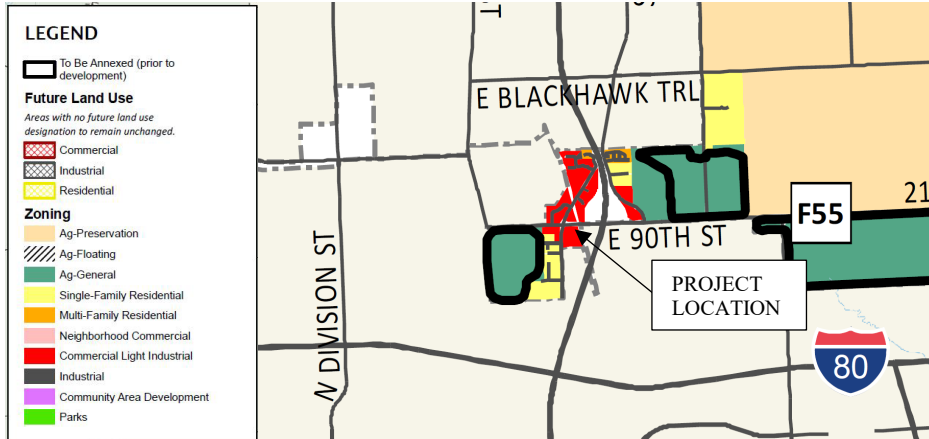


Figure 6 – Scott County Future Land Use Map Extract

Background Growth

The population chart for the City of Davenport is shown in Figure 7. According to World Population Review, Davenport’s population has been decreasing at a rate of 1.69% since the 2020 US Census recorded the population at 101,584. The current population in 2023 is estimated at 99,868 and future projections show it continuing to decrease by 3.49% to 96,500 by 2029. As such, a background growth factor was not applied, and the existing traffic counts were used in the developed and future traffic analyses.

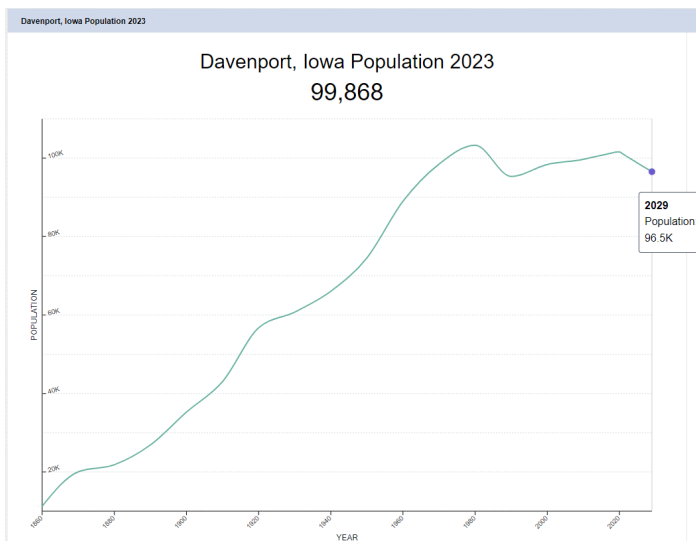


Figure 7—Davenport Population Growth Chart

The last 20 years of AADT volumes from the Iowa DOT traffic maps were analyzed to determine the traffic growth factor. As shown in the following snip, the traffic volume on the east leg of 210th Street has decreased 2.6% over the last 20 years. Since both the population and traffic volume are declining, no background growth was applied in the Synchro models for the developed and future traffic analyses.

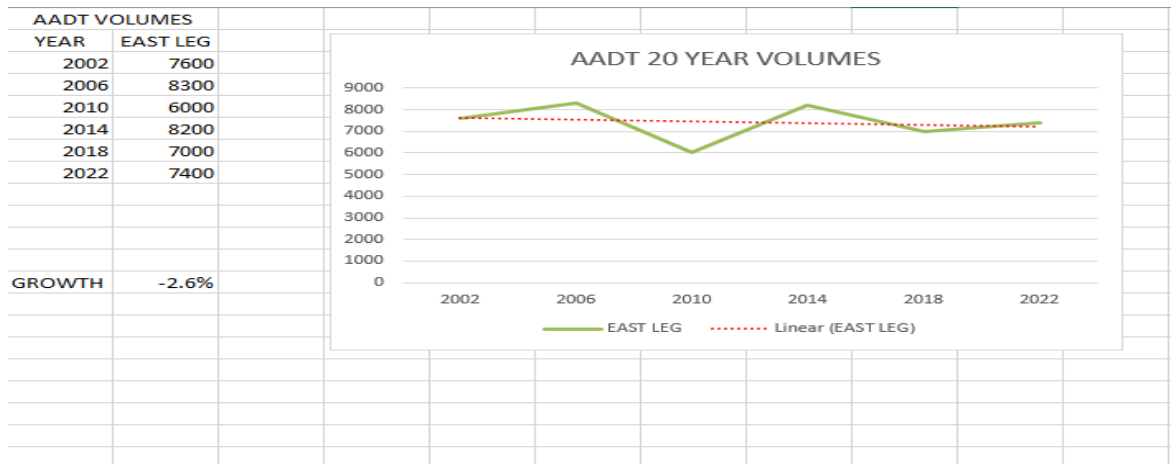


Figure 8 – Iowa DOT 20 Year for AADT for 210th Street

2.2 Physical Characteristics

The development is located at the southeast corner of the intersection of 210th Street and Brady Street.

210th Street borders the property to the north and is classified as a minor arterial. It consists of a four-lane section with no left turn lanes. The section west of Brady Street has curb and gutter, while the east section has a raised median and aggregate shoulders. There is an at-grade railroad crossing located approximately 575 feet east of the intersection with Brady Street. The posted speed limit for 210th Street is 35 mph near the intersection.

Brady Street borders the property to the west, and it is classified as a local road. It consists of a four-lane roadway section with right turn lanes at the north and south approaches to the 210th intersection. The west edge of pavement has curb and gutter, but the east edge does not. There are also raised islands present at both approaches to separate the right turn lane from the through lanes. The posted speed limit along Brady Street is 35 mph and both approaches to the intersection are stop controlled. The proposed development will have two commercial entrances connecting off Brady Street.

Pictures of each intersection approach are shown in Figures 9-12.



Figure 9 –Roadway Characteristics –West leg of the 210th Street and Brady Street Intersection Looking East



Figure 10 –Roadway Characteristics –East leg of the 210th Street and Brady Street Intersection Looking West



Figure 11 –Roadway Characteristics –North leg of the 210th Street and Brady Street Intersection Looking South



Figure 12 –Roadway Characteristics –South leg of the 210th Street and Brady Street Intersection Looking North

2.3 Data Collection

Crash data comes from the Iowa Department of Transportation Iowa Crash Analysis Tool (ICAT) website. The data for the last five years was evaluated for the study of the 210th Street and Brady Street intersection.

AM and PM peak hour traffic counts were conducted by Veenstra & Kimm at the intersection of 210th Street and Brady Road from 6am-9am, 11am-1pm, and 2:30pm-5:30pm on Wednesday, August 23rd, 2023. The traffic counts are located in Appendix B.

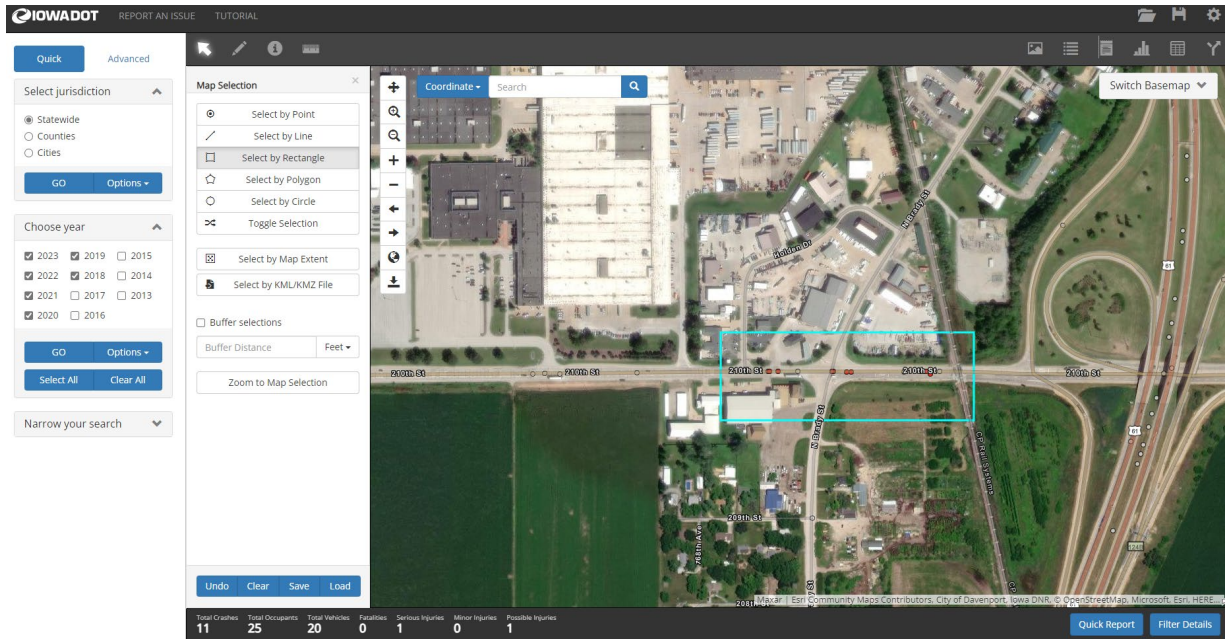


Figure 13 – Map of Crashes 2018-2023

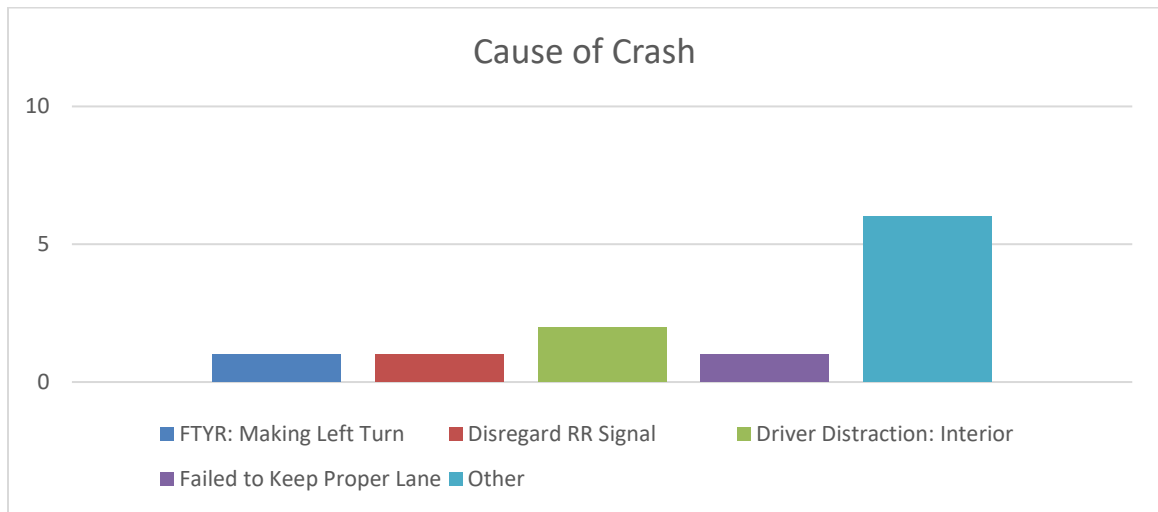


Figure 14 – Cause of Crash

2.6 Current Background Traffic

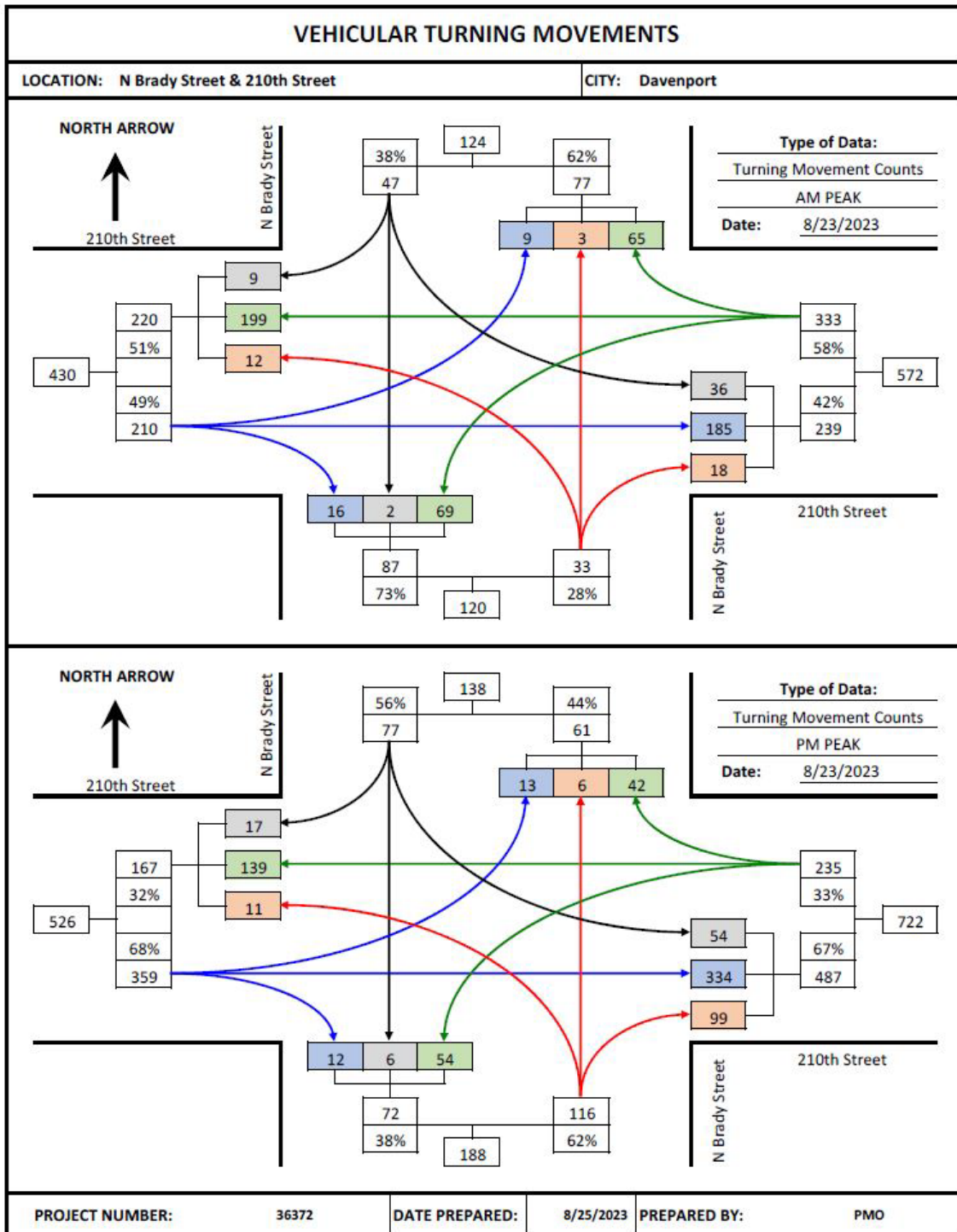


Figure 15 – Traffic Counts AM Peak and PM Peak

2.7 Traffic Modeling

The existing AM and PM peak hours were analyzed using the traffic modeling software Synchro version 11 and visually analyzed using SimTraffic software. The 210th Street and Brady Street intersection is unsignalized and was evaluated using the HCM 6th Edition reports for two-way stop control.

2.8 Capacity/Level of Service

Table 1 shows the levels of service for the intersection movements with the existing volumes. The 210th Street and Brady Street intersection is 2-way stop controlled on Brady Street and free flowing on 210th Street.

Table 1 – Existing Level of Service 2023 (AM/PM)

INTERSECTION	MOVEMENT											
	EAST BOUND			WEST BOUND			NORTH BOUND			SOUTH BOUND		
	L	TH	R	L	TH	R	L	TH	R	L	TH	R
210 th Street & Brady Street	A/A	A/A	A/A	A/A	A/A	A/A	B/C	A/A	A/A	B/C	B/B	B/B

2.9 Traffic Signal Warrant Analysis

The eight-hour traffic count was evaluated for traffic signal warrants. Only three warrants applied to this location. Warrant 1 – Eight-hour Vehicular Volumes, Warrant 2 – Four-Hour Vehicular Volume, Warrant 3 – Peak Hour Vehicular Volumes. Full warrant reports are located in Appendix H.

Table 2 – Signal Warrants

Intersection	Warrant 1 8-Hour	Warrant 2 4-Hour	Warrant 3 Peak Hour
210 th Street & Brady Street	No	No	No

2.10 Turn Lane Warrant Analysis

Left turn and right turn lane warrants were evaluated using NCHRP Report 457 — Evaluating Intersection Improvements: An Engineering Study Guide.

To evaluate the left turn warrant, Figure 2-5 from NCHRP 457 was utilized. It provides guidance for adding a left turn bay on a four-lane major road at a two-way stop-controlled intersection. The existing 210th Street and Brady Street intersection volumes were analyzed to consider if adding a left turn lane was warranted on any of the legs.

NCHRP 457's Figure 2-6 was used to evaluate if a right turn bay on a four-lane major road at a two-way stop-controlled intersection was warranted. All four legs of the existing 210th Street and Brady Street intersection were assessed.

Appendix I contains the graphs of the Left Turn Lane Warrant spreadsheet (Figure 2-5), as well as the graphs of the Right Turn Lane Warrant spreadsheet (Figure 2-6) from NCHRP Report 457. Results for the existing left turn and existing right turn analyses are summarized accordingly in Table 3 and Table 4.

The current traffic volumes do not meet either warrant for adding a dedicated left turn lane or dedicated right turn lane to any of the approaches on the 210th Street and Brady Street intersection.

Left Turn Lanes

Table 3 – Existing Left Turn Lane Warrant Analysis (AM/PM) NCHRP 457

Intersection	Direction	Warrant Met?	
		AM	PM
210 th Street & Brady Street	EB	No	No
210 th Street & Brady Street	WB	No	No
210 th Street & Brady Street	NB	No	No
210 th Street & Brady Street	SB	No	No

Right Turn Lanes

Table 4 – Existing Right Turn Lane Warrant Analysis (AM/PM) NCHRP 457

Intersection	Direction	Warrant Met?	
		AM	PM
210 th Street & Brady Street	EB	No	No
210 th Street & Brady Street	WB	No	No
210 th Street & Brady Street	NB	No	No
210 th Street & Brady Street	SB	No	No

3. Proposed Development

3.1 Description

2.81 acres of the 4.60-acre lot owned by Molo Companies will be developed by Hodge Construction Company, Inc. for the purpose of constructing a Big 10 Mart gas station and convenience store. The development will be situated on the western portion of the lot and will have two commercial entrances tying into Brady Street, just south of the 210th Street intersection.

The remaining 1.79 acres on the east side of the lot will be subdivided for a future development. Access to the eastern lot will be achieved using a cross site connection at the northeast corner of the Big 10 Mart development. The future joint access road for the eastern property will be constructed in line with the gas station's southern entrance off Brady Street. This entrance will function as a joint property entrance for both sites.

The Big 10 Mart site plan is shown in Appendix A.

Land use and intensity

Table 5 – Big 10 Mart Site

Number	Land Use Type	Intensity	Units	ITE Code	Pass-by Rate AM	Pass-by Rate PM
1	Convenience Store/Gas Station	19	Pumps	945	76%	75%
2	Strip Retail Plaza (FUTURE)	19	GLA	822	0%	40%

Zoning

C2 Commercial & Light Industrial District

3.2 Access Management

The development is proposing to connect to Brady Street at two locations. Both entrances will be 30' wide dimensioned to back of curb. The northern entrance is located 226' south of the 210th Street & Brady Street intersection and will serve as the main entrance to the site. The southern entrance is located 368' south of the intersection and will be utilized as a joint property access for the gas station and the eastern lot when it is developed in the future. There are no accesses planned to connect to 210th Street. The two connections on Brady Street are new and have been evaluated for turn lane warrants.

3.3 Multi-modal Considerations (Bike, Pedestrians, Transit)

The development will have an internal sidewalk around the convenience store. This sidewalk will not tie into any sidewalk or trail networks offsite since there are not any in the surrounding commercial/industrial zoned area.

3.4 Traffic Forecast

Development

The trip generation was developed using ITE TripGen Web-based App based on the ITE Trip Generation Manual, 11th Edition. The pass-by trip percentages come from the ITE Pass-By Tables. The trip generation and distribution are located in Appendix C.

4. Analysis of Future Conditions

4.1 Overview

The analysis is for the following scenarios:

1. 2024 Developed Big 10 Mart.
2. 2044 Future Big 10 Mart with Retail

4.2 Modeling

Background Growth

A background growth factor was not applied since the trend in population and traffic volumes has been declining. The existing traffic counts were used in the developed and future traffic analyses.

Synchro Traffic Analysis

The development trips were calculated using the ITE Trip Generation Manual and were then entered into the Synchro for analysis. Pass-by rates come from the ITE Trip Generation Manual. The Traffic Forecast is located in Appendix C.

Site Access

The site was analyzed with a single access into the Big 10 Mart to simplify the analysis and also provide a worst case scenario where one access is primarily used.

4.3 Turn Lane Warrant Analysis

Left Turn Lanes

The left turn lane warrant review was conducted using NCHRP Report 457 — Evaluating Intersection Improvements: An Engineering Study Guide.

In addition to analyzing the 210th and Brady intersection, left turn warrants were also evaluated for the SB left into the proposed Big 10 development from Brady and the WB left out of the Big 10 development for both 2024 and 2044.

Neither of the two intersections met the warrant for left turn lanes. Appendix I contains the graphs of the Left Turn Lane Warrant Spreadsheet from NCHRP Report 457. Table 6 summarizes the 2024 Developed results and Table 7 includes the 2044 Future results.

Table 6 – Developed 2024 Left Turn Lane Warrant Analysis (AM/PM) NCHRP 457

Intersection	Direction	Warrant Met?	
		AM	PM
210 th Street & Brady Street	EB	No	No
210 th Street & Brady Street	WB	No	No
210 th Street & Brady Street	NB	No	No
210 th Street & Brady Street	SB	No	No
Brady and Big 10 Mart Development	SB	No	No
Brady and Big 10 Mart Development	WB	No	No

Table 7 – Future 2044 Left Turn Lane Warrant Analysis (AM/PM) NCHRP 457

Intersection	Direction	Warrant Met?	
		AM	PM
210 th Street & Brady Street	EB	No	No
210 th Street & Brady Street	WB	No	No
210 th Street & Brady Street	NB	No	No
210 th Street & Brady Street	SB	No	No
Brady and Big 10 Mart Development	SB	No	No
Brady and Big 10 Mart Development	WB	No	No

Right Turn Lanes

The right turn lane warrant review was conducted using NCHRP Report 457 — Evaluating Intersection Improvements: An Engineering Study Guide.

In addition to analyzing the 210th and Brady intersection, right turn warrants were also evaluated for the NB right into the proposed Big 10 development from Brady and the WB right out of the Big 10 development for both 2024 and 2044.

Neither of the two intersections met the warrant for right turn lanes. Appendix I contains the graphs of the Right Turn Lane Warrant Spreadsheet from NCHRP Report 457. Table 8 summarizes the 2024 Developed results and Table 9 includes the 2044 Future results.

Table 8 – Developed 2024 Right Turn Lane Warrant Analysis (AM/PM) NCHRP 457

Intersection	Direction	Warrant Met?	
		AM	PM
210 th Street & Brady Street	EB	No	No
210 th Street & Brady Street	WB	No	No
210 th Street & Brady Street	NB	No	No
210 th Street & Brady Street	SB	No	No
Brady and Big 10 Mart Development	NB	No	No
Brady and Big 10 Mart Development	WB	No	No

Table 9 – Future 2044 Right Turn Lane Warrant Analysis (AM/PM) NCHRP 457

Intersection	Direction	Warrant Met?	
		AM	PM
210 th Street & Brady Street	EB	No	No
210 th Street & Brady Street	WB	No	No
210 th Street & Brady Street	NB	No	No
210 th Street & Brady Street	SB	No	No
Brady and Big 10 Mart Development	NB	No	No
Brady and Big 10 Mart Development	WB	No	No

4.4 Developed 2024 – Big 10 Mart

Big 10 Mart is planning to construct a new gas station and convenience store to be opened next year. Table 10 below shows the level of service for both intersections in the study. The lowest LOS is a C for the NB & SB left turn movements on Brady Street.

Table 10 – Level of Service 2024 (AM/PM) – Big 10 Mart

INTERSECTION	MOVEMENT											
	EAST BOUND			WEST BOUND			NORTH BOUND			SOUTH BOUND		
	L	TH	R	L	TH	R	L	TH	R	L	TH	R
210 th Street & Brady Street	A/A	A/A	A/A	A/A	A/A	A/A	C/C	B/A	B/A	C/C	B/C	B/C
Brady Street & Big 10 Mart				B/B		B/B				A/A	A/A	A/A

4.5 Future 2044 – Big 10 Mart & Retail

Table 11 – Level of Service 2044 (AM/PM) – Big 10 Mart & Retail

INTERSECTION	MOVEMENT											
	EAST BOUND			WEST BOUND			NORTH BOUND			SOUTH BOUND		
	L	TH	R	L	TH	R	L	TH	R	L	TH	R
210 th Street & Brady Street	A/A	A/A	A/A	A/A	A/A	A/A	E 39s*/F 51s**	C/C	C/C	C/E 47s***	C/D	C/D
Brady Street & Big 10 Mart				B/B		B/B				A/A	A/A	A/A

*95th %tile Q – 3.9 Vehicles

**95th %tile Q – 3.1 Vehicles

***95th %tile Q – 2.0 Vehicles

Once the site is fully developed in twenty years, the 210th Street and Brady Street intersection will begin to see some delays as shown in Table 11 above. The northbound left turns on Brady for the AM peak hour is a LOS of E, but the delay is 39s and a queue length is 3.9 vehicles. During the PM peak hour, the northbound left on Brady falls to a LOS of F with a delay of 51 seconds and the queue length of 3.2 vehicles and the southbound LOS falls to an E with a delay of 47 seconds and a queue length of 2.0 vehicles. This intersection can function with its current stop control on the side streets until the property is fully built out. The intersection should be monitored and if there is an increase in background volumes over the next 20 years, the intersection should be evaluated for a traffic signal the delay on the northbound and southbound approaches on Brady Street.

5. Conclusion & Recommendation

5.1 Conclusion

The proposed Big 10 Mart will feature a convenience store and gas station. It will be built at the southeast quadrant of the 210th Street and Brady Street intersection and will have two site accesses connecting to Brady Street. Based off the impact analysis, it shows that operationally, no improvements are required for the study area at this time.

No background growth was applied to the 20-year projection since both the historic traffic volumes and the population of Davenport have been declining based on the available data. The developed 2024 and future 2044 scenarios were evaluated using existing traffic counts and site specific ITE trip generations to forecast the proposed traffic for the surrounding roadway network. Other than the future development of the eastern portion of the site, there are no other known planned developments in the immediate area. The surrounding area is zoned commercial/light industrial and there are no existing multi-modal connections for the proposed development to connect to.

Based on the ICAT crash data that was analyzed, there were 11 reported crashes in the study area over the course of the last five years. Six of the crashes took place at the 210th and Brady Street intersection. Both the quantity and types of crashes do not indicate there being any safety deficiencies that would benefit from improving the intersection.

The existing 210th and Brady intersection volumes did not meet any MUTCD warrants for a traffic signal. Both the 210th and Brady Street intersection and the proposed Brady Street and Big 10 Mart intersection were evaluated for left and right turn lane warrants per guidance from NCHRP Report 457. Neither intersection met the warrants for adding a right turn or left turn bay to any of the approaches.

All movements of both intersections operate at a Level of Service of C or above in the existing and 2024 Developed projections. The level of service for the left turn lanes on NB & SB Brady drop to an E or F based on the Future 2044 projection when the eastern lot is estimated to be built out for retail. However, after observing the Sim Traffic for the peak hours and looking at the amount of delay, it was determined that the F LOS is barely met with a delay of 51 seconds and the 95th percentile of vehicle queue length is only 3.9 vehicles. Before the adjacent eastern lot is developed, it would be beneficial to evaluate the 210th Street and Brady Street intersection background growth to see if a traffic signal would be warranted.

5.2 Recommendations

Based on the analysis, no additional roadway or safety improvements are recommended for the development of the proposed Big 10 Mart. However, it should be noted that the specific type of business and year of construction for the adjacent eastern lot is not currently known. Thus, it is recommended that the 210th and Brady Street intersection be evaluated for a signal warrant once that information is available in the future.

APPENDIX – A

Site Information

APPENDIX – B

Traffic Count Data

8.23 am Big 10 Mart
 Count Taken At: 6:00
 Interval Length 15 mins
 # of Intervals: 12
 This Count was located at:
 Lat: 0.0
 Long: 0.0
 Southbound: N Brady St
 Westbound:
 Northbound:
 Eastbound: 210th St
 Notes: AM Peak

Interval	Time	SBR	SB	SBL	WBR	WB	WBL	NBR	NB	NBL	EBR	EB	EBL	Int Total	Int Avg	Last Hour
1	6:00 to 6:15	1	2	6	10	24	2	1	1	0	0	31	1	79	6.58	90
2	6:15 to 6:30	0	1	6	11	25	9	3	0	2	1	15	2	75	6.25	174
3	6:30 to 6:45	0	0	3	18	45	12	2	0	3	5	22	1	111	9.25	294
4	6:45 to 7:00	2	0	2	22	72	15	4	0	0	5	24	5	151	12.58	460
5	7:00 to 7:15	1	0	7	17	45	15	4	0	5	1	27	2	124	10.33	501
6	7:15 to 7:30	0	1	6	13	59	16	5	1	1	2	28	2	134	11.17	568
7	7:30 to 7:45	2	0	6	13	44	9	3	0	2	4	35	1	119	9.92	580
8	7:45 to 8:00	3	0	11	16	50	30	5	1	2	2	42	4	166	13.83	601
9	8:00 to 8:15	3	0	8	21	24	11	1	0	3	3	58	1	133	11.08	623
10	8:15 to 8:30	4	0	9	14	34	14	9	0	2	0	31	0	117	9.75	614
11	8:30 to 8:45	5	0	9	5	28	5	3	1	1	2	22	1	82	6.83	583
12	8:45 to 9:00	3	0	7	11	17	12	5	1	1	4	23	1	85	7.08	498

Car	Totals	8	1	31	63	177	66	14	2	8	11	163	8	552
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Trucks:

1	6:00 to 6:15	0	0	1	2	4	0	0	0	0	0	1	0	8
2	6:15 to 6:30	0	0	2	0	0	0	0	0	0	0	7	0	9
3	6:30 to 6:45	0	0	1	0	5	0	0	0	0	0	3	0	9
4	6:45 to 7:00	0	0	1	1	6	1	1	0	0	0	5	0	15
5	7:00 to 7:15	0	0	1	0	2	1	1	0	0	0	2	0	7
6	7:15 to 7:30	0	0	2	0	4	0	0	1	0	2	5	1	15
7	7:30 to 7:45	0	0	2	0	4	1	0	0	1	0	2	0	10
8	7:45 to 8:00	1	0	0	1	6	1	1	0	0	1	10	0	21
9	8:00 to 8:15	0	0	1	0	8	0	2	0	2	2	5	0	20
10	8:15 to 8:30	1	0	3	2	6	0	0	0	1	1	11	0	25
11	8:30 to 8:45	1	0	1	1	8	0	0	1	1	1	5	0	19
12	8:45 to 9:00	1	0	1	0	2	1	2	0	0	0	10	0	17

The Average Number of Trucks Per Interval Was 14.58 trucks

Truck	Totals	1	0	5	1	22	2	3	1	3	5	22	1	66
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Buses:

1	6:00 to 6:15	0	0	0	0	1	0	0	0	0	0	2	0	3
2	6:15 to 6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
3	6:30 to 6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4	6:45 to 7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5	7:00 to 7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6	7:15 to 7:30	0	0	0	0	0	1	0	0	1	0	0	0	2
7	7:30 to 7:45	0	1	0	1	0	0	1	0	0	0	0	0	3
8	7:45 to 8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
9	8:00 to 8:15	0	0	0	0	0	0	0	0	0	0	0	0	0
10	8:15 to 8:30	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8:30 to 8:45	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8:45 to 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0

Bus	Totals	0	1	0	1	0	1	1	0	1	0	0	0	5
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TOTAL VEHICLES	SBR	SB	SBL	WBR	WB	WBL	NBR	NB	NBL	EBR	EB	EBL	
1	6:00 to 6:15	1	2	7	12	29	2	1	1	0	0	34	1
2	6:15 to 6:30	0	1	8	11	25	9	3	0	2	1	22	2
3	6:30 to 6:45	0	0	4	18	50	12	2	0	3	5	25	1
4	6:45 to 7:00	2	0	3	23	78	16	5	0	0	5	29	5
5	7:00 to 7:15	1	0	8	17	47	16	5	0	5	1	29	2
6	7:15 to 7:30	0	1	8	13	63	17	5	2	2	4	33	3
7	7:30 to 7:45	2	1	8	14	48	10	4	0	3	4	37	1
8	7:45 to 8:00	4	0	11	17	56	31	6	1	2	3	52	4
9	8:00 to 8:15	3	0	9	21	32	11	3	0	5	5	63	1
10	8:15 to 8:30	5	0	12	16	40	14	9	0	3	1	42	0
11	8:30 to 8:45	6	0	10	6	36	5	3	2	2	3	27	1
12	8:45 to 9:00	4	0	8	11	19	13	7	1	1	4	33	1

Peak	Totals	9	2	36	65	199	69	18	3	12	16	185	9	623
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The Average Number of Buses Per Interval Was 0.67 buses

The peak interval was: 8 With 187 Vehicles

From 7:45 to 8:00

The peak hour falls between 7:15 and 8:15

The PHF calculated is 0.8329 (minimum 0.2500) with a variability of 0.0026

The average traffic flow was 0.00 vehicles per interval (0.00 vehicles per hour)

8.23 midday Big 10 Mart
 Count Taken At: 11:00
 Interval Length 15 mins
 # of Intervals: 8
 This Count was located at:
 Lat: 0.0
 Long: 0.0
 Southbound: N Brady St
 Westbound:
 Northbound:
 Eastbound: 210 St
 Notes: MID Peak

Interval	Time	SBR	SB	SBL	WBR	WB	WBL	NBR	NB	NBL	EBR	EB	EBL	Int Total	Int Avg	Last Hour
1	11:00 to 11:15	6	0	4	7	23	6	10	0	1	0	28	0	85	7.08	107
2	11:15 to 11:30	1	3	11	6	36	4	14	0	3	1	26	1	106	8.83	240
3	11:30 to 11:45	4	2	8	7	32	6	13	3	1	1	27	2	106	8.83	363
4	11:45 to 12:00	0	1	7	6	22	8	15	2	3	4	43	2	113	9.42	494
5	12:00 to 12:15	2	2	10	10	24	6	10	5	1	2	40	1	113	9.42	523
6	12:15 to 12:30	3	0	10	6	33	8	7	1	2	0	16	3	89	7.42	493
7	12:30 to 12:45	4	3	4	8	39	12	8	2	0	2	30	2	114	9.5	503
8	12:45 to 13:00	1	0	8	13	36	5	9	0	2	2	21	2	99	8.25	490

Car	Totals	7	8	36	29	114	24	52	10	8	8	136	6			438
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Trucks:																
1	11:00 to 11:15	0	0	1	3	3	0	0	0	1	3	11	0	22		
2	11:15 to 11:30	0	2	0	1	15	1	0	0	0	0	8	0	27		
3	11:30 to 11:45	0	1	0	0	5	0	2	0	0	0	9	0	17		
4	11:45 to 12:00	0	0	1	1	4	0	0	0	1	0	11	0	18		
5	12:00 to 12:15	0	0	2	2	10	0	1	1	0	0	7	0	23		
6	12:15 to 12:30	0	0	1	0	5	0	1	0	0	0	7	0	14		
7	12:30 to 12:45	0	0	0	1	11	0	0	0	0	0	7	0	19		
8	12:45 to 13:00	0	0	0	1	11	1	0	0	0	0	6	0	19		

Truck	Totals	0	3	3	4	34	1	3	1	1	0	35	0			85
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The Average Number of Trucks Per Interval Was 19.88 trucks

Buses:																
1	11:00 to 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	11:15 to 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	11:30 to 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11:45 to 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	12:00 to 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	12:15 to 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	12:30 to 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	12:45 to 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bus	Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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TOTAL VEHICLES	SBR	SB	SBL	WBR	WB	WBL	NBR	NB	NBL	EBR	EB	EBL	
1	11:00 to 11:15	6	0	5	10	26	6	10	0	2	3	39	0
2	11:15 to 11:30	1	5	11	7	51	5	14	0	3	1	34	1
3	11:30 to 11:45	4	3	8	7	37	6	15	3	1	1	36	2
4	11:45 to 12:00	0	1	8	7	26	8	15	2	4	4	54	2
5	12:00 to 12:15	2	2	12	12	34	6	11	6	1	2	47	1
6	12:15 to 12:30	3	0	11	6	38	8	8	1	2	0	23	3
7	12:30 to 12:45	4	3	4	9	50	12	8	2	0	2	37	2
8	12:45 to 13:00	1	0	8	14	47	6	9	0	2	2	27	2

Peak	Totals	7	11	39	33	148	25	55	11	9	8	171	6			523
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The Average Number of Buses Per Interval Was 0.00 buses
 The peak interval was: 5 With 136 Vehicles
 From 12:00 to 12:15
 The peak hour falls between 11:15 and 12:15
 The PHF calculated is 0.9614 (minimum 0.2500) with a variability of 0.0050
 The average traffic flow was 0.00 vehicles per interval (0.00 vehicles per hour).

8.23 afternoon Big 10 Mart
 Count Taken At: 2:30
 Interval Length 15 mins
 # of Intervals: 12
 This Count was located at:
 Lat: 0.0
 Long: 0.0
 Southbound: N Brady St
 Westbound:
 Northbound:
 Eastbound: 210th St
 Notes: PM Peak

Interval	Time	SBR	SB	SBL	WBR	WB	WBL	NBR	NB	NBL	EBR	EB	EBL	Int Total	Int Avg	Last Hour
1	2:30 to 2:45	8	2	16	16	37	18	12	1	1	0	70	2	183	15.25	197
2	2:45 to 3:00	3	1	10	7	26	13	6	0	0	3	34	2	105	8.75	313
3	3:00 to 3:15	7	0	15	23	36	10	16	0	8	3	36	0	154	12.83	480
4	3:15 to 3:30	3	1	11	8	29	8	20	1	2	4	51	3	141	11.75	633
5	3:30 to 3:45	5	3	20	9	22	19	19	1	3	4	108	3	216	18	678
6	3:45 to 4:00	4	1	11	6	28	16	15	2	1	2	76	2	164	13.67	745
7	4:00 to 4:15	5	0	11	10	34	9	39	2	2	1	79	1	193	16.08	787
8	4:15 to 4:30	2	2	9	9	29	3	17	1	5	2	42	4	125	10.42	766
9	4:30 to 4:45	3	1	17	12	25	7	22	2	0	3	56	1	149	12.42	681
10	4:45 to 5:00	0	0	15	9	23	15	20	0	4	0	44	1	131	10.92	634
11	5:00 to 5:15	0	0	20	9	24	5	31	0	3	1	40	0	133	11.08	564
12	5:15 to 5:30	3	1	8	4	25	6	17	2	4	2	23	0	95	7.92	534

Car	Totals	17	5	53	33	113	52	93	6	8	11	314	9			714
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Trucks:

1	2:30 to 2:45	0	1	0	1	5	2	0	0	1	1	3	0	14
2	2:45 to 3:00	0	0	0	1	4	0	0	0	2	1	2	1	11
3	3:00 to 3:15	0	0	0	2	4	1	1	0	1	1	3	0	13
4	3:15 to 3:30	0	0	0	2	3	0	1	0	1	0	4	1	12
5	3:30 to 3:45	0	0	1	2	6	0	2	0	1	1	8	2	23
6	3:45 to 4:00	0	0	0	1	8	1	0	0	1	0	4	1	16
7	4:00 to 4:15	0	0	0	3	8	0	1	0	0	0	4	0	16
8	4:15 to 4:30	0	0	1	0	2	0	0	0	0	0	3	1	7
9	4:30 to 4:45	0	0	0	0	3	0	0	0	0	1	3	0	7
10	4:45 to 5:00	0	0	0	0	1	1	0	0	0	0	3	0	5
11	5:00 to 5:15	0	0	0	0	3	0	0	0	0	1	2	0	6
12	5:15 to 5:30	0	0	3	0	2	0	2	0	0	0	0	0	7

Truck	Totals	0	0	1	8	25	1	4	0	3	1	20	4			67
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The Average Number of Trucks Per Interval Was 11.42 trucks

Buses:

1	2:30 to 2:45	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2:45 to 3:00	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3:00 to 3:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3:15 to 3:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5	3:30 to 3:45	0	0	0	0	1	1	1	0	0	0	0	0	3
6	3:45 to 4:00	0	1	0	1	0	0	1	0	0	0	0	0	3
7	4:00 to 4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4:15 to 4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
9	4:30 to 4:45	0	0	0	0	1	0	0	0	0	0	0	0	1
10	4:45 to 5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
11	5:00 to 5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
12	5:15 to 5:30	0	0	0	0	0	0	0	0	0	0	0	0	0

Bus	Totals	0	1	0	1	1	1	2	0	0	0	0	0			6
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TOTAL VEHICLES	SBR	SB	SBL	WBR	WB	WBL	NBR	NB	NBL	EBR	EB	EBL	
1	2:30 to 2:45	8	3	16	17	42	20	12	1	2	1	73	2
2	2:45 to 3:00	3	1	10	8	30	13	6	0	2	4	36	3
3	3:00 to 3:15	7	0	15	25	40	11	17	0	9	4	39	0
4	3:15 to 3:30	3	1	11	10	32	8	21	1	3	4	55	4
5	3:30 to 3:45	5	3	21	11	29	20	22	1	4	5	116	5
6	3:45 to 4:00	4	2	11	8	36	17	16	2	2	2	80	3
7	4:00 to 4:15	5	0	11	13	42	9	40	2	2	1	83	1
8	4:15 to 4:30	2	2	10	9	31	3	17	1	5	2	45	5
9	4:30 to 4:45	3	1	17	12	29	7	22	2	0	4	59	1
10	4:45 to 5:00	0	0	15	9	24	16	20	0	4	0	47	1
11	5:00 to 5:15	0	0	20	9	27	5	31	0	3	2	42	0
12	5:15 to 5:30	3	1	11	4	27	6	19	2	4	2	23	0

Peak	Totals	17	6	54	42	139	54	99	6	11	12	334	13			787
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The Average Number of Buses Per Interval Was 0.58 buses

The peak interval was: 5 With 242 Vehicles

From 3:30 to 3:45

The peak hour falls between 3:15 and 4:15

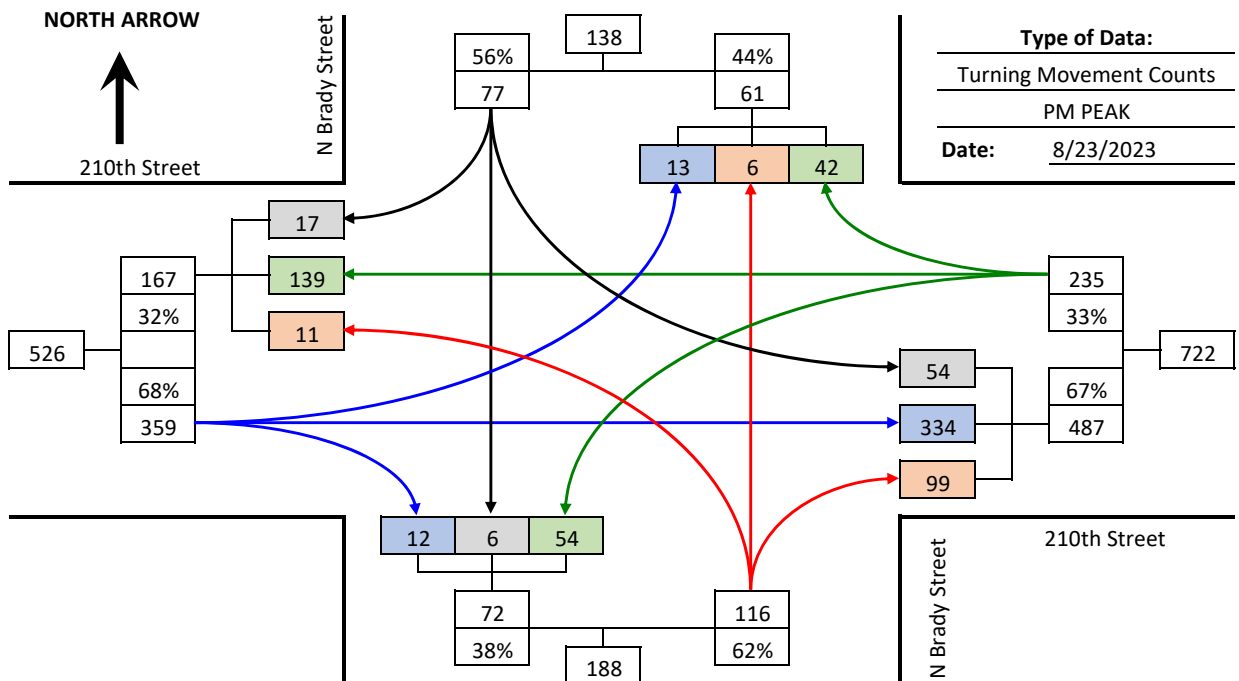
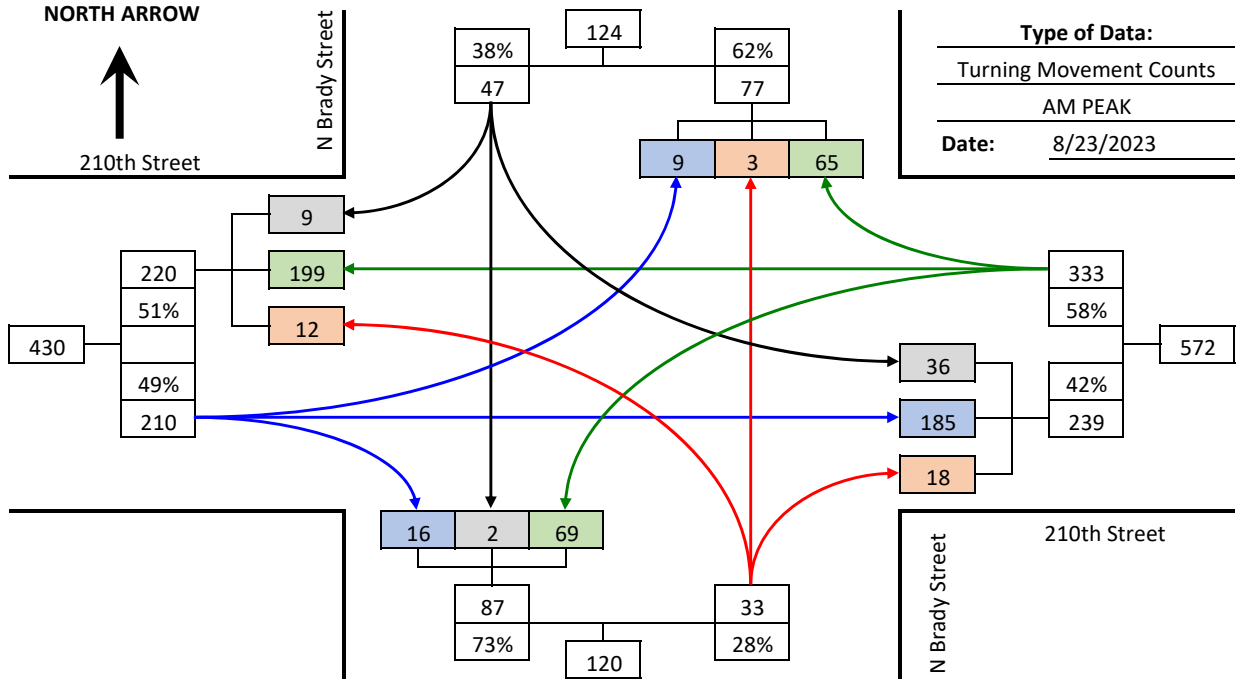
The PHF calculated is 0.8130 (minimum 0.2500) with a variability of 0.0019

The average traffic flow was 0.00 vehicles per interval (0.00 vehicles per hour).

VEHICULAR TURNING MOVEMENTS

LOCATION: N Brady Street & 210th Street

CITY: Davenport



PROJECT NUMBER:

36372

DATE PREPARED:

8/25/2023

PREPARED BY:

PMO

APPENDIX – C

Traffic Forecast



ITE TripGen Web-based App

Graph Look Up

How to Use ITE TripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Add-ons to do more

Try OTISS Pro

Graph Look Up

Query Filter

DATA SOURCE:

SEARCH BY LAND USE CODE:

LAND USE GROUP:

LAND USE:

LAND USE SUBCATEGORY:

SETTING/LOCATION:

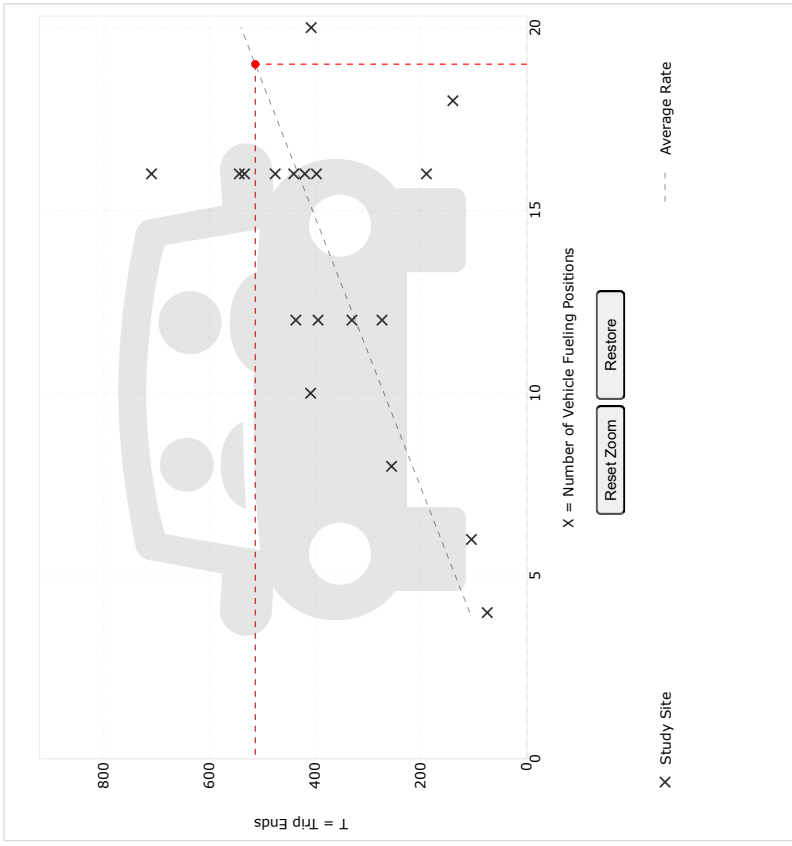
INDEPENDENT VARIABLE (IV):

TIME PERIOD:

TRIP TYPE:

ENTER IV VALUE TO CALCULATE TRIPS:

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use:
Convenience Store/Gas Station - GFA (4-5.5k) (945)
[Click for Description and Data Plots](#)

Independent Variable:
Vehicle Fueling Positions

Time Period:
Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 7 and 9 a.m.

Setting/Location:
General Urban/Suburban

Trip Type:
Vehicle

Number of Studies:
18

Avg. Num. of Vehicle Fueling Positions:
13

Average Rate:
27.04

Range of Rates:
7.76 - 44.38

Standard Deviation:
9.86

Fitted Curve Equation:
Not Given

R²:

Directional Distribution:
50% entering, 50% exiting

Calculated Trip Ends:
Average Rate: 514 (Total), 257 (Entry), 257 (Exit)

Graph Look Up



ITE
A Community of Transportation Professionals

ITETripGen Web-based App

Graph Look Up

How to Use ITETripGen

TGM Desk Reference

TGM Appendices

Support Documents

Add Users

Comments

Query

Filter

DATA SOURCE:

Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE:

945

LAND USE GROUP:

(900-999) Services

LAND USE :

945 - Convenience Store/Gas Station

LAND USE SUBCATEGORY:

GFA (4-5.5k)

SETTING/LOCATION:

General Urban/Suburban

INDEPENDENT VARIABLE (IV):

Vehicle Fueling Positions

TIME PERIOD:

Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE:

Vehicle

ENTER IV VALUE TO CALCULATE TRIPS:

19

Calculate

Data Plot and Equation



DATA STATISTICS

Land Use:

Convenience Store/Gas Station - GFA (4-5.5k) (945)

[Click for Description and Data Plots](#)

Independent Variable:

Vehicle Fueling Positions

Time Period:

Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location:

General Urban/Suburban

Trip Type:

Vehicle

Number of Studies:

23

Avg. Num. of Vehicle Fueling Positions:

14

Average Rate:

22.76

Range of Rates:

9.76 - 37.50

Standard Deviation:

8.49

Fitted Curve Equation:

Not Given

R²:

Directional Distribution:

50% entering, 50% exiting

Calculated Trip Ends:

Average Rate: 432 (Total), 216 (Entry), 216 (Exit)

Use the mouse wheel to Zoom Out or Zoom In.
Hover the mouse pointer on data points to view X and T values.

Add-ons to do more

Try OTISS Pro



Graph Look Up

Query

Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 822

LAND USE GROUP: (800-899) Retail

LAND USE : 822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GLA

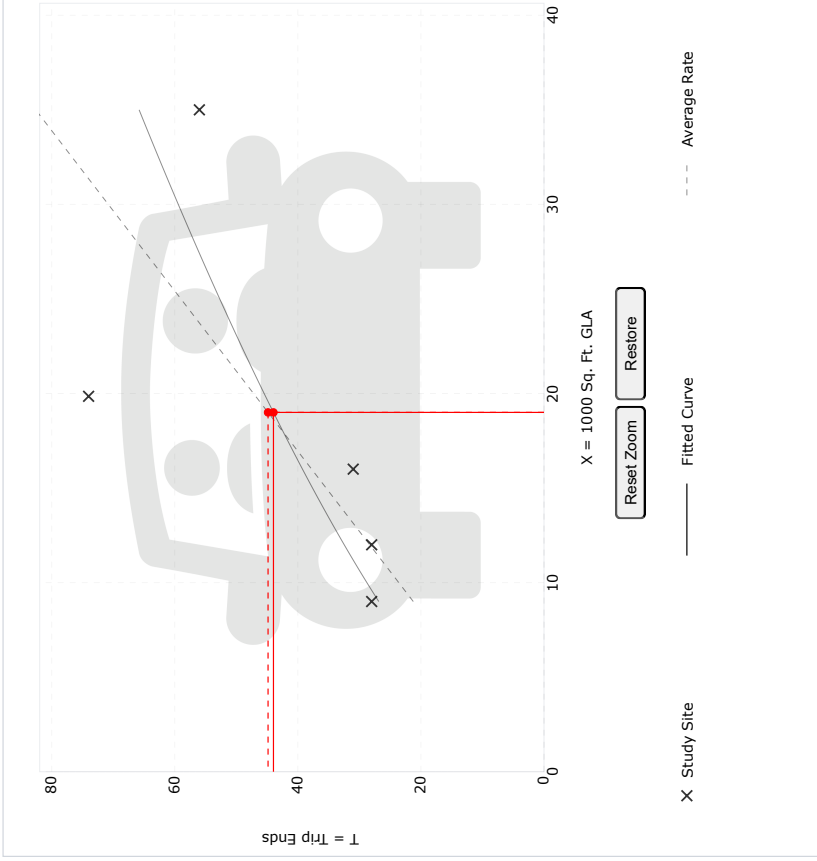
TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 19

Data Plot and Equation

Caution - Small Sample Size



Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

Query Filter

DATA SOURCE: Trip Generation Manual, 11th Ed

SEARCH BY LAND USE CODE: 822

LAND USE GROUP: (800-899) Retail

LAND USE: 822 - Strip Retail Plaza (<40k)

LAND USE SUBCATEGORY: All Sites

SETTING/LOCATION: General Urban/Suburban

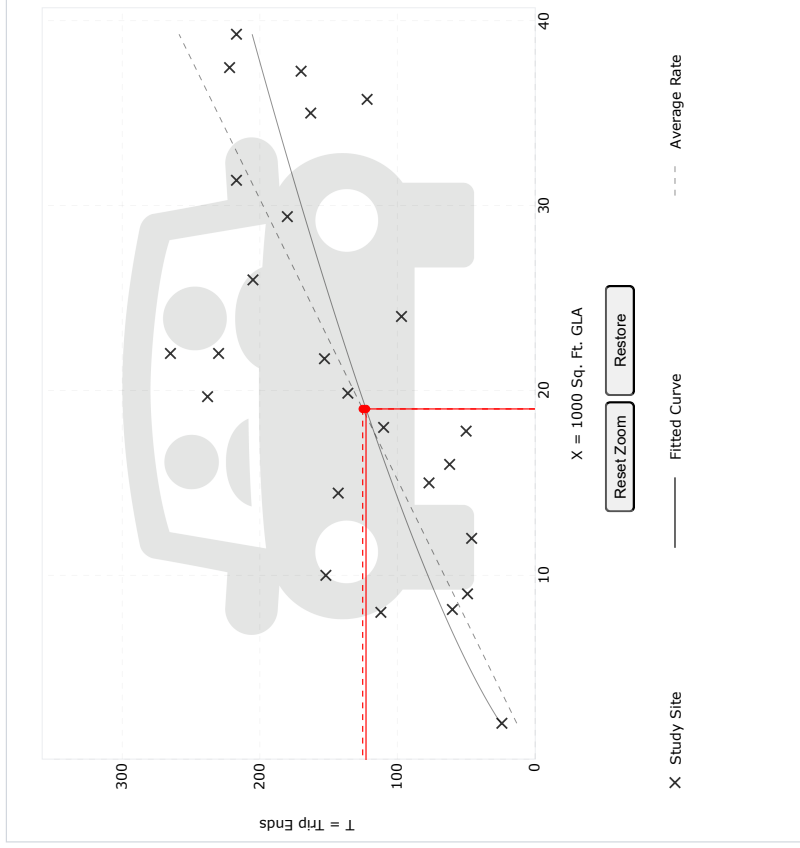
INDEPENDENT VARIABLE (IV): 1000 Sq. Ft. GLA

TIME PERIOD: Weekday, Peak Hour of Adjacent Street Traffic

TRIP TYPE: Vehicle

ENTER IV VALUE TO CALCULATE TRIPS: 19

Data Plot and Equation



Use the mouse wheel to Zoom Out or Zoom In. Hover the mouse pointer on data points to view X and T values.

DATA STATISTICS

Land Use: Strip Retail Plaza (<40k) (822) [Click for Descriptor and Data Plots](#)

Independent Variable: 1000 Sq. Ft. GLA

Time Period: Weekday
Peak Hour of Adjacent Street Traffic
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Trip Type: Vehicle

Number of Studies: 25

Avg. 1000 Sq. Ft. GLA: 21

Average Rate: 6.59

Range of Rates: 2.81 - 15.20

Standard Deviation: 2.94

Fitted Curve Equation: $Ln(T) = 0.71 Ln(X) + 2.72$

R²: 0.56

Directional Distribution: 50% entering, 50% exiting

Calculated Trip Ends: Average Rate: 125 (Total), 63 (Entry), 62 (Exit)
Fitted Curve: 123 (Total), 61 (Entry), 62 (Exit)



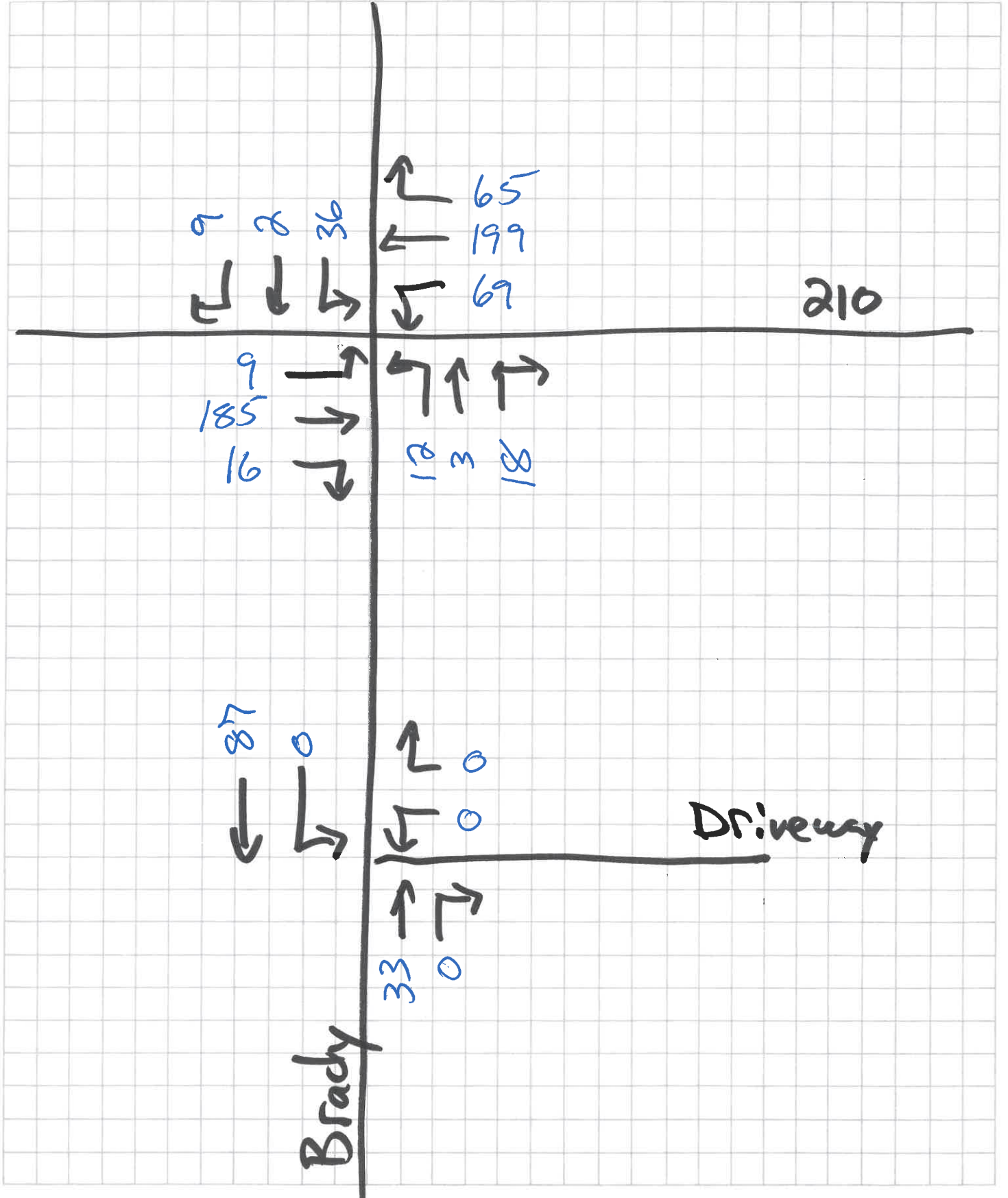
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Checked By Date Approved By Date

Sheet No. of



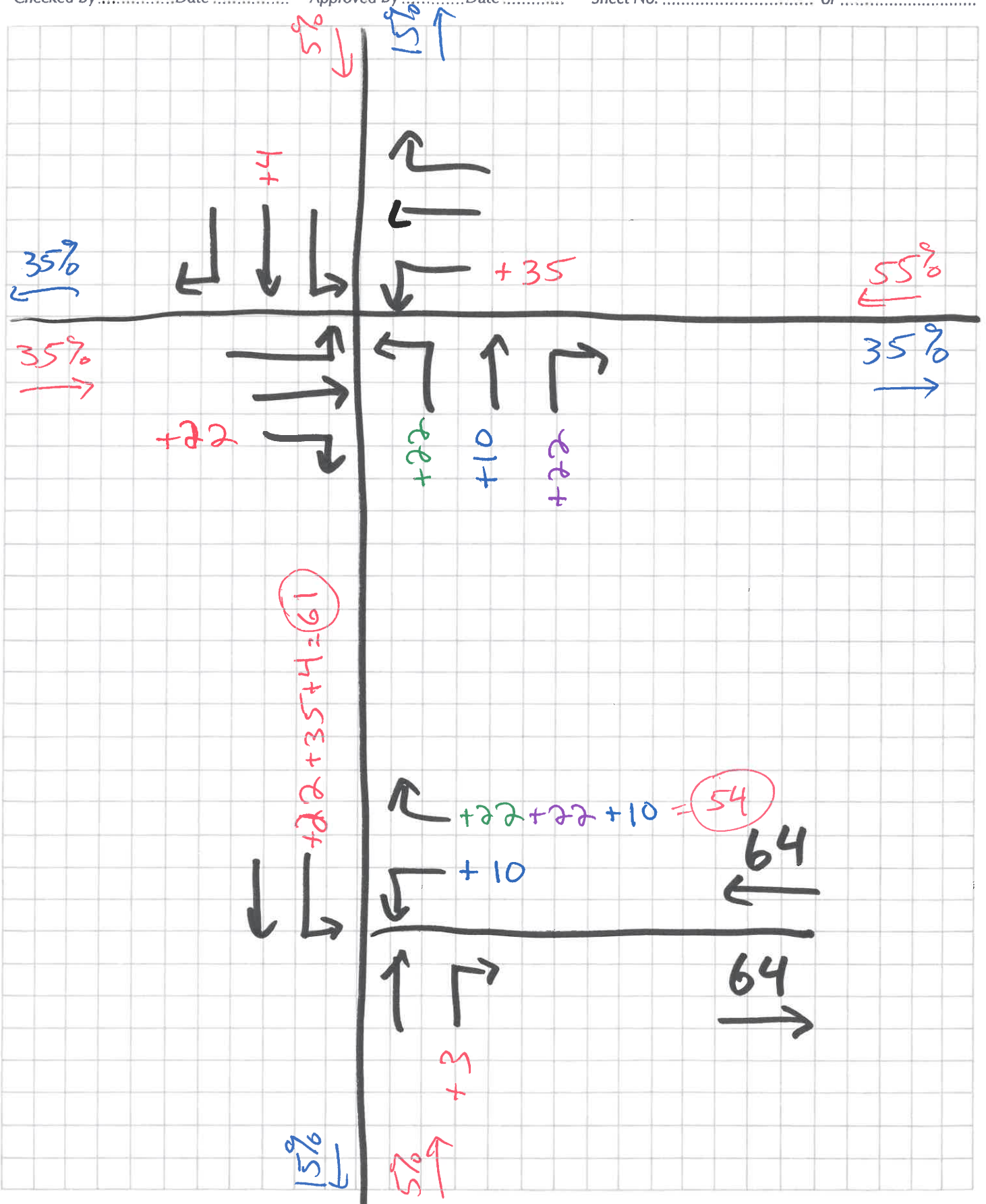


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Checked By Date Approved By Date

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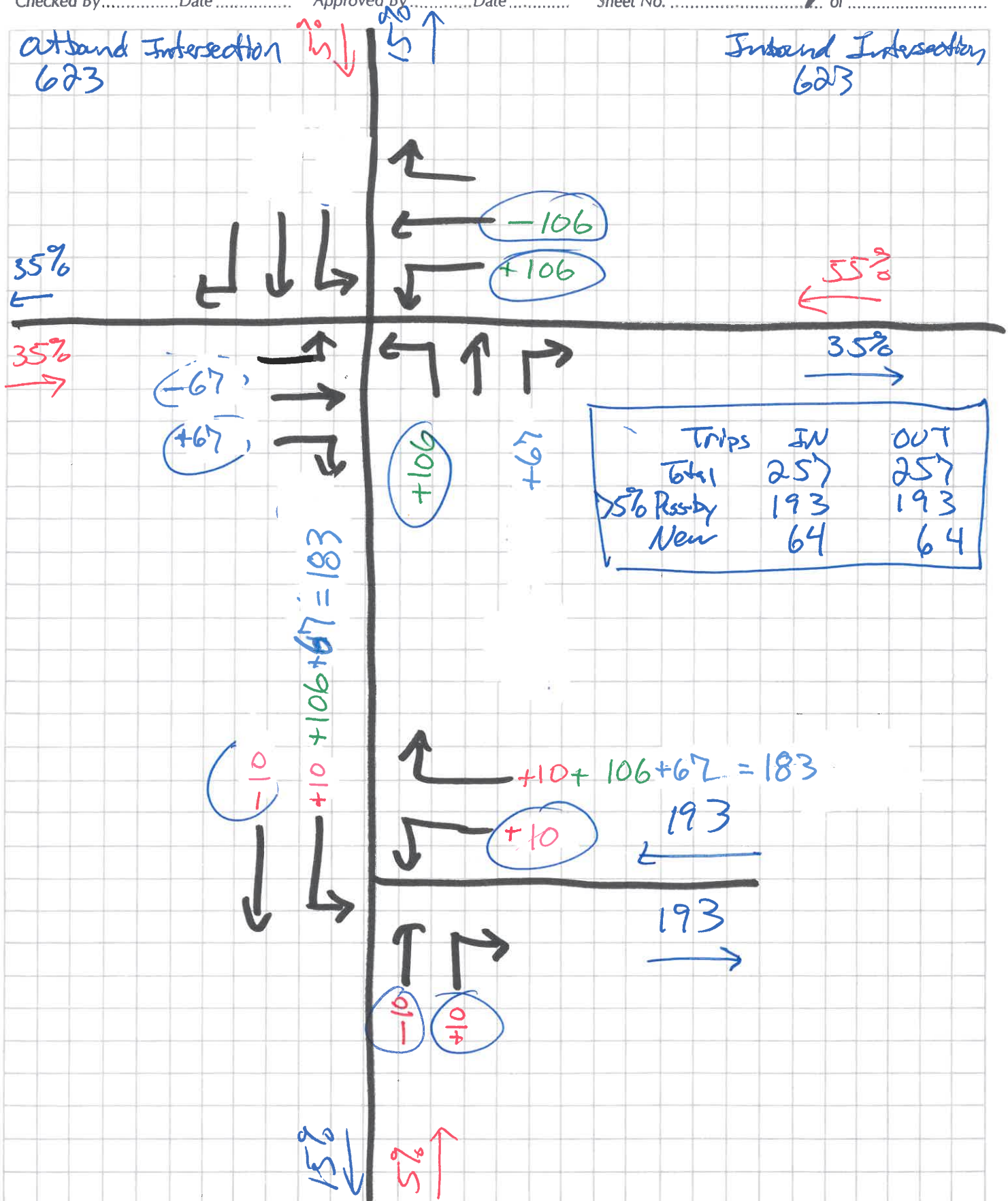




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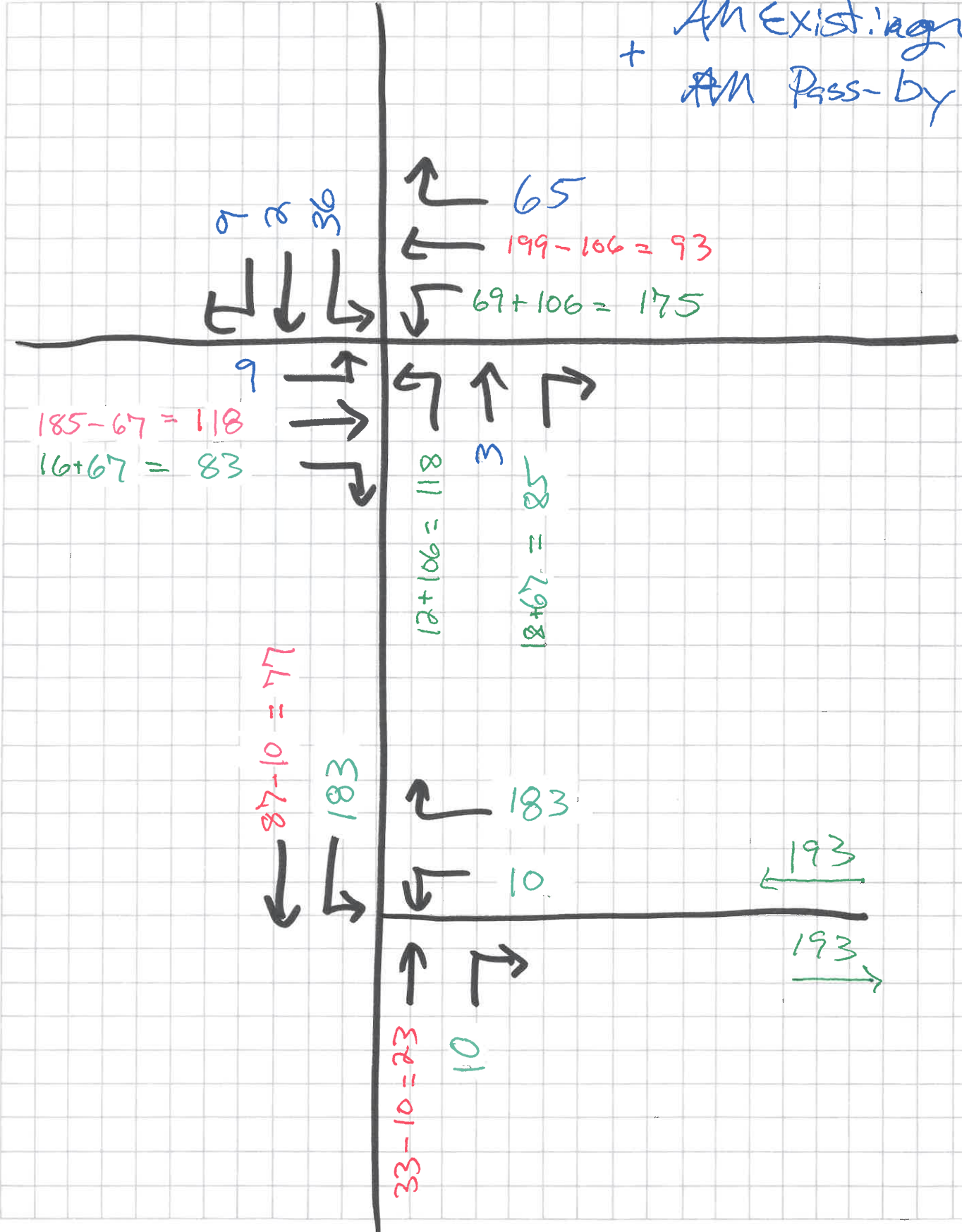
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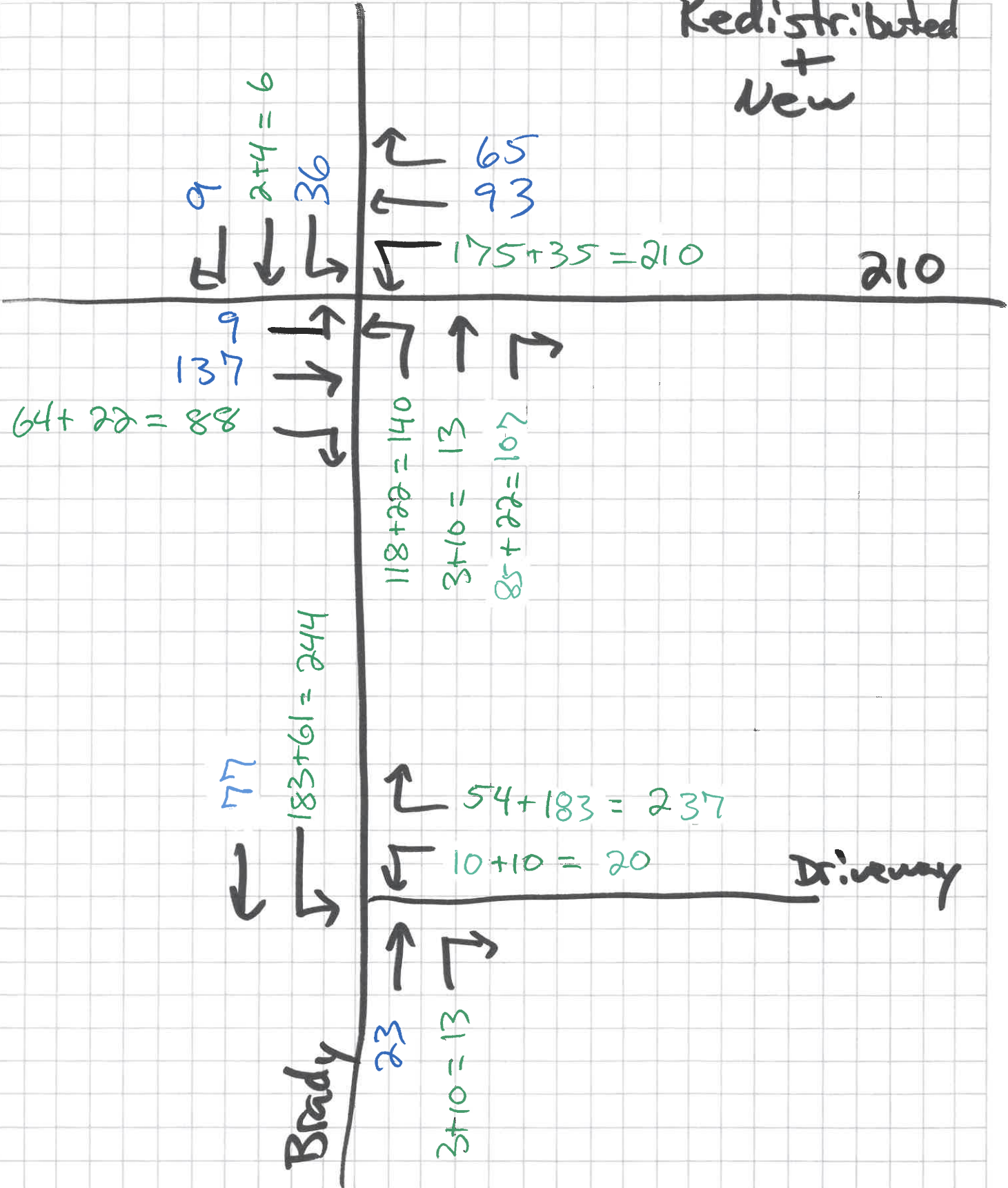
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Job No. Page No. **7**

Subject **PM**

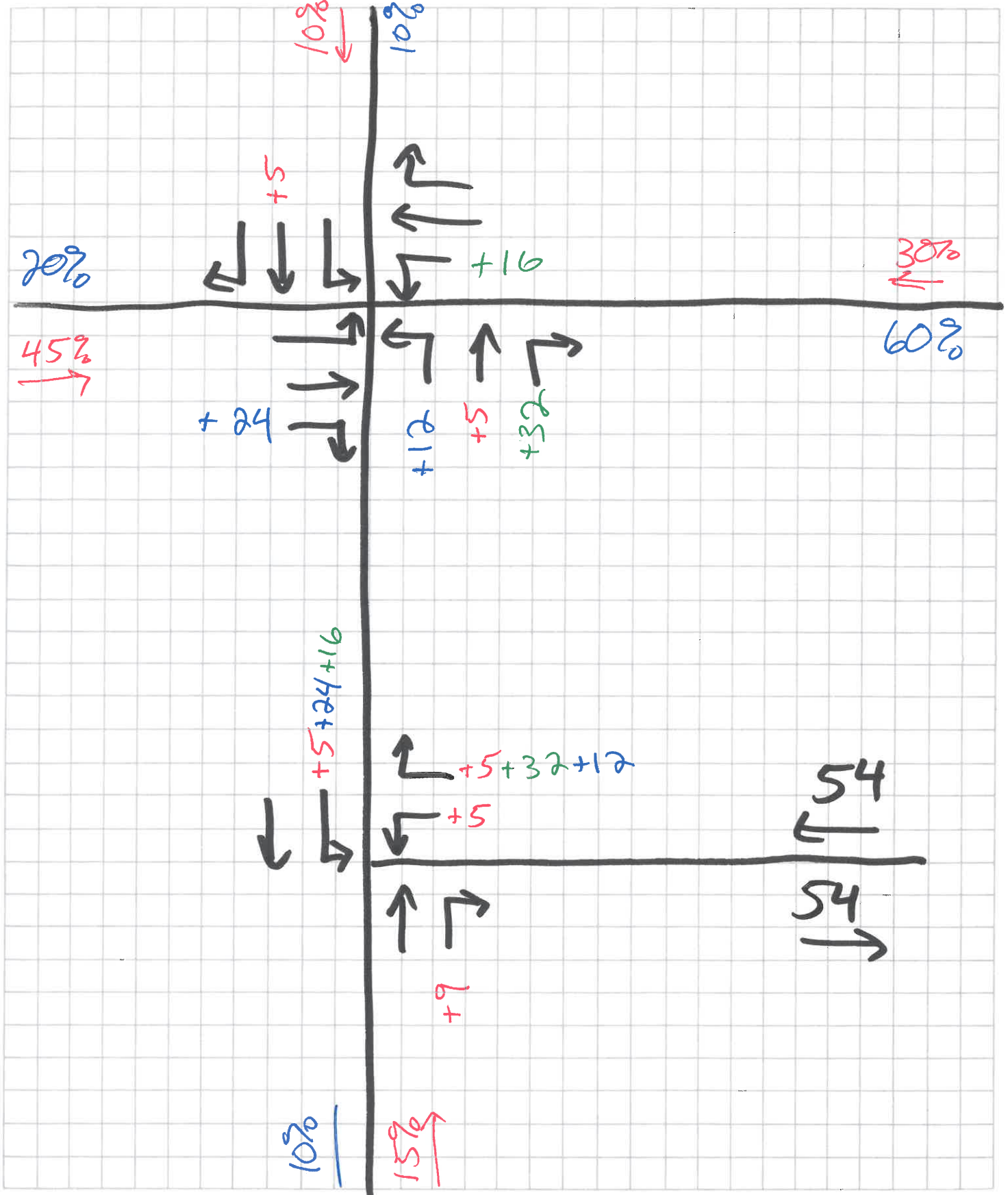
VEENSTRA & KIMM, INC.

Computed By Date Reviewed By Date

New

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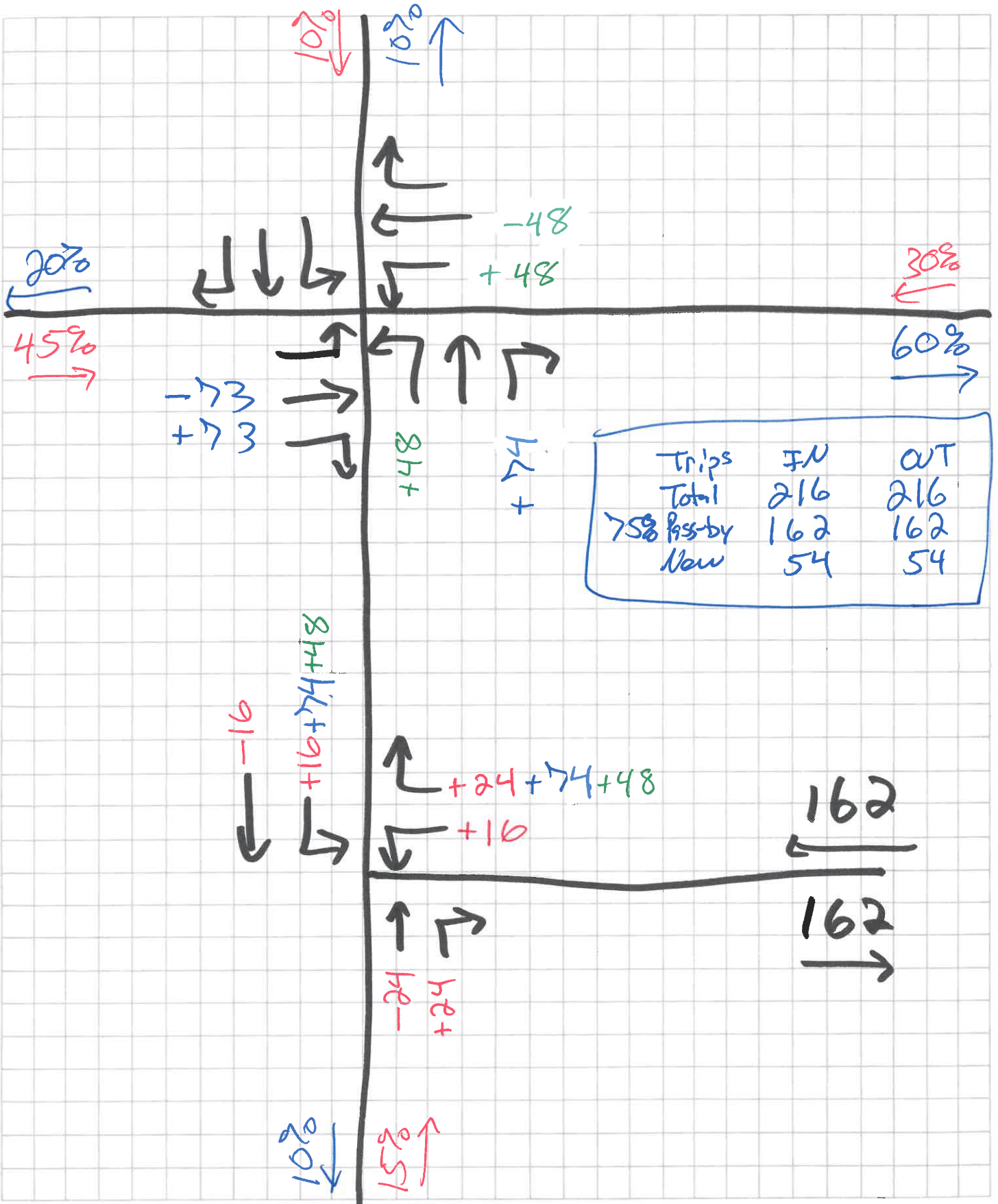
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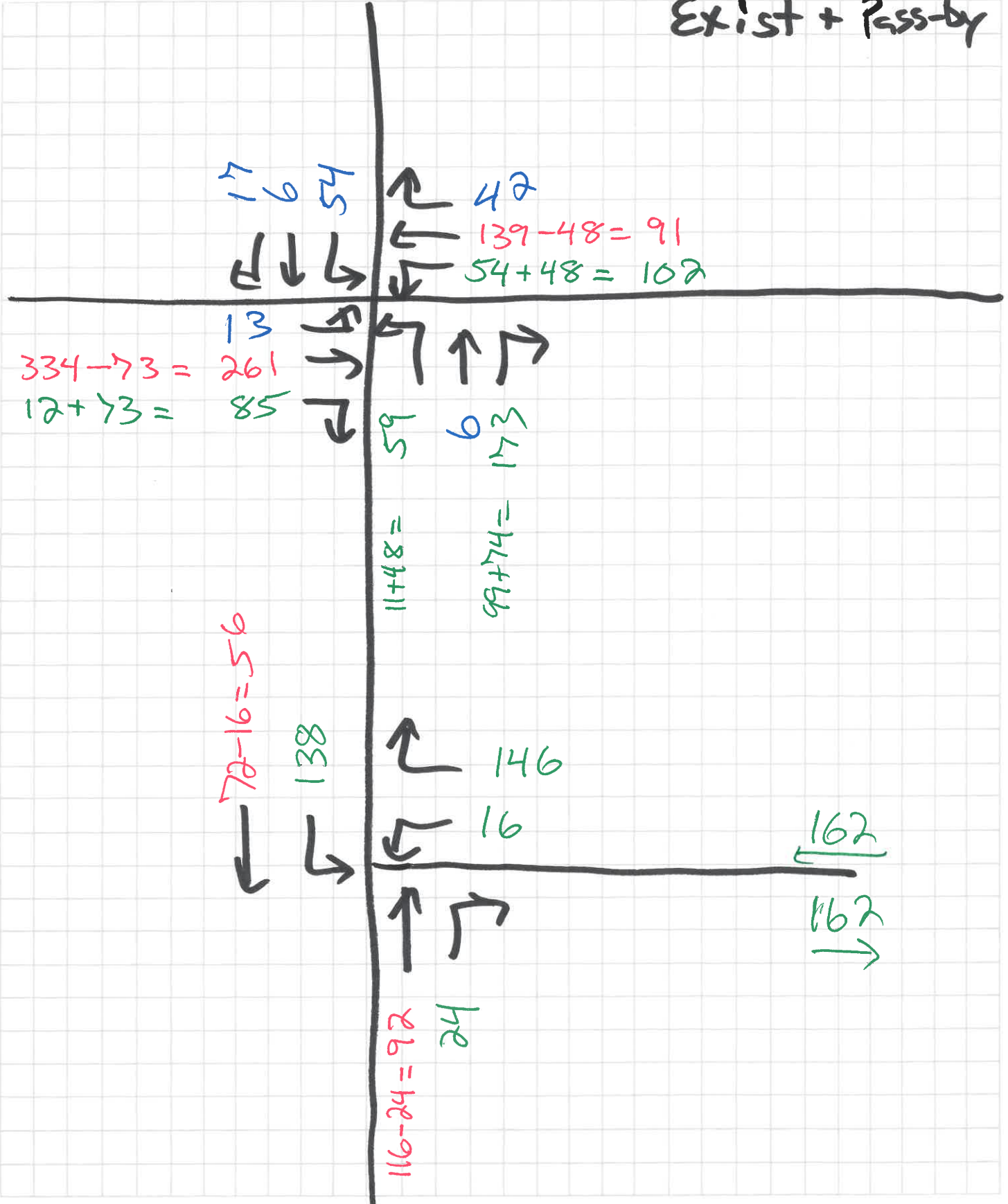
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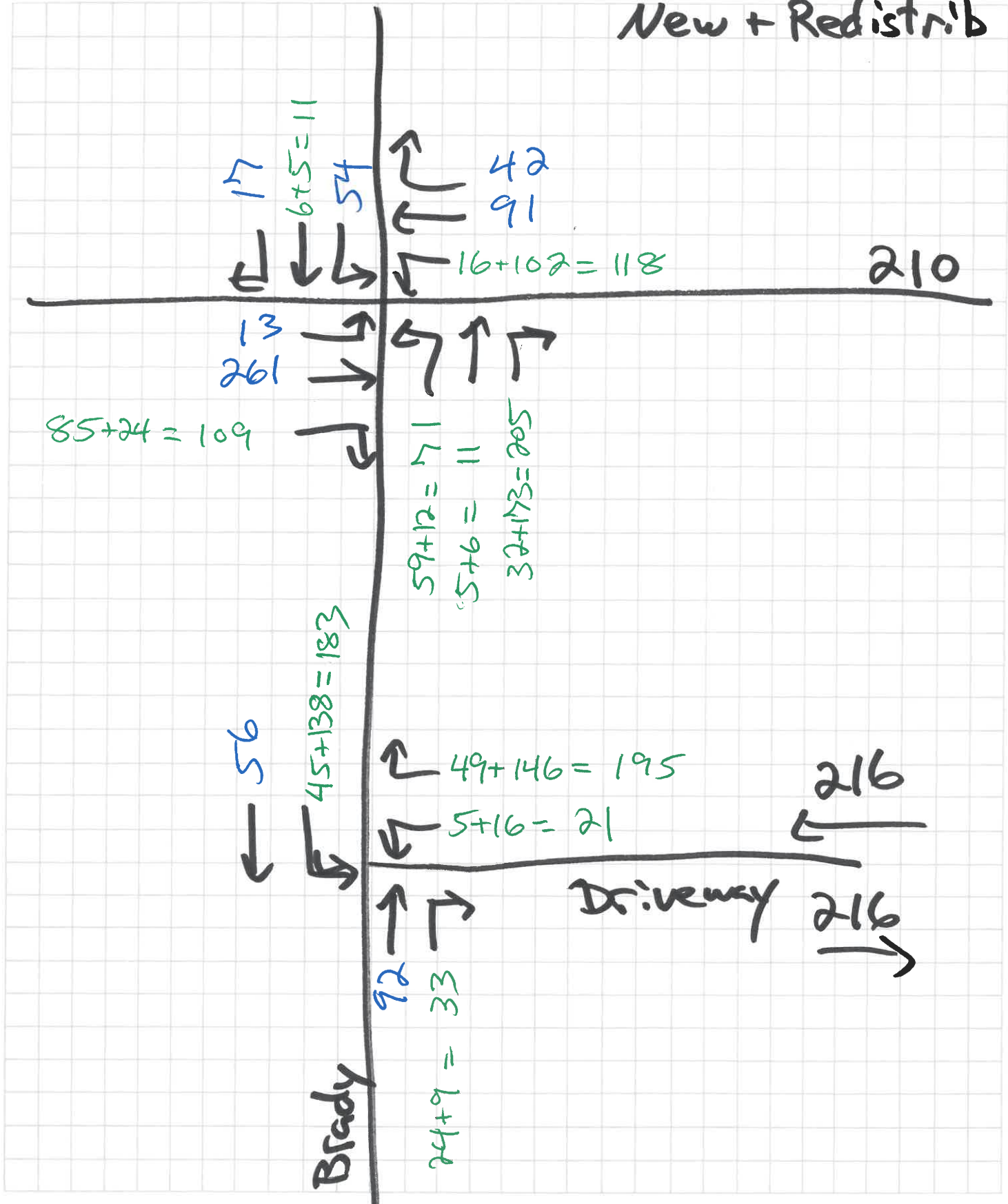
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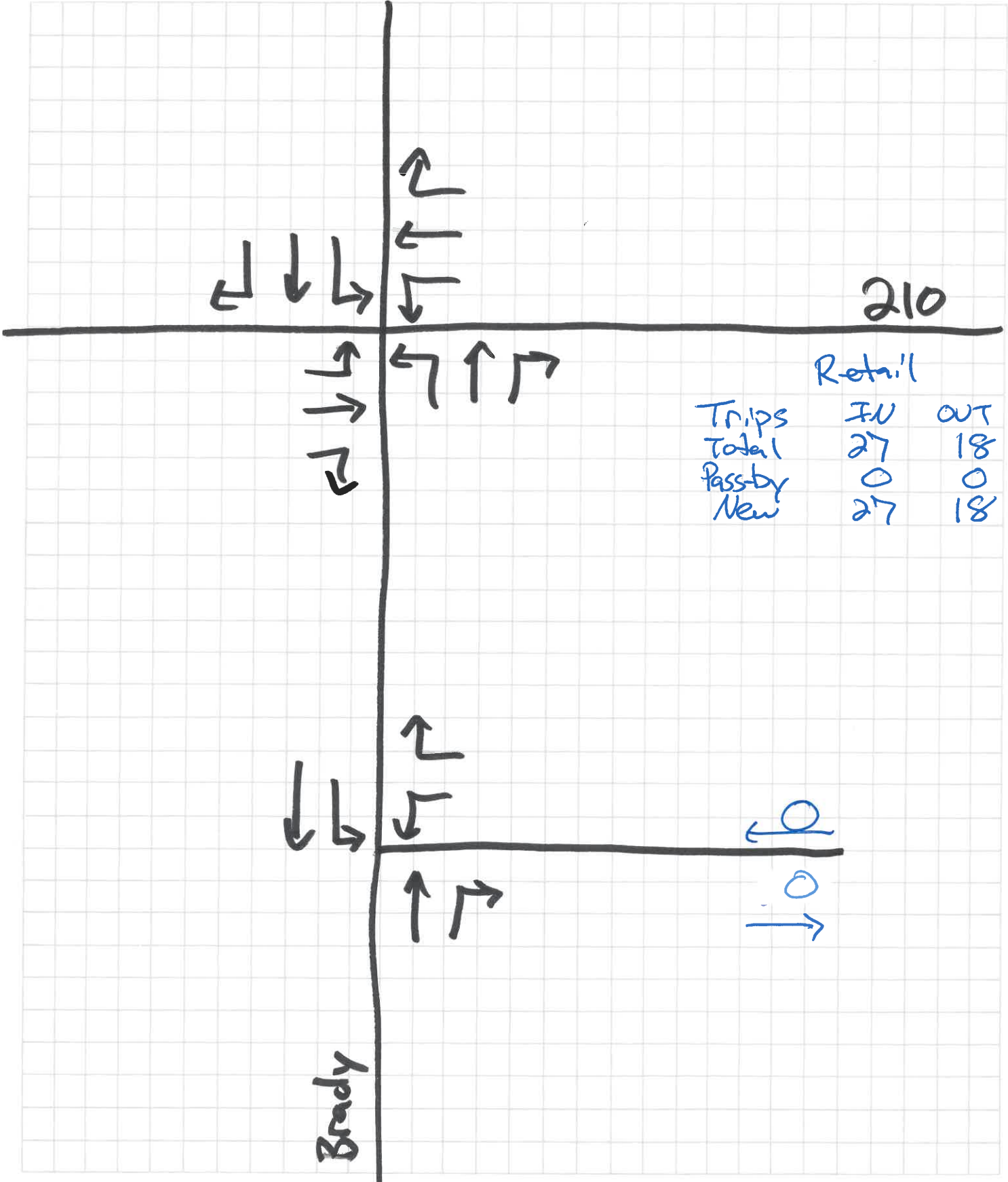




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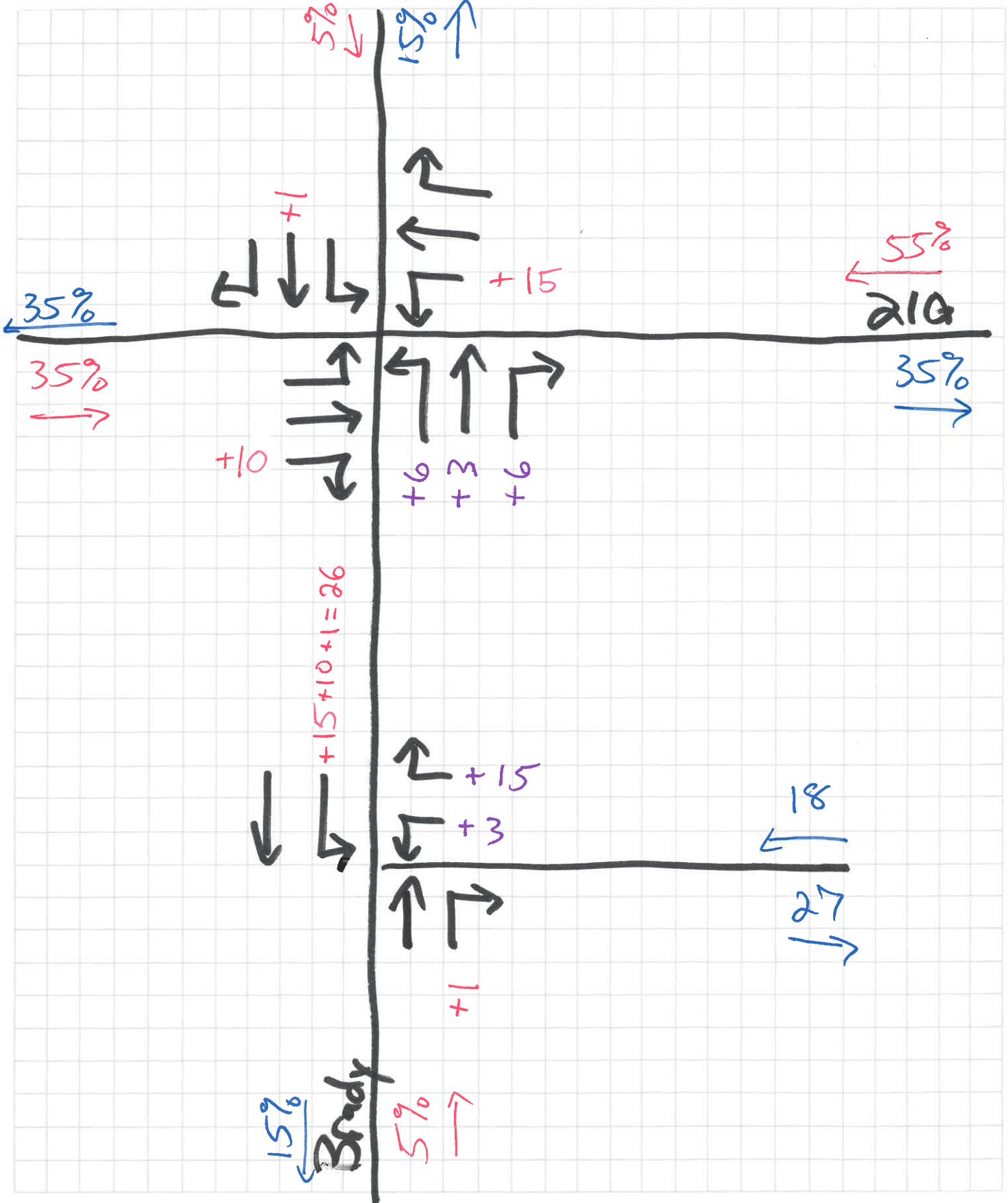




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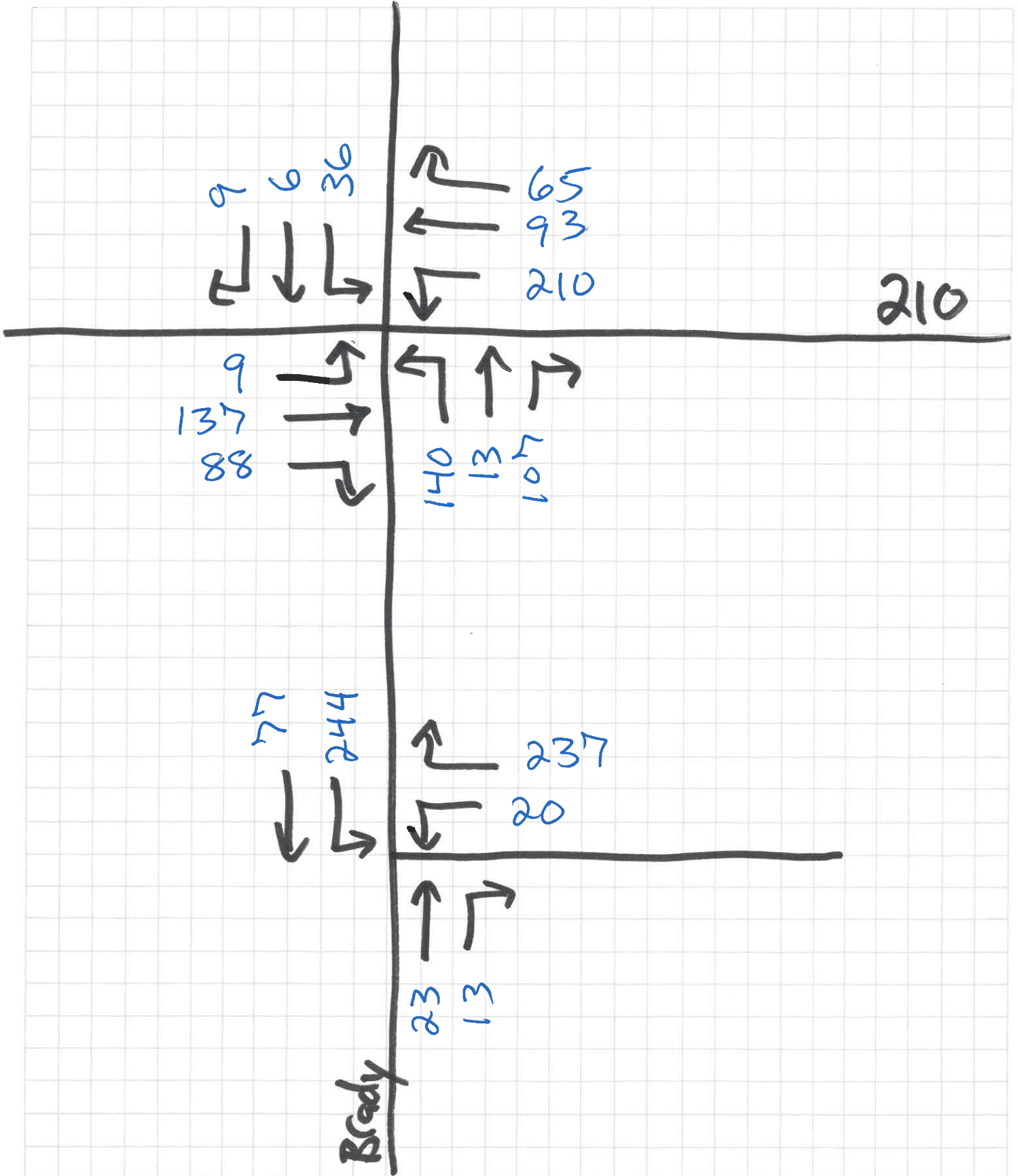
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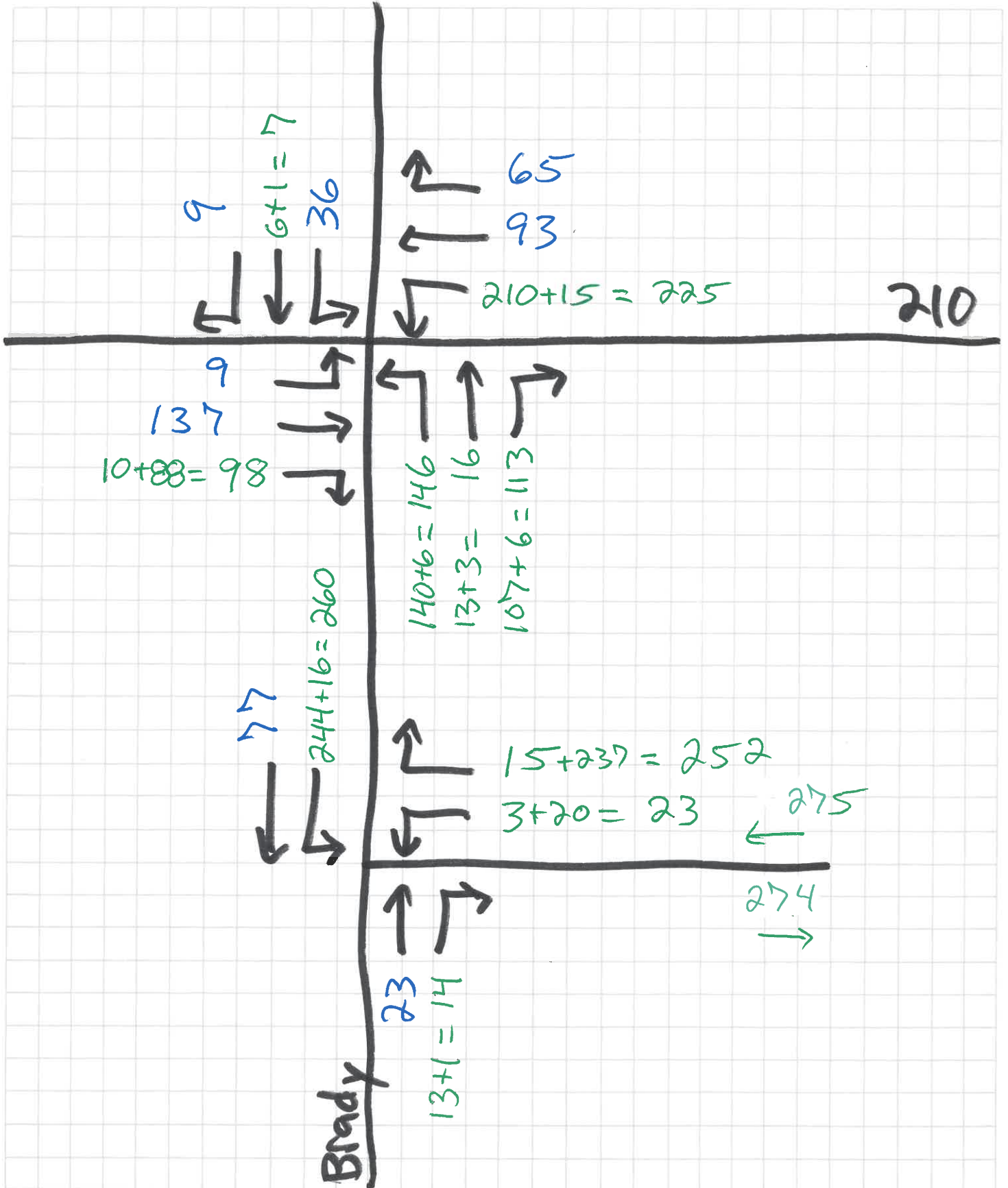


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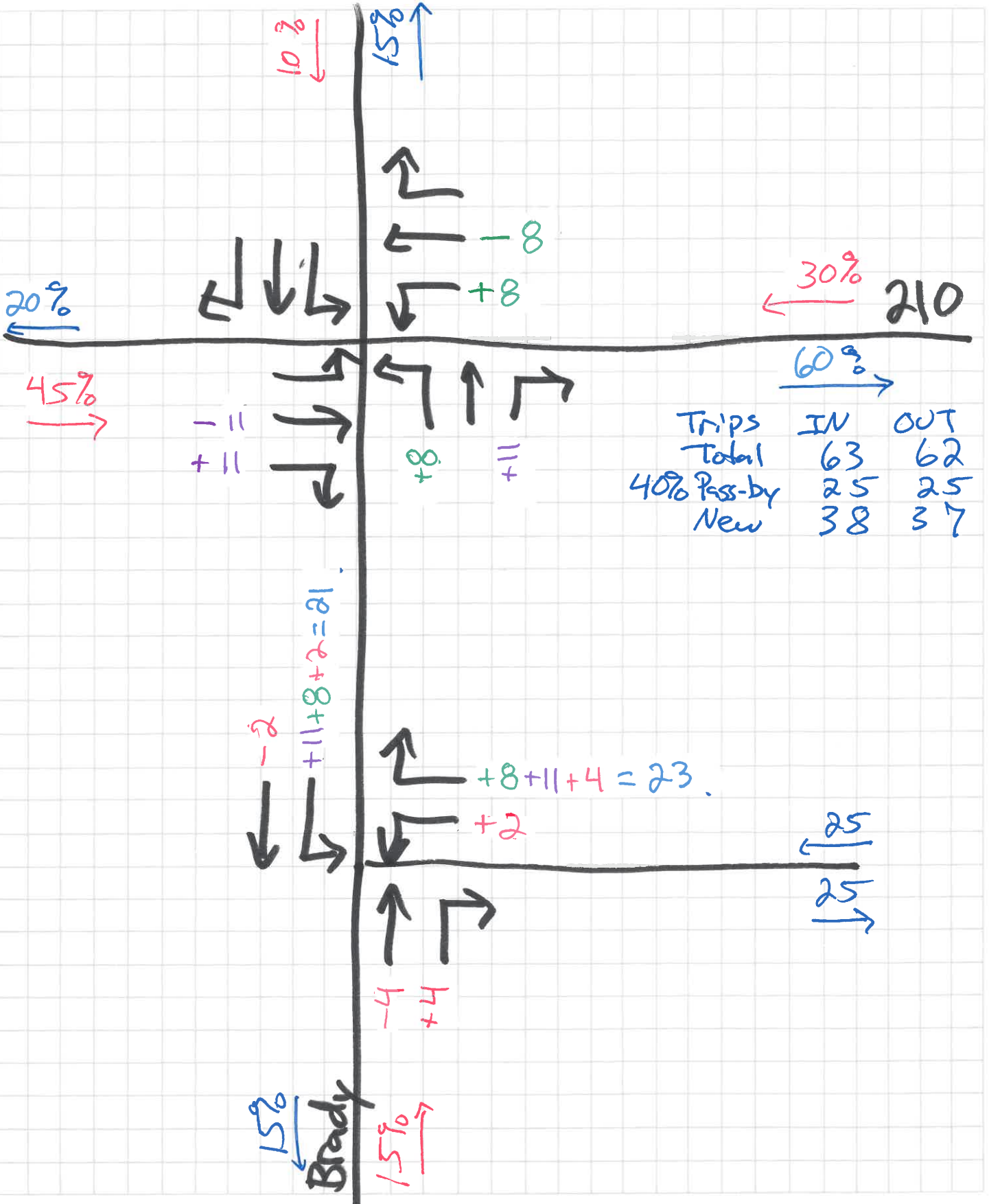


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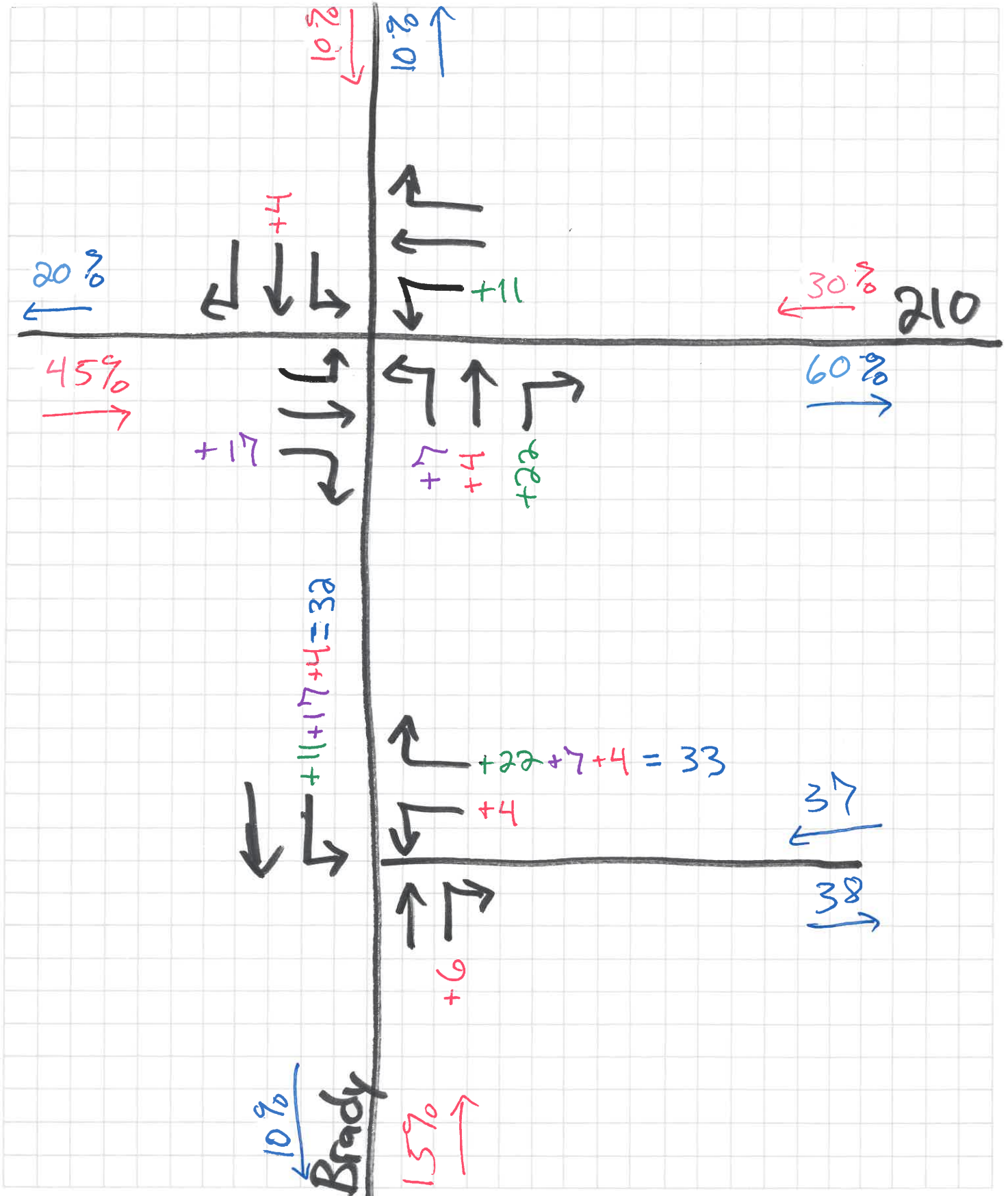
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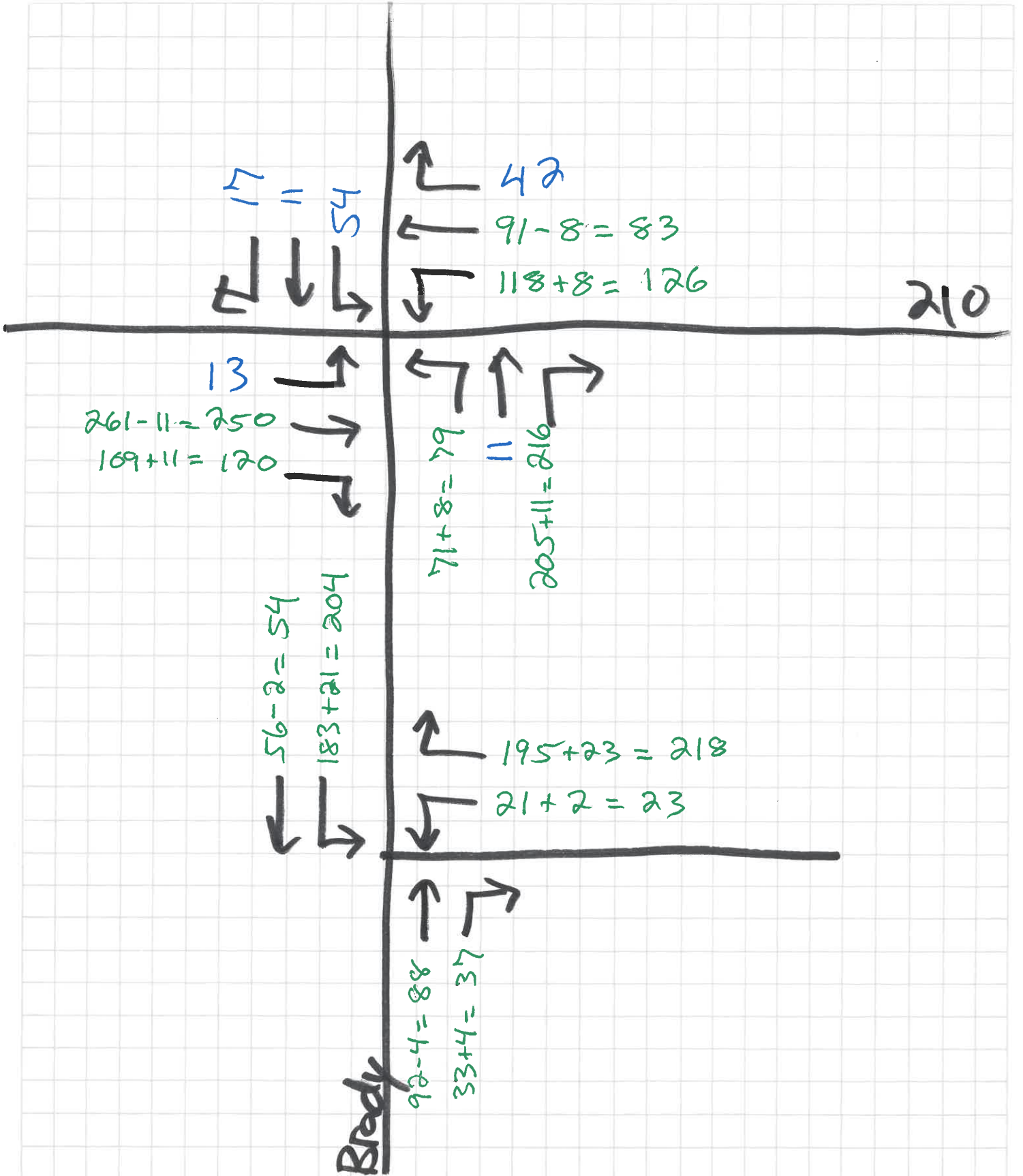
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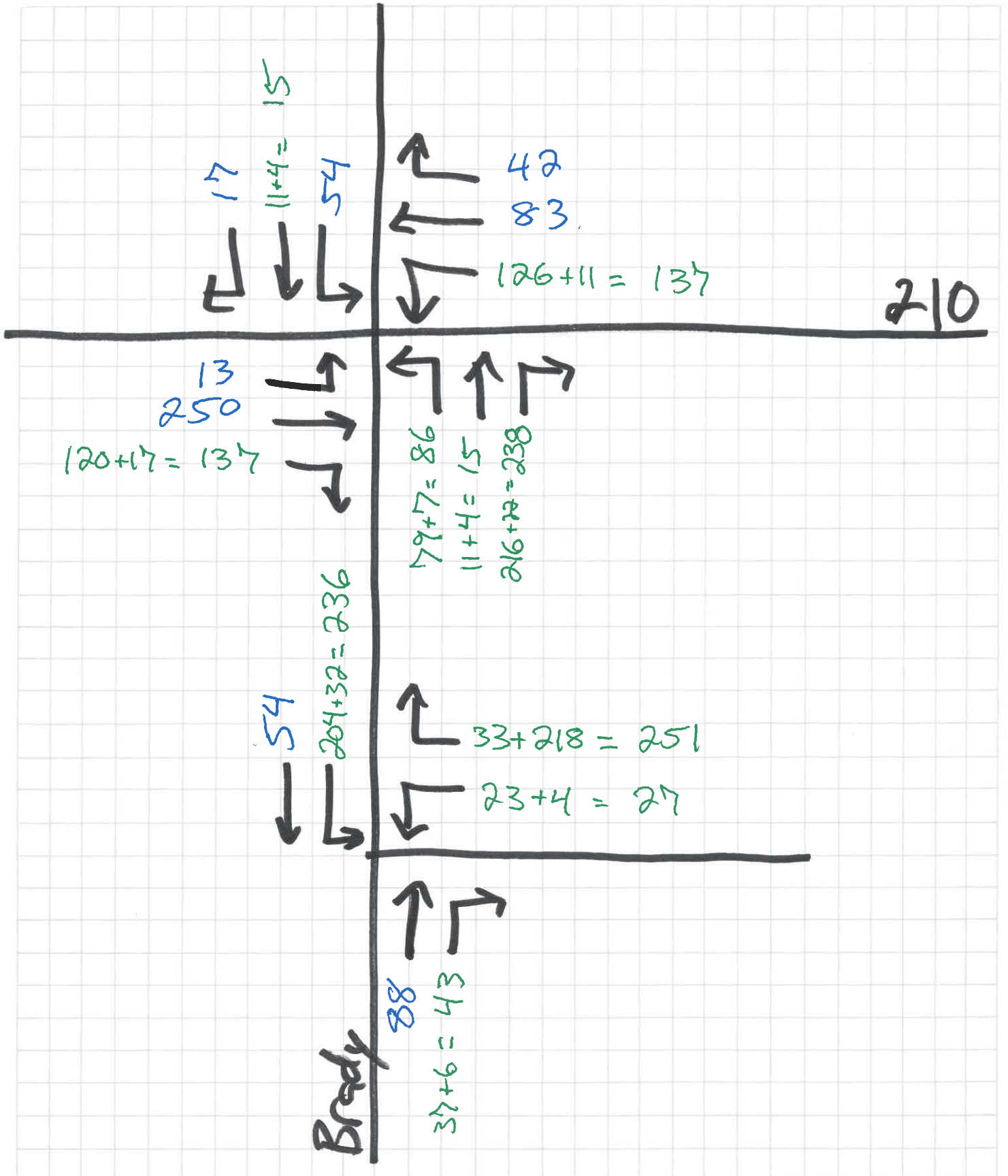


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APPENDIX – D

Traffic Analysis – Existing



HCM 6th TWSC
1: Brady Street & 210th Street

Existing 2023
AM Peak

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	9	185	16	69	199	65	12	3	18	36	2	9
Future Vol, veh/h	9	185	16	69	199	65	12	3	18	36	2	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	201	17	75	216	71	13	3	20	39	2	10

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	216	0	-	201	0	0	480	587	101	488	587	108
Stage 1	-	-	-	-	-	-	221	221	-	366	366	-
Stage 2	-	-	-	-	-	-	259	366	-	122	221	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1351	-	0	1368	-	0	469	420	935	463	420	925
Stage 1	-	-	0	-	-	0	761	719	-	626	621	-
Stage 2	-	-	0	-	-	0	723	621	-	869	719	-
Platoon blocked, %		-				-						
Mov Cap-1 Maneuver	1351	-	-	1368	-	-	438	391	935	426	391	925
Mov Cap-2 Maneuver	-	-	-	-	-	-	438	391	-	426	391	-
Stage 1	-	-	-	-	-	-	755	713	-	621	582	-
Stage 2	-	-	-	-	-	-	668	582	-	840	713	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.4		2.1		10.8		13.9	
HCM LOS					B		B	

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	432	941	1351	-	1368	-	425	524
HCM Lane V/C Ratio	0.034	0.023	0.007	-	0.055	-	0.095	0.021
HCM Control Delay (s)	13.6	8.9	7.7	0	7.8	0.1	14.4	12
HCM Lane LOS	B	A	A	A	A	A	B	B
HCM 95th %tile Q(veh)	0.1	0.1	0	-	0.2	-	0.3	0.1



HCM 6th TWSC
1: Brady Street & 210th Street

Existing 2023
PM Peak

Intersection												
Int Delay, s/veh	4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	13	334	12	54	139	42	11	6	99	54	6	17
Future Vol, veh/h	13	334	12	54	139	42	11	6	99	54	6	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	363	13	59	151	46	12	7	108	59	7	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	151	0	-	363	0	0	588	660	182	482	660	76
Stage 1	-	-	-	-	-	-	391	391	-	269	269	-
Stage 2	-	-	-	-	-	-	197	269	-	213	391	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1428	-	0	1192	-	0	392	382	829	467	382	970
Stage 1	-	-	0	-	-	0	605	606	-	713	685	-
Stage 2	-	-	0	-	-	0	786	685	-	769	606	-
Platoon blocked, %		-			-							
Mov Cap-1 Maneuver	1428	-	-	1192	-	-	360	357	829	381	357	970
Mov Cap-2 Maneuver	-	-	-	-	-	-	360	357	-	381	357	-
Stage 1	-	-	-	-	-	-	598	599	-	704	648	-
Stage 2	-	-	-	-	-	-	722	648	-	654	599	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.4			10			15.4		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	359	971	1428	-	1192	-	380	486
HCM Lane V/C Ratio	0.042	0.114	0.01	-	0.049	-	0.163	0.045
HCM Control Delay (s)	15.5	9.2	7.5	0	8.2	0.1	16.3	12.8
HCM Lane LOS	C	A	A	A	A	A	C	B
HCM 95th %tile Q(veh)	0.1	0.4	0	-	0.2	-	0.6	0.1

APPENDIX – E

Traffic Analysis – Developed



HCM 6th TWSC
1: Brady Street & 210th Street

Developed 2024
AM Peak

Intersection												
Int Delay, s/veh	8.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔↔			↔↔	
Traffic Vol, veh/h	9	137	88	110	93	65	140	13	107	36	6	9
Future Vol, veh/h	9	137	88	110	93	65	140	13	107	36	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	149	96	120	101	71	152	14	116	39	7	10

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	101	0	-	149	0	0	463	510	75	443	510	51
Stage 1	-	-	-	-	-	-	169	169	-	341	341	-
Stage 2	-	-	-	-	-	-	294	341	-	102	169	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1489	-	0	1430	-	0	482	465	971	498	465	1006
Stage 1	-	-	0	-	-	0	816	758	-	647	637	-
Stage 2	-	-	0	-	-	0	690	637	-	893	758	-
Platoon blocked, %		-				-						
Mov Cap-1 Maneuver	1489	-	-	1430	-	-	437	421	971	396	421	1006
Mov Cap-2 Maneuver	-	-	-	-	-	-	437	421	-	396	421	-
Stage 1	-	-	-	-	-	-	810	753	-	642	580	-
Stage 2	-	-	-	-	-	-	615	580	-	766	753	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.5		4.2		14.8		14.5	
HCM LOS					B		B	

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	436	740	1489	-	1430	-	398	485
HCM Lane V/C Ratio	0.365	0.167	0.007	-	0.084	-	0.107	0.027
HCM Control Delay (s)	17.9	10.8	7.4	0	7.7	0.1	15.1	12.6
HCM Lane LOS	C	B	A	A	A	A	C	B
HCM 95th %tile Q(veh)	1.6	0.6	0	-	0.3	-	0.4	0.1

Intersection						
Int Delay, s/veh	7.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	237	23	13	244	77
Future Vol, veh/h	20	237	23	13	244	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	258	25	14	265	84

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	604	20	0	0	39	0
Stage 1	32	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	430	1053	-	-	1569	-
Stage 1	986	-	-	-	-	-
Stage 2	528	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	354	1053	-	-	1569	-
Mov Cap-2 Maneuver	354	-	-	-	-	-
Stage 1	986	-	-	-	-	-
Stage 2	435	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.7	0	5.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	913	1569
HCM Lane V/C Ratio	-	-	0.306	0.169
HCM Control Delay (s)	-	-	10.7	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.3	0.6



Intersection												
Int Delay, s/veh	7.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	13	261	109	118	91	42	71	11	205	54	11	17
Future Vol, veh/h	13	261	109	118	91	42	71	11	205	54	11	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	14	284	118	128	99	46	77	12	223	59	12	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	99	0	-	284	0	0	624	667	142	531	667	50
Stage 1	-	-	-	-	-	-	312	312	-	355	355	-
Stage 2	-	-	-	-	-	-	312	355	-	176	312	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1492	-	0	1275	-	0	370	378	880	431	378	1008
Stage 1	-	-	0	-	-	0	673	656	-	635	628	-
Stage 2	-	-	0	-	-	0	673	628	-	809	656	-
Platoon blocked, %	-			-								
Mov Cap-1 Maneuver	1492	-	-	1275	-	-	322	334	880	285	334	1008
Mov Cap-2 Maneuver	-	-	-	-	-	-	322	334	-	285	334	-
Stage 1	-	-	-	-	-	-	666	649	-	628	561	-
Stage 2	-	-	-	-	-	-	578	561	-	586	649	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.4			4.6			11.9			19.5		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	323	1132	1492	-	1275	-	289	369
HCM Lane V/C Ratio	0.257	0.202	0.009	-	0.101	-	0.224	0.066
HCM Control Delay (s)	20	9	7.4	0	8.1	0.1	21	15.4
HCM Lane LOS	C	A	A	A	A	A	C	C
HCM 95th %tile Q(veh)	1	0.8	0	-	0.3	-	0.8	0.2

Intersection						
Int Delay, s/veh	6.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	195	92	33	183	56
Future Vol, veh/h	21	195	92	33	183	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	212	100	36	199	61

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	547	68	0	0	136
Stage 1	118	-	-	-	-
Stage 2	429	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	467	981	-	-	1446
Stage 1	894	-	-	-	-
Stage 2	624	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	401	981	-	-	1446
Mov Cap-2 Maneuver	401	-	-	-	-
Stage 1	894	-	-	-	-
Stage 2	535	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.8	0	6.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	860	1446
HCM Lane V/C Ratio	-	-	0.273	0.138
HCM Control Delay (s)	-	-	10.8	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.1	0.5

APPENDIX – F

Traffic Analysis – Future



Intersection												
Int Delay, s/veh	14											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	9	137	98	225	93	65	146	16	113	36	7	9
Future Vol, veh/h	9	137	98	225	93	65	146	16	113	36	7	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	149	107	245	101	71	159	17	123	39	8	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	101	0	-	149	0	0	714	760	75	694	760	51
Stage 1	-	-	-	-	-	-	169	169	-	591	591	-
Stage 2	-	-	-	-	-	-	545	591	-	103	169	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1489	-	0	1430	-	0	319	334	971	329	334	1006
Stage 1	-	-	0	-	-	0	816	758	-	460	493	-
Stage 2	-	-	0	-	-	0	490	493	-	892	758	-
Platoon blocked, %		-			-							
Mov Cap-1 Maneuver	1489	-	-	1430	-	-	265	271	971	234	271	1006
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	271	-	234	271	-
Stage 1	-	-	-	-	-	-	810	753	-	457	403	-
Stage 2	-	-	-	-	-	-	389	403	-	756	753	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			5.7			29.1			22.2		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	265	451	1489	-	1430	-	237	289
HCM Lane V/C Ratio	0.632	0.292	0.007	-	0.171	-	0.181	0.047
HCM Control Delay (s)	39.3	16.2	7.4	0	8	0.1	23.5	18.1
HCM Lane LOS	E	C	A	A	A	A	C	C
HCM 95th %tile Q(veh)	3.9	1.2	0	-	0.6	-	0.6	0.1

Intersection						
Int Delay, s/veh	7.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↑↑			↑↑
Traffic Vol, veh/h	23	252	23	14	260	77
Future Vol, veh/h	23	252	23	14	260	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	274	25	15	283	84

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	641	20	0	0	40	0
Stage 1	33	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	407	1053	-	-	1568	-
Stage 1	985	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	330	1053	-	-	1568	-
Mov Cap-2 Maneuver	330	-	-	-	-	-
Stage 1	985	-	-	-	-	-
Stage 2	410	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	890	1568
HCM Lane V/C Ratio	-	-	0.336	0.18
HCM Control Delay (s)	-	-	11.1	7.8
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.5	0.7



Intersection												
Int Delay, s/veh	14											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	137	250	13	137	83	42	86	15	238	54	15	17
Future Vol, veh/h	137	250	13	137	83	42	86	15	238	54	15	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Free	-	-	Free	-	-	Stop	-	-	Stop
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	149	272	14	149	90	46	93	16	259	59	16	18

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	90	0	-	272	0	0	921	958	136	830	958	45
Stage 1	-	-	-	-	-	-	570	570	-	388	388	-
Stage 2	-	-	-	-	-	-	351	388	-	442	570	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1503	-	0	1288	-	0	225	256	888	263	256	1015
Stage 1	-	-	0	-	-	0	474	504	-	607	607	-
Stage 2	-	-	0	-	-	0	639	607	-	564	504	-
Platoon blocked, %		-			-							
Mov Cap-1 Maneuver	1503	-	-	1288	-	-	172	198	888	145	198	1015
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	198	-	145	198	-
Stage 1	-	-	-	-	-	-	419	445	-	536	533	-
Stage 2	-	-	-	-	-	-	534	533	-	340	445	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	2.8		5.1		25.8		41.2	
HCM LOS					D		E	

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	174	589	1503	-	1288	-	150	192
HCM Lane V/C Ratio	0.584	0.453	0.099	-	0.116	-	0.446	0.139
HCM Control Delay (s)	51.3	16.1	7.7	0.2	8.2	0.1	47	26.7
HCM Lane LOS	F	C	A	A	A	A	E	D
HCM 95th %tile Q(veh)	3.1	2.3	0.3	-	0.4	-	2	0.5

Intersection						
Int Delay, s/veh	7.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	27	251	98	43	236	54
Future Vol, veh/h	27	251	98	43	236	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	273	107	47	257	59

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	675	77	0	0	154
Stage 1	131	-	-	-	-
Stage 2	544	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14
Critical Hdwy Stg 1	5.84	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22
Pot Cap-1 Maneuver	387	968	-	-	1424
Stage 1	881	-	-	-	-
Stage 2	546	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	315	968	-	-	1424
Mov Cap-2 Maneuver	315	-	-	-	-
Stage 1	881	-	-	-	-
Stage 2	444	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.1	0	6.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	806	1424
HCM Lane V/C Ratio	-	-	0.375	0.18
HCM Control Delay (s)	-	-	12.1	8.1
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	1.8	0.7

APPENDIX – G

ICAT Crash Data



Iowa Crash Analysis Tool
Quick Report
2018-2023

Crash Severity	11
Fatal Crash	0
Suspected Serious Injury Crash	1
Suspected Minor Injury Crash	0
Possible/Unknown Injury Crash	1
Property Damage Only	9

Injury Status Summary	2
Fatalities	0
Suspected serious/incapacitating	1
Suspected minor/non-incapacitating	0
Possible (complaint of pain/injury)	1
Unknown	0

Property/Vehicles/Occupants	
Property Damage Total (dollars):	53,601.00
Average (per crash dollars):	4,872.82
Total Vehicles:	20.00
Average (per crash):	1.82
Total Occupants:	25.00
Average (per crash):	2.27

Average Severity	
Fatalities/Fatal Crash:	0.00
Fatalities/Crash:	0.00
Injuries/Crash:	0.18
Major Injuries/Crash:	0.09
Minor Injuries/Crash:	0.00
Possible/Unknown Injuries/Crash:	0.09





Iowa Crash Analysis Tool
Quick Report
2018-2023

Major Cause			11
Animal	1	Ran traffic signal	0
Ran stop sign	1	Failed to yield to emergency vehicle	0
FTYROW: At uncontrolled intersection	0	FTYROW: Making right turn on red signal	0
FTYROW: From stop sign	0	FTYROW: From yield sign	0
FTYROW: Making left turn	1	FTYROW: From driveway	0
FTYROW: From parked position	0	FTYROW: To pedestrian	0
FTYROW: Other	0	Drove around RR grade crossing gates	0
Disregarded RR Signal	1	Crossed centerline (undivided)	0
Crossed median (divided)	0	Traveling wrong way or on wrong side of road	0
Aggressive driving/road rage	0	Driving too fast for conditions	0
Exceeded authorized speed	0	Improper or erratic lane changing	0
Operating vehicle in an reckless, erratic, ca...	1	Followed too close	0
Passing: On wrong side	0	Passing: Where prohibited by signs/markings	0
Passing: With insufficient distance/inadequa...	0	Passing: Through/around barrier	0
Passing: Other passing	0	Made improper turn	0
Driver Distraction: Manual operation of an e...	0	Driver Distraction: Talking on a hand-held d...	0
Driver Distraction: Talking on a hands free ...	0	Driver Distraction: Adjusting devices (radio...	0
Driver Distraction: Other electronic device ...	0	Driver Distraction: Passenger	0
Driver Distraction: Unrestrained animal	0	Driver Distraction: Reaching for object(s)/f...	0
Driver Distraction: Inattentive/lost in thou...	0	Driver Distraction: Other interior distracti...	2
Driver Distraction: Exterior distraction	0	Ran off road - right	0
Ran off road - straight	0	Ran off road - left	0
Lost control	0	Swerving/Evasive Action	0
Over correcting/over steering	0	Failed to keep in proper lane	1
Failure to signal intentions	0	Traveling on prohibited traffic way	0
Vehicle stopped on railroad tracks	0	Other: Vision obstructed	0
Other: Improper operation	0	Other: Disregarded warning sign	0
Other: Disregarded signs/road markings	0	Other: Illegal off-road driving	0
Downhill runaway	0	Separation of units	0
Towing improperly	0	Cargo/equipment loss or shift	0
Equipment failure	0	Oversized load/vehicle	0
Other: Getting off/out of vehicle	0	Failure to dim lights/have lights on	0
Improper backing	0	Improper starting	0
Illegally parked/unattended	0	Driving less than the posted speed limit	0
Operator inexperience	0	Other	2
Unknown	1	Not reported	0
Other: No improper action	0		



**Iowa Crash Analysis Tool
Quick Report
2018-2023**

Time of Day/Day of Week														
Day of Week	12 AM to 2 AM	2 AM to 4 AM	4 AM to 6 AM	6 AM to 8 AM	8 AM to 10 AM	10 AM to Noon	Noon to 2 PM	2 PM to 4 PM	4 PM to 6 PM	6 PM to 8 PM	8 PM to 10 PM	10 PM to 12 AM	Not reported	Total
Sunday	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Monday	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuesday	0	0	0	1	0	0	0	1	1	0	0	0	0	3
Wednesday	0	0	0	1	0	0	0	0	1	0	0	0	0	2
Thursday	0	0	0	1	0	0	0	0	1	0	0	0	0	2
Friday	0	0	0	0	0	1	0	1	0	0	0	0	0	2
Saturday	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	0	0	0	3	0	1	1	2	4	0	0	0	0	11

Manner of Crash Collision	11
Non-collision (single vehicle)	3
Head-on (front to front)	0
Rear-end (front to rear)	4
Angle, oncoming left turn	2
Broadside (front to side)	0
Sideswipe, same direction	1
Sideswipe, opposite direction	0
Rear to rear	0
Rear to side	1
Not reported	0
Other	0
Unknown	0

Surface Conditions	11
Dry	7
Wet	1
Ice/frost	0
Snow	0
Slush	1
Mud, dirt	0
Water (standing or moving)	0
Sand	0
Oil	0
Gravel	0
Not reported	1
Other	1
Unknown	0

Fixed Object Struck	20
Bridge overhead structure	0
Bridge/bridge rail parapet	0
Ditch	0
Ground	1
Guardrail - face	0
Concrete traffic barrier (median or right sid...	0
Cable barrier	0
Utility pole/light support	0
Traffic signal support	0
Fire hydrant	0
Tree	0
Snow bank	0
Wall	0
Other fixed object	0
Bridge pier or support	0
Curb/island/raised median	0
Embankment	0
Culvert/pipe opening	0
Guardrail - end	0
Other traffic barrier	0
Impact attenuator/crash cushion	0
Traffic sign support	0
Other post/pole/support	0
Mailbox	0
Landscape/shrubbery	0
Fence	0
Building	0
None (no fixed object struck)	19



Iowa Crash Analysis Tool
Quick Report
2018-2023

Driver Age/Driver Gender					
Driver Age - 5 year Bins	Female	Male	Not reported	Unknown	Total
< 14	0	0	0	0	0
= 14	0	0	0	0	0
= 15	0	0	0	0	0
= 16	0	0	0	0	0
= 17	0	0	0	0	0
= 18	0	0	0	0	0
= 19	0	0	0	0	0
= 20	0	0	0	0	0
>= 21 and <= 24	0	4	0	0	4
>= 25 and <= 29	1	0	0	0	1
>= 30 and <= 34	1	2	0	0	3
>= 35 and <= 39	1	1	0	0	2
>= 40 and <= 44	0	0	0	0	0
>= 45 and <= 49	0	0	0	0	0
>= 50 and <= 54	0	2	0	0	2
>= 55 and <= 59	3	0	0	0	3
>= 60 and <= 64	0	0	0	0	0
>= 65 and <= 69	0	1	0	0	1
>= 70 and <= 74	0	2	0	0	2
>= 75 and <= 79	0	1	0	0	1
>= 80 and <= 84	0	0	0	0	0
>= 85 and <= 89	0	0	0	0	0
>= 90 and <= 94	0	0	0	0	0
>= 95	0	0	0	0	0
Not reported	0	0	0	0	0
Unknown	0	0	1	0	1
Total	6	13	1	0	20

Alcohol Test Given	20
None	17
Blood	0
Urine	0
Breath	2
Vitreous	0
Refused	0
Not reported	1

Drug Test Given	20
None	19
Blood	0
Urine	0
Breath	0
Vitreous	0
Refused	0
Not reported	1

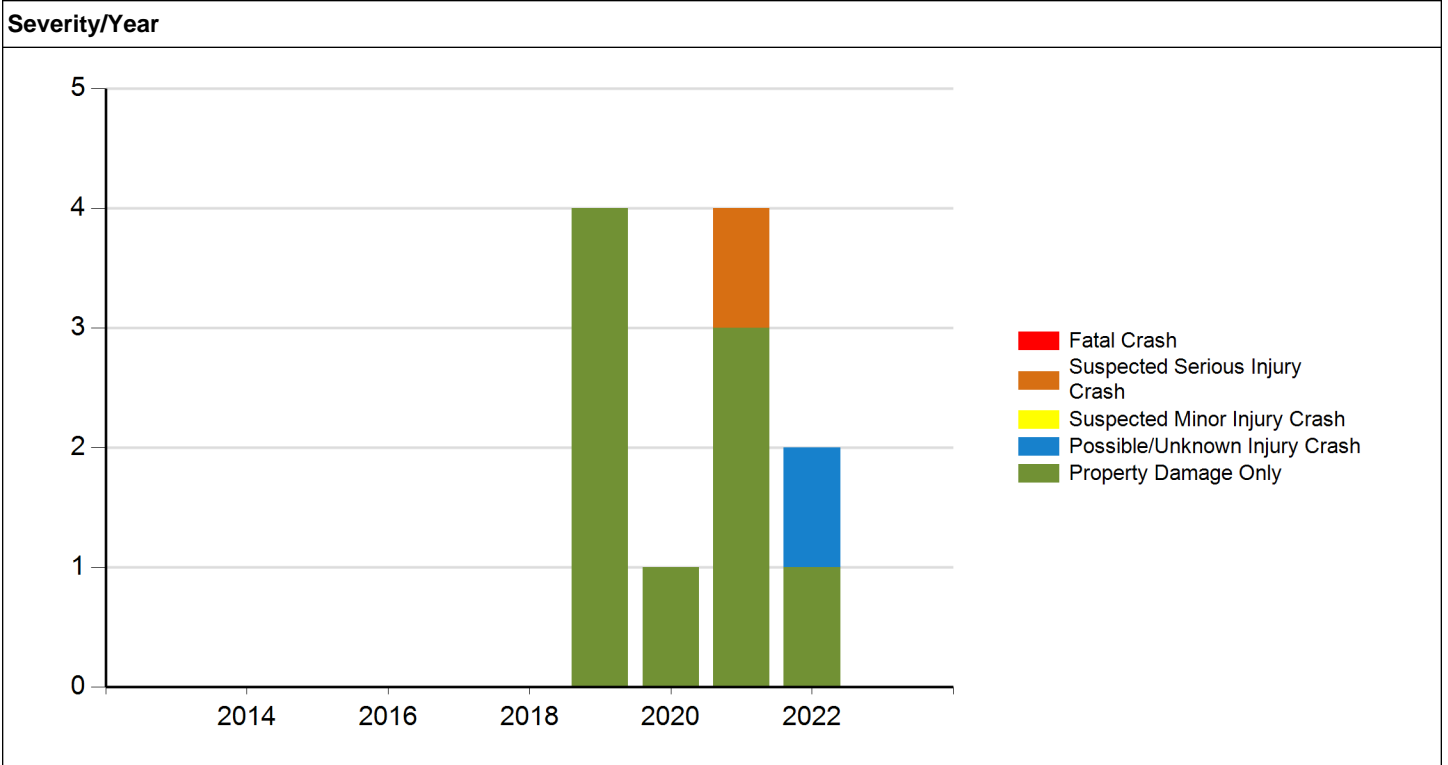
Drug Test Result	20
Negative	0
Cannabis	0
Central Nervous System depressants	0
Central Nervous System stimulants	0
Hallucinogens	0
Inhalants	0
Narcotic Analgesics	0
Dissociative Anesthetic (PCP)	0
Prescription Drug	0
Not reported	20
Other	0

Drug/Alcohol Related	11
Drug	0
Alcohol (< Statutory)	1
Alcohol (Statutory)	1
Drug and Alcohol (< Statutory)	0
Drug and Alcohol (Statutory)	0
Refused	0
Under Influence of Alcohol/Drugs/Medications	0
None Indicated	9



Iowa Crash Analysis Tool
Quick Report
2018-2023

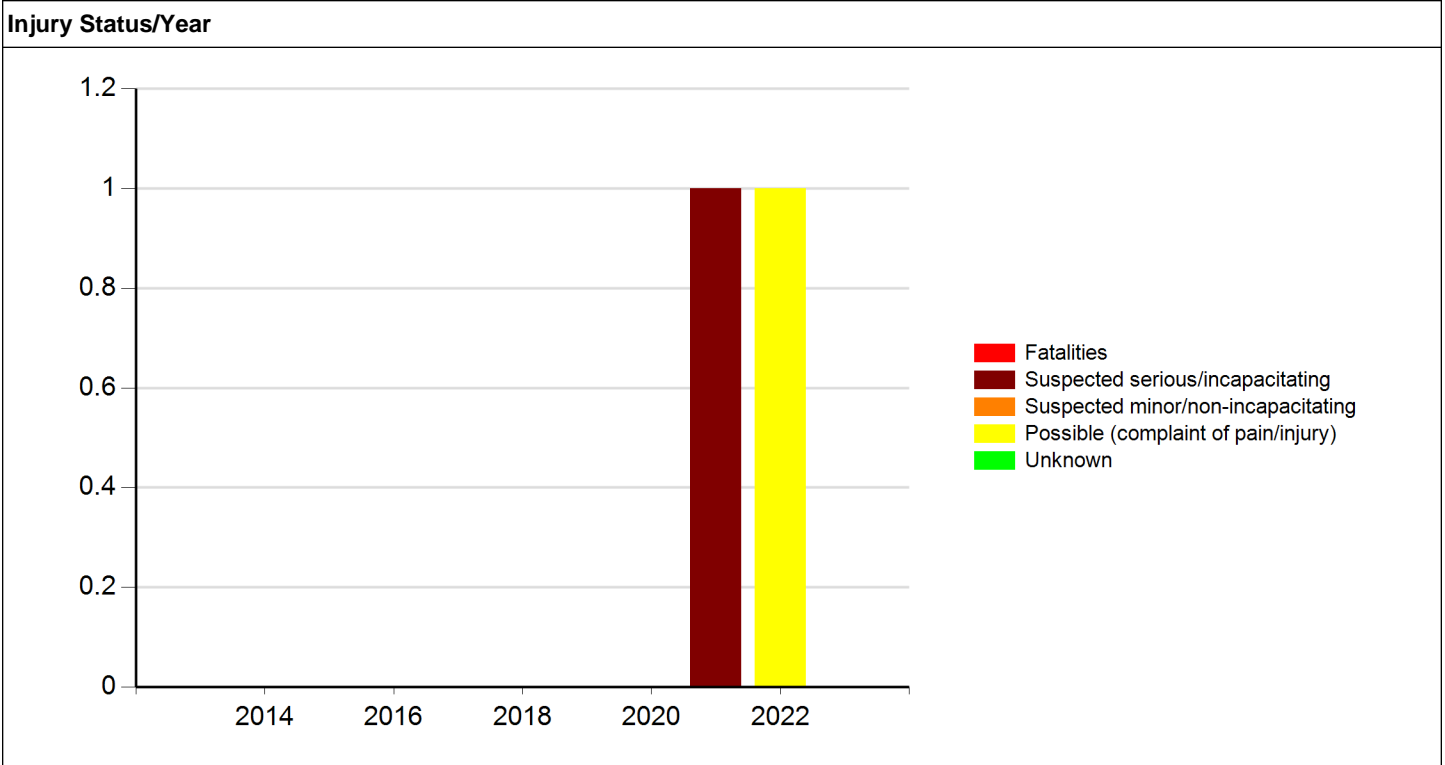
Crash Severity - Annual						
Crash Year	Fatal Crash	Suspected Serious Injury Crash	Suspected Minor Injury Crash	Possible/Unknown Injury Crash	Property Damage Only	Total
2013	0	0	0	0	0	0
2014	0	0	0	0	0	0
2015	0	0	0	0	0	0
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	0	0	0	0	4	4
2020	0	0	0	0	1	1
2021	0	1	0	0	3	4
2022	0	0	0	1	1	2
2023	0	0	0	0	0	0
Total	0	1	0	1	9	11





Iowa Crash Analysis Tool
Quick Report
2018-2023

Injury Status - Annual						
Crash Year	Fatalities	Suspected serious/incapacitating	Suspected minor/non-incapacitating	Possible (complaint of pain/injury)	Unknown	Total
2013	0	0	0	0	0	0
2014	0	0	0	0	0	0
2015	0	0	0	0	0	0
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	0	0	0	0	0	0
2020	0	0	0	0	0	0
2021	0	1	0	0	0	1
2022	0	0	0	1	0	1
2023	0	0	0	0	0	0
Total	0	1	0	1	0	2





Meeting the following criteria

Jurisdiction: Statewide
Year: 2018, 2019, 2020, 2021, 2022, 2023
Map Selection: Yes
Filter: None

Analyst Information

APPENDIX – H

Signal Warrants

Warrants Summary Report

1: 210 & Brady St

Intersection Information:

	Major Street	Minor Street
Street Name	210th St	Brady St
Direction	EB/WB	NB/SB
Number of Lanes	2	1
Approach Speed	35	35

Warrant	Met?	Notes
Warrant 1, Eight-Hour Vehicular Volume		
	No	
Condition A or B Met?	No	0 Hours met (8 required)
Condition A and B Met?	No	0 Hours met (8 required)
Warrant 2, Four-Hour Vehicular Volume		
	No	0 Hours met (4 required)
Warrant 3, Peak Hour		
	No	
Condition A Met?	No	0 Hours met (1 required)
Condition B Met?	No	0 Hours met (1 required)

Warrant 1: Eight-hour Vehicular Volume

1: 210 & Brady St

Intersection Information:

Major Street Name: 210th St

Major Street Direction: EB/WB

Minor Street Direction: NB/SB

WARRANT 1 MET? No

Details:

Condition A Met? **No** 0 Hours met (8 required) at 100%

Condition B Met? **No** 0 Hours met (8 required) at 100%

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	100% Standard Met? Cond. A OR Cond. B		80% Standard Met? Cond. A AND Cond. B	
			Condition A 100% Column	Condition B 100% Column	Condition A 80% Column	Condition B 80% Column
06:00 to 07:00	415	28	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		
06:15 to 07:15	449	27	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		
06:30 to 07:30	512	29	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		
06:45 to 07:45	515	34	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

07:00 to 08:00	522	44	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

07:15 to 08:15	543	47	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

07:30 to 08:30	523	55	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

07:45 to 08:45	487	60	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

08:00 to 09:00	405	57	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

08:15 to 09:15	272	45	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

08:30 to 09:30	159	28	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

08:45 to 09:45	81	12	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

11:00 to 12:00	373	69	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

11:15 to 12:15	391	75	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

11:30 to 12:30	370	69	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

11:45 to 12:45	393	60	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

12:00 to 13:00	390	50	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

12:15 to 13:15	288	34	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

12:30 to 13:30	210	21	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

12:45 to 13:45	98	11	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No		

14:30 to 15:30	481	78	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

14:45 to 15:45	512	86	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

15:00 to 16:00		564		98		No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

15:15 to 16:15		594		116		No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

15:30 to 16:30		576		114		No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

15:45 to 16:45		502		111		No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (120)?	No					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

16:00 to 17:00		453		115		No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No					
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

16:15 to 17:15		389		105		No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No					
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

16:30 to 17:30	356		107	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No			
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No			
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes			
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes			

16:45 to 17:45	244		83	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No			
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No			
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes			
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes			

17:00 to 18:00	147		59	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No			
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No			
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No			
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No			

17:15 to 18:15	62		25	No	No	No	No
Condition A	Volume >= 100% column (600)?	No	Volume >= 100% column (150)?	No			
	Volume >= 80% column (480)?	No	Volume >= 80% column (120)?	No			
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	No			
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	No			

Warrant 2: Four-hour Vehicular Volume

1: 210 & Brady St

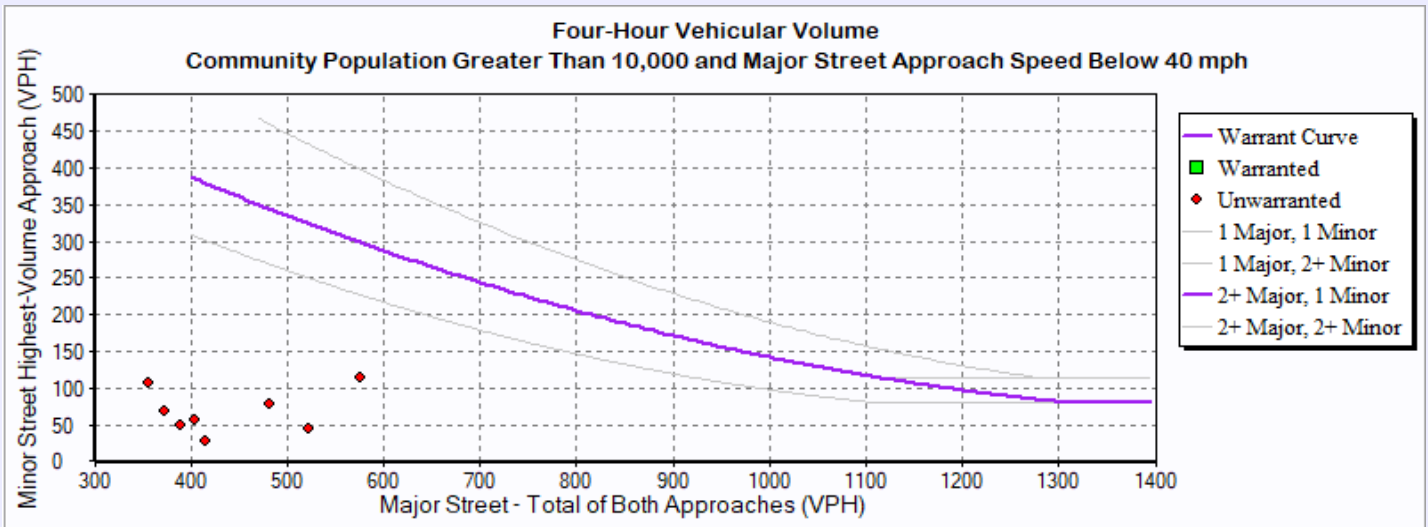
Intersection Information:

	Major Street	Minor Street
Street Name	210th St	Brady St
Direction	EB/WB	NB/SB
Number of Lanes	2	1
Approach Speed	35	35

Warrant 2 Met? **No**

Details:

Notes	0 Hours met (4 required)
Low population?	No



Hourly Volumes

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
00:00:00 - 01:00:00	0	0
01:00:00 - 02:00:00	0	0
02:00:00 - 03:00:00	0	0
03:00:00 - 04:00:00	0	0
04:00:00 - 05:00:00	0	0
05:00:00 - 06:00:00	0	0
06:00:00 - 07:00:00	415	28
07:00:00 - 08:00:00	522	44
08:00:00 - 09:00:00	405	57
09:00:00 - 10:00:00	0	0
10:00:00 - 11:00:00	0	0
11:00:00 - 12:00:00	373	69
12:00:00 - 13:00:00	390	50
13:00:00 - 14:00:00	0	0
14:00:00 - 15:00:00	249	41
15:00:00 - 16:00:00	564	98
16:00:00 - 17:00:00	453	115
17:00:00 - 18:00:00	147	59
18:00:00 - 19:00:00	0	0
19:00:00 - 20:00:00	0	0
20:00:00 - 21:00:00	0	0
21:00:00 - 22:00:00	0	0
22:00:00 - 23:00:00	0	0
23:00:00 - 00:00:00	0	0

Warranted Hours

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)

Warrant 3: Peak Hour

1: 210 & Brady St

Intersection Information:

	Major Street	Minor Street
Street Name	210th St	Brady St
Direction	EB/WB	NB/SB
Number of Lanes	2	1
Approach Speed	35	35

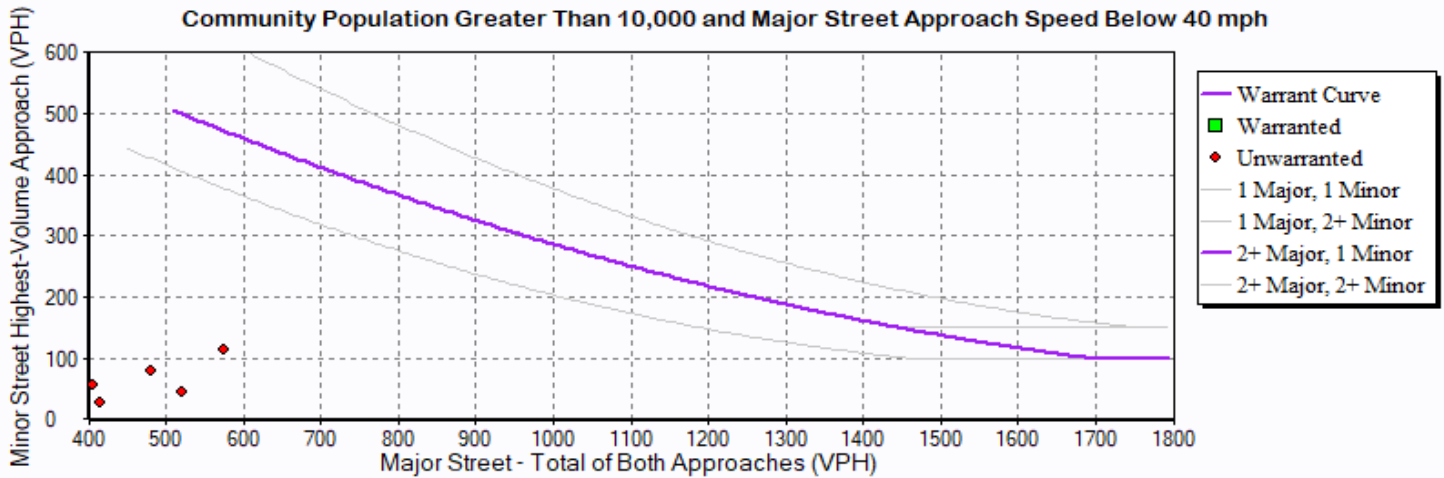
Warrant 3 Met? **No**

Details

Low Population?	No		
Condition A Met?	No	Condition B Met?	No
Notes	0 Hours met (1 required)	Notes	0 Hours met (1 required)
Minor Approach Time Delay Condition Met?	Not Met		
Minor Approach Volume Condition Met?	Met		
Total Entering Intersection Volume Condition Met?	Not Met		

Peak Hour Vehicular Volume

Community Population Greater Than 10,000 and Major Street Approach Speed Below 40 mph



Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
6:00	415	28
7:00	522	44
8:00	405	57
11:00	373	69
12:00	390	50
14:30	481	78
15:30	576	114
16:30	356	107

APPENDIX – I

Turn Lane Warrants

NCHRP 457 – LEFT TURN LANE WARRANTS

EXISTING AM PEAK

BRADY & 210TH STREET—EBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

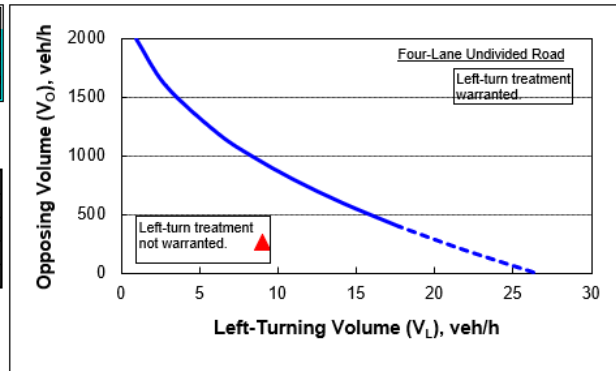
Variable	Value
Left-turning volume (V_L), veh/h:	9
Advancing volume (V_A), veh/h:	210
Opposing volume (V_O), veh/h:	264

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

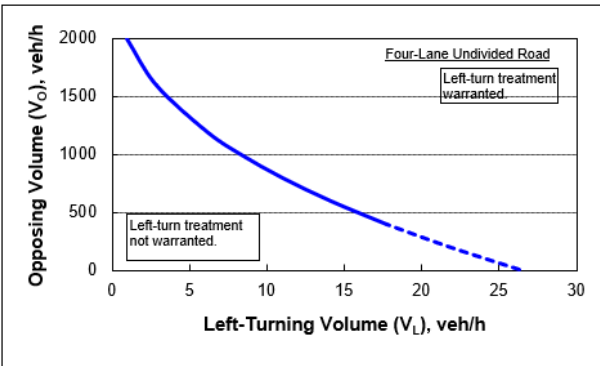
Variable	Value
Left-turning volume (V_L), veh/h:	69
Advancing volume (V_A), veh/h:	333
Opposing volume (V_O), veh/h:	201

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

EXISTING AM PEAK

BRADY & 210TH STREET—NBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

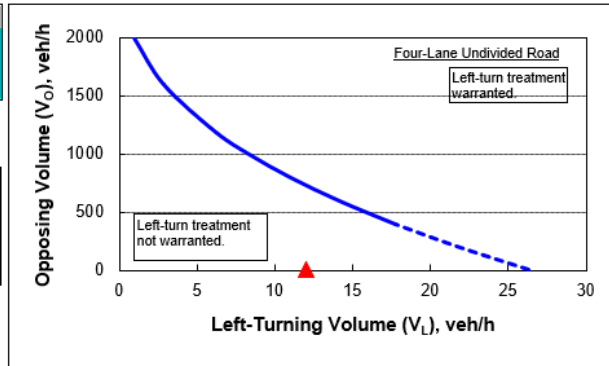
Variable	Value
Left-turning volume (V_L), veh/h:	12
Advancing volume (V_A), veh/h:	33
Opposing volume (V_O), veh/h:	11

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

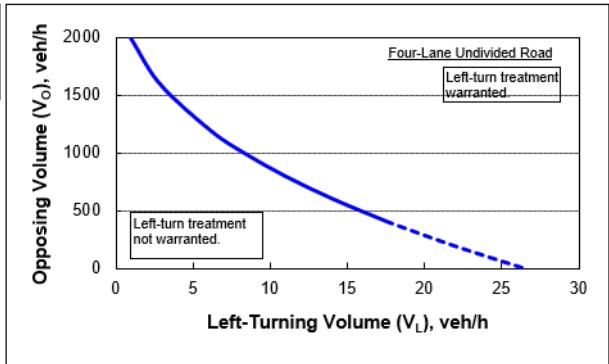
Variable	Value
Left-turning volume (V_L), veh/h:	36
Advancing volume (V_A), veh/h:	47
Opposing volume (V_O), veh/h:	21

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

EXISTING PM PEAK

BRADY & 210TH STREET—EBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

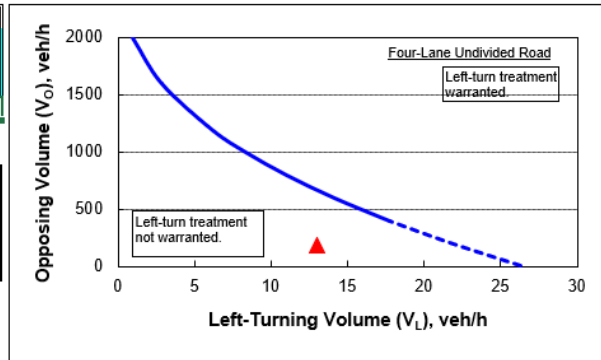
Variable	Value
Left-turning volume (V_L), veh/h:	13
Advancing volume (V_A), veh/h:	359
Opposing volume (V_O), veh/h:	181

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

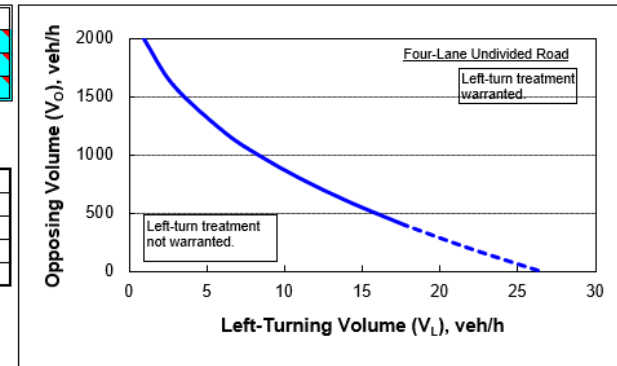
Variable	Value
Left-turning volume (V_L), veh/h:	54
Advancing volume (V_A), veh/h:	235
Opposing volume (V_O), veh/h:	346

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

EXISTING PM PEAK

BRADY & 210TH STREET—NBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

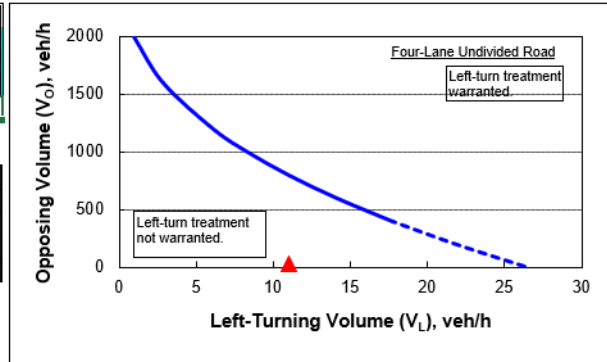
Variable	Value
Left-turning volume (V_L), veh/h:	11
Advancing volume (V_A), veh/h:	116
Opposing volume (V_O), veh/h:	23

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay: Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

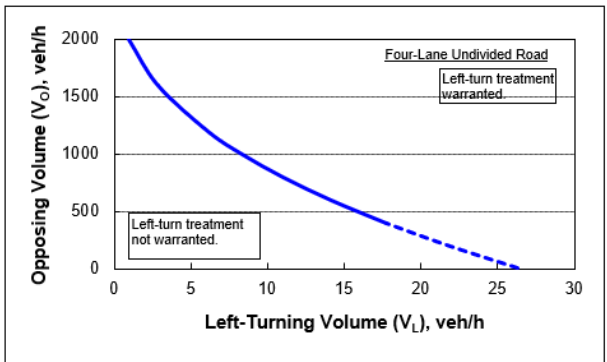
Variable	Value
Left-turning volume (V_L), veh/h:	54
Advancing volume (V_A), veh/h:	77
Opposing volume (V_O), veh/h:	105

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay: Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

DEVELOPED AM PEAK

BRADY & 210TH STREET—EBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

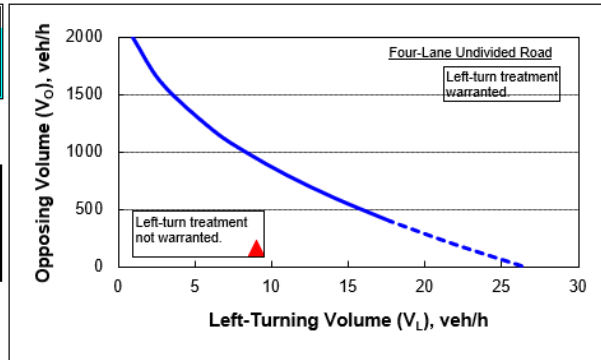
4-lane roadway

INPUT

Variable	Value
Left-turning volume (V_L), veh/h:	9
Advancing volume (V_A), veh/h:	234
Opposing volume (V_O), veh/h:	158

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0

BRADY & 210TH STREET—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

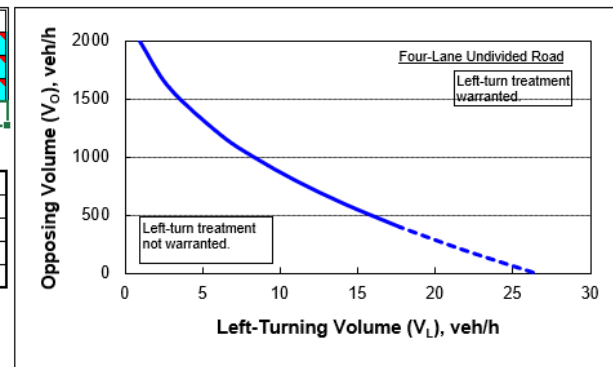
4-lane roadway

INPUT

Variable	Value
Left-turning volume (V_L), veh/h:	210
Advancing volume (V_A), veh/h:	368
Opposing volume (V_O), veh/h:	225

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0

NCHRP 457 – LEFT TURN LANE WARRANTS

DEVELOPED AM PEAK

BRADY & 210TH STREET—NBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

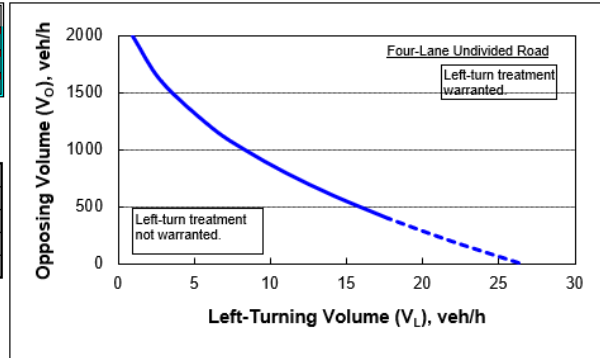
Variable	Value
Left-turning volume (V_L), veh/h:	140
Advancing volume (V_A), veh/h:	260
Opposing volume (V_O), veh/h:	15

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

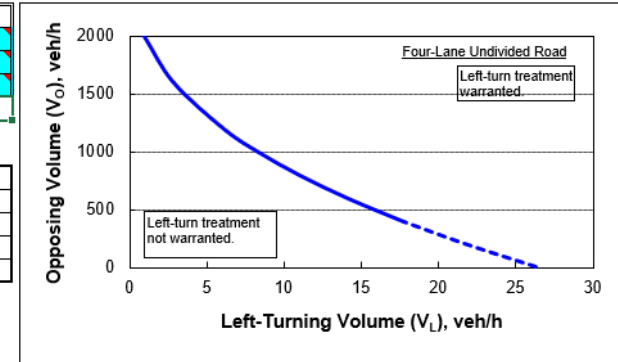
Variable	Value
Left-turning volume (V_L), veh/h:	36
Advancing volume (V_A), veh/h:	51
Opposing volume (V_O), veh/h:	120

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

DEVELOPED AM PEAK

BRADY & BIG 10 MART—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

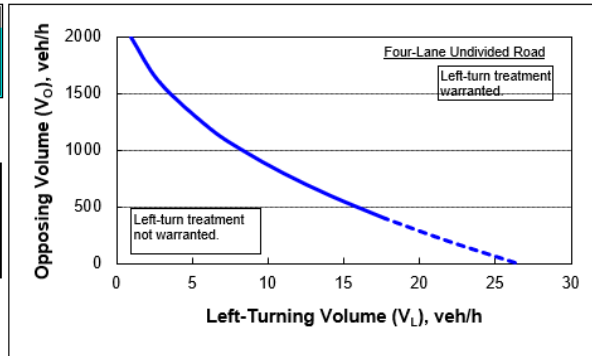
Variable	Value
Left-turning volume (V_L), veh/h:	244
Advancing volume (V_A), veh/h:	321
Opposing volume (V_O), veh/h:	36

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & BIG 10 MART—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

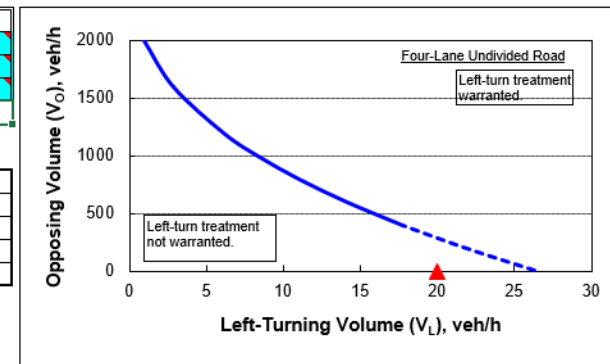
Variable	Value
Left-turning volume (V_L), veh/h:	20
Advancing volume (V_A), veh/h:	257
Opposing volume (V_O), veh/h:	0

OUTPUT

Variable	Message
Opposing volume (V_O) check:	Volume too low.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
#DIV/0!	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

DEVELOPED PM PEAK

BRADY & 210TH STREET—EBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

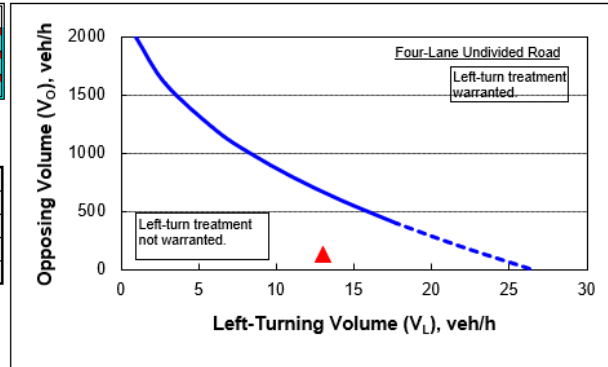
Variable	Value
Left-turning volume (V_L), veh/h:	13
Advancing volume (V_A), veh/h:	383
Opposing volume (V_O), veh/h:	133

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

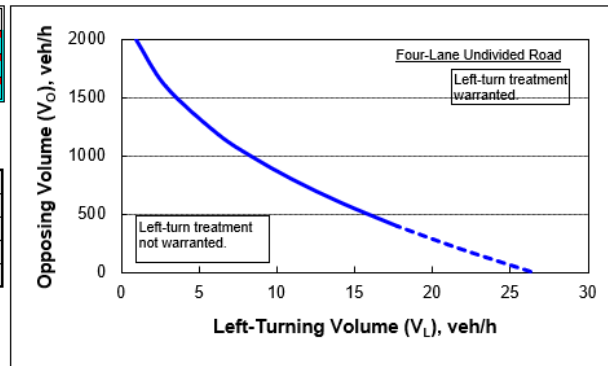
Variable	Value
Left-turning volume (V_L), veh/h:	118
Advancing volume (V_A), veh/h:	251
Opposing volume (V_O), veh/h:	370

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

DEVELOPED PM PEAK

BRADY & 210TH STREET—NBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

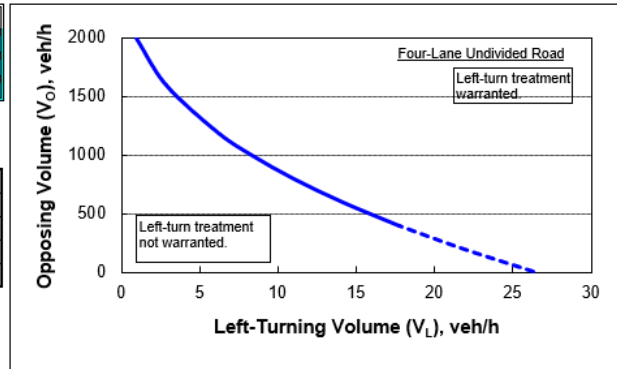
Variable	Value
Left-turning volume (V_L), veh/h:	71
Advancing volume (V_A), veh/h:	287
Opposing volume (V_O), veh/h:	28

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

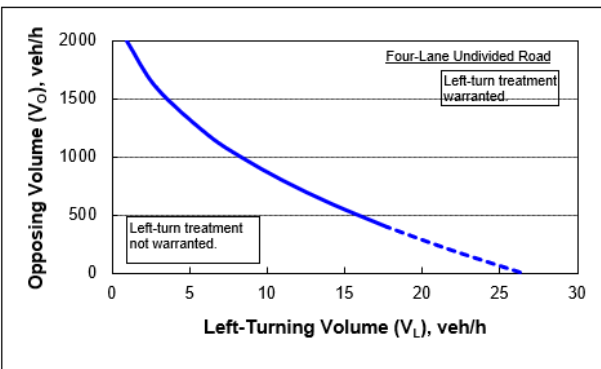
Variable	Value
Left-turning volume (V_L), veh/h:	54
Advancing volume (V_A), veh/h:	82
Opposing volume (V_O), veh/h:	216

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

DEVELOPED PM PEAK

BRADY & BIG 10 MART—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

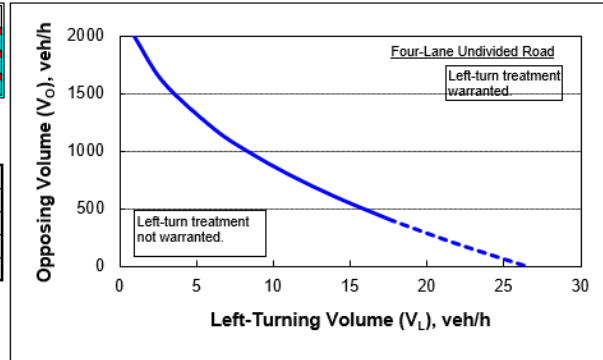
Variable	Value
Left-turning volume (V_L), veh/h:	183
Advancing volume (V_A), veh/h:	239
Opposing volume (V_O), veh/h:	125

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & BIG 10 MART—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

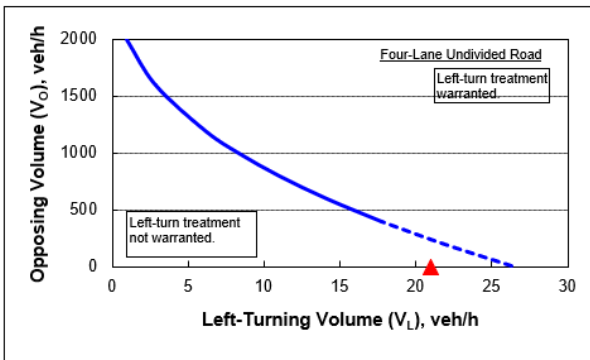
Variable	Value
Left-turning volume (V_L), veh/h:	21
Advancing volume (V_A), veh/h:	216
Opposing volume (V_O), veh/h:	0

OUTPUT

Variable	Message
Opposing volume (V_O) check:	Volume too low.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
#DIV/0!	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

FUTURE AM PEAK

BRADY & 210TH STREET—EBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

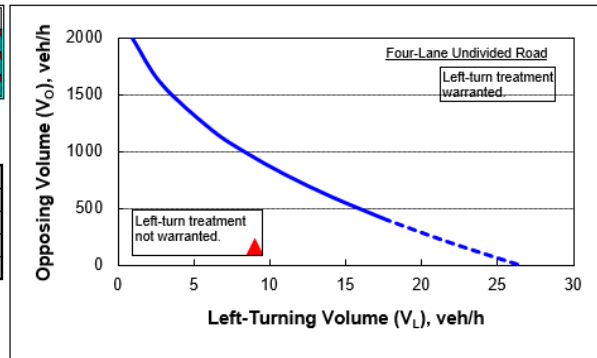
Variable	Value
Left-turning volume (V_L), veh/h:	9
Advancing volume (V_A), veh/h:	244
Opposing volume (V_O), veh/h:	158

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

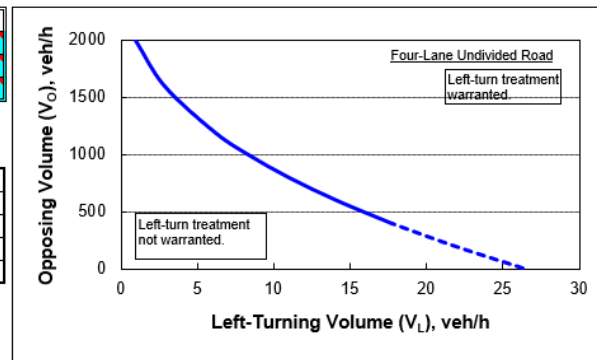
Variable	Value
Left-turning volume (V_L), veh/h:	225
Advancing volume (V_A), veh/h:	383
Opposing volume (V_O), veh/h:	235

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

FUTURE AM PEAK

BRADY & 210TH STREET—NBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

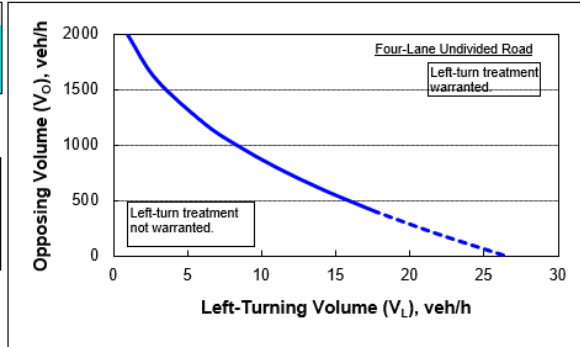
Variable	Value
Left-turning volume (V_L), veh/h:	146
Advancing volume (V_A), veh/h:	275
Opposing volume (V_O), veh/h:	16

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

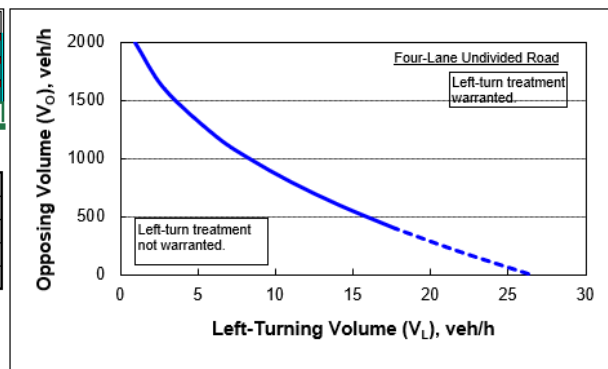
Variable	Value
Left-turning volume (V_L), veh/h:	36
Advancing volume (V_A), veh/h:	52
Opposing volume (V_O), veh/h:	129

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

FUTURE AM PEAK

BRADY & BIG 10 MART—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

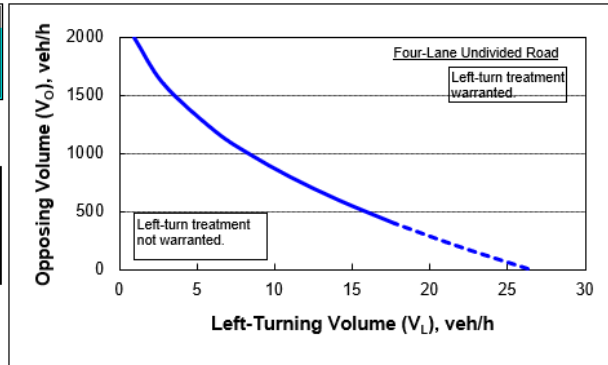
Variable	Value
Left-turning volume (V_L), veh/h:	260
Advancing volume (V_A), veh/h:	337
Opposing volume (V_O), veh/h:	37

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & BIG 10 MART—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

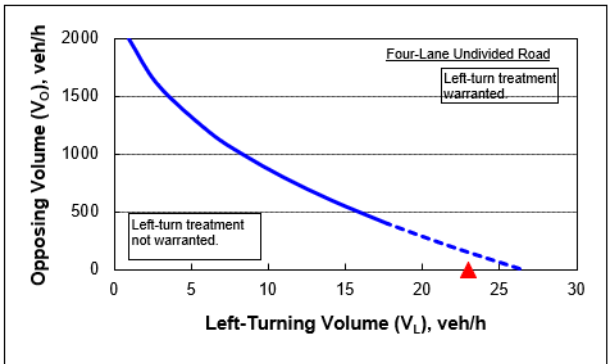
Variable	Value
Left-turning volume (V_L), veh/h:	23
Advancing volume (V_A), veh/h:	275
Opposing volume (V_O), veh/h:	0

OUTPUT

Variable	Message
Opposing volume (V_O) check:	Volume too low.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
#DIV/0!	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

FUTURE PM PEAK

BRADY & 210TH STREET—EBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

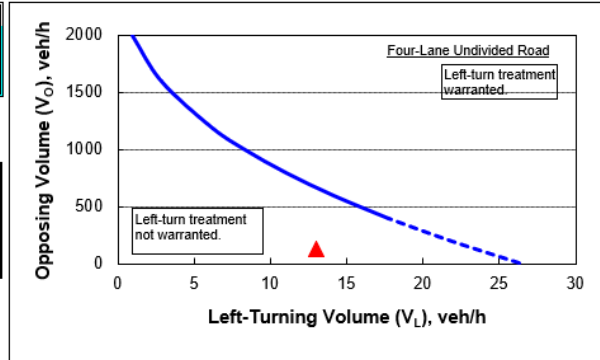
Variable	Value
Left-turning volume (V_L), veh/h:	13
Advancing volume (V_A), veh/h:	400
Opposing volume (V_O), veh/h:	125

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	O.K.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

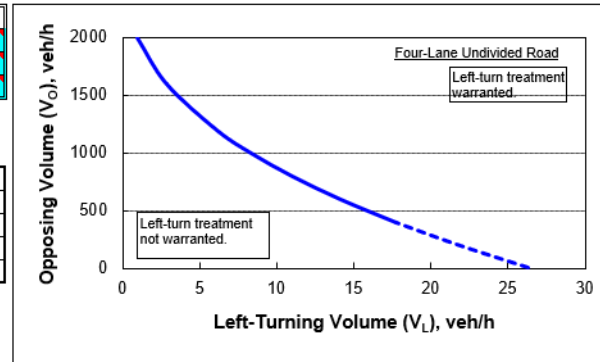
Variable	Value
Left-turning volume (V_L), veh/h:	137
Advancing volume (V_A), veh/h:	262
Opposing volume (V_O), veh/h:	387

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

FUTURE PM PEAK

BRADY & 210TH STREET—NBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

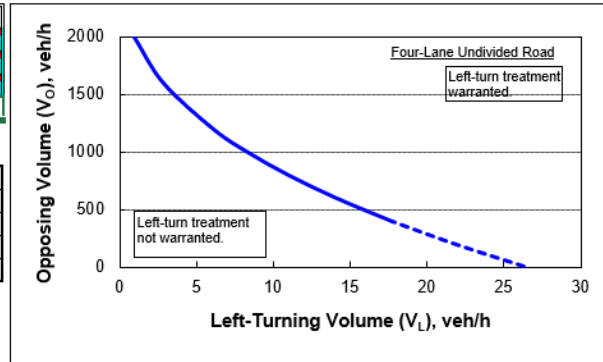
Variable	Value
Left-turning volume (V_L), veh/h:	86
Advancing volume (V_A), veh/h:	339
Opposing volume (V_O), veh/h:	32

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & 210TH STREET—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

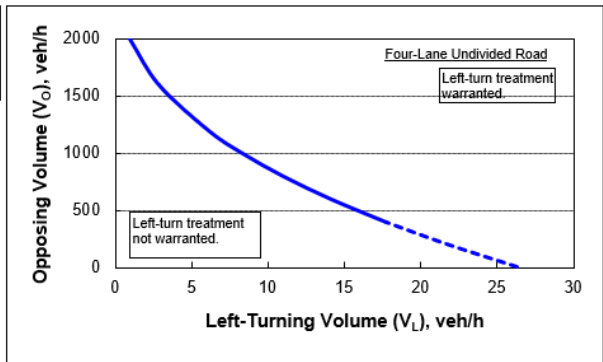
Variable	Value
Left-turning volume (V_L), veh/h:	54
Advancing volume (V_A), veh/h:	86
Opposing volume (V_O), veh/h:	253

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – LEFT TURN LANE WARRANTS

FUTURE PM PEAK

BRADY & BIG 10 MART—SBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

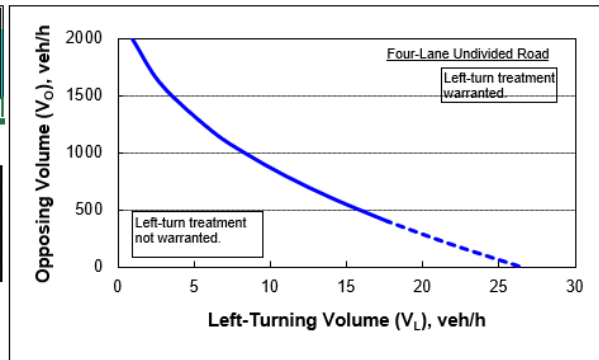
Variable	Value
Left-turning volume (V_L), veh/h:	236
Advancing volume (V_A), veh/h:	290
Opposing volume (V_O), veh/h:	131

OUTPUT

Variable	Message
Opposing volume (V_O) check:	O.K.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

BRADY & BIG 10 MART—WBLT (NO)

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

4-lane roadway

INPUT

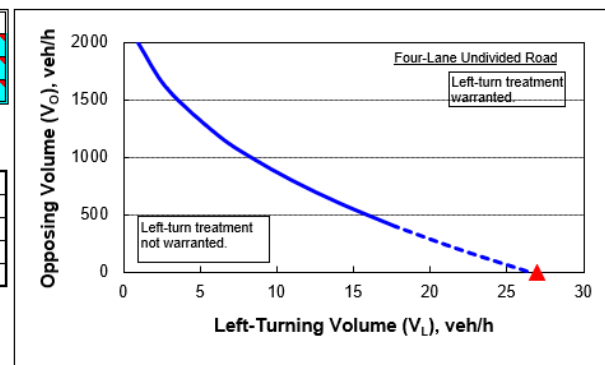
Variable	Value
Left-turning volume (V_L), veh/h:	27
Advancing volume (V_A), veh/h:	278
Opposing volume (V_O), veh/h:	0

OUTPUT

Variable	Message
Opposing volume (V_O) check:	Volume too low.
Combined volume (V_A and V_O) check:	No bay needed.
Guidance for determining the need for a major-road left-turn bay:	
#DIV/0!	

CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	4.1
Critical headway, s:	6.0



Note: When $V_O < 400$ veh/h (dashed line), a left-turn lane is not normally warranted unless the advancing volume (V_A) in the same direction as the left-turning traffic exceeds 400 veh/h ($V_A > 400$ veh/h).

NCHRP 457 – RIGHT TURN LANE WARRANTS

EXISTING AM PEAK

BRADY & 210TH STREET—EBRT (NO)

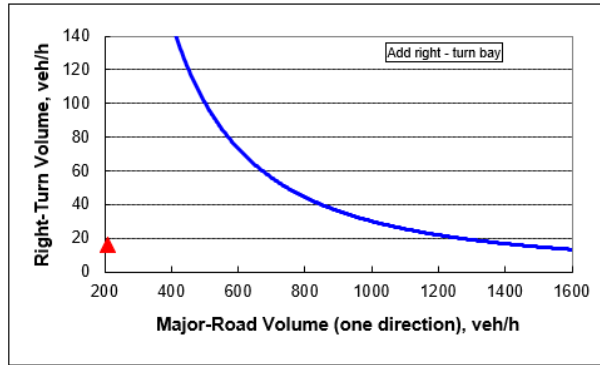
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
Variable	Value	
Major-road speed, mph:	45	
Major-road volume (one direction), veh/h:	210	
Right-turn volume, veh/h:	16	

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	452
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—WBRT (NO)

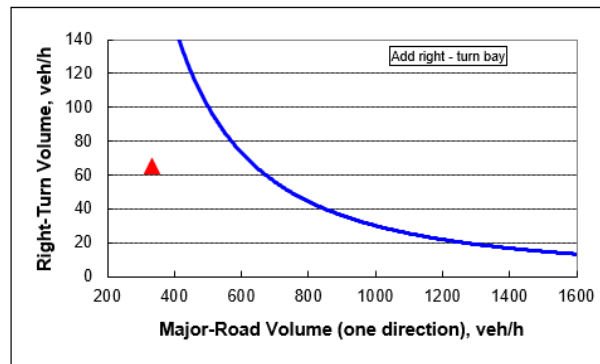
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
Variable	Value	
Major-road speed, mph:	45	
Major-road volume (one direction), veh/h:	333	
Right-turn volume, veh/h:	65	

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	203
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

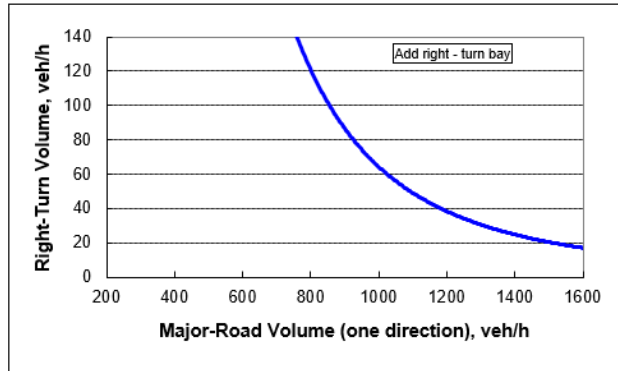
EXISTING AM PEAK

BRADY & 210TH STREET—NBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT	
Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	33
Right-turn volume, veh/h:	18

OUTPUT	
Variable	Value
Limiting right-turn volume, veh/h:	988731
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	

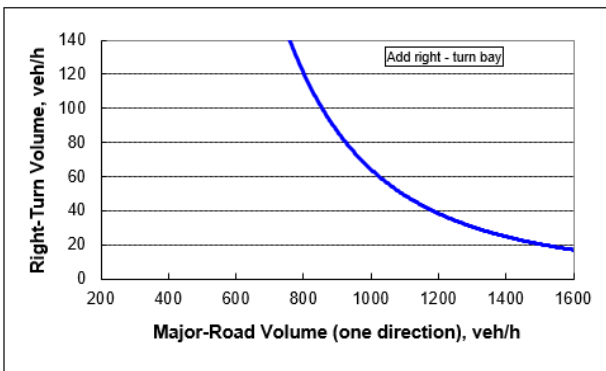


BRADY & 210TH STREET—SBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT	
Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	47
Right-turn volume, veh/h:	9

OUTPUT	
Variable	Value
Limiting right-turn volume, veh/h:	363683
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

EXISTING PM PEAK

BRADY & 210TH STREET—EBRT (NO)

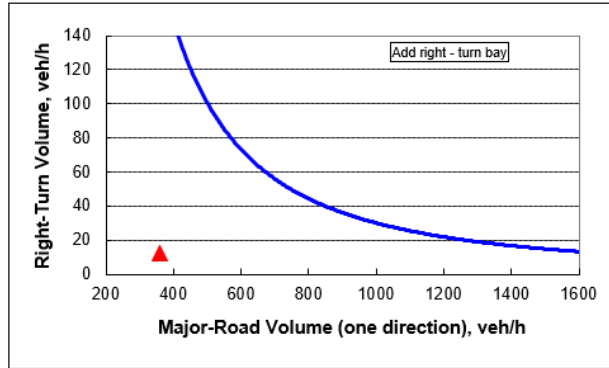
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	359
Right-turn volume, veh/h:	12

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	178
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—WBRT (NO)

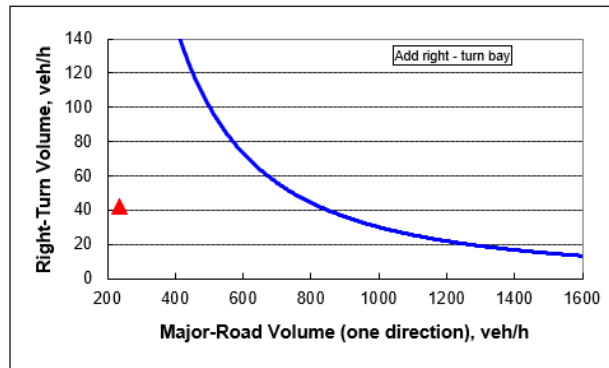
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	235
Right-turn volume, veh/h:	42

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	371
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

EXISTING PM PEAK

BRADY & 210TH STREET—NBRT (NO)

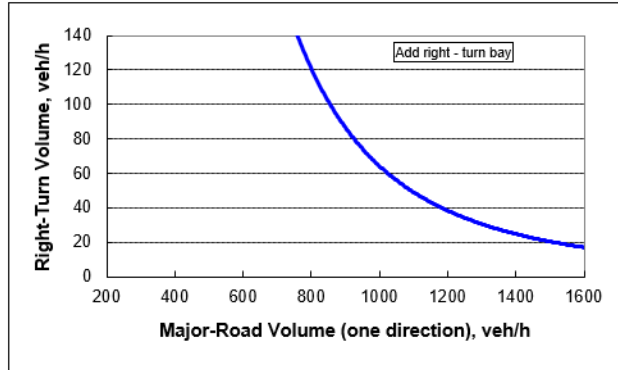
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		35
Major-road volume (one direction), veh/h:		116
Right-turn volume, veh/h:		99

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		28254
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



BRADY & 210TH STREET—SBRT (NO)

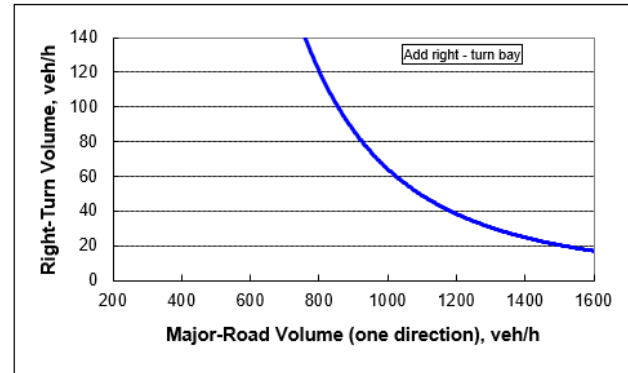
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		35
Major-road volume (one direction), veh/h:		77
Right-turn volume, veh/h:		17

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		90031
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



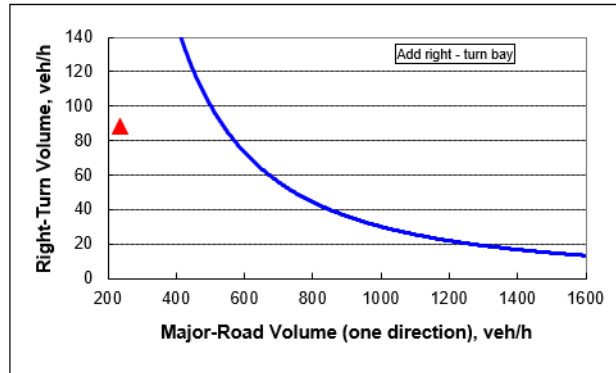
NCHRP 457 – RIGHT TURN LANE WARRANTS

DEVELOPED AM PEAK

BRADY & 210TH STREET—EBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

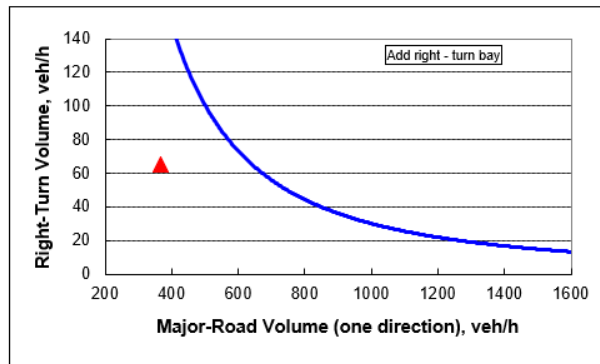
INPUT	
Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	234
Right-turn volume, veh/h:	88
OUTPUT	
Limiting right-turn volume, veh/h:	374
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—WBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT	
Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	368
Right-turn volume, veh/h:	65
OUTPUT	
Limiting right-turn volume, veh/h:	170
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

DEVELOPED AM PEAK

BRADY & 210TH STREET—NBRT (NO)

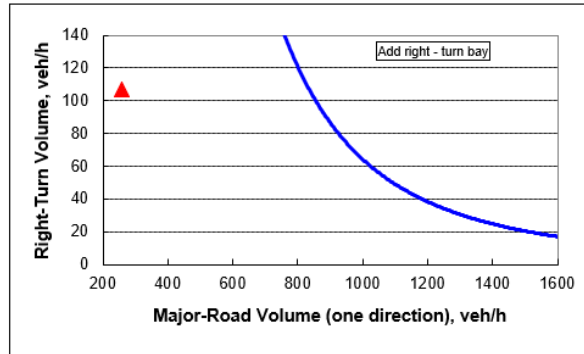
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	260
Right-turn volume, veh/h:	107

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	2883
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—SBRT (NO)

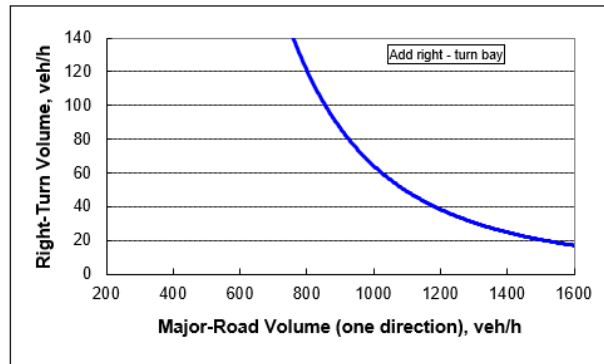
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	51
Right-turn volume, veh/h:	9

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	288671
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

DEVELOPED AM PEAK

BRADY & BIG 10 MART—NBRT (NO)

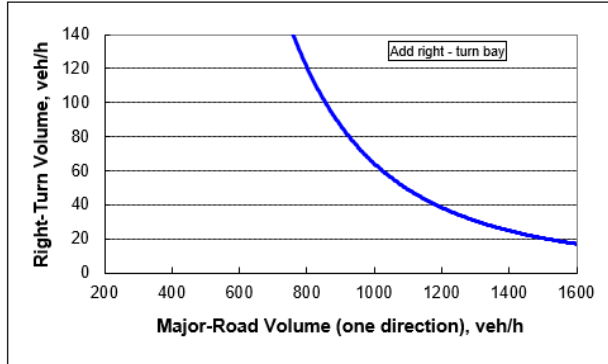
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	36
Right-turn volume, veh/h:	13

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	773049
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & BIG 10 MART—WBRT (NO)

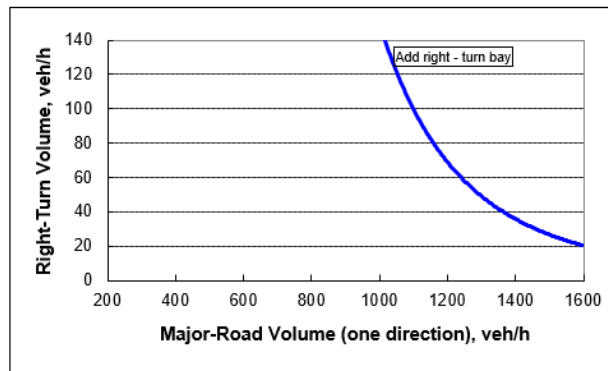
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	25
Major-road volume (one direction), veh/h:	257
Right-turn volume, veh/h:	237

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	47763
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

DEVELOPED PM PEAK

BRADY & 210TH STREET—EBRT (NO)

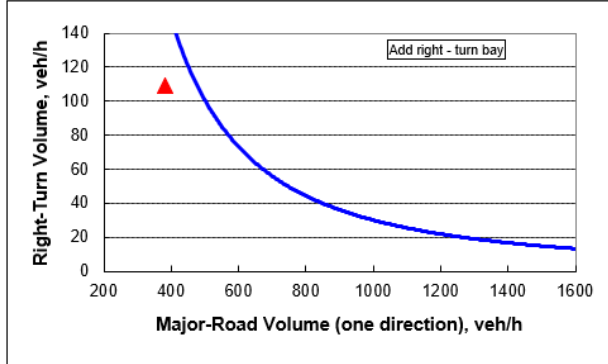
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	383
Right-turn volume, veh/h:	109

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	159
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—WBRT (NO)

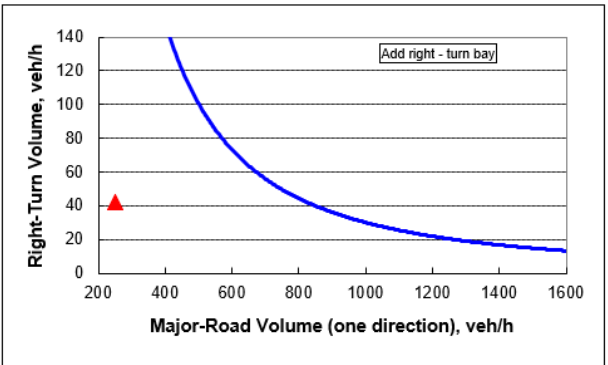
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	251
Right-turn volume, veh/h:	42

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	331
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

DEVELOPED PM PEAK

BRADY & 210TH STREET—NBRT (NO)

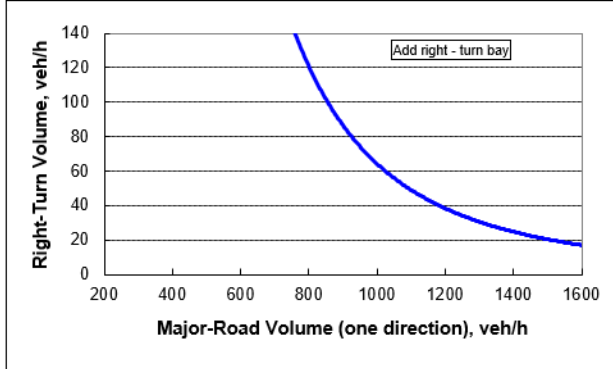
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	287
Right-turn volume, veh/h:	205

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	2180
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—SBRT (NO)

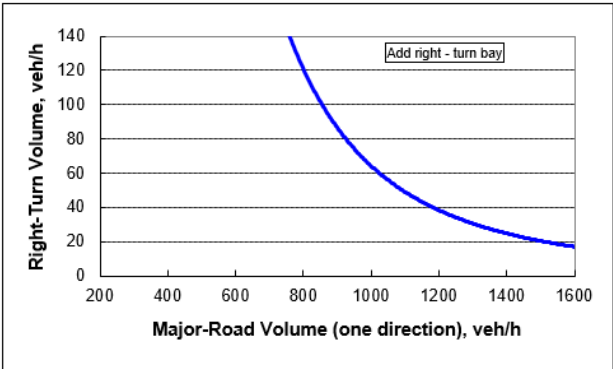
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	82
Right-turn volume, veh/h:	17

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	75356
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

DEVELOPED PM PEAK

BRADY & BIG 10 MART—NBRT (NO)

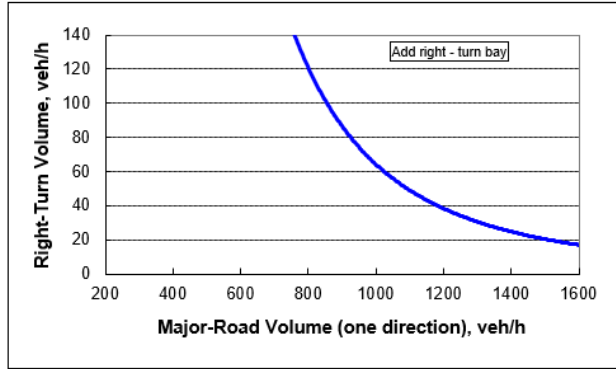
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		35
Major-road volume (one direction), veh/h:		82
Right-turn volume, veh/h:		17

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		75356
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



BRADY & BIG 10 MART—WBRT (NO)

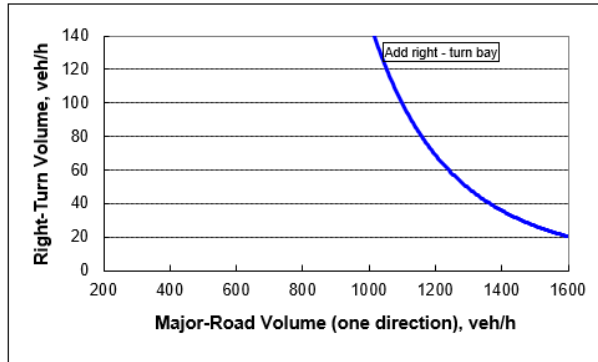
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		25
Major-road volume (one direction), veh/h:		216
Right-turn volume, veh/h:		195

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		99963
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



NCHRP 457 – RIGHT TURN LANE WARRANTS

FUTURE AM PEAK

BRADY & 210TH STREET—EBRT (NO)

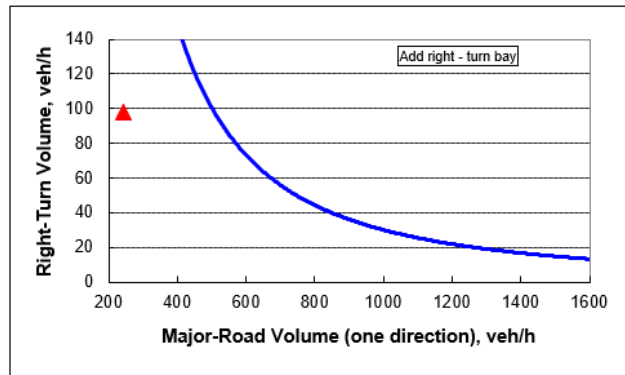
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		45
Major-road volume (one direction), veh/h:		244
Right-turn volume, veh/h:		98

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		348
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



BRADY & 210TH STREET—WBRT (NO)

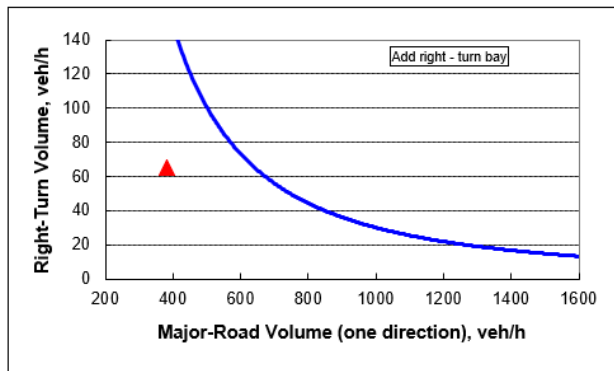
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		45
Major-road volume (one direction), veh/h:		383
Right-turn volume, veh/h:		65

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		159
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



NCHRP 457 – RIGHT TURN LANE WARRANTS

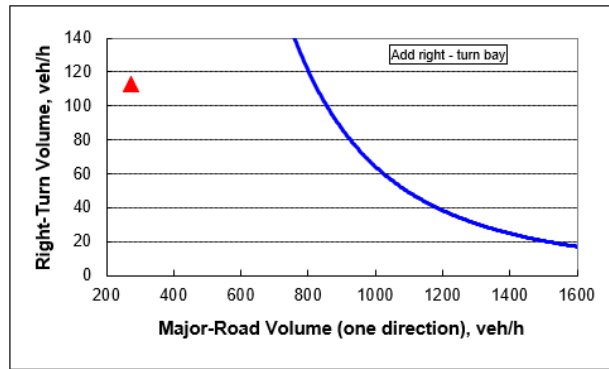
FUTURE AM PEAK

BRADY & 210TH STREET—NBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT	
Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	275
Right-turn volume, veh/h:	113

OUTPUT	
Variable	Value
Limiting right-turn volume, veh/h:	2460
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	

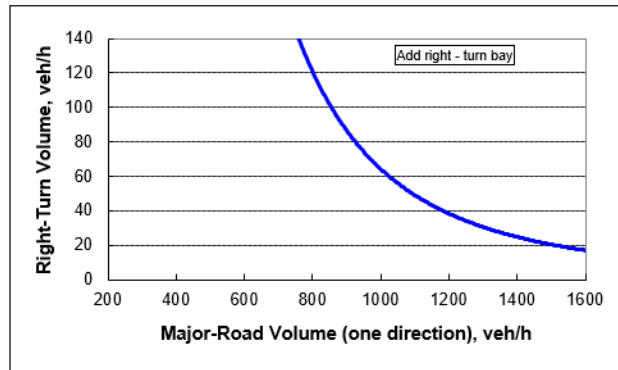


BRADY & 210TH STREET—SBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT	
Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	52
Right-turn volume, veh/h:	9

OUTPUT	
Variable	Value
Limiting right-turn volume, veh/h:	273245
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

FUTURE AM PEAK

BRADY & BIG 10 MART—NBRT (NO)

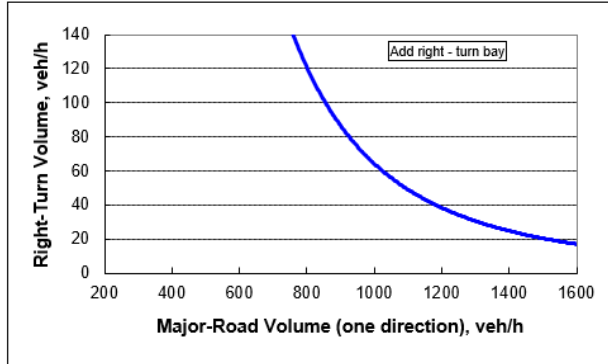
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	37
Right-turn volume, veh/h:	14

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	715410
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & BIG 10 MART—WBRT (NO)

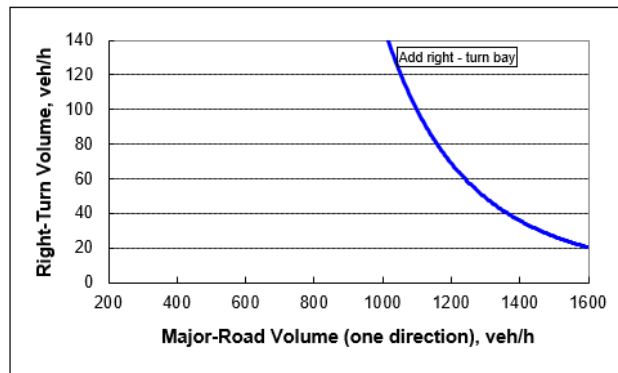
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	25
Major-road volume (one direction), veh/h:	275
Right-turn volume, veh/h:	252

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	35823
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



NCHRP 457 – RIGHT TURN LANE WARRANTS

FUTURE PM PEAK

BRADY & 210TH STREET—EBRT (NO)

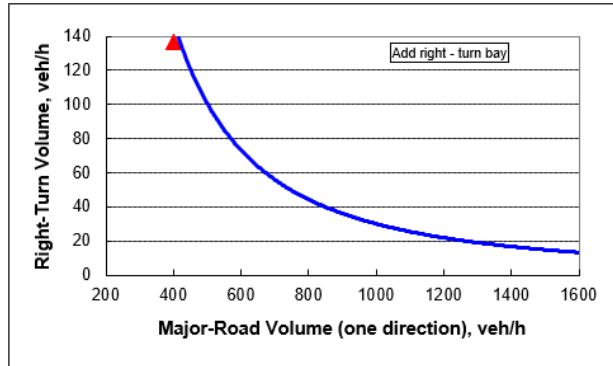
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	400
Right-turn volume, veh/h:	137

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	147
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	



BRADY & 210TH STREET—WBRT (NO)

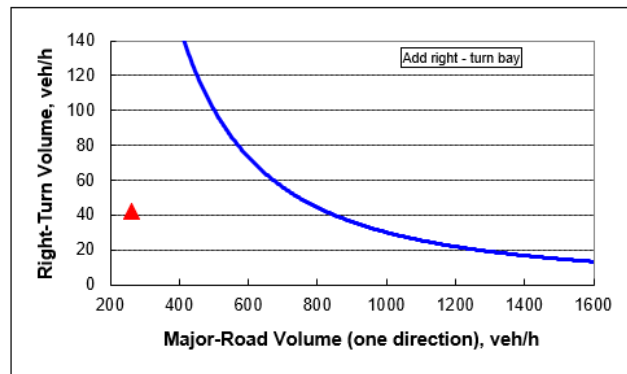
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	262
Right-turn volume, veh/h:	42

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	307
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:	
Do NOT add right-turn bay.	

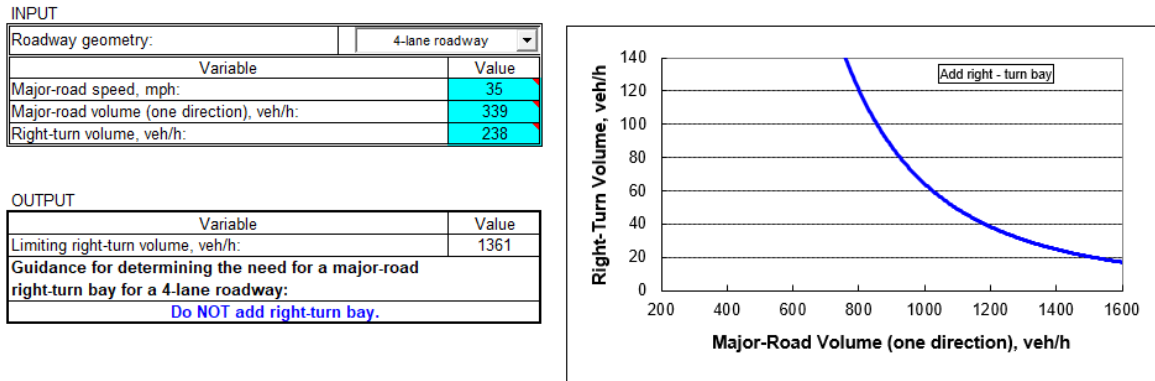


NCHRP 457 – RIGHT TURN LANE WARRANTS

FUTURE PM PEAK

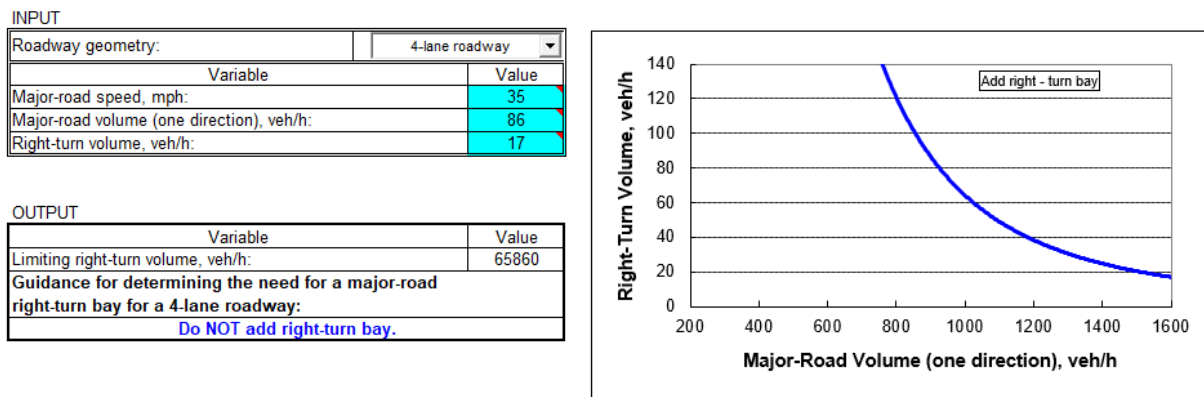
BRADY & 210TH STREET—NBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.



BRADY & 210TH STREET—SBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.



NCHRP 457 – RIGHT TURN LANE WARRANTS

FUTURE PM PEAK

BRADY & BIG 10 MART—NBRT (NO)

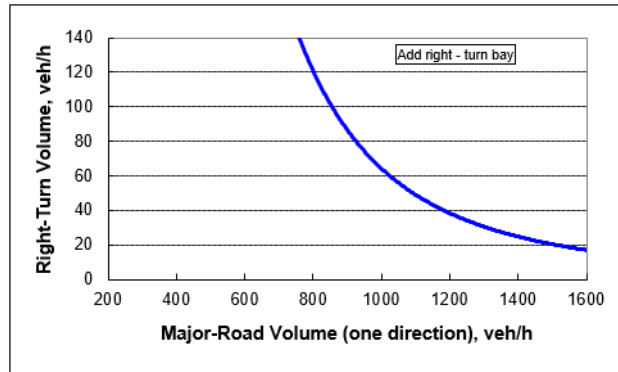
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		35
Major-road volume (one direction), veh/h:		131
Right-turn volume, veh/h:		43

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		20032
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		



BRADY & BIG 10 MART—WBRT (NO)

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	4-lane roadway	
	Variable	Value
Major-road speed, mph:		25
Major-road volume (one direction), veh/h:		278
Right-turn volume, veh/h:		251

OUTPUT

	Variable	Value
Limiting right-turn volume, veh/h:		34208
Guidance for determining the need for a major-road right-turn bay for a 4-lane roadway:		
Do NOT add right-turn bay.		

