Babcock and Mendenhall Safety Improvements

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ENDURING COMMUNITY DESIGN

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INTRODUCTION

The Downtown Bozeman Transportation Study was initiated in 2020 with Part 1 being completed in December 2020. It evaluated design concepts for the recommended improvements in the 2019 Downtown Bozeman Improvement Plan (DBIP) for the following downtown streets: Babcock Street, Main Street and Mendenhall Street.

Sanderson Stewart is currently contracted with the Downtown Bozeman Partnership to complete the Babcock & Mendenhall Safety Improvements Study, which consists of data analysis and a traffic safety study focusing on corridor and intersection improvements along Babcock Street and Mendenhall Street. This report will provide a summary of the data analysis and safety solutions for the corridors and intersections.

SITE LOCATION AND DESCRIPTION

A study was performed to evaluate the downtown Bozeman operational and safety existing conditions and concerns, specifically for the corridors of Mendenhall Street and Babcock Street, between Tracy Avenue and Black Avenue. The corridors were studied, and a sign inventory was performed to help determine existing conditions for evaluation and recommended improvements. The Traffic volumes were collected and evaluated to determine the AM, noon and PM peak hours of travel which correlated with 8:30-9:30 AM, 11:45-12:45 PM, and 4:45-5:45 PM, respectively. Intersection capacity calculations were performed to determine that all intersections operate at an acceptable level of service, a qualitative measure of performance of an intersection abased on speed and travel time, freedom to maneuver and comfort and convenience. No vehicular traffic signal warrants were met.

A speed study was performed to determine travel speeds along the corridors. It was found that 85 percent of traffic travels between 27 and 30 mph on both corridors of Mendenhall Street and Babcock Street. Pedestrian and bicycle volumes were collected and evaluated to determine the AM, noon, and PM peak hours of travel. There was no clue morning peak hour for pedestrians/bicyclists, but a noon peak hour of 12:15-1:15 PM was evident with a smaller peak at 2:15-3:15 PM. Pedestrian level of service, which measures connectivity, directness and safety were found to be acceptable on Mendenhall Street, Main Street and Babcock Street.

EXECUTIVE SUMMARY

A crash analysis was performed to determine crash trends regarding frequency and severity at intersections and along the corridors. A historical crash rate higher than predicted was found at Mendenhall Street/Tracy Avenue. It was determined that pedestrian crashes typically resulted in injuries. There were four (4) pedestrian crashes in the study area, and several rear-end collisions resulting from a lead vehicle stopping for a pedestrian. Corridor crashes typically involved right angle crashes involving vehicles leaving access points, rear-end collisions and pedestrian/bicycle collisions, with the latter resulting in the most severe crashes.

A summary of FHWA's pedestrian safety countermeasures was provided. For roadways in the project area, per FHWA guidance, it is suggested that high visibility crosswalk markings, parking restrictions on crosswalk approaches, adequate nighttime lighting level and pedestrian crossing warning signs always be considered. Additionally, consideration should be given to raised crosswalks, in-street pedestrian crossing signs, and curb extensions. Each project intersection was evaluated for presence of the suggested countermeasures, and two (2) study area intersections, Tracy

Avenue/Mendenhall and Babcock Street/Black Street were used as example intersections. Graphics to illustrate the application of potential countermeasures and costs were provided. Recommendations to the study area were provided to help improve safety in downtown Bozeman, including the installation of curb bulb outs/extensions, increased crosswalk signs and pavement markings, lighting and restricting parking.

EXISTING CONDITIONS

Streets

Babcock Street (eastbound) and Mendenhall Street (westbound) are both one-way streets with two (2) travel lanes, Main Street has a four-lane section with two travel lanes in each direction, and the north/south streets through downtown generally have two-lane sections with two-way traffic. All downtown streets generally provide parallel parking on both sides of the street and there is consistent sidewalk throughout the project area.

There are painted striped crosswalks across all legs of every intersection in the downtown area. Pedestrian crossings at Main Street intersections are controlled by traffic signals. There are curb bulb-outs on some corners for pedestrian crossings along Babcock Street, but no other permanent pedestrian facilities currently exist in the study area. Temporary painted curb bulb-outs with delineators were installed during the summer of 2022 at the Babcock Street/Black Avenue intersection.

Mendenhall Street and Babcock Street have transit stops, and on Mendenhall Street there is a transit slip lane between the Tracy Avenue and Black Avenue cross streets, allowing buses to stop in a protected area and providing passenger safety without impacting traffic negatively.

Sign Inventory

A sign inventory was performed for the study area and details all signs on the corridors of Mendenhall Street and Babcock Street between North 5th Avenue and Willson Avenue. The inventory is provided for knowledge regarding existing signs, to coordinate wayfinding information and to help consolidate signage in the downtown area. Appendix A includes Exhibits A and B that detail the location of signs on the two corridors.

Traffic & Pedestrian Data and Analysis

Weekday AM, noon, and PM peak hour vehicle turning movement and bike/pedestrian counts were collected for study area intersections on Wednesday, July 13, 2022. The following study area intersections were evaluated because they are the heaviest traveled corridors located in the heart of downtown, where there is a focus on redevelopment and the most potential for traffic modifications such as traffic signals and bicycle corridors:

- Mendenhall Street/Black Avenue
- Mendenhall Street/Tracy Avenue
- Main Street/Black Avenue
- Main Street/Tracy Avenue
- Babcock Street/Black Avenue

- Babcock Street/Tracy Avenue

The traffic data was collected using Miovision Scout video-based systems. In general, the weekday AM, noon, and PM vehicle peak hour periods were found to occur from 8:30-9:30 AM, 11:45 AM-12:45 PM, and 4:45-5:45 PM. Raw count data was adjusted for seasonal variation using MDT seasonal adjustment factors. Figure 1 (page 4) summarizes the Existing Conditions (2022) peak hour turning movement volumes for the AM, noon, and PM peak hours. Bike and pedestrian peak hours were slightly different than the vehicle peak hours, with no clear peak in the morning and the highest-volume hour of 12:15-1:15 PM, with a second smaller peak from 2:15-3:15 PM. Figure 2 (page 5) shows Existing Conditions (2022) bike/pedestrian counts for those peak hours, as well as AM volumes during the vehicle peak hour of 8:30-9:30 AM. Detailed vehicle traffic and bike/pedestrian count data worksheets are included in Appendix B.

Truck traffic was observed during the peak hours previously mentioned. During the AM, noon and PM peak hours, truck traffic on Babcock Street compromised 1.8%, 1.4% and 1.5% of all traffic, respectively. During the AM, noon and PM peak hours on Mendenhall Street, truck traffic was observed to be 5.2%, 2.7% and 2.0% of traffic, respectively. On Main Street, during the AM, noon and PM peak hours, trucks were 2.8%/3.0% (eastbound/westbound), 2.5%/4.0% (eastbound/westbound), and 1.6%/0.7% (eastbound/westbound) of traffic, respectively. Truck traffic on Tracy Avenue at Mendenhall Street was highest on the southbound approaches during all peak hours, with the AM peak, noon and PM peak hours making up 15.4%, 9.7% and 5.1% of all traffic, respectively.

Couplet Roadways & Conversions

Babcock Street and Mendenhall Street are couplets serving downtown Bozeman. Couplets are two parallel one-way roadways that run in opposite directions to provide two-way mobility in a specific area and typically connect to roadways with two-way traffic. They are established to provide greater capacity for vehicles and provide an opportunity to reduce pedestrian crossing distances by adding curb extensions or narrowing travel lanes. They typically have fewer intersection turning movements that may increase safety and improve pedestrian crossing safety as vehicles are approaching from one less direction. They also provide an opportunity to create bicycle lanes and/or, in Bozeman's context, on-street parking.

Disadvantages of couplets include increased travel time and out of direction travel for local residents, delays for emergency vehicles, and without appropriate traffic management strategies, they may provide context for increased vehicle speeds. One-way streets are typically associated with higher speeds and multi-lane one-way streets create a multiple threat condition for pedestrians crossing a road. Additionally, left-turning motor vehicle drivers may be less cautious when turning from a one-way street, and therefore less inclined to notice a pedestrian.

In terms of pedestrian safety, there are benefits to both one-way and two-way streets, and so the decision to convert a one-way street to two-way is context sensitive. FHWA highlighted one-way/two-way street conversions in a case study, *PedSafe 2013, Pedestrian Safety Guide and Countermeasures Selection System*, and suggested one-way streets should have traffic calming features to reduce vehicle speeds and design features, such as curb extensions and turning radius reductions, to discourage high vehicular speeds.

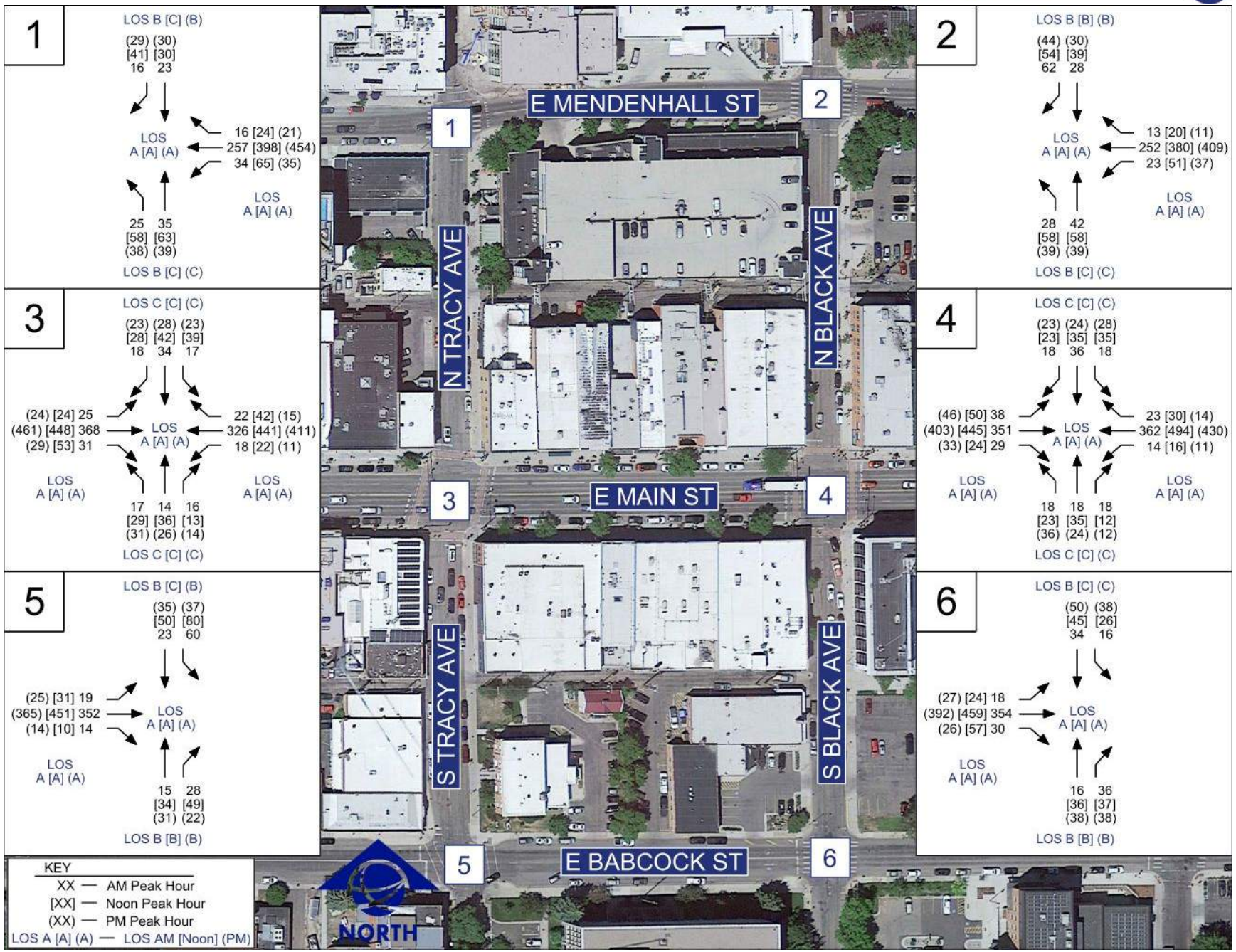


Figure 1: Existing Conditions (2022) Vehicle Turning Movements for Peak Hours

Downtown Bozeman Safety Study

Figure 2: Existing Conditions (2022) Pedestrian/Bicycle Turning Movements for Peak Hours

Downtown Bozeman Safety Study

Parking

Main Street has on-street parallel parking on both sides of the street throughout the project corridor, with parking at some intersections less than 20 feet from the crosswalks. Babcock Street has on-street parallel parking on the south side throughout the project area and on the north side of the roadway east of Bozeman Avenue and west of Black Avenue. Parking extends to approximately 30 feet from crosswalks, and the intersection with Tracy Avenue has bulb-outs on each corner with the exception of the southwest corner. Mendenhall Street has parallel parking on both sides of the street throughout the project area with the exception of the block between Black Avenue and Tracy Avenue, where a transit island is present. The distance of on-street parking on Mendenhall Street varies but is typically approximately 20 feet from the crosswalks. There are several locations in downtown Bozeman where trucks double park in traffic lanes for unloading and/or loading. Consideration should be given to providing a 15-minute loading/unloading space in areas that have frequent double-parked trucks that are unloading/loading at local businesses.

On-Street Bicycle Lanes

Under existing conditions there are no on-street bicycle lanes in the downtown study area. Some roadways have "sharrows," pavement markings designating that vehicles and cyclists share the road. In the summer the City provides bicycle racks located in on-street parking stalls to encourage bicycling. Consideration should be given to consistently painting sharrows on downtown roads to bring awareness to bicyclists and drivers that they are sharing the roadways.

In the 2019 DBIP study, one concept was to remove the north side on-street parking on Babcock Street and replace it with a two-way cycle track to provide cyclists a separated space instead of sharing the roadway and/or sidewalks. Narrowed drive lanes were suggested to provide traffic calming to lower speeds and allow room for the cycle track. The report also recognized that providing a cycle track was a challenge with the width constraints on Babcock Street the presence of numerous driveway egresses, the existing traffic control at intersections which presently is for eastbound only traffic and would result in the loss of 81 on-street parking spaces. Due to the mentioned challenges, sharrows were recommended in both lanes for Babcock Street and Mendenhall Street in the 2019 DBIP, and in the southern lane of Mendenhall Street and as a secondary option on Babcock Street (to create a cycle track) in the Phase 1 Downtown Bozeman study. Consideration should be given to applying sharrow pavement markings uniformly throughout downtown.

Vehicle Intersection Capacity

Existing Conditions (2022) vehicle intersection capacity calculations were performed for the study area intersections using Synchro, Version 11, which is based on the Highway Capacity Manual, 6th Edition (Transportation Research Board, 2016). Level of service (LOS) is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS is a qualitative measure of the performance of an intersection with values ranging from LOS A, which indicates good operation and low vehicle delays, to LOS F, which indicates congestion and longer vehicle delays. LOS C is typically considered a minimum acceptable threshold for operations in Montana-based communities, though exceptions are made in certain cases.

The results of the Existing Conditions (2022) vehicle intersection capacity calculations showed that all intersections and approaches operate at LOS C or better during all three peak hours. Projected 95th percentile queues are minimal on all

approaches. Figure 1 also shows the Existing Conditions (2022) LOS results at each intersection. A detailed capacity summary table and capacity calculation worksheets for each of the study area intersections can be found in Appendix C.

Signal Warrant Analysis

Traffic signal warrants were evaluated at the four (4) stop-controlled intersections of Mendenhall Street and Babcock Street with Tracy Avenue and Black Avenue using criteria outlined in the Manual on Uniform Traffic Control Devices (MUTCD) for the Existing Conditions (2022) vehicular traffic volume scenario. The MUTCD presents several warrants that can be considered based on traffic volumes, school crossings, crash history, and others. For the purposes of this analysis, all but Warrants 5 and 9 (School Crossing and Intersection Near a Railroad Grade Crossing) were evaluated because there are no school or railroad crossings near the intersections. Satisfaction of the Peak Hour warrant alone should not be considered as warranting a signal, as it is primarily meant for application at office complexes, manufacturing plants, or other high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

Signal warrants are not close to being met at any of the four (4) intersections when evaluated with Existing Conditions (2022) volumes. Traffic signal warrant worksheets can be found in Appendix D.

Speed Data

Speed data was gathered using StatTrak Data Collectors and Houston Radar Stats Analyzer on July 11-15, 2022, on Babcock Street between Black Avenue and Bozeman Avenue, Babcock Street between South 3rd Avenue and South Grand Avenue, Mendenhall Street between North 3rd Avenue and North Grand Avenue, and Mendenhall Street between North Bozeman Avenue and Rouse Avenue. Posted speeds on all roadways are 25 mph. 50th percentile and 85th percentile speeds, the speeds that 50 percent of traffic and 85 percent of traffic are observed to travel at or below during free-flow conditions, were collected in addition to maximum speeds and are illustrated in Table 1 below.

Table 1: Speed Data

	Mendenhall - 3rd & Grand	Mendenhall - Bozeman & Rouse	Babcock - Black & Bozeman	Babcock - 3rd & Grand
Date	7/11-13/2022	7/13-15/2022	7/13-15/2022	7/11-13/2022
Direction of Vehicles	Westbound	Westbound	Eastbound	Eastbound
ADT (veh)	5,148	4,355	5,774	4,497
85th Percentile Speed (mph)	30	27	28	30
Max speed (mph)	49	55	49	48
50th Percentile Speed (mph)	26	23	24	26

85th percentile speeds are used to help establish appropriate speed limits. It should be noted that the radar unit on Mendenhall Street between 3rd Avenue and Grand Avenue had sporadic high speeds (8 data points over 70 mph), so that data was manually removed from the analysis. Speed data summary sheets can be found in Appendix E.

Eighty-fifth (85th) percentile speeds collected on Mendenhall Street and Babcock Street exceeded the posted speed limit of 25 mph, with 85th percentile speeds being 27 mph and 28 mph within the immediate downtown area (Bozeman Avenue and Rouse Avenue) and slightly higher (30 mph) further outside of the center of downtown (3rd Avenue and Grand Avenue).

Pedestrian Level of Service

Motor vehicles on roadways have a level of service (LOS) that is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to manuever, traffic interuptions, and comfort and convenience. Similarly, an algorithm to determine pedestrian LOS has been created with considerations including a combination of connectivity, directness, safety and capacity measures. Table 2 below presents the pedestrian LOS for the downtown intersections on Mendenhall Street and Babcock Street. Generally, pedestrians do not have a long wait before being able to cross with either a break in traffic or vehicles yielding to pedestrians. The LOS was higher on Main Street, most likely due to signalized pedestrian crossings providing more protection.

Table 2: Pedestrian Level of Service

Road Segment	Pedestrian Level of Service
Mendenhall Tracy to Black	2.05 (B)
Main Tracy to Black	1.25 (A)
Babcock Tracy to Black	1.68 (B)

CRASH HISTORY

Crashes for corridor segements and study area intersections were evaluated to determine any trends with regards to frequency or severity and potential safety treatments.

Intersection Crash History

Historical intersection and corridor crash data was obtained from MDT for the 5-year period from January 1, 2014, through December 31, 2018. Crash data was collected from the City of Bozeman Police Department from January 1, 2019 through October 2022 and evaluated separately. The data was analyzed for the purposes of calculating intersection crash and severity rates and evaluating corridor and intersection collision type trends. Tables 3 (page 9) and 4 (page 10) illustrate the results of the historical crash analysis.

Intersection crash rates were calculated on the standard basis of crashes per million vehicles entering (MVE) for each intersection. The MVE metric was estimated based on 2022 peak hour traffic counts and published historical ADT

volumes from the MDT website. Crash rates for the study area intersections ranged from 0.17 crashes/MVE to 0.86 crashes/MVE.

As a means of evaluating the historical crash frequency rates, Sanderson Stewart calculated expected rates using the predictive crash rate formulas in the American Association of State Highway Transportation Officials (AASHTO) Highway Safety Manual (HSM). The process involves calculating the number of crashes predicted in a year based on traffic demand (AADTs) and various physical and traffic environment-based conditions such as lane configurations, traffic signal phasing, and approach speeds. The calculations result in a crashes-per-year prediction. Sanderson Stewart then back calculated a frequency rate on the basis of MVE for the sake of comparison with the actual historical crash rate. The results of the calculations for this study showed that the historical crash rate was slightly higher than the predicted crash rate at the intersection of Mendenhall Street/Tracy Avenue. The historical crash rates were lower than the predicted crash rates at all other study area intersections. The HSM rate predictions and 5-year crash totals for each intersection are summarized in Table 3 below.

Table 3: Crash Frequency and Severity, 2014-2018

Intersection	2014-2018 DEV[1]	Reported Crashes[2]	Crash Type			Crash Data[3]			HSM Predictions[4]	
			PDO	Injury	Fatality	Average Crash Frequency (Crash/Yr)	Crash Rate (Crash/ MVE)	Severity Index	Predicted Average Crash Frequency (Crash/Yr)	Predicted Crash Rate (Crash/ MVE)
Mendenhall St/Black Ave	3078	1	0	1	0	0.20	0.18	3.00	0.94	0.84
Mendenhall St/Tracy Ave	3178	5	4	1	0	1.00	0.86	1.40	0.92	0.79
Main St/Black Ave	13097	4	2	2	0	0.80	0.17	2.00	1.49	0.31
Main St/Tracy Ave	15095	5	3	2	0	1.00	0.18	1.80	2.72	0.49
Babcock St/Black Ave	4029	2	2	0	0	0.40	0.27	1.00	1.14	0.78
Babcock St/Tracy Ave	3853	4	3	1	0	0.80	0.57	1.50	1.16	0.82

[1] Daily Entering Volume (DEV) estimated from 2022 peak hour counts and 2014 through 2018 MDT published ADTs

[2] Crashes reported from January 1, 2014 to December 31, 2018

[3] Crash rates expressed as crashes per million vehicles entering (MVE)

[4] Rates calculated using Highway Safety Manual (HSM) 1st Edition predictive methodology using SPICE tool

Severity index is defined as the weighted average by crash severity, including fatality, injury, and property damage only (PDO) crashes. The highest severity index was 3.00 at the intersection of Mendenhall Street/Black Avenue due to the only crash resulting in injuries. At the intersection of Main Street/Black Avenue the severity index was 2.00, due to 2 of 4 (50%) of crashes resulting in injuries. Overall, pedestrian crashes typically resulted in injuries, with 2 of 4 (50%) pedestrian crashes resulting in severe injuries. The two severe injury related pedestrian crashes occurred at the intersections of Babcock Street/Tracy Avenue and Mendenhall Street/Black Avenue with dry pavement and clear weather conditions, and the latter pedestrian crash occurred in the dark. Severity index calculation results are also shown in Table 3.

Sanderson Stewart performed an analysis of intersection collision classification to determine if any patterns could be identified. Table 4 on page 10 illustrates the results of the types of crashes in the study area. There is a history of rear-end crashes on the Main Street intersections and the intersection of Mendenhall Street/Tracy Avenue. The intersection of Mendenhall Street/Tracy Avenue also had 2 of 5 (40%) of crashes due to right-angle collisions. The intersections

along Babcock Street and Main Street each had 1 sideswipe, same direction crash. There were 4 pedestrian crashes at the six (6) intersections, including one at each of the following intersections: Babcock Street/Tracy Avenue, Main Street/Black Avenue, Main Street/Tracy Avenue and Mendenhall Street/Black Avenue.

Table 4: Intersection Crash History – Collision Type, 2014-2018

	Collision Type						
	Rear End	Right Angle	LT, SD	SS, SD	Pedestrian	Other	Total
Mendenhall St/Black Ave					1		1
Mendenhall St/Tracy Ave	2	2	1				5
Main St/Black Ave	2			1	1		4
Main St/Tracy Ave	2	1		1	1		5
Babcock St/Black Ave		1		1			2
Babcock St/Tracy Ave		1		1	1	1	4

*Crashes reported from January 1, 2014 to December 31, 2018

Rear-end collisions commonly occur at signalized intersections because the signalized control is dynamic, and thereby requires drivers to recognize and react to changing conditions in real time. High speeds approaching signalized intersections allow drivers less response time, which creates an opportunity for an increased chance of rear-end collisions. Another potential contributing factor for rear-end collisions at a signalized intersection is a yellow change interval that is too short for the prevailing operating speeds in that corridor.

Based on the application of yellow change interval formulas from the Institute of Transportation Engineers (ITE) Traffic Engineering Handbook with assumed 25 mph thru-movement operating speeds, it was calculated that the minimum "design" yellow change intervals of 3.0 seconds for the approaches are adequate. For intersections where the 85th percentile speeds are closer to 30 mph, then the 3.0 second yellow clearance may be inadequate. Consideration should be given to increasing the yellow clearances to 3.2 seconds to conform to ITE recommendations that more closely match the 85th percentile speeds of 30 mph.

The unsignalized intersection of Mendenhall Street/Tracy Avenue had 2 of 5 (40%) of crashes due to rear-end collisions, and 2 of 5 (40%) due to right-angle collisions. Both rear-end collisions involved westbound vehicles. One (1) rear-end collision occurred when a westbound vehicle hit a parked vehicle in snowy conditions. The other rear-end collision occurred when a westbound vehicle failed to yield to the vehicle in front of it during dark, lighted conditions with dry pavement and clear weather. More information would need to be provided to determine exact crash causes.

Right-angle collisions often occur at unsignalized intersections after a driver stops at a stop sign and then proceeds when it is unsafe to do so due to limited sight distance or inadequately judging gaps in vehicles. At the intersection of Mendenhall Street/Tracy Avenue both crashes involved a westbound vehicle colliding with a southbound vehicle. It may be possible that higher speeds on Mendenhall Street make it difficult for minor road drivers to judge vehicle gaps. Increasing visibility for the intersection on the minor roadway may also help to improve safety. More visible pavement markings and the application of a larger stop sign on Tracy Avenue may call more attention to the intersection to help increase safety. Although not necessarily the cause of right-angle collisions with southbound vehicles, on the south approach of this intersection it is possible that sight distance may be prohibited to the east by the trees located on the

southeast quadrant of the intersection. Consideration should be given to maintaining and pruning the trees to help improve sight distance and improve safety.

Sideswipe, same direction crashes typically occur at intersections when there are not dedicated turn lanes and when vehicles switch lanes to avoid slowing or queued vehicles approaching a turning movement. At the unsignalized intersection of Babcock Street/Tracy Avenue, one (1) sideswipe, same direction crash occurred due to an eastbound vehicle colliding with a vehicle that was changing lanes. The other sideswipe crash at Babcock Street/Black Avenue involved an eastbound vehicle hitting a parked car during clear daylight conditions. More detailed crash data would be needed to determine the exact causes of the crashes.

The intersections of Main Street/Black Avenue and Main Street/Tracy Avenue had one (1) sideswipe, same direction crash. The crashes at both Main Street/Black Avenue and Main Street/Tracy Avenue involved westbound parked vehicles entering the traffic lane and being sideswiped by a passing vehicle.

The four (4) pedestrian crashes occurring at the study area intersections (Babcock Street/Tracy Avenue, Main Street/Black Avenue, Main Street/Tracy Avenue and Mendenhall Street/Black Avenue) typically occurred with clear weather conditions and dry pavement and all crashes resulted in injuries. Two (2) crashes involved vehicles making a left-turn and the other two (2) crashes involved vehicles traveling straight before hitting the pedestrian. More crash information would need to be provided to determine exact causes and potential safety countermeasures, however enhanced pedestrian crossings and lower vehicle speeds through the high pedestrian traveled intersections may help improve pedestrian safety.

Crash data was collected from the City of Bozeman Police Department for the period of January 1, 2019 through October 21, 2022 for the intersections of Babcock Street/Tracy Avenue, Babcock Street/Black Avenue, Mendenhall Street/Tracy Avenue and Mendenhall Street/Black Avenue. Collision types for corridor crashes are provided in Table 5 below:

Table 5: Intersection Crash History -- Collision Type, 2019-2022

Intersection	Collision Type					
	SS, SD	LT, SD	Rear End	Right Angle	Fixed Object	Pedestrian
Mendenhall Street/ Black Avenue	2	4	1	1	4	1
Mendenhall Street/ Tracy Ave	1		1	2	1	
Babcock Street/ Black Avenue	2	1	1	5	1	
Babcock Street/ Tracy Ave	4	3	2	1	1	

*Crashes reported from January 1, 2019 to October 21, 2022

Common crash types were sideswipe, same direction crashes that occurred when vehicles were switching lanes and failed to yield to a vehicle in the adjacent lane. Left-turn, same direction crashes commonly occurred when vehicles were making a left-turn from the far travel lane on the one-way roadway and collided with a vehicle in the internal lane. There were several rear-end collisions, often occurring when the lead vehicles were stopping for a pedestrian, and several right-angle collisions involving a left-turning vehicle colliding with a through moving vehicle. One pedestrian crash was recorded. Crash severity was not available from this crash database.

Corridor Crash History

Corridor crash data was evaluated for the five-year period of January 1, 2014 to December 31, 2018 to determine trends along the downtown corridors of Babcock Street and Mendenhall Street between Willson Avenue and Rouse Avenue. Previously referenced Black Avenue and Tracy Avenue intersection-related crashes are included in Table 6 (below) which summarizes crash data, but will not be discussed in detail.

Babcock Street, between Willson Avenue and Rouse Avenue, had two (2) non-intersection related crashes. Both crashes (one coded as sideswipe, same direction and the other as a rear-end collision) involved a vehicle colliding with a parked car and resulted in no injuries. The remaining crashes occurred at intersections or accesses along Babcock Street. There were 2 of 24 (8%) crashes involving pedestrians/bicyclists and both resulted in injuries. Fifteen (15) of 24 (63%) crashes were right-angle collisions and 5 of 15 (33%) right-angle collisions resulted in injuries. The most severe crashes on Babcock Street were a pedestrian related crash with an eastbound vehicle near Tracy Avenue and a right-angle collision that resulted in a severe injury at Babcock Street/Willson Avenue. This crash involved an eastbound and a southbound vehicle.

Table 6: Corridor Crash History – Collision Type, 2014-2018

Corridor	Rear End	Fell from Vehicle	Fixed Object	LT, SD	SS,SD	Right Angle	Backing Vehicle	Pedestrian	Bicycle	Total
Babcock Street S Willson Ave - S Rouse Ave	1	1		2	3	15		2		24
W Mendenhall Street S Willson Ave - S Rouse Ave	5		1	1	1	3	1	1	2	15

*Crashes reported from January 1, 2014 to December 31, 2018

On Mendenhall Street, between Willson Avenue and Rouse Avenue, there were two (2) crashes that were not intersection related. Both crashes involved vehicles colliding with parked vehicles; one crash was reported as a sideswipe, same direction and the other as a rear-end collision and both crashes resulted in property damage only. The remainder of the crashes along the corridor of Mendenhall Street occurred at intersections. There were two bicycle related crashes that occurred at the intersections of Mendenhall Street/Willson Avenue and Mendenhall Street/Bozeman Avenue. Both bicycle crashes resulted in injuries.

When evaluating crashes, it is important to consider both crash frequency and severity. Table 7 (page 13) provides the breakdown of crash severity for crashes along the Babcock Street and Mendenhall Street corridors. On Babcock Street, between Willson Avenue and Rouse Avenue, 17 of 24 (71%) crashes were property damage only with the remaining 29% resulting in various levels of severity. Mendenhall Street had 4 of 14 (29%) crashes resulting in some type of injury.

Table 7: Summary of Crash Severity for Corridor Crashes, 2014-2018

Corridor	Crash Severity			
	Property Damage Only	Possible Injury Crash	Suspected Minor Injury	Suspected Severe Injury
Babcock Street S Willson Ave - S Rouse Ave	17	1	4	2
W Mendenhall Street S Willson Ave - S Rouse Ave	10	2	1	1

*Crashes reported from January 1, 2014 to December 31, 2018

The most frequent crash types that resulted in injuries are presented in Table 8 (*below*). On Babcock Street the most severe crashes were caused by right-angle and pedestrian collisions. Mendenhall Street had the most severe injury crashes because of pedestrian and bicycle collisions. Pedestrian and bicycle safety countermeasures may help reduce the severity of crashes.

Table 8: Most Frequent Cause of Corridor Crashes by Severity

Corridor	Possible Injury Crash	Suspected Minor Injury	Suspected Severe Injury
Babcock St	Right Angle	Pedestrian Right Angle (3)	Pedestrian Right Angle
Mendenhall St	Rear End (2) Bicycle	Bicycle	Pedestrian

*Crashes reported from January 1, 2014 to December 31, 2018

It is important to note that all the previous evaluations are speculative, and more detailed information about individual crashes would be needed to determine exact causes for each collision.

Pedestrian Safety Countermeasures for Crash Reductions

The Federal Highway Administration (FHWA) has created a Best Practices Toolbox of countermeasures and their potential effectiveness to reduce pedestrian crashes. Signalization, geometric and operational countermeasures are provided in the Toolbox with their targeted crash type (fatality, injury, property damage only or all) and calculated crash reduction factor (CRF), the percentage crash reduction that might be expected after implementing a given countermeasure.

The countermeasures that may be applicable to Mendenhall Street, Main Street and Babcock Street are summarized in Table 9 on page 14. More specific information on applications in Bozeman follow in the report.

Table 9: Best Practices Toolbox of Countermeasures for Pedestrian Safety, FHWA

Countermeasure	Crash Severity	CRF for Pedestrian Crashes (%)
Signalization Countermeasures		
Add exclusive pedestrian phasing	All	34
Replace Walk/Don't Walk Signals with Pedestrian Countdown Signal Heads	All	25
Modify signal phasing (implement a leading pedestrian interval)	All	5
Geometric Countermeasures		
Install Raised Pedestrian Crossing	All	30
	Fatal/Injury	36
Signs/Markings/Operational Countermeasures		
Add Intersection Lighting	All	21 (nighttime crashes)
	Injury	27 (nighttime crashes)
Prohibit Right Turn on Red		3
Prohibit Left Turns		10
Restrict on-street parking near intersections	All	30

Uncontrolled Crossing Pedestrian Safety Countermeasures

FHWA's Best Practices Toolbox includes the *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* (2018) to address safety issues at locations where pedestrian facilities intersect with uncontrolled roadways. The guide helps assist with selecting appropriate countermeasures based on roadway volumes, posted speeds and lane configurations to improve crossing safety. For a two-lane roadway, with posted speeds of 30 mph or below with AADT of less than 9,000 vehicles per day, the following pedestrian crash countermeasures should always be implemented if feasible:

- High visibility crosswalk markings
- Parking restrictions on crosswalk approaches
- Adequate nighttime lighting levels
- Pedestrian crossing warning signs

Additionally, consideration should also be given to the following countermeasures:

- Raised crosswalks
- In-street pedestrian crossing sign
- Curb extensions

The evaluated countermeasures help address conflicts with crossing locations, vehicle speeds, inadequate conspicuity/visibility, drivers not yielding to pedestrians, and insufficient separation of pedestrians from traffic as shown in Table 10 (below) from the guide.

Table 10: Safety Issues Addressed Per Countermeasure, FHWA

Pedestrian Crash Countermeasure for Uncontrolled Crossings	Safety Issue Addressed				
	Conflicts at crossing locations	Excessive Vehicle Speed	Inadequate Conspicuity/ Visibility	Drivers not yielding to pedestrians in crosswalks	Insufficient separation from traffic
Crosswalk Visibility Enhancement	✓	✓	✓	✓	✓
High-visibility crosswalk markings*	✓		✓	✓	
Parking restriction on crosswalk approach*	✓		✓	✓	
Improved nighttime lighting*	✓		✓		
Advance yield here to pedestrian sign and yield line*	✓		✓	✓	✓
In-Street pedestrian crossing sign*	✓	✓	✓	✓	
Curb Extension*	✓	✓	✓		✓
Raised Crosswalk	✓	✓	✓	✓	
Pedestrian Refuge Island	✓	✓	✓		✓
Pedestrian Hybrid Beacon	✓	✓	✓	✓	
Road Diet	✓	✓	✓		✓
Rectangular Rapid- Flashing Beacon	✓		✓	✓	✓

*These countermeasures make up the STEP Countermeasures. Crossing visibility enhancements and multiple countermeasures may be implemented at a location as part of crosswalk visibility enhancements.

PEDESTRIAN SAFETY COUNTERMEASURES

FHWA has compiled proven pedestrian safety countermeasures including crosswalk visibility enhancements; these enhancements include high visibility crosswalks, lighting, and signing and pavement markings to make crosswalks, and users, more visible to drivers.

High Visibility Crosswalk Markings

High visibility crosswalk markings use patterns (bar pairs, continental, ladder) that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks. Both FHWA and the National Association of City Transportation Officials (NACTO) suggest the use of retroreflective pavement markings to improve safety. Retroreflective materials such as inlay or thermoplastic tape, instead of paint or brick, should be used for highly reflective crosswalk markings to improve safety, particularly at night. They should be provided at all established mid-block pedestrian crossings and considered at all uncontrolled intersections. Their application is anticipated to reduce pedestrian injury crashes up to 40%.

Parking Restrictions on Crosswalk Approach

The FHWA acknowledges that on-street parking has an important relationship to pedestrian and motorist's safety. On-street parking can create a buffer, separating pedestrians from vehicular traffic on the adjacent roadway and reducing motorist's travel speeds. However, on-street parking also blocks visibility between the pedestrians and the motorists, particularly for children.

Parking restrictions can include the removal of parking spots close to an intersection, installation of new "parking prohibited" pavement markings or curb paint and signs. The suggested minimum setback is 20 feet in advance of a crosswalk where speeds are 25 mph or less. Thirty (30) foot setbacks are recommended for speeds between 26 and 35 mph, which would be more appropriate for the Downtown Bozeman intersections. The negative aspects of restricting curb parking are that it may eliminate a parking space for motorists, which may be opposed by nearby business owners, and potential increases in speeds for vehicles, which is also undesirable for pedestrians. Restricting on-street parking near intersections has been proven to reduce pedestrian crashes by 30%.

Adequate Nighttime Lighting Levels

To provide adequate nighttime lighting levels, consideration should be given to placing lights in advance of midblock and intersection crosswalks on both approaches to illuminate the front of the pedestrian and avoid creating a silhouette. Intersection lighting has been proven to reduce all pedestrian nighttime crashes by 21% and injury pedestrian nighttime crashes by 27%.

Crosswalk Warning Signs

Crosswalk warning signs are advanced crosswalk yield signs that are placed 20-50 feet in advance of a marked crosswalk to indicate where vehicles are required to yield to pedestrians. To supplement the signing, a yield bar (commonly referred to as "shark's teeth") pavement marking can be used to indicate where vehicles are required to yield. Advanced crosswalk signs are typically used when a crossing is unexpected, such as mid-block. They have shown a reduction of 25% in pedestrian crashes.

Raised Crosswalks

Raised crosswalks are ramped speed tables spanning the entire width of the roadway to make the pedestrian more prominent in the driver's field of vision. The crossing is marked with paint or special paving materials. These crosswalks may reduce vehicle speeds, improve motorist yielding and allow the pedestrian to cross at grade. The raised crosswalk is flush with the height of the sidewalk and is typically at least ten feet wide so a vehicle's front and back tires can be on the table at the same time. Drainage needs to be given careful consideration. Raised crosswalks may not be appropriate for primary emergency vehicle routes and can be a concern for snowplowing. They have shown a 45% reduction in pedestrian crashes.

In-Street Pedestrian Signs

In-street yield to pedestrian signing may be appropriate on 2- or 3-lane roads where speed limits are 30 mph or less. They serve to remind road users of laws regarding yielding to pedestrians and are typically placed in between travel lanes. They can be a concern for snowplowing due to their location in the middle of the roadway. There currently is no crash reduction factor calculated for in-street pedestrian signs.

Curb Extensions

An alternative to improve safety and maintain parking is to provide curb extensions, also referred to as bulb-outs, at pedestrian crossings. Curb extensions extend the sidewalk or curb line out into the parking lane, which reduces the street width. They shorten the distance for pedestrians to cross, allow the pedestrians to be more visible to motorists approaching intersections, and provide protection for pedestrians trying to view approaching vehicles instead of walking into a lane of traffic.

Curb extensions can improve accessibility for emergency vehicles as intersections are kept clear of parked cars. They can also be used to place landscaping or streetscaping. Curb extensions must not extend into travel lanes and should not extend into bicycle lanes. There currently is no crash reduction factor calculated for curb extensions.

City of Bozeman Pedestrian Safety Countermeasures

Mendenhall Street and Babcock Street were evaluated to determine which of the suggested countermeasures from FHWA's *Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* are currently installed at the uncontrolled crossings of Bozeman Avenue, Black Avenue and Tracy Avenue. Table 11 below illustrates the countermeasures currently installed.

Table 11: Pedestrian Countermeasures Currently in Use in Bozeman

Treatment	Intersections					
	Babcock/ Bozeman	Babcock/ Black	Babcock/ Tracy	Mendenhall/ Bozeman	Mendenhall /Black	Mendenhall /Tracy
High Visibility Crosswalk Markings		✓	✓			
Parking Restrictions on Crosswalk Approach	✓		✓	✓	✓	✓
Adequate Nighttime Lighting Levels	✓			✓	✓	✓
Crosswalk Warning Signs		✓	✓			
Raised Crosswalks						
In-Street Pedestrian Crossing Sign						
Curb Extension		✓				

Application of Pedestrian Countermeasures

Sanderson Stewart met with the Downtown Bozeman Partnership staff on October 25, 2022 and discussed the feasibility of applying uniform pedestrian countermeasures at downtown intersections. To provide information on application and cost, the intersections of Mendenhall Street/Tracy Avenue and Babcock Street/Black Avenue were selected as examples. At the intersection of Mendenhall Street/Tracy Avenue the following countermeasures were evaluated: High Visibility Crosswalks, Crosswalk Warning Signs, In-Street Pedestrian Crossing Sign and Curb Extensions. The intersection of Babcock Street/Black Avenue was used to evaluate the following countermeasures: High Visibility Pavement Markings, Parking Restriction on Crosswalk Approach (via a curb bulb-out), Nighttime Lighting Levels, and In-Street Pedestrian Crossing Signs.

Figures 3 and 4 on pages 19 and 20 provide a bird's eye view and perspective image for the two intersections with the application of the discussed pedestrian countermeasures. Raised medians were not considered due to drainage and plowing concerns. Utility work was estimated, and prices are provided based upon recent construction projects in Bozeman. Table 12 below provides the anticipated crash reduction factor and estimated cost for implementation. Check marks are present in boxes where these treatments are presently installed.

Table 12: Pedestrian Safety Treatments and Cost on Mendenhall Street and Babcock Street

Treatment	Babcock Street/ Black Avenue	Mendenhall Street/ Tracy Ave
High Visibility Crosswalk Markings	✓	Cost $18,000 CRF: 40% (ped injury crashes)
Parking Restrictions on Crosswalk Approach	Cost: $15,500* CRF: 30% (ped crashes)	✓
Adequate Nighttime Lighting Levels	Cost: $20,000 CRF: 42% (ped crashes)	✓
Crosswalk Warning Signs	✓	Cost: $800 CRF: 25% (ped crashes)
Raised Crosswalks	Cost: Not evaluated CRF: 45% (ped crashes)	Cost: Not evaluated CRF: 45% (ped crashes)
In-Street Pedestrian Crossing Sign	Cost: $1,200 each CRF: Unknown	Cost: $1,200 each CRF: Unknown
Curb Extension	✓	Cost: $10,800 CRF: Unknown

*At Babcock Street/Black Avenue, a curb extension was built to help restrict parking on the crosswalk approach.

NO.	QTY.	UNIT	DESCRIPTION	UNIT PRICE		TOTAL PRICE
101	90	SY	Asphalt Removal	$10.00 / SY	=	$900.00
102	150	LF	Curb and Gutter Removal	$20.00 / LF	=	$3,000.00
103	180	LF	Standard Curb and Gutter	$20.00 / LF	=	$3,600.00
104	800	SF	Curb Extension Sidewalk	$10.00 / SF	=	$8,000.00
105	1	EA	New Sidewalk Mounted Sign	$800.00 / EA	=	$800.00
106	1	EA	New In-Street Pedestrian Crossing Sign	$400.00 / EA	=	$400.00
107	600	SF	Thermoplastic Pavement Marking	$30.00 / SF	=	$18,000.00
108	1	LS	Remove and Relocate Street Signs	$800.00 / EA	=	$800.00
109	2	EA	New Luminaire	$10,000.00 / EA	=	$20,000.00
110	3	EA	Relocated Curb Inlet	$16,667 / EA	=	$50,000.00
				Subtotal Schedule I	=	**$105,500.00**
				Design and Construction Administration (15%)	=	**$15,825.00**
				Total Cost of Babcock Street and Black Avenue	=	**$121,325.00**

Figure 3: Application of Pedestrian Countermeasures at Babcock Street/Black Avenue

NO.	QTY.	UNIT	DESCRIPTION	UNIT PRICE		TOTAL PRICE
101	60	SY	Asphalt Removal	$10.00 / SY	=	$600.00
102	100	LF	Curb and Gutter Removal	$20.00 / LF	=	$2,000.00
103	160	LF	Standard Curb and Gutter	$20.00 / LF	=	$3,200.00
104	500	SF	Curb Extension Sidewalk	$10.00 / SF	=	$5,000.00
105	1	EA	New Sign on Existing Luminaire	$400.00 / EA	=	$400.00
106	1	EA	New Sidewalk Mounted Sign	$800.00 / EA	=	$800.00
107	1	EA	New In-Street Pedestrian Crossing Sign	$400.00 / EA	=	$400.00
108	600	SF	Thermoplastic Pavement Marking	$30.00 / SF	=	$18,000.00
				Subtotal Schedule I	=	**$30,400.00**
				Design and Construction Administration (15%)	=	**$4,560.00**
				Total Cost of Mendenhall Street and Tracy Avenue	=	**$34,960.00**

Figure 4: Application of Pedestrian Countermeasures at Mendenhall Street/Tracy Avenue

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The preceding analysis has evaluated the safety and operations for the downtown Bozeman corridors of Babcock Street, Main Street and Mendenhall Street. An evaluation of Existing Conditions (2022) intersection capacity showed that at all intersections function at LOS C or better during the AM, noon, and PM peak hours. Pedestrian LOS was calculated to be LOS B or better at the study area intersections. A signal warrant analysis resulted in no warrants being met for the study area unsignalized intersections.

Speed data was gathered on six different segments of downtown streets and 85th percentile speeds were observed to be between 27 and 30 mph. The posted speed limit on downtown roadways is 25 mph.

A crash history analysis found that the historical crash rate was slightly higher than the predicted crash rate at the intersection of Mendenhall Street/Tracy Avenue. The historical crash rates were lower than the predicted crash rates at all other study area intersections. There were crash trends including rear-end, right-angle, sideswipe, same direction, left-turn, same direction, and pedestrian/bicycle collisions in the study area, with the most severe crashes occurring due to pedestrian and bicycle crashes and right-angle collisions.

FHWA guidance for pedestrian safety countermeasures were discussed and applied to the two example intersections of Mendenhall Street/Tracy Avenue and Babcock Street/Black Avenue. Information was provided about the crash reduction factors for the treatments and the estimated costs of application. It is suggested that these improvements be installed at other study area intersections for consistency and improved safety.

Recommendations

The following list of recommendations is based on the analysis results from this study and the professional judgment of the author:

At the intersection of Babcock Street/Black Avenue:

- Install high visibility pavement markings on all approaches and crosswalk warning signs and in-street pedestrian crossing signs on the eastbound approach.
- Install lighting on the northeast and southwest corners and curb extensions on the Northeast, Northwest, and Southeast corners to help improve pedestrian safety.
- Continue to evaluate intersection operations for warrants for signalization.
- Coordinate these improvements with the bike boulevard project (through the City's transportation term contract) to avoid any design conflicts.

At the intersection of Mendenhall Street/Tracy Avenue:

- Install high visibility pavement markings on all approaches and larger stop signs on Tracy Avenue to call more attention to the intersection.

- Install advanced crosswalk warning signs and in-street pedestrian crossing signs on the westbound approach to improve pedestrian safety.
- Maintain the tree on the southeast corner of the intersection to provide adequate sight distance.
- Install curb extensions on the west side of the intersection to improve pedestrian safety.

Throughout the downtown area:

- Provide adequately sized 15-minute loading/unloading spaces at locations where trucks frequently double park.
- Install sharrows uniformly on downtown streets.
- Restrict parking within 30' of all crosswalk approaches.
- Consolidate signage in the downtown area.
- Install lighting at intersections for pedestrian safety.
- Install high-visibility pavement marks, crosswalk warning signs, in-street pedestrian signs, curb extensions and lighting at other study area intersections for consistency and to improve safety.
- Increase the yellow clearance intervals to 3.2 seconds to match the 85th percentile speeds of 30 mph.
- Consideration should be given to continue an ongoing review of metrics.
- All transportation-related improvements shall be designed in accordance with City of Bozeman and/or MDT standards (where applicable) and the Manual on Uniform Traffic Control Devices (MUTCD).

EXHIBITS -
SIGN INVENTORY

APPENDIX A

ENDURING COMMUNITY DESIGN

SANDERSON STEWART

EXHIBIT E

EXISTING SIGNS

BABCOCK: N 5TH TO WILLSON

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

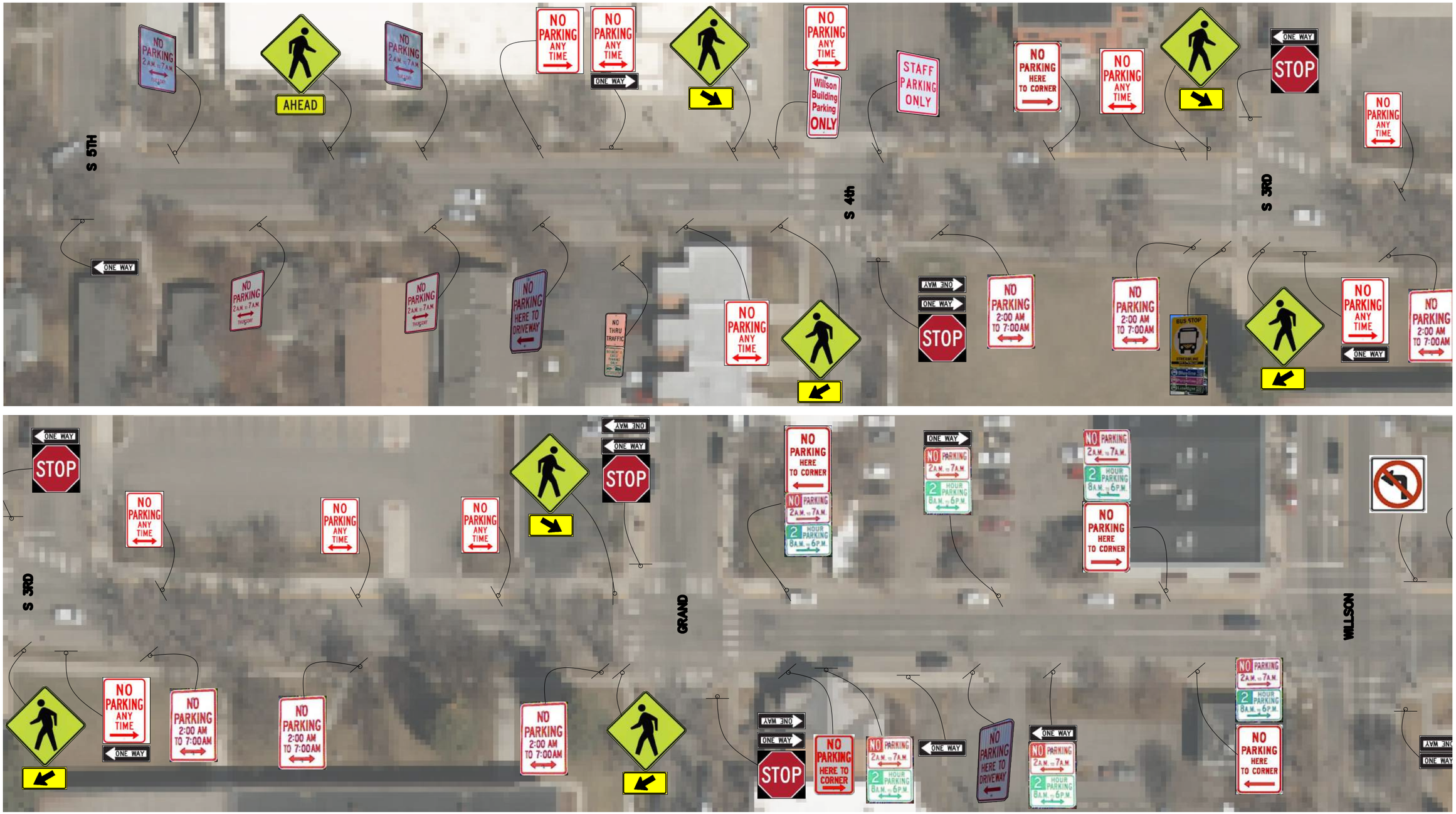


EXHIBIT F

EXISTING SIGNS

BABCOCK: WILLSON TO BOZEMAN

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

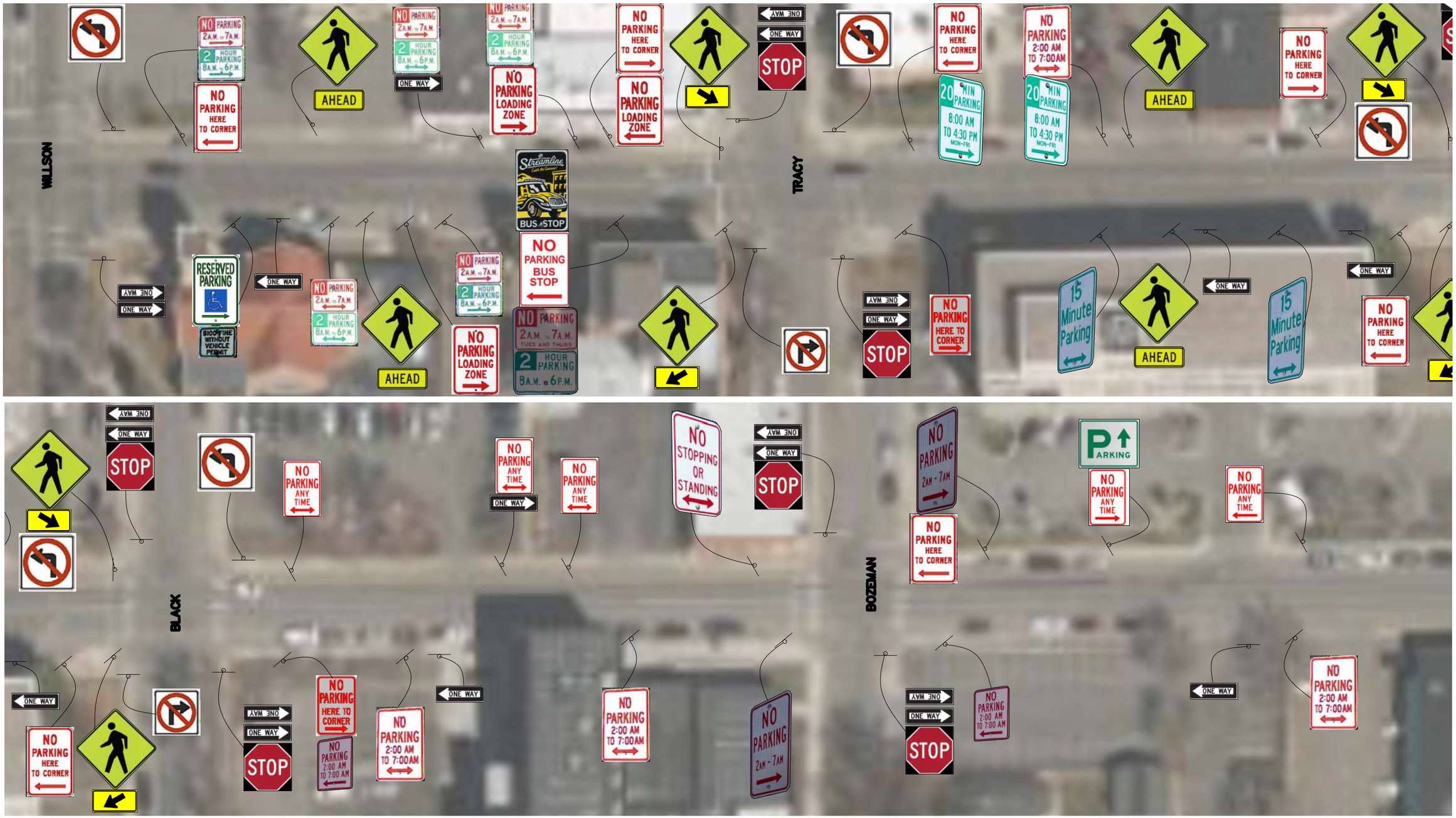


EXHIBIT G

EXISTING SIGNS

BABCOCK: ROUSE TO WALLACE

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

EXHIBIT A

EXISTING SIGNS

MENDENHALL: N 5TH TO WILLSON

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

EXHIBIT B

EXISTING SIGNS

MENDENHALL: WILLSON TO BOZEMAN

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

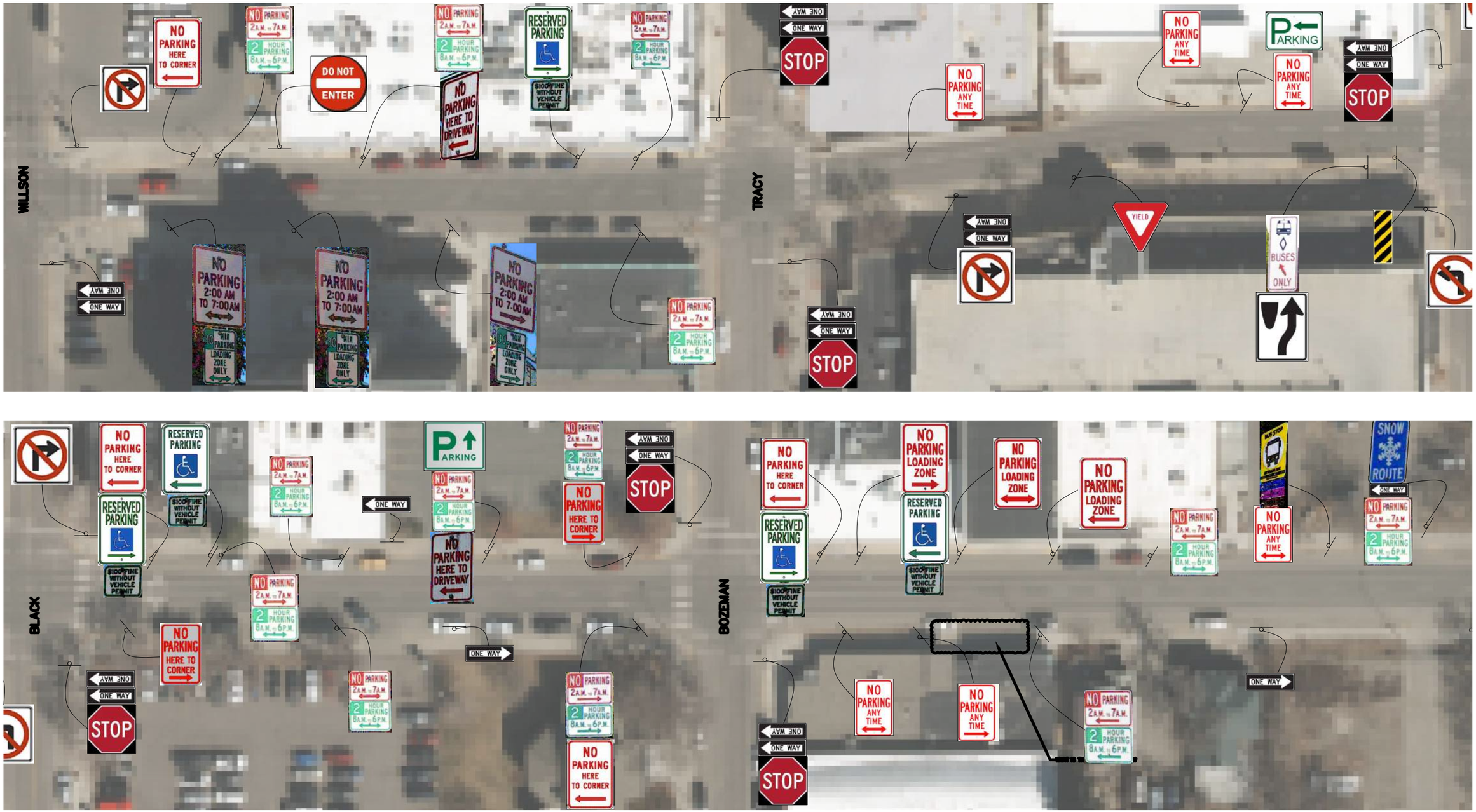


EXHIBIT C

EXISTING SIGNS

MENDENHALL: BOZEMAN TO WALLACE

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

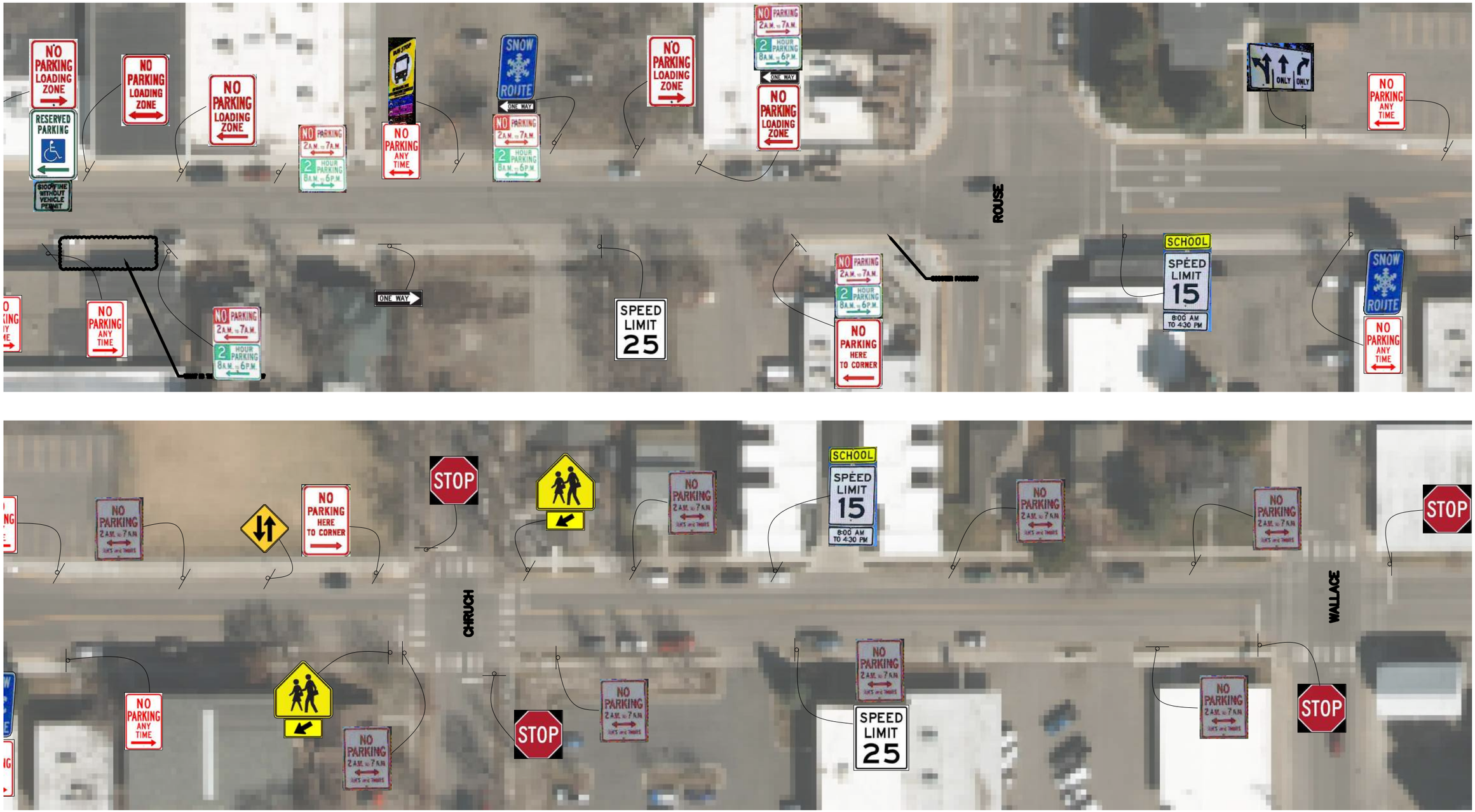


EXHIBIT D

EXISTING SIGNS

MENDENHALL: WALLACE TO BROADWAY

PREPARED FOR : CITY OF BOZEMAN

PREPARED BY : SANDERSON STEWART

OCTOBER 2022

BOZEMAN, MONTANA

NORTH

25 0 25 50

SCALE:1" = 50'

EXISTING VOLUMES –
VEHICLE AND BIKE/PEDESTRIAN COUNTS (2022)

APPENDIX B

ENDURING COMMUNITY DESIGN

SANDERSON STEWART

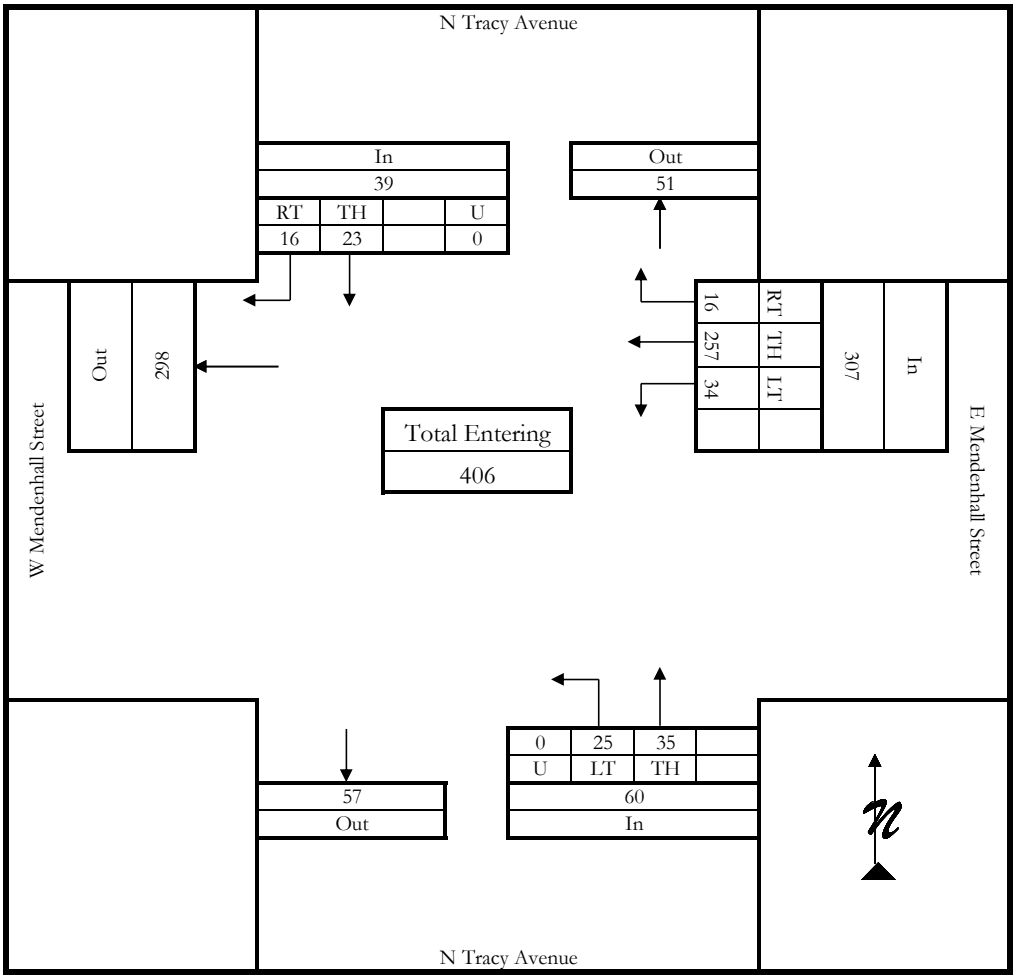
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	Mendenhall Street & N Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Tracy Avenue	East/West Street:	Mendenhall Street

Vehicle Volumes and Adjustments

	N Tracy Avenue Southbound					N Tracy Avenue Northbound					W Mendenhall Street Eastbound					E Mendenhall Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
8:30 AM	5	3	0	0	8	0	12	2	0	14					0	4	70	6	0	80	102
8:45 AM	4	9	0	0	13	0	7	5	0	12					0	6	63	12	0	81	106
9:00 AM	4	8	0	0	12	0	9	8	0	17					0	3	63	11	0	77	106
9:15 AM	3	3	0	0	6	0	7	10	0	17					0	3	61	5	0	69	92
Grand Total	16	23	0	0	39	0	35	25	0	60	0	0	0	0	0	16	257	34	0	307	406
Medium Truck %	0.0	4.3	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0					0.0	0.0	5.1	5.9	0.0	4.9	
Heavy Truck %	25.0	4.3	0.0	0.0	12.8	0.0	2.9	0.0	0.0	1.7					0.0	0.0	0.4	0.0	0.0	0.3	
Total Truck %	25.0	8.7	0.0	0.0	15.4	0.0	2.9	0.0	0.0	1.7					0.0	0.0	5.4	5.9	0.0	5.2	
Total %	3.9	5.7	0.0	0.0	9.6	0.0	8.6	6.2	0.0	14.8	0.0	0.0	0.0	0.0	0.0	3.9	63.3	8.4	0.0	75.6	100.0
PHF	0.75	0.75	0.75			1.00	1.00	1.00			1.00	1.00	1.00			0.94	0.94	0.94			0.95



SANDERSON STEWART

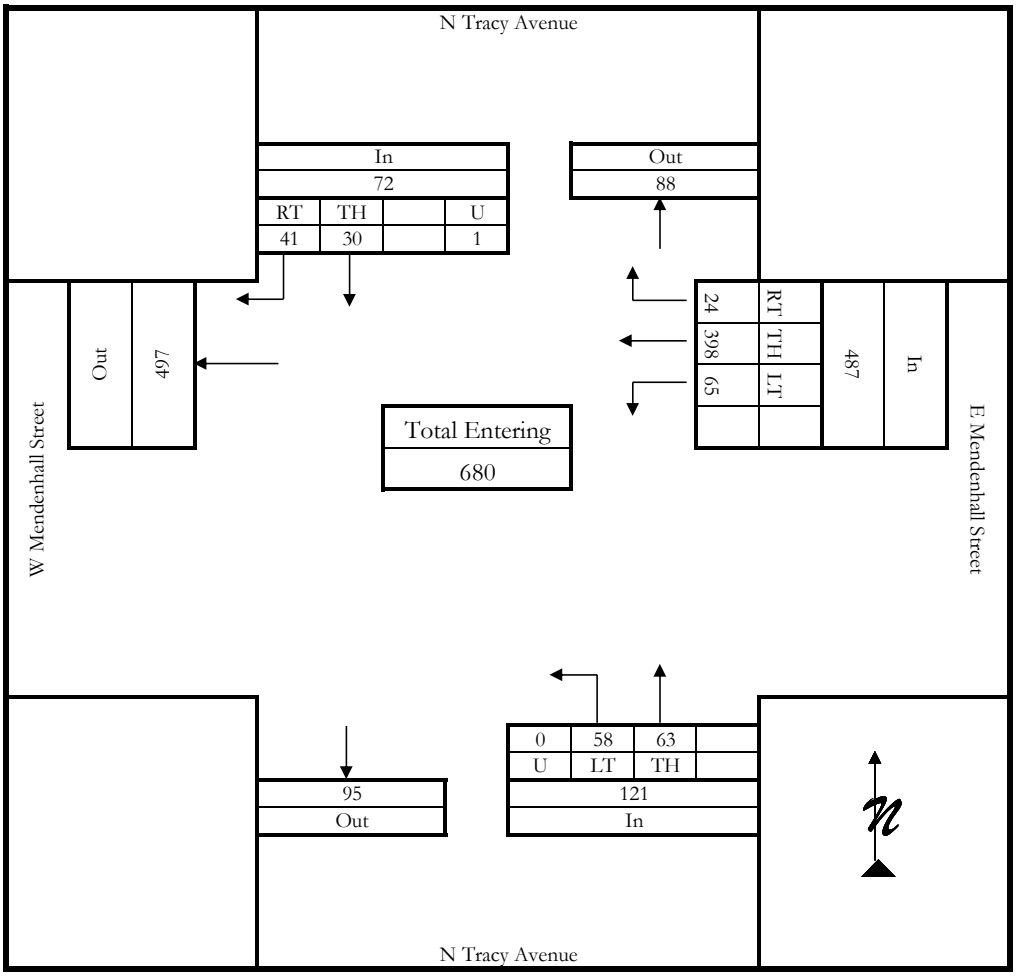
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	Mendenhall Street & N Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	Noon Peak Hour (11:45 AM - 12:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Tracy Avenue	East/West Street:	Mendenhall Street

Vehicle Volumes and Adjustments

	N Tracy Avenue Southbound					N Tracy Avenue Northbound					W Mendenhall Street Eastbound					E Mendenhall Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
11:45 AM	13	6	0	0	19	0	9	13	0	22					0	7	96	20	0	123	164
12:00 PM	9	9	0	0	18	0	21	18	0	39					0	4	94	12	0	110	167
12:15 PM	8	6	0	0	14	0	15	15	0	30					0	6	103	13	0	122	166
12:30 PM	11	9	0	1	21	0	18	12	0	30					0	7	105	20	0	132	183
Grand Total	41	30	0	1	72	0	63	58	0	121	0	0	0	0	0	24	398	65	0	487	680
Medium Truck %	0.0	3.3	0.0	0.0	1.4	0.0	3.2	0.0	0.0	1.7					0.0	8.3	2.3	3.1	0.0	2.7	
Heavy Truck %	14.6	0.0	0.0	0.0	8.3	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	14.6	3.3	0.0	0.0	9.7	0.0	3.2	0.0	0.0	1.7					0.0	8.3	2.3	3.1	0.0	2.7	
Total %	6.0	4.4	0.0	0.1	10.6	0.0	9.3	8.5	0.0	17.8	0.0	0.0	0.0	0.0	0.0	3.5	58.5	9.6	0.0	71.6	100.0
PHF	0.86	0.86	0.86			1.01	1.01	1.01			1.00	1.00	1.00			0.92	0.92	0.92			0.93



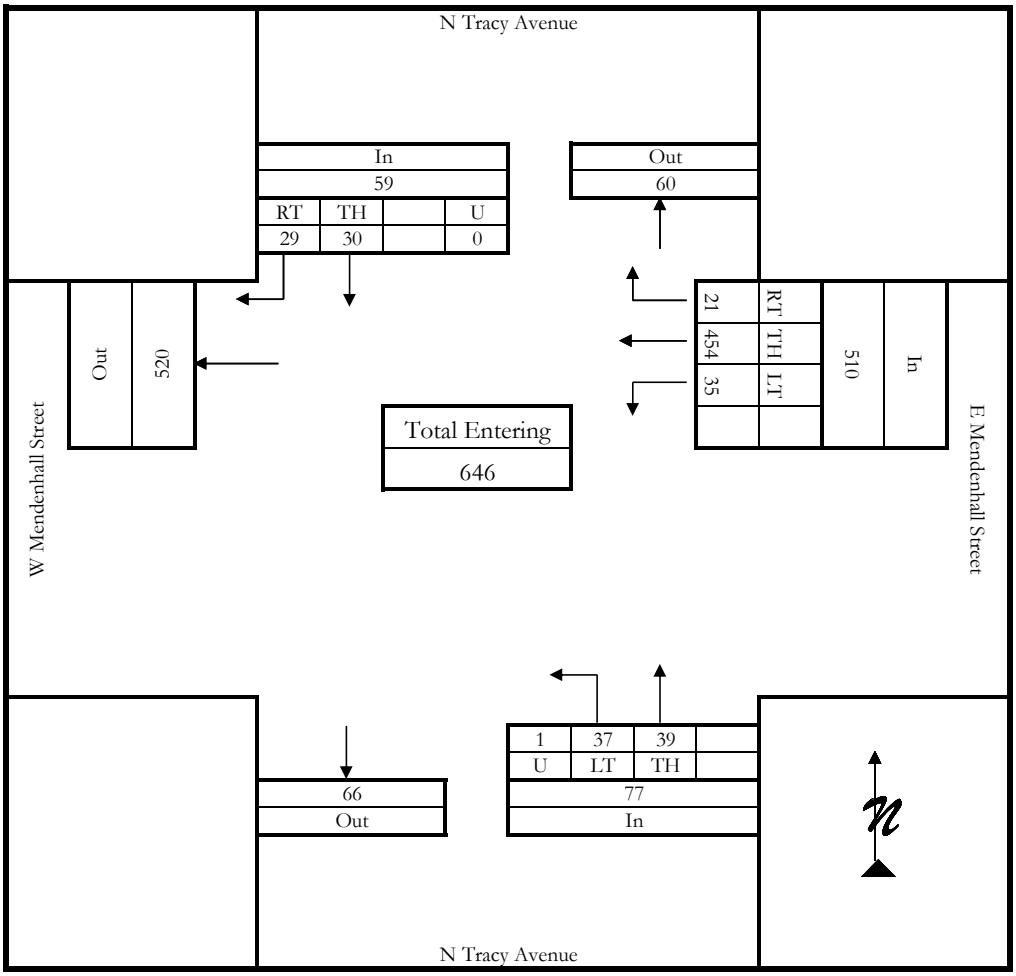
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	Mendenhall Street & N Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Tracy Avenue	East/West Street:	Mendenhall Street

Vehicle Volumes and Adjustments

	N Tracy Avenue Southbound					N Tracy Avenue Northbound					W Mendenhall Street Eastbound					E Mendenhall Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
4:45 PM	8	10	0	0	18	0	14	12	0	26					0	3	93	9	0	105	149
5:00 PM	8	5	0	0	13	0	6	9	0	15					0	7	136	10	0	153	181
5:15 PM	9	10	0	0	19	0	13	9	0	22					0	7	113	7	0	127	168
5:30 PM	4	5	0	0	9	0	6	7	1	14					0	4	112	9	0	125	148
Grand Total	29	30	0	0	59	0	39	37	1	77	0	0	0	0	0	21	454	35	0	510	646
Medium Truck %	3.4	0.0	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0					0.0	4.8	1.5	2.9	0.0	1.8	
Heavy Truck %	6.9	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.2	0.0	0.0	0.2	
Total Truck %	10.3	0.0	0.0	0.0	5.1	0.0	0.0	0.0	0.0	0.0					0.0	4.8	1.8	2.9	0.0	2.0	
Total %	4.5	4.6	0.0	0.0	9.1	0.0	6.0	5.7	0.2	11.9	0.0	0.0	0.0	0.0	0.0	3.3	70.3	5.4	0.0	78.9	100.0
PHF	1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			0.83	0.83	0.83			0.88



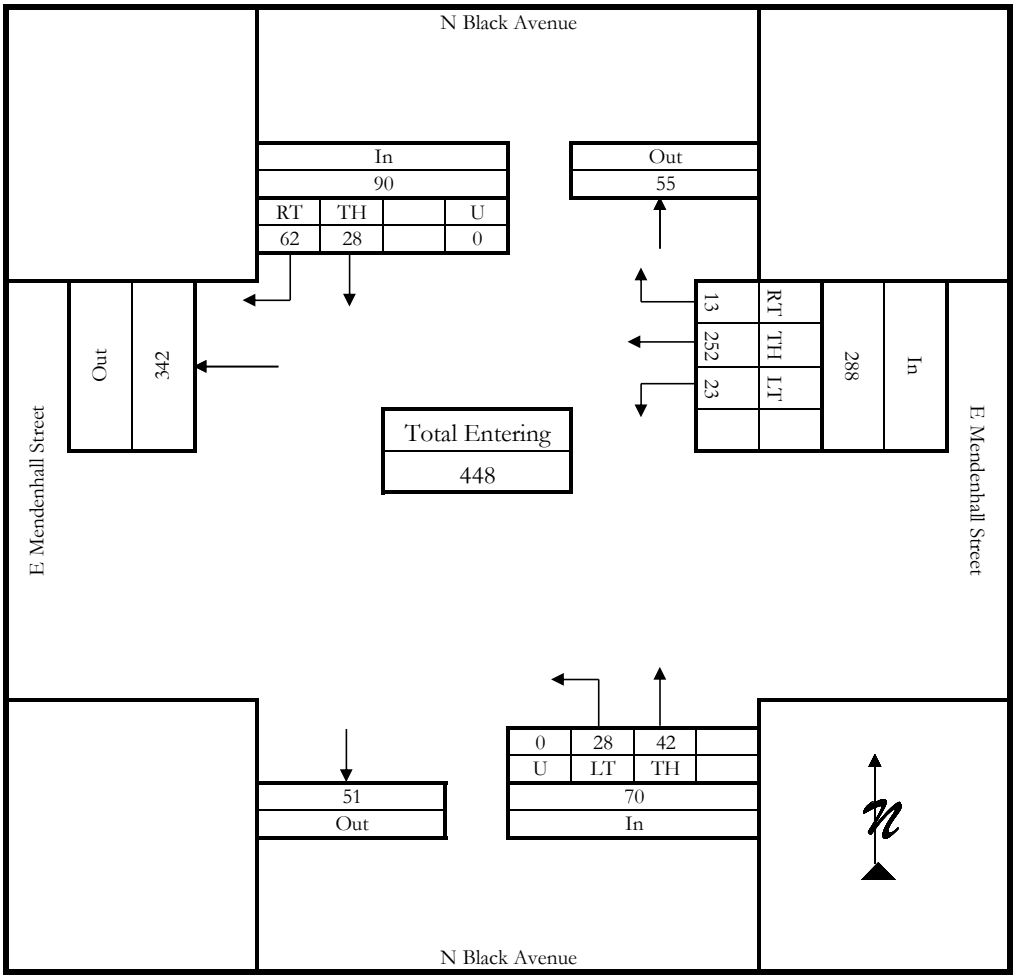
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	E Mendenhall Street & N Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Black Avenue	East/West Street:	E Mendenhall Street

Vehicle Volumes and Adjustments

	N Black Avenue Southbound					N Black Avenue Northbound					E Mendenhall Street Eastbound					E Mendenhall Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
8:30 AM	19	10	0	0	29	0	11	7	0	18					0	3	60	7	0	70	117
8:45 AM	23	9	0	0	32	0	12	8	0	20					0	5	64	7	0	76	128
9:00 AM	13	8	0	0	21	0	10	7	0	17					0	3	63	5	0	71	109
9:15 AM	7	1	0	0	8	0	9	6	0	15					0	2	65	4	0	71	94
Grand Total	62	28	0	0	90	0	42	28	0	70	0	0	0	0	0	13	252	23	0	288	448
Medium Truck %	3.2	0.0	0.0	0.0	2.2	0.0	2.4	3.6	0.0	2.9					0.0	7.7	5.2	0.0	0.0	4.9	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	3.2	0.0	0.0	0.0	2.2	0.0	2.4	3.6	0.0	2.9					0.0	7.7	5.2	0.0	0.0	4.9	
Total %	13.8	6.3	0.0	0.0	20.1	0.0	9.4	6.3	0.0	15.6	0.0	0.0	0.0	0.0	0.0	2.9	56.3	5.1	0.0	64.3	100.0
PHF	0.70	0.70	0.70			0.88	0.88	0.88			1.00	1.00	1.00			0.95	0.95	0.95			0.88



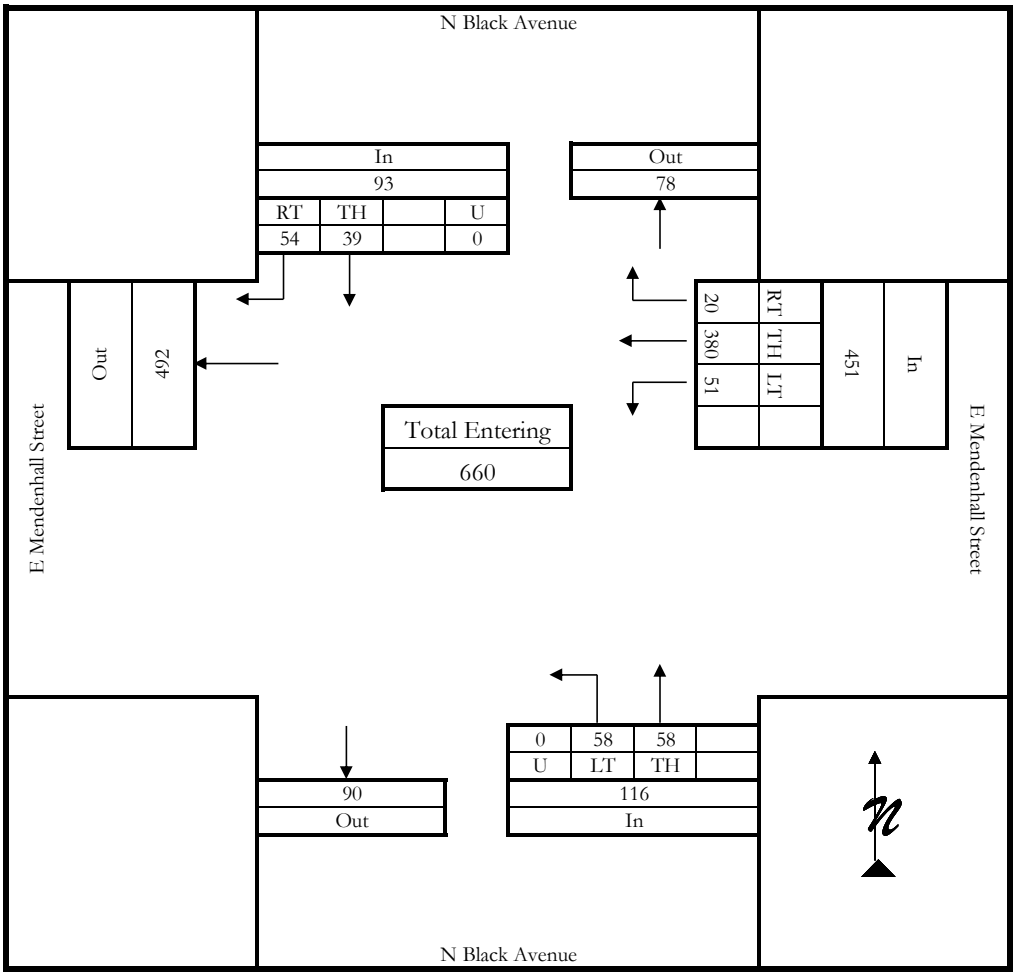
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	E Mendenhall Street & N Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	Noon Peak Hour (11:45 AM - 12:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Black Avenue	East/West Street:	E Mendenhall Street

Vehicle Volumes and Adjustments

	N Black Avenue Southbound					N Black Avenue Northbound					E Mendenhall Street Eastbound					E Mendenhall Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
11:45 AM	12	14	0	0	26	0	15	15	0	30					0	7	93	15	0	115	171
12:00 PM	14	9	0	0	23	0	14	14	0	28					0	6	86	17	0	109	160
12:15 PM	18	9	0	0	27	0	14	14	0	28					0	3	97	8	0	108	163
12:30 PM	10	7	0	0	17	0	15	15	0	30					0	4	104	11	0	119	166
Grand Total	54	39	0	0	93	0	58	58	0	116	0	0	0	0	0	20	380	51	0	451	660
Medium Truck %	1.9	0.0	0.0	0.0	1.1	0.0	1.7	1.7	0.0	1.7					0.0	10.0	3.2	0.0	0.0	3.1	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.0	0.0	0.0	0.0	
Total Truck %	1.9	0.0	0.0	0.0	1.1	0.0	1.7	1.7	0.0	1.7					0.0	10.0	3.2	0.0	0.0	3.1	
Total %	8.2	5.9	0.0	0.0	14.1	0.0	8.8	8.8	0.0	17.6	0.0	0.0	0.0	0.0	0.0	3.0	57.6	7.7	0.0	68.3	100.0
PHF	0.89	0.89	0.89			0.97	0.97	0.97			1.00	1.00	1.00			0.98	0.98	0.98			0.96



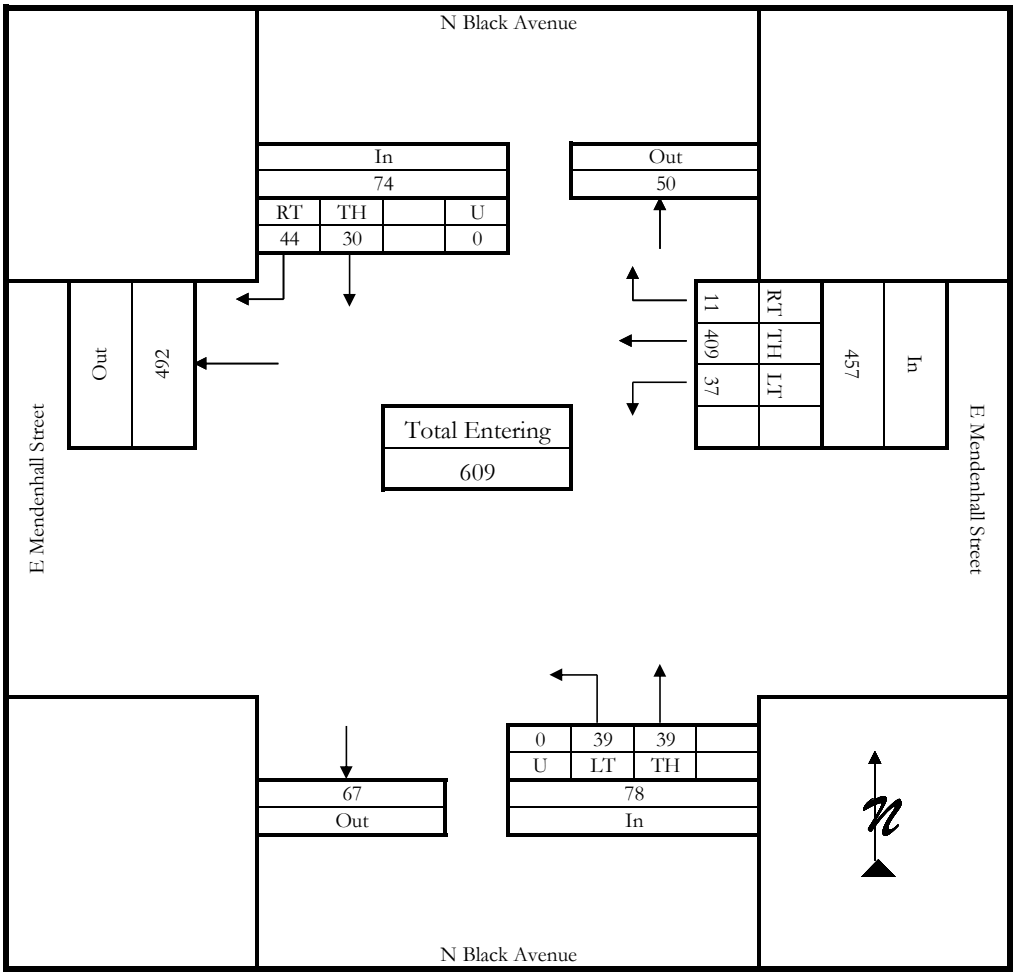
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	E Mendenhall Street & N Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Black Avenue	East/West Street:	E Mendenhall Street

Vehicle Volumes and Adjustments

	N Black Avenue Southbound					N Black Avenue Northbound					E Mendenhall Street Eastbound					E Mendenhall Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
4:45 PM	10	6	0	0	16	0	8	8	0	16					0	3	85	9	0	97	129
5:00 PM	10	8	0	0	18	0	11	11	0	22					0	2	122	8	0	132	172
5:15 PM	8	7	0	0	15	0	10	10	0	20					0	2	110	9	0	121	156
5:30 PM	16	9	0	0	25	0	10	10	0	20					0	4	92	11	0	107	152
Grand Total	44	30	0	0	74	0	39	39	0	78	0	0	0	0	0	11	409	37	0	457	609
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0	2.2	5.4	0.0	2.4	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0	0.2	0.0	0.0	0.2	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	0.0	2.4	5.4	0.0	2.6	
Total %	7.2	4.9	0.0	0.0	12.2	0.0	6.4	6.4	0.0	12.8	0.0	0.0	0.0	0.0	0.0	1.8	67.2	6.1	0.0	75.0	100.0
PHF	1.00	1.00	1.00			0.89	0.89	0.89			1.00	1.00	1.00			0.87	0.87	0.87			0.88



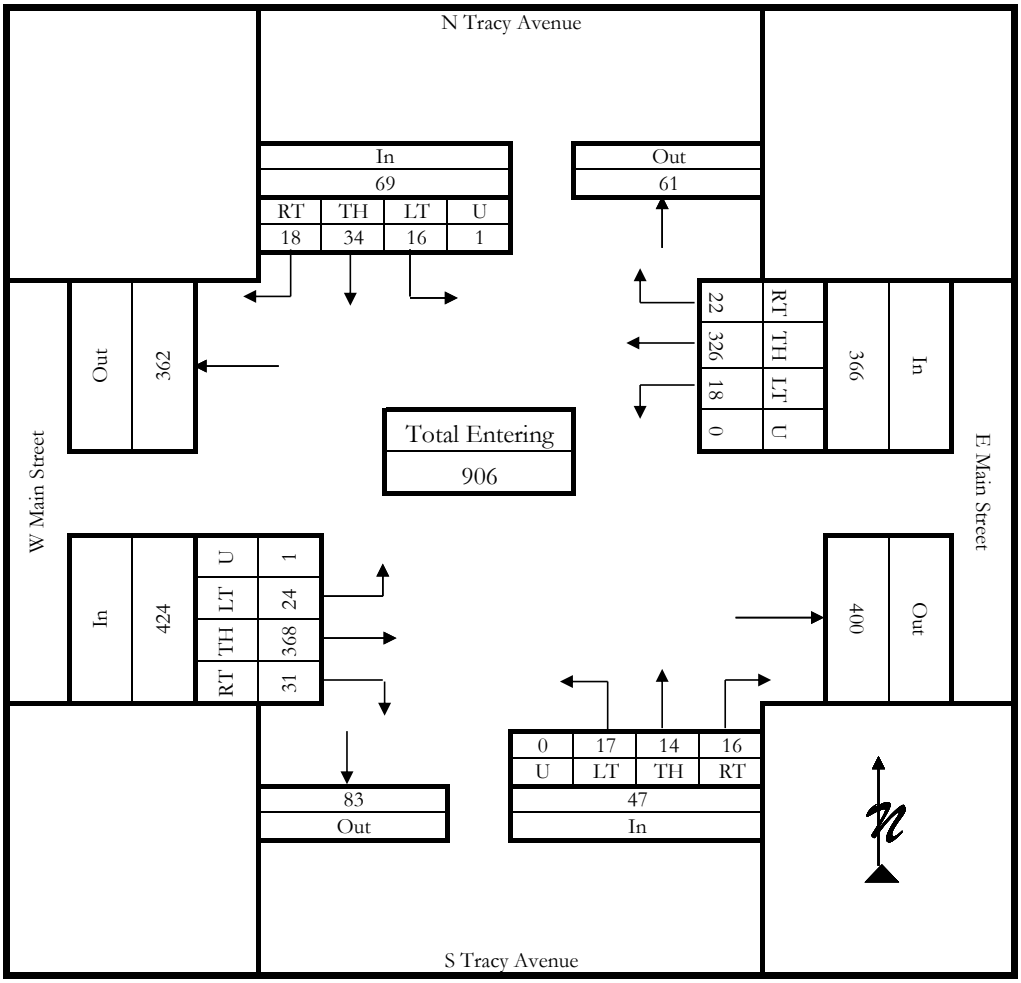
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	Main Street & Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Tracy Avenue	East/West Street:	Main Street

Vehicle Volumes and Adjustments

	N Tracy Avenue Southbound					S Tracy Avenue Northbound					W Main Street Eastbound					E Main Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.85	0.85	0.85	0.85		0.85	0.85	0.85	0.85		
8:30 AM	4	7	2	1	14	3	5	3	0	11	7	92	7	0	106	7	71	6	0	84	215
8:45 AM	6	11	6	0	23	3	2	5	0	10	7	99	7	1	114	4	73	7	0	84	231
9:00 AM	4	9	5	0	18	8	3	4	0	15	7	79	6	0	92	7	85	3	0	95	220
9:15 AM	4	7	3	0	14	2	4	5	0	11	10	98	4	0	112	4	97	2	0	103	240
Grand Total	18	34	16	1	69	16	14	17	0	47	31	368	24	1	424	22	326	18	0	366	906
Medium Truck %	5.6	2.9	6.3	0.0	4.3	0.0	7.1	0.0	0.0	2.1	0.0	1.6	0.0	0.0	1.4	0.0	2.1	0.0	0.0	1.9	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.4	0.0	1.2	0.0	0.0	1.1	
Total Truck %	5.6	2.9	6.3	0.0	4.3	0.0	7.1	0.0	0.0	2.1	0.0	3.3	0.0	0.0	2.8	0.0	3.4	0.0	0.0	3.0	
Total %	2.0	3.8	1.8	0.1	7.6	1.8	1.5	1.9	0.0	5.2	3.4	40.6	2.6	0.1	46.8	2.4	36.0	2.0	0.0	40.4	100.0
PHF	1.00	1.00	1.00			1.00	1.00	1.00			0.94	0.94	0.94			0.89	0.89	0.89			0.94



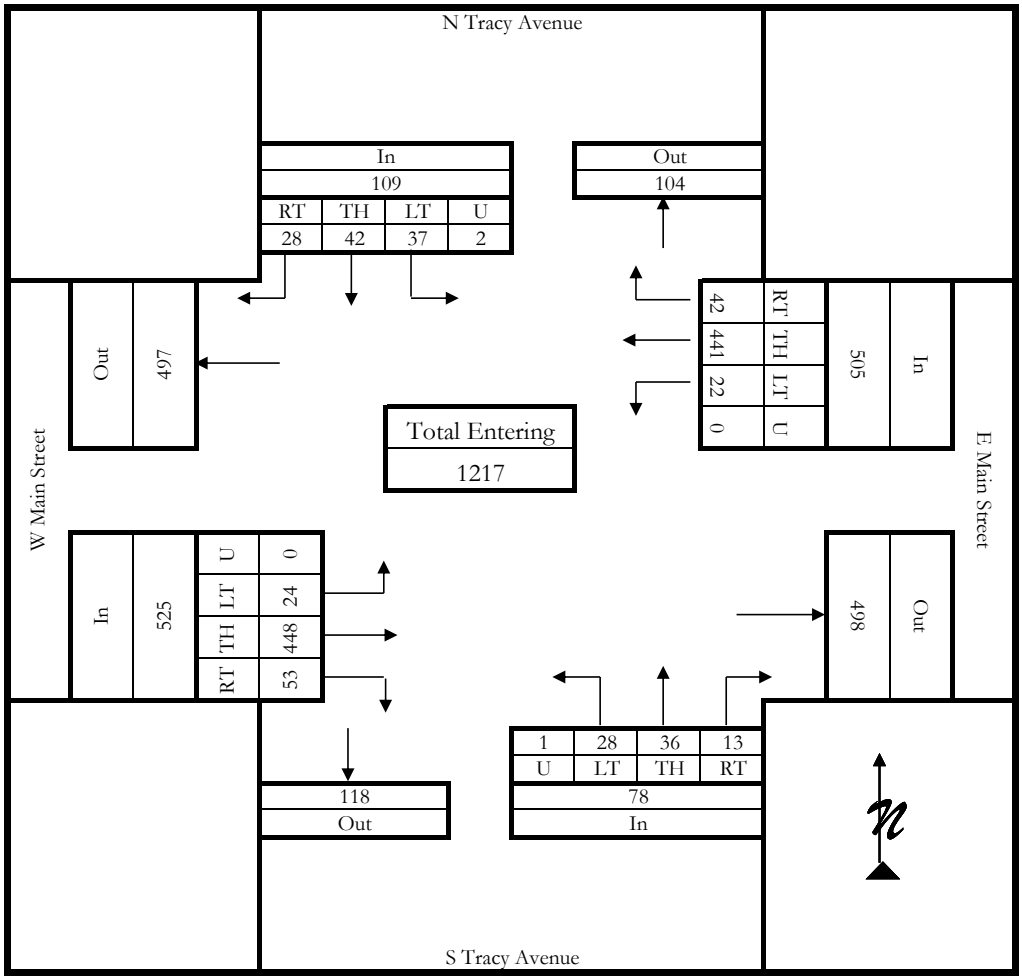
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	Main Street & Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	Noon Peak Hour (11:45 AM - 12:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Tracy Avenue	East/West Street:	Main Street

Vehicle Volumes and Adjustments

	N Tracy Avenue Southbound					S Tracy Avenue Northbound					W Main Street Eastbound					E Main Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.85	0.85	0.85	0.85		0.85	0.85	0.85	0.85		
11:45 AM	6	12	14	1	33	4	7	6	1	18	13	103	3	0	119	14	119	5	0	138	308
12:00 PM	7	13	1	1	22	4	9	8	0	21	17	99	9	0	125	12	90	5	0	107	275
12:15 PM	7	7	8	0	22	3	12	10	0	25	9	127	4	0	140	8	118	6	0	132	319
12:30 PM	8	10	14	0	32	2	8	4	0	14	14	119	8	0	141	8	114	6	0	128	315
Grand Total	28	42	37	2	109	13	36	28	1	78	53	448	24	0	525	42	441	22	0	505	1217
Medium Truck %	0.0	0.0	5.4	0.0	1.8	0.0	2.8	3.6	0.0	2.6	0.0	1.1	0.0	0.0	1.0	4.8	2.5	0.0	0.0	2.6	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	4.2	0.0	1.5	0.0	1.6	0.0	0.0	1.4	
Total Truck %	0.0	0.0	5.4	0.0	1.8	0.0	2.8	3.6	0.0	2.6	0.0	2.7	4.2	0.0	2.5	4.8	4.1	0.0	0.0	4.0	
Total %	2.3	3.5	3.0	0.2	9.0	1.1	3.0	2.3	0.1	6.4	4.4	36.8	2.0	0.0	43.1	3.5	36.2	1.8	0.0	41.5	100.0
PHF	1.00	1.00	1.00			0.78	0.78	0.78			0.94	0.94	0.94			0.95	0.95	0.95			0.95



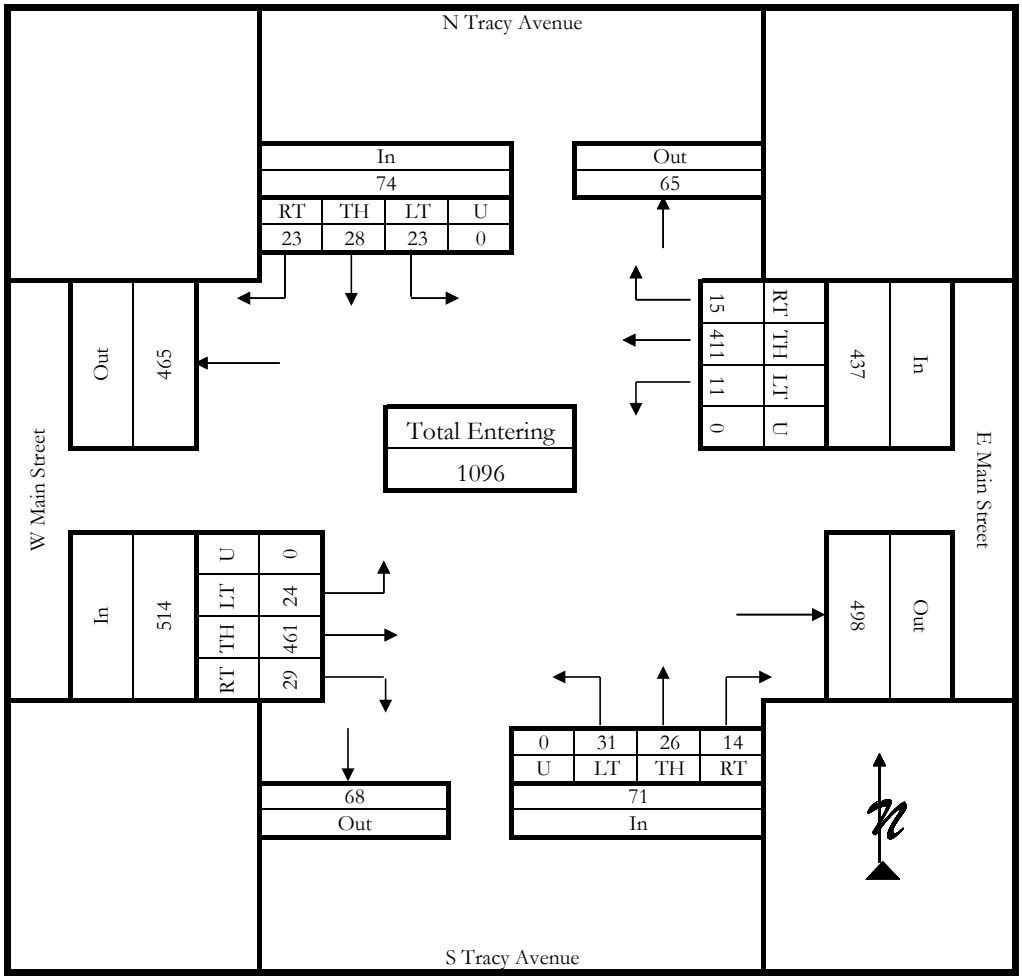
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	Main Street & Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Tracy Avenue	East/West Street:	Main Street

Vehicle Volumes and Adjustments

	N Tracy Avenue Southbound					S Tracy Avenue Northbound					W Main Street Eastbound					E Main Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.85	0.85	0.85	0.85		0.85	0.85	0.85	0.85		
4:45 PM	7	9	5	0	21	3	8	8	0	19	8	125	9	0	142	4	92	1	0	97	279
5:00 PM	4	8	7	0	19	4	5	12	0	21	11	104	4	0	119	5	111	6	0	122	281
5:15 PM	7	4	6	0	17	5	8	5	0	18	3	117	8	0	128	3	106	3	0	112	275
5:30 PM	5	7	5	0	17	2	5	6	0	13	7	115	3	0	125	3	102	1	0	106	261
Grand Total	23	28	23	0	74	14	26	31	0	71	29	461	24	0	514	15	411	11	0	437	1096
Medium Truck %	0.0	0.0	4.3	0.0	1.4	14.3	0.0	0.0	0.0	2.8	0.0	0.7	0.0	0.0	0.6	0.0	0.2	0.0	0.0	0.2	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.0	0.0	0.5	0.0	0.0	0.5	
Total Truck %	0.0	0.0	4.3	0.0	1.4	14.3	0.0	0.0	0.0	2.8	0.0	1.7	0.0	0.0	1.6	0.0	0.7	0.0	0.0	0.7	
Total %	2.1	2.6	2.1	0.0	6.8	1.3	2.4	2.8	0.0	6.5	2.6	42.1	2.2	0.0	46.9	1.4	37.5	1.0	0.0	39.9	100.0
PHF	0.97	0.97	0.97			0.85	0.85	0.85			1.00	1.00	1.00			0.90	0.90	0.90			0.98



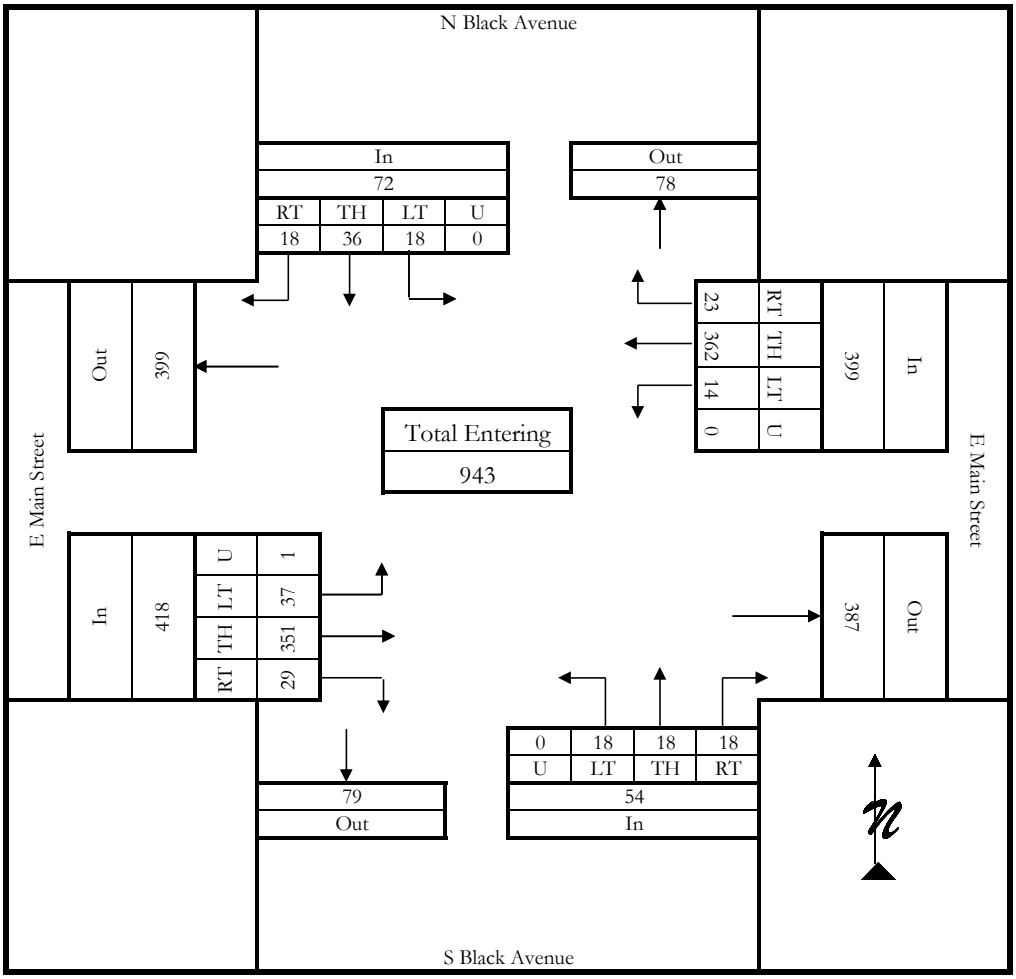
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	E Main Street & Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Black Avenue	East/West Street:	E Main Street

Vehicle Volumes and Adjustments

	N Black Avenue Southbound					S Black Avenue Northbound					E Main Street Eastbound					E Main Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.85	0.85	0.85	0.85		0.85	0.85	0.85	0.85		
8:30 AM	4	8	4	0	16	4	4	4	0	12	5	82	8	0	95	5	83	4	0	92	215
8:45 AM	4	9	4	0	17	4	4	4	0	12	4	92	9	1	106	5	79	3	0	87	222
9:00 AM	5	9	5	0	19	5	5	5	0	15	13	81	9	0	103	6	94	3	0	103	240
9:15 AM	5	10	5	0	20	5	5	5	0	15	7	96	11	0	114	7	106	4	0	117	266
Grand Total	18	36	18	0	72	18	18	18	0	54	29	351	37	1	418	23	362	14	0	399	943
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.4	0.0	1.4	0.0	0.0	1.3	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.4	0.0	1.1	0.0	0.0	1.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	2.9	0.0	2.5	0.0	0.0	2.3	
Total %	1.9	3.8	1.9	0.0	7.6	1.9	1.9	1.9	0.0	5.7	3.1	37.2	3.9	0.1	44.3	2.4	38.4	1.5	0.0	42.3	100.0
PHF	0.90	0.90	0.90			0.90	0.90	0.90			0.92	0.92	0.92			0.85	0.85	0.85			0.89



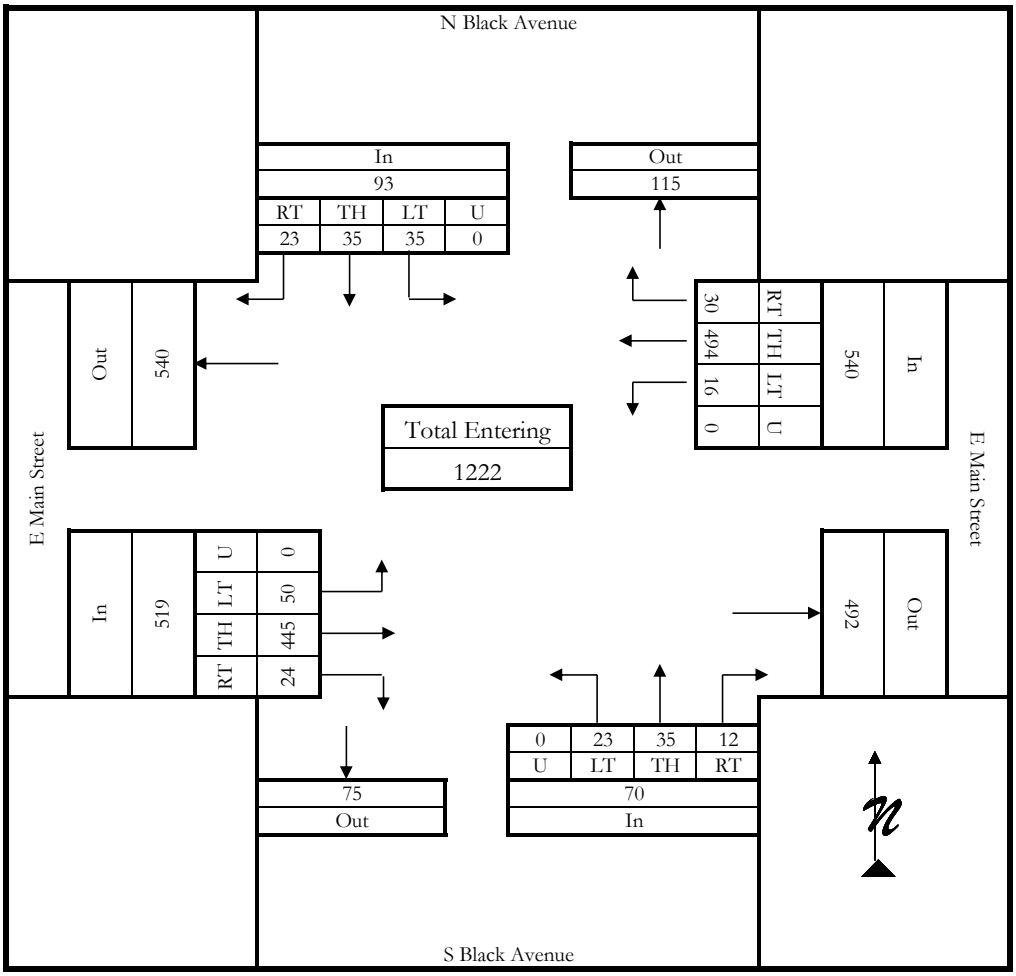
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	E Main Street & Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	Noon Peak Hour (11:45 AM - 12:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Black Avenue	East/West Street:	E Main Street

Vehicle Volumes and Adjustments

	N Black Avenue Southbound					S Black Avenue Northbound					E Main Street Eastbound					E Main Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.85	0.85	0.85	0.85		0.85	0.85	0.85	0.85		
11:45 AM	6	8	8	0	22	3	8	6	0	17	6	103	12	0	121	7	126	3	0	136	296
12:00 PM	5	8	8	0	21	3	8	5	0	16	7	90	11	0	108	7	114	7	0	128	273
12:15 PM	6	10	10	0	26	3	10	6	0	19	3	133	14	0	150	8	131	3	0	142	337
12:30 PM	6	9	9	0	24	3	9	6	0	18	8	119	13	0	140	8	123	3	0	134	316
Grand Total	23	35	35	0	93	12	35	23	0	70	24	445	50	0	519	30	494	16	0	540	1222
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.2	0.0	2.0	0.0	0.0	1.9	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.3	0.0	1.0	0.0	0.0	0.9	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	2.5	0.0	3.0	0.0	0.0	2.8	
Total %	1.9	2.9	2.9	0.0	7.6	1.0	2.9	1.9	0.0	5.7	2.0	36.4	4.1	0.0	42.5	2.5	40.4	1.3	0.0	44.2	100.0
PHF	0.89	0.89	0.89			0.92	0.92	0.92			0.87	0.87	0.87			0.95	0.95	0.95			0.91



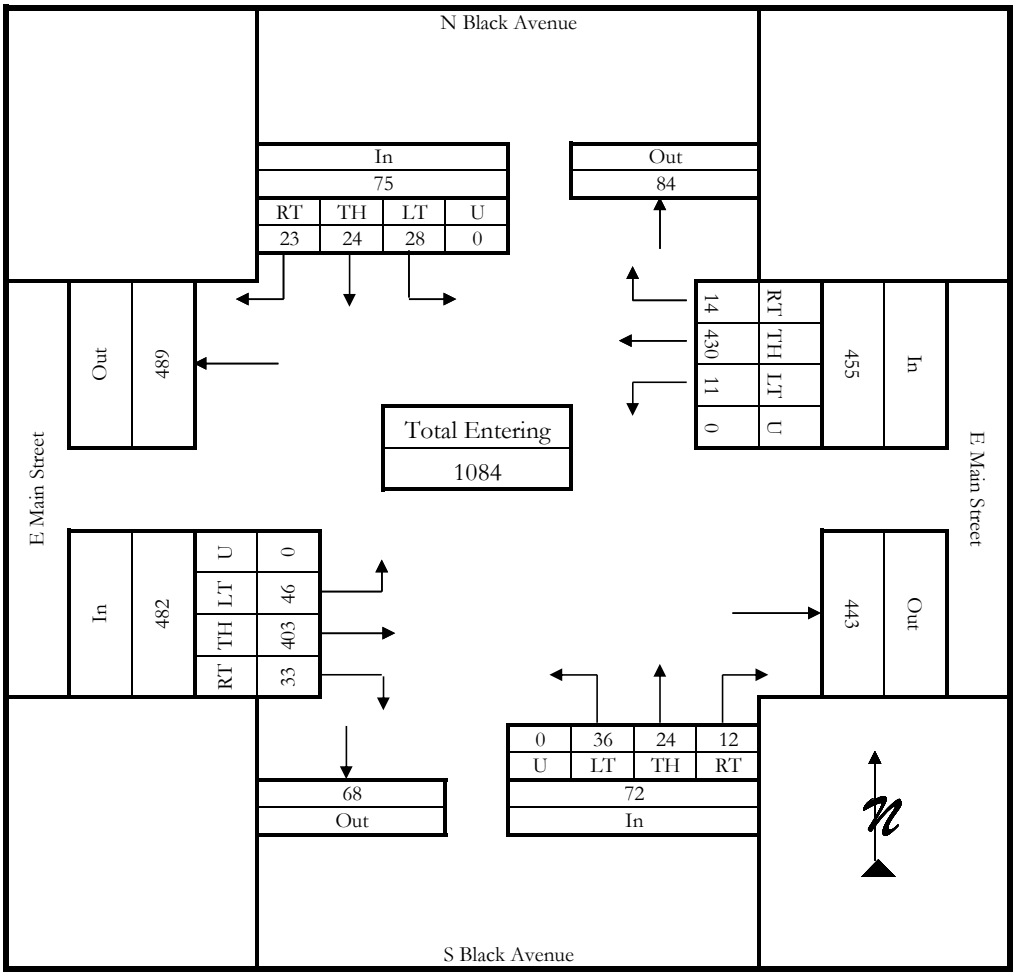
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	E Main Street & Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Black Avenue	East/West Street:	E Main Street

Vehicle Volumes and Adjustments

	N Black Avenue Southbound					S Black Avenue Northbound					E Main Street Eastbound					E Main Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.85	0.85	0.85	0.85		0.85	0.85	0.85	0.85		
4:45 PM	5	6	6	0	17	3	6	9	0	18	8	110	11	0	129	3	95	3	0	101	265
5:00 PM	5	3	5	0	13	3	6	9	0	18	11	86	10	0	107	4	123	3	0	130	268
5:15 PM	4	5	7	0	16	3	6	9	0	18	6	112	12	0	130	1	106	3	0	110	274
5:30 PM	9	10	10	0	29	3	6	9	0	18	8	95	13	0	116	6	106	2	0	114	277
Grand Total	23	24	28	0	75	12	24	36	0	72	33	403	46	0	482	14	430	11	0	455	1084
Medium Truck %	0.0	0.0	7.1	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	1.2	0.0	0.5	0.0	0.0	0.4	
Total Truck %	0.0	0.0	7.1	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.0	0.0	2.7	0.0	0.5	0.0	0.0	0.4	
Total %	2.1	2.2	2.6	0.0	6.9	1.1	2.2	3.3	0.0	6.6	3.0	37.2	4.2	0.0	44.5	1.3	39.7	1.0	0.0	42.0	100.0
PHF	0.65	0.65	0.65			1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00			0.98



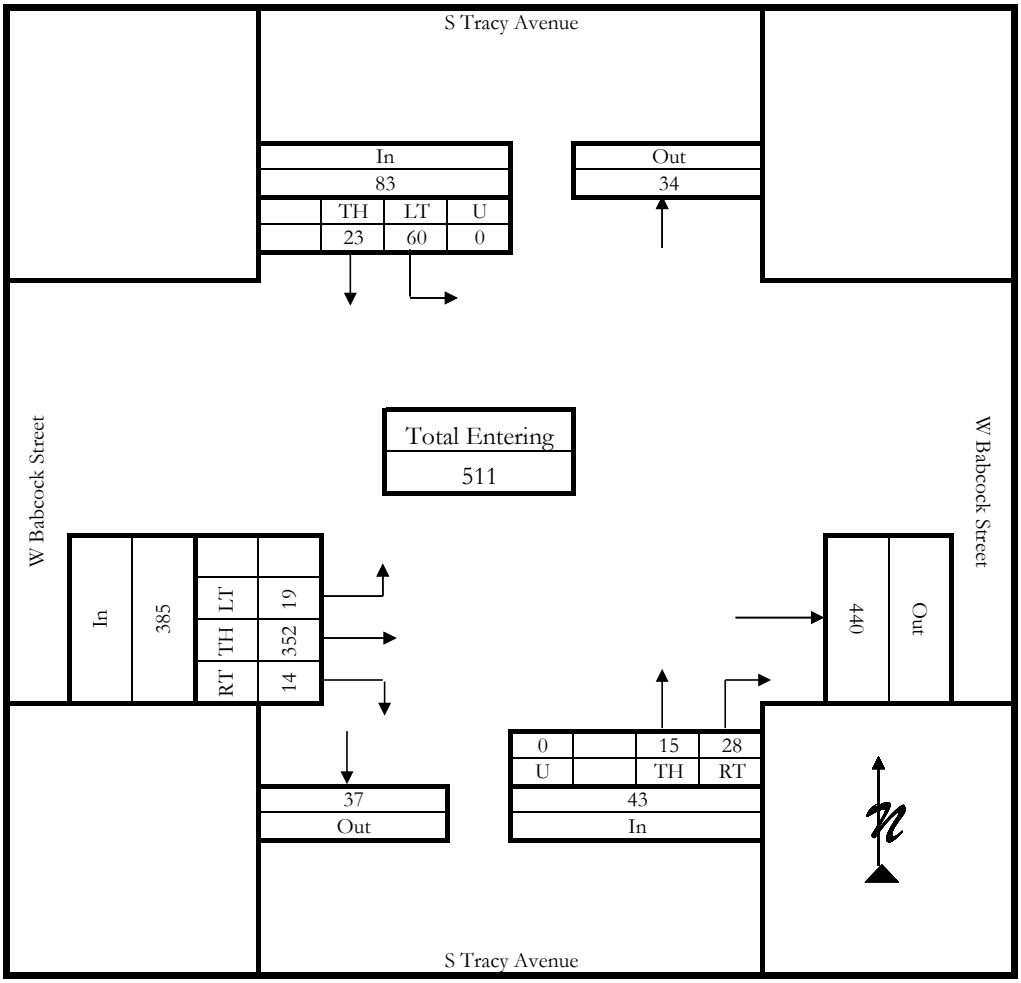
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	W Babcock Street & S Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Tracy Avenue	East/West Street:	W Babcock Street

Vehicle Volumes and Adjustments

	S Tracy Avenue Southbound					S Tracy Avenue Northbound					W Babcock Street Eastbound					W Babcock Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
8:30 AM	0	7	11	0	18	5	3	0	0	8	3	86	4	0	93					0	119
8:45 AM	0	6	17	0	23	9	2	0	0	11	3	112	4	0	119					0	153
9:00 AM	0	7	15	0	22	8	5	0	0	13	4	82	4	0	90					0	125
9:15 AM	0	3	17	0	20	6	5	0	0	11	4	72	7	0	83					0	114
Grand Total	0	23	60	0	83	28	15	0	0	43	14	352	19	0	385	0	0	0	0	0	511
Medium Truck %	0.0	0.0	1.7	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.6					0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3					0.0	
Total Truck %	0.0	0.0	1.7	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.8					0.0	
Total %	0.0	4.5	11.7	0.0	16.2	5.5	2.9	0.0	0.0	8.4	2.7	68.9	3.7	0.0	75.3	0.0	0.0	0.0	0.0	0.0	100.0
PHF	0.90	0.90	0.90			0.98	0.98	0.98			0.81	0.81	0.81			1.00	1.00	1.00			0.83



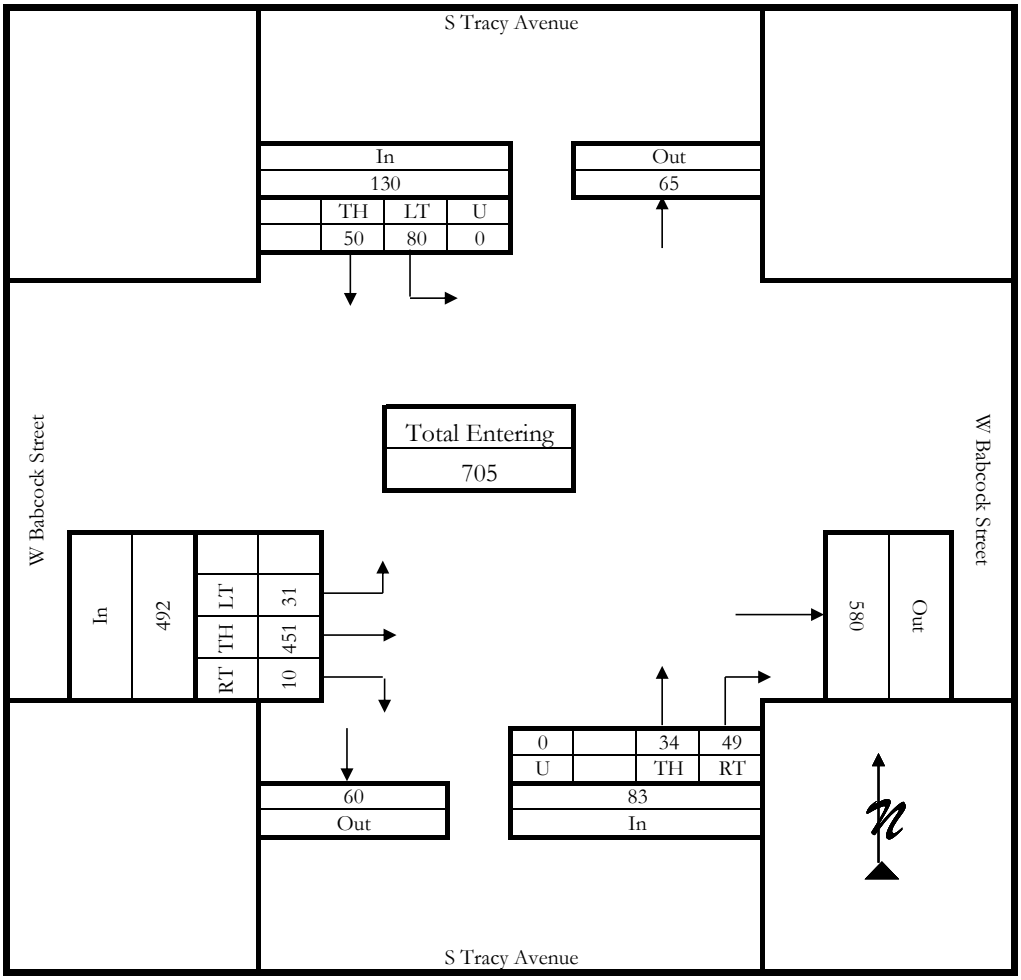
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	W Babcock Street & S Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	Noon Peak Hour (11:45 AM - 12:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Tracy Avenue	East/West Street:	W Babcock Street

Vehicle Volumes and Adjustments

	S Tracy Avenue Southbound					S Tracy Avenue Northbound					W Babcock Street Eastbound					W Babcock Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
11:45 AM	0	10	21	0	31	10	8	0	0	18	3	102	6	0	111					0	160
12:00 PM	0	15	21	0	36	10	8	0	0	18	0	116	8	0	124					0	178
12:15 PM	0	13	13	0	26	11	9	0	0	20	3	118	14	0	135					0	181
12:30 PM	0	12	25	0	37	18	9	0	0	27	4	115	3	0	122					0	186
Grand Total	0	50	80	0	130	49	34	0	0	83	10	451	31	0	492	0	0	0	0	0	705
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	1.2	0.0	1.3	3.2	0.0	1.4					0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	2.9	0.0	0.0	1.2	0.0	1.3	3.2	0.0	1.4					0.0	
Total %	0.0	7.1	11.3	0.0	18.4	7.0	4.8	0.0	0.0	11.8	1.4	64.0	4.4	0.0	69.8	0.0	0.0	0.0	0.0	0.0	100.0
PHF	0.88	0.88	0.88			0.77	0.77	0.77			1.00	1.00	1.00			1.00	1.00	1.00			0.95



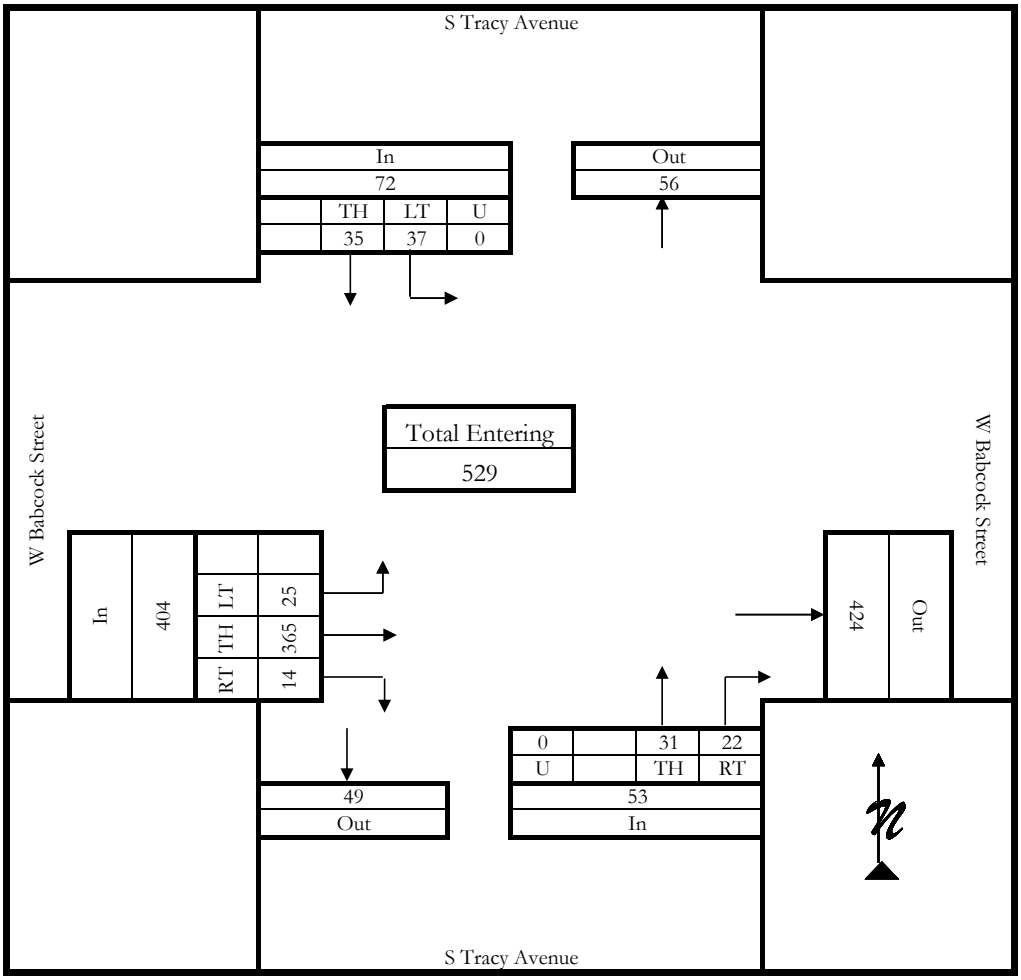
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	W Babcock Street & S Tracy Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Tracy Avenue	East/West Street:	W Babcock Street

Vehicle Volumes and Adjustments

	S Tracy Avenue Southbound					S Tracy Avenue Northbound					W Babcock Street Eastbound					W Babcock Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
4:45 PM	0	9	5	0	14	4	6	0	0	10	4	80	12	0	96					0	120
5:00 PM	0	11	20	0	31	3	8	0	0	11	4	103	5	0	112					0	154
5:15 PM	0	7	3	0	10	6	9	0	0	15	4	97	5	0	106					0	131
5:30 PM	0	8	9	0	17	9	8	0	0	17	2	85	3	0	90					0	124
Grand Total	0	35	37	0	72	22	31	0	0	53	14	365	25	0	404	0	0	0	0	0	529
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	1.2					0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.2					0.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	4.0	0.0	1.5					0.0	
Total %	0.0	6.6	7.0	0.0	13.6	4.2	5.9	0.0	0.0	10.0	2.6	69.0	4.7	0.0	76.4	0.0	0.0	0.0	0.0	0.0	100.0
PHF	0.58	0.58	0.58			1.00	1.00	1.00			0.90	0.90	0.90			1.00	1.00	1.00			0.86



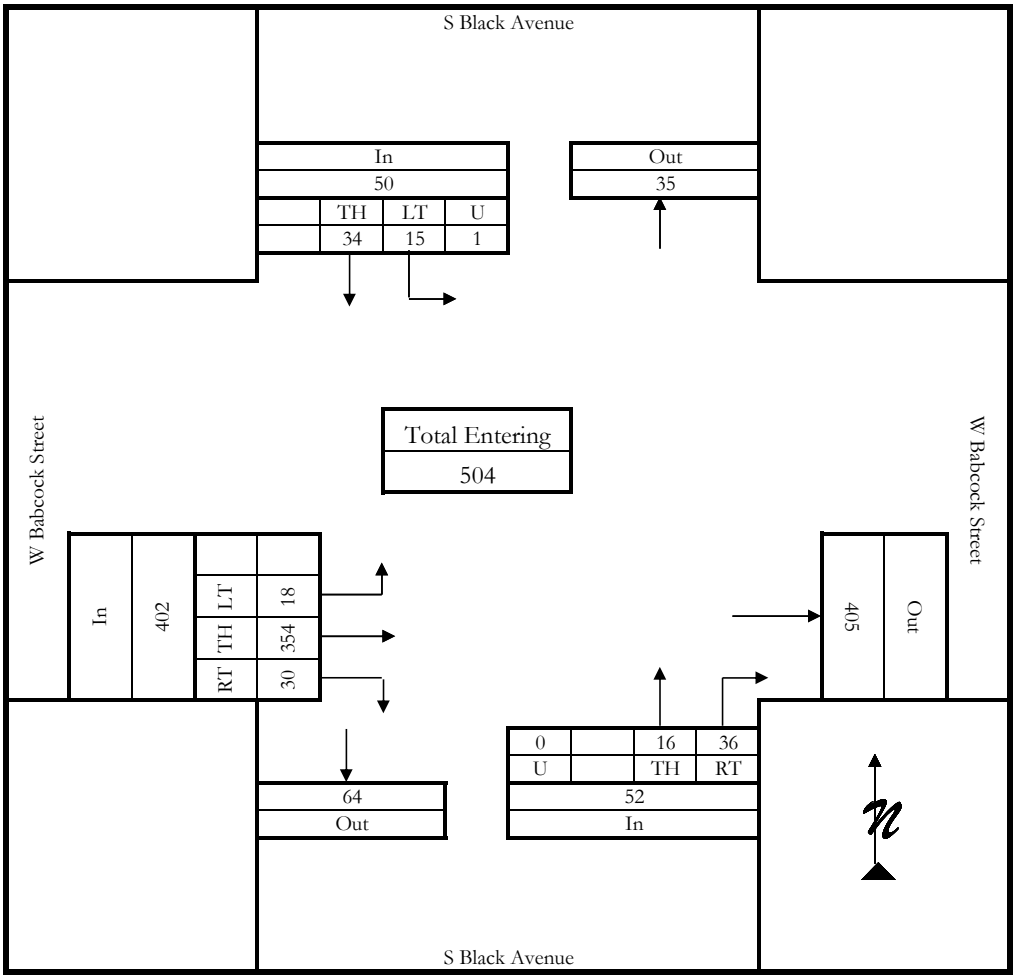
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	W Babcock Street & S Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Black Avenue	East/West Street:	W Babcock Street

Vehicle Volumes and Adjustments

	S Black Avenue Southbound					S Black Avenue Northbound					W Babcock Street Eastbound					W Babcock Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
8:30 AM	0	8	4	0	12	5	4	0	0	9	6	92	4	0	102					0	123
8:45 AM	0	11	4	0	15	5	5	0	0	10	9	112	6	0	127					0	152
9:00 AM	0	7	4	0	11	15	4	0	0	19	10	77	4	0	91					0	121
9:15 AM	0	8	3	1	12	11	3	0	0	14	5	73	4	0	82					0	108
Grand Total	0	34	15	1	50	36	16	0	0	52	30	354	18	0	402	0	0	0	0	0	504
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.0					0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.2					0.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	1.2					0.0	
Total %	0.0	6.7	3.0	0.2	9.9	7.1	3.2	0.0	0.0	10.3	6.0	70.2	3.6	0.0	79.8	0.0	0.0	0.0	0.0	0.0	100.0
PHF	0.83	0.83	0.83			1.00	1.00	1.00			0.80	0.80	0.80			1.00	1.00	1.00			0.83



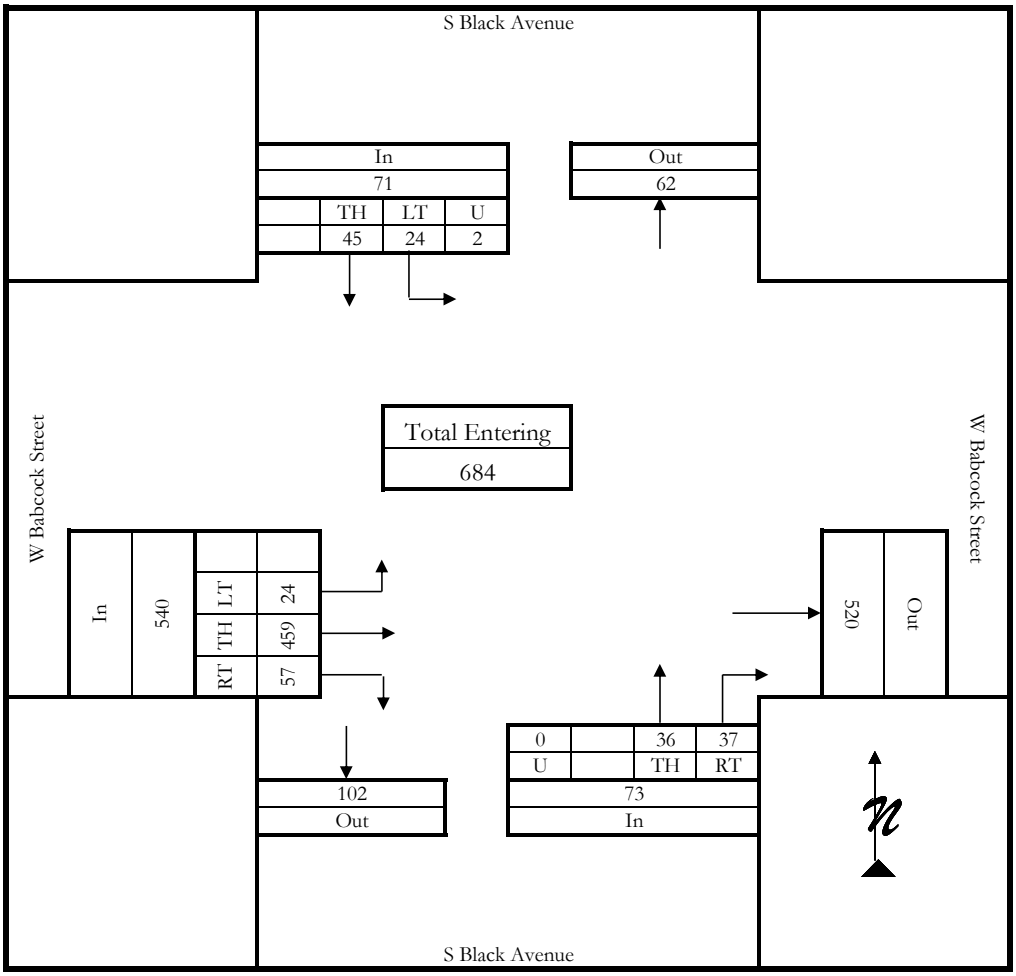
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	W Babcock Street & S Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	Noon Peak Hour (11:45 AM - 12:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Black Avenue	East/West Street:	W Babcock Street

Vehicle Volumes and Adjustments

	S Black Avenue Southbound					S Black Avenue Northbound					W Babcock Street Eastbound					W Babcock Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
11:45 AM	0	9	8	1	18	10	9	0	0	19	15	112	6	0	133					0	170
12:00 PM	0	18	5	0	23	11	9	0	0	20	15	110	6	0	131					0	174
12:15 PM	0	6	7	0	13	7	9	0	0	16	9	120	6	0	135					0	164
12:30 PM	0	12	4	1	17	9	9	0	0	18	18	117	6	0	141					0	176
Grand Total	0	45	24	2	71	37	36	0	0	73	57	459	24	0	540	0	0	0	0	0	684
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.9					0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.9					0.0	
Total %	0.0	6.6	3.5	0.3	10.4	5.4	5.3	0.0	0.0	10.7	8.3	67.1	3.5	0.0	78.9	0.0	0.0	0.0	0.0	0.0	100.0
PHF	1.00	1.00	1.00			1.01	1.01	1.01			0.96	0.96	0.96			1.00	1.00	1.00			0.97



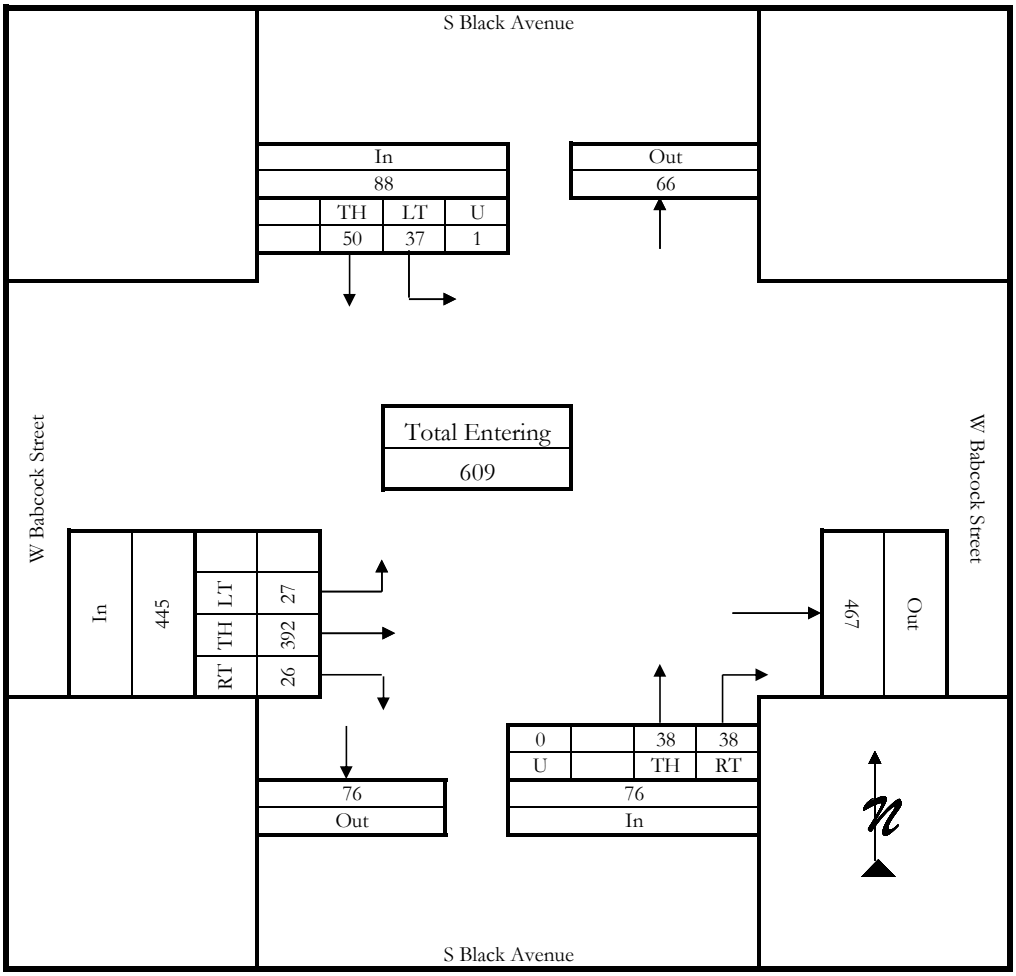
INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

Counted By:	Wyatt Brown	Intersection:	W Babcock Street & S Black Avenue
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman/MDT
Count Time Period:	PM Peak Hour (4:45 - 5:45 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Black Avenue	East/West Street:	W Babcock Street

Vehicle Volumes and Adjustments

	S Black Avenue Southbound					S Black Avenue Northbound					W Babcock Street Eastbound					W Babcock Street Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		0.86	0.86	0.86	0.86		0.86	0.86	0.86	0.86		
4:45 PM	0	10	7	1	18	9	8	0	0	17	5	84	6	0	95					0	130
5:00 PM	0	11	13	0	24	13	11	0	0	24	9	114	8	0	131					0	179
5:15 PM	0	11	6	0	17	8	9	0	0	17	6	98	6	0	110					0	144
5:30 PM	0	18	11	0	29	8	10	0	0	18	6	96	7	0	109					0	156
Grand Total	0	50	37	1	88	38	38	0	0	76	26	392	27	0	445	0	0	0	0	0	609
Medium Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.1					0.0	
Heavy Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					0.0	
Total Truck %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.1					0.0	
Total %	0.0	8.2	6.1	0.2	14.4	6.2	6.2	0.0	0.0	12.5	4.3	64.4	4.4	0.0	73.1	0.0	0.0	0.0	0.0	0.0	100.0
PHF	0.92	0.92	0.92			0.79	0.79	0.79			0.85	0.85	0.85			1.00	1.00	1.00			0.85



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

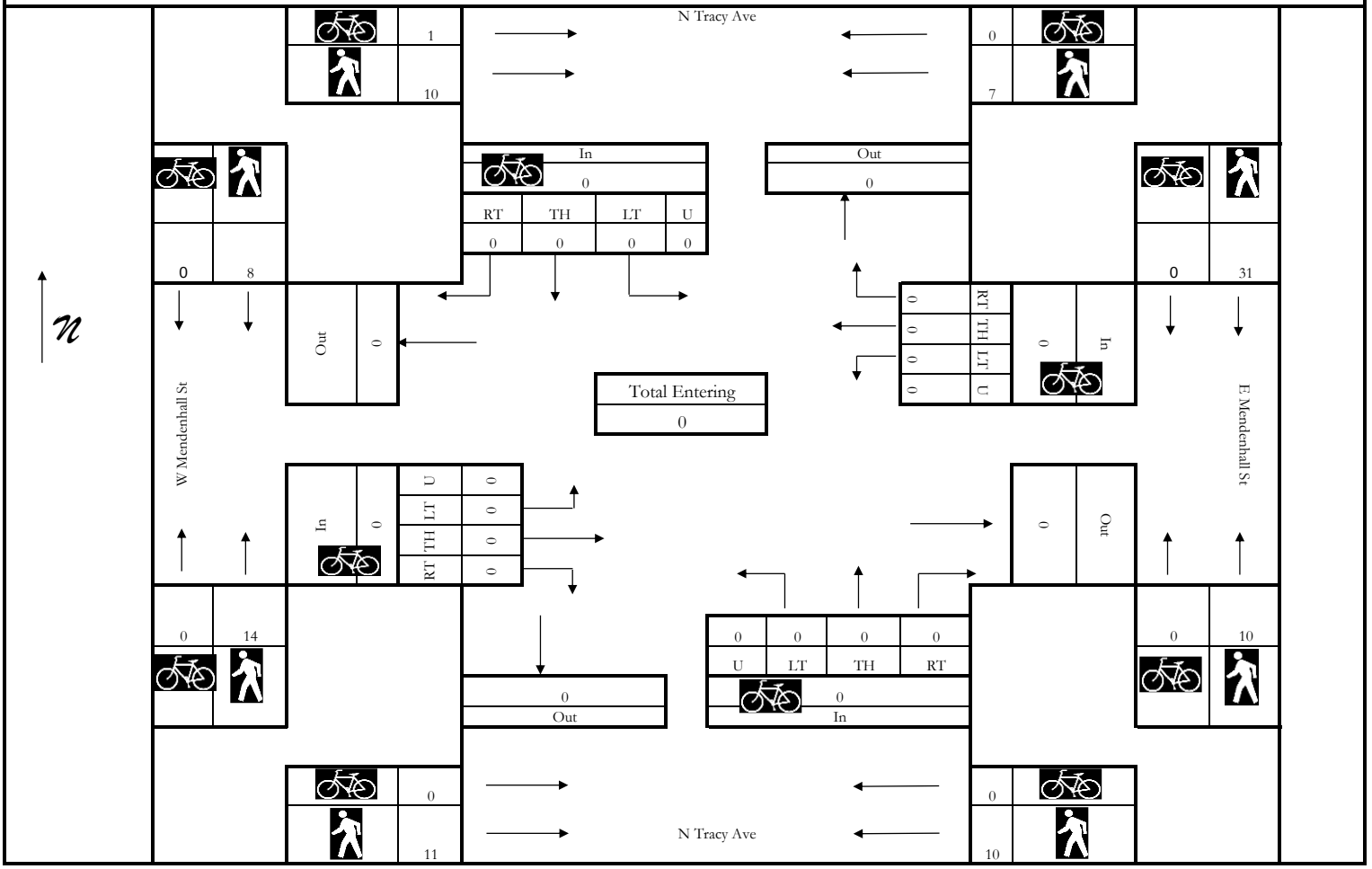
Counted By:	Wyatt Brown	Intersection:	Mendenhall St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Tracy Ave	East/West Street:	Mendenhall St

Bikes in Roadway

	N Tracy Ave Southbound					N Tracy Ave Northbound					W Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Tracy Ave Southbound					N Tracy Ave Northbound					W Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	3	3	0	1	0	2	3	0	5	0	2	7	0	5	0	3	8	21
8:45 AM	1	8	0	1	10	0	3	0	3	6	0	6	0	2	8	0	12	0	3	15	39
9:00 AM	0	0	0	1	1	0	3	0	4	7	0	1	0	4	5	0	5	0	4	9	22
9:15 AM	0	2	0	2	4	0	3	0	2	5	0	2	0	0	2	0	9	0	0	9	20
Grand Total	1	10	0	7	18	0	10	0	11	21	0	14	0	8	22	0	31	0	10	41	102



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

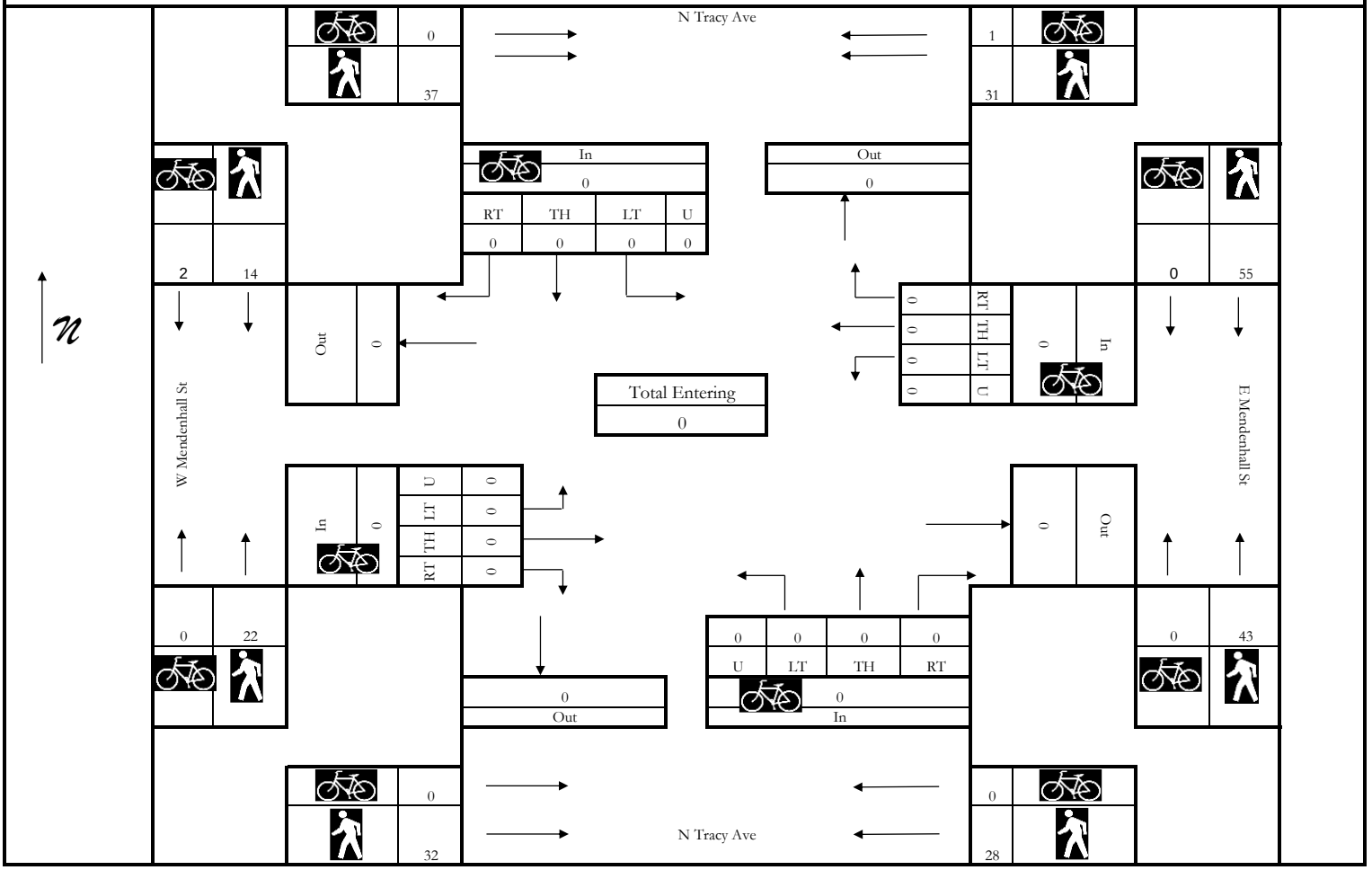
Counted By:	Wyatt Brown	Intersection:	Mendenhall St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	Noon Peak Hour (12:15 - 1:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Tracy Ave	East/West Street:	Mendenhall St

Bikes in Roadway

	N Tracy Ave Southbound					N Tracy Ave Northbound					W Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Tracy Ave Southbound					N Tracy Ave Northbound					W Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	3	0	7	10	0	4	0	14	18	0	3	2	3	8	0	13	0	10	23	59
12:30 PM	0	3	0	7	10	0	11	0	6	17	0	9	0	2	11	0	12	0	10	22	60
12:45 PM	0	18	0	4	22	0	9	0	6	15	0	4	0	7	11	0	13	0	10	23	71
1:00 PM	0	13	1	13	27	0	4	0	6	10	0	6	0	2	8	0	17	0	13	30	75
Grand Total	0	37	1	31	69	0	28	0	32	60	0	22	2	14	38	0	55	0	43	98	265



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

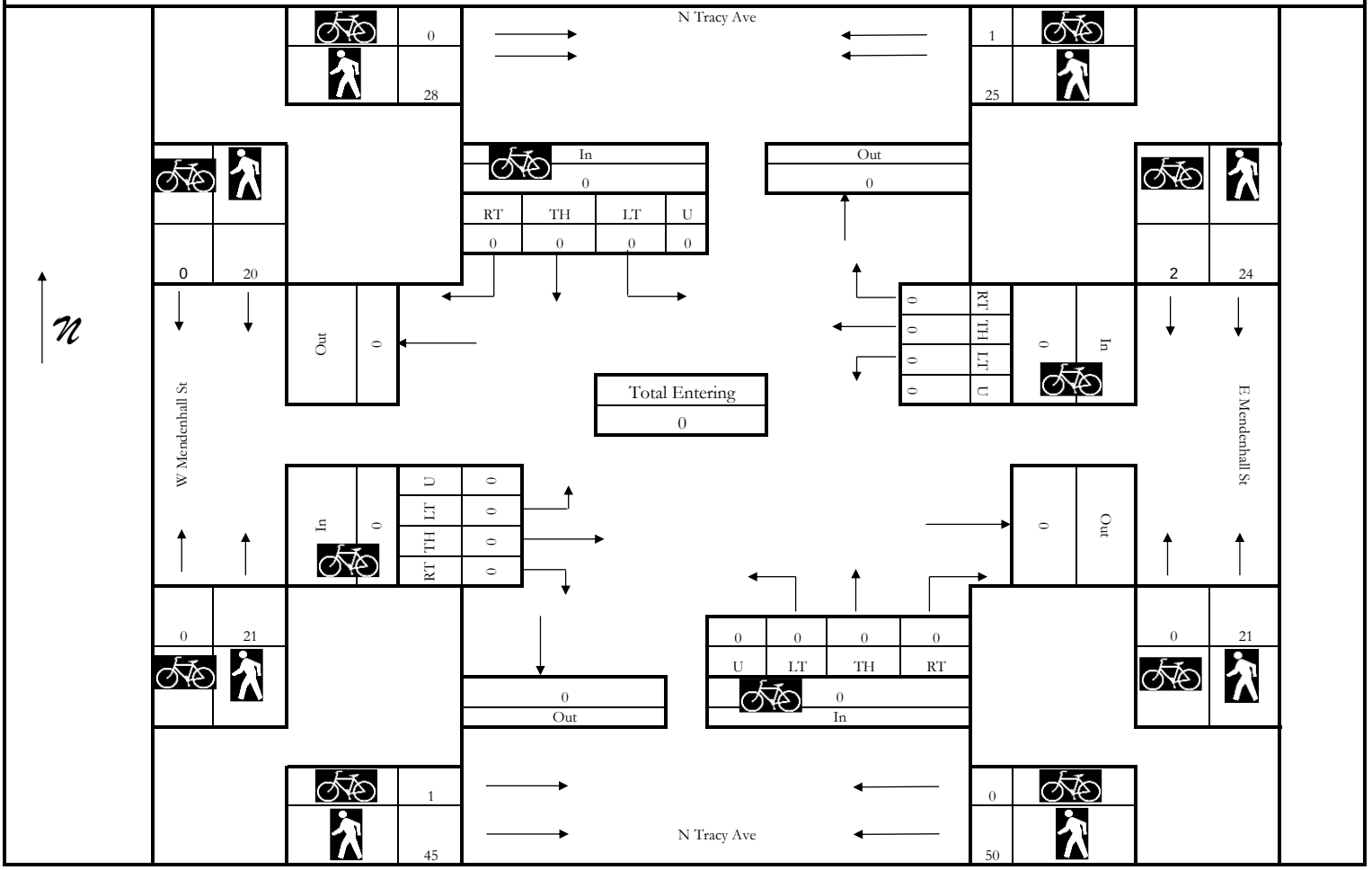
Counted By:	Wyatt Brown	Intersection:	Mendenhall St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	PM Peak Hour (2:15 - 3:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Tracy Ave	East/West Street:	Mendenhall St

Bikes in Roadway

	N Tracy Ave Southbound					N Tracy Ave Northbound					W Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Tracy Ave Southbound					N Tracy Ave Northbound					W Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	3	0	5	8	0	9	0	19	28	0	5	0	9	14	0	3	0	8	11	61
6:45 PM	0	5	1	2	8	0	11	0	6	17	0	6	0	0	6	0	8	0	6	14	45
7:00 PM	0	8	0	15	23	0	9	0	5	14	0	7	0	5	12	0	4	0	2	6	55
7:15 PM	0	12	0	3	15	0	21	1	15	37	0	3	0	6	9	2	9	0	5	16	77
Grand Total	0	28	1	25	54	0	50	1	45	96	0	21	0	20	41	2	24	0	21	47	238



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

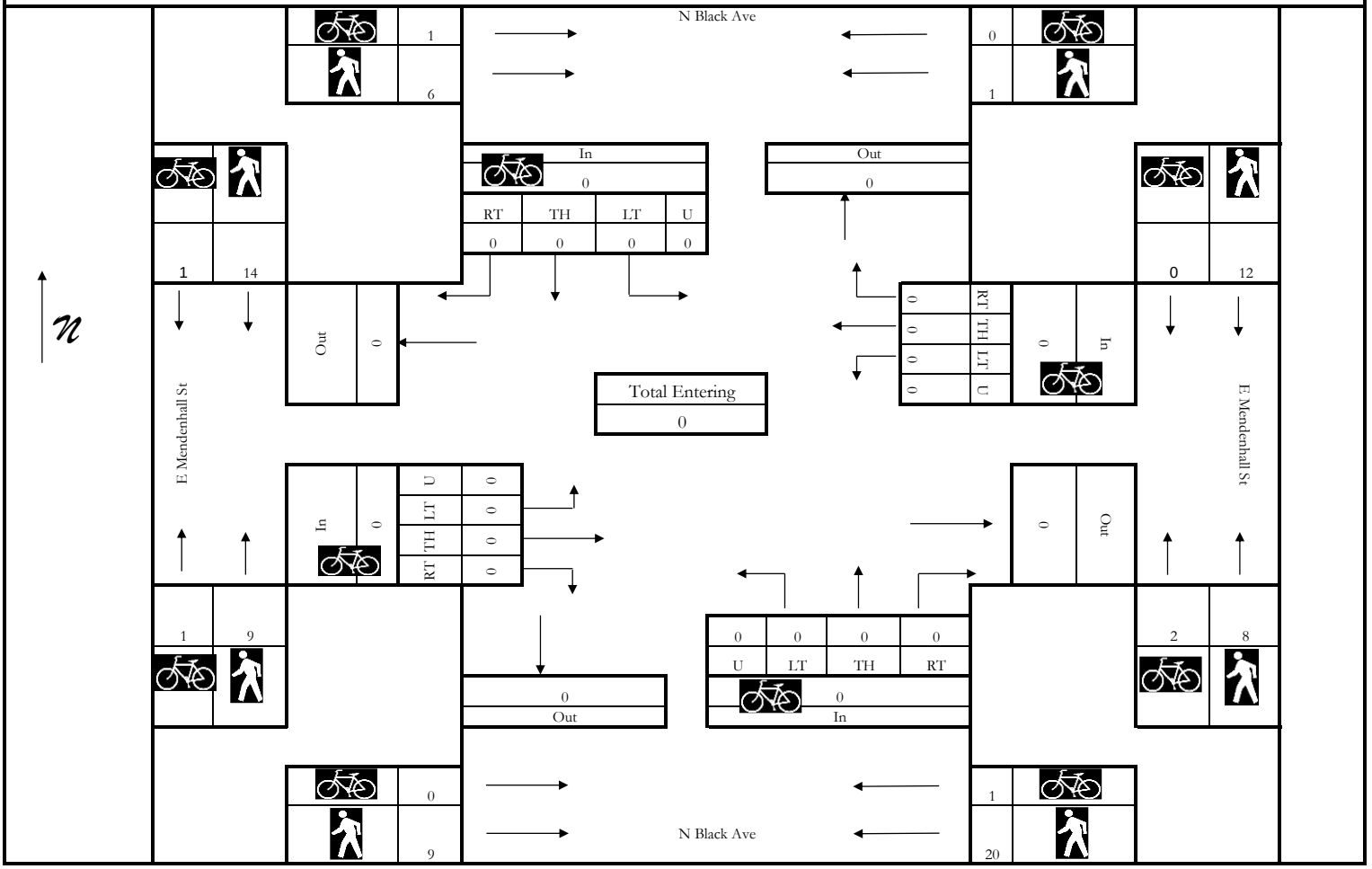
Counted By:	Wyatt Brown	Intersection:	Mendenhall St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Black Ave	East/West Street:	E Mendenhall St

Bikes in Roadway

	N Black Ave Southbound					N Black Ave Northbound					E Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Black Ave Southbound					N Black Ave Northbound					E Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	3	0	0	3	0	6	0	2	8	0	6	0	5	11	0	6	1	1	8	30
8:45 AM	1	1	0	1	3	1	9	0	3	13	0	1	0	4	5	0	4	0	4	8	29
9:00 AM	0	1	0	0	1	0	4	0	0	4	1	0	0	1	2	0	2	0	2	4	11
9:15 AM	0	1	0	0	1	0	1	0	4	5	0	2	1	4	7	0	0	1	1	2	15
Grand Total	1	6	0	1	8	1	20	0	9	30	1	9	1	14	25	0	12	2	8	22	85



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

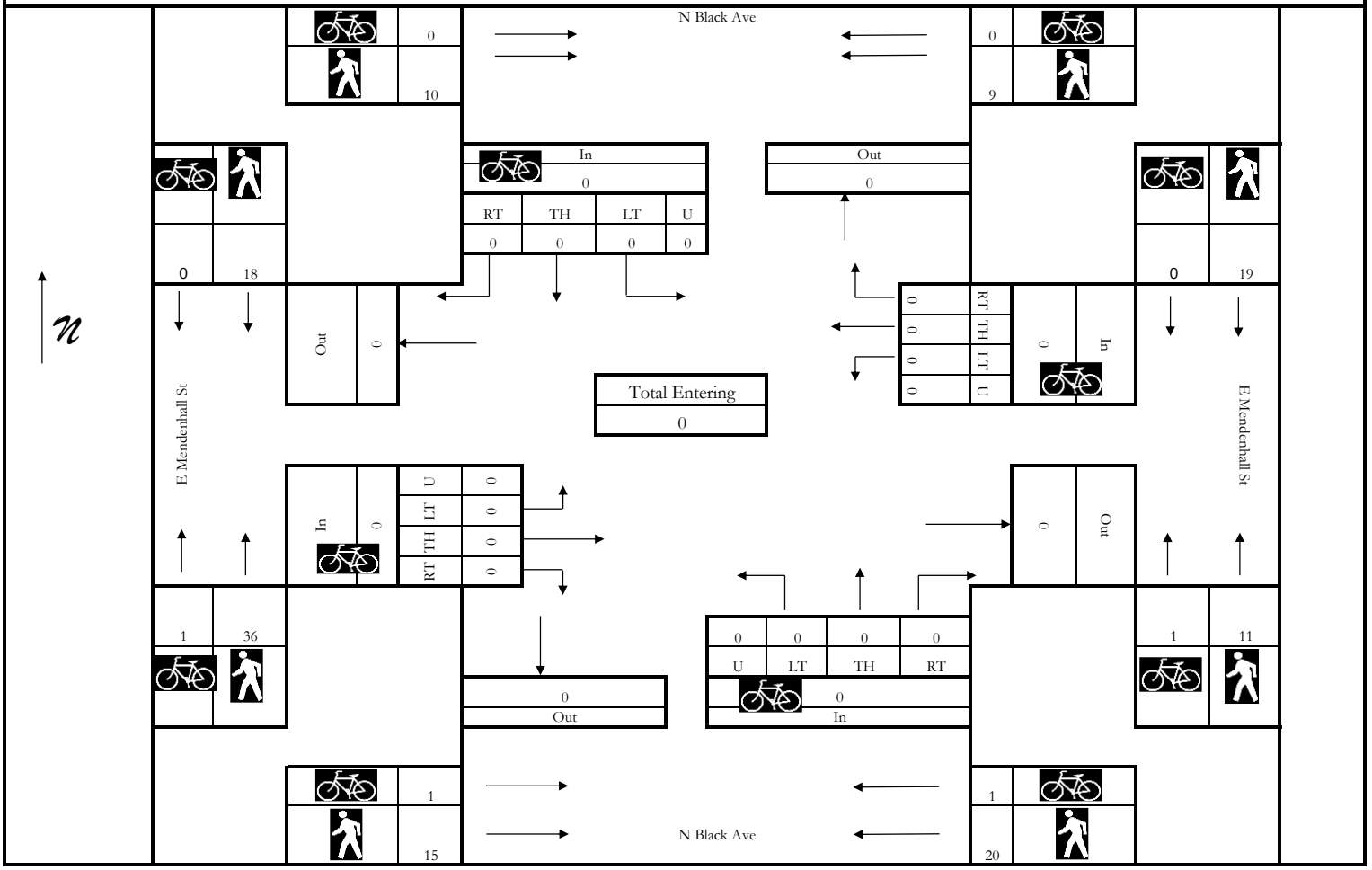
Counted By:	Wyatt Brown	Intersection:	Mendenhall St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	Noon Peak Hour (12:15 - 1:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Black Ave	East/West Street:	E Mendenhall St

Bikes in Roadway

	N Black Ave Southbound					N Black Ave Northbound					E Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Black Ave Southbound					N Black Ave Northbound					E Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	4	4	1	2	0	6	9	0	9	0	9	18	0	5	0	2	7	38
12:30 PM	0	1	0	1	2	0	5	1	3	9	0	7	0	4	11	0	4	1	2	7	29
12:45 PM	0	3	0	1	4	0	9	0	5	14	1	11	0	4	16	0	6	0	1	7	41
1:00 PM	0	6	0	3	9	0	4	0	1	5	0	9	0	1	10	0	4	0	6	10	34
Grand Total	0	10	0	9	19	1	20	1	15	37	1	36	0	18	55	0	19	1	11	31	142



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

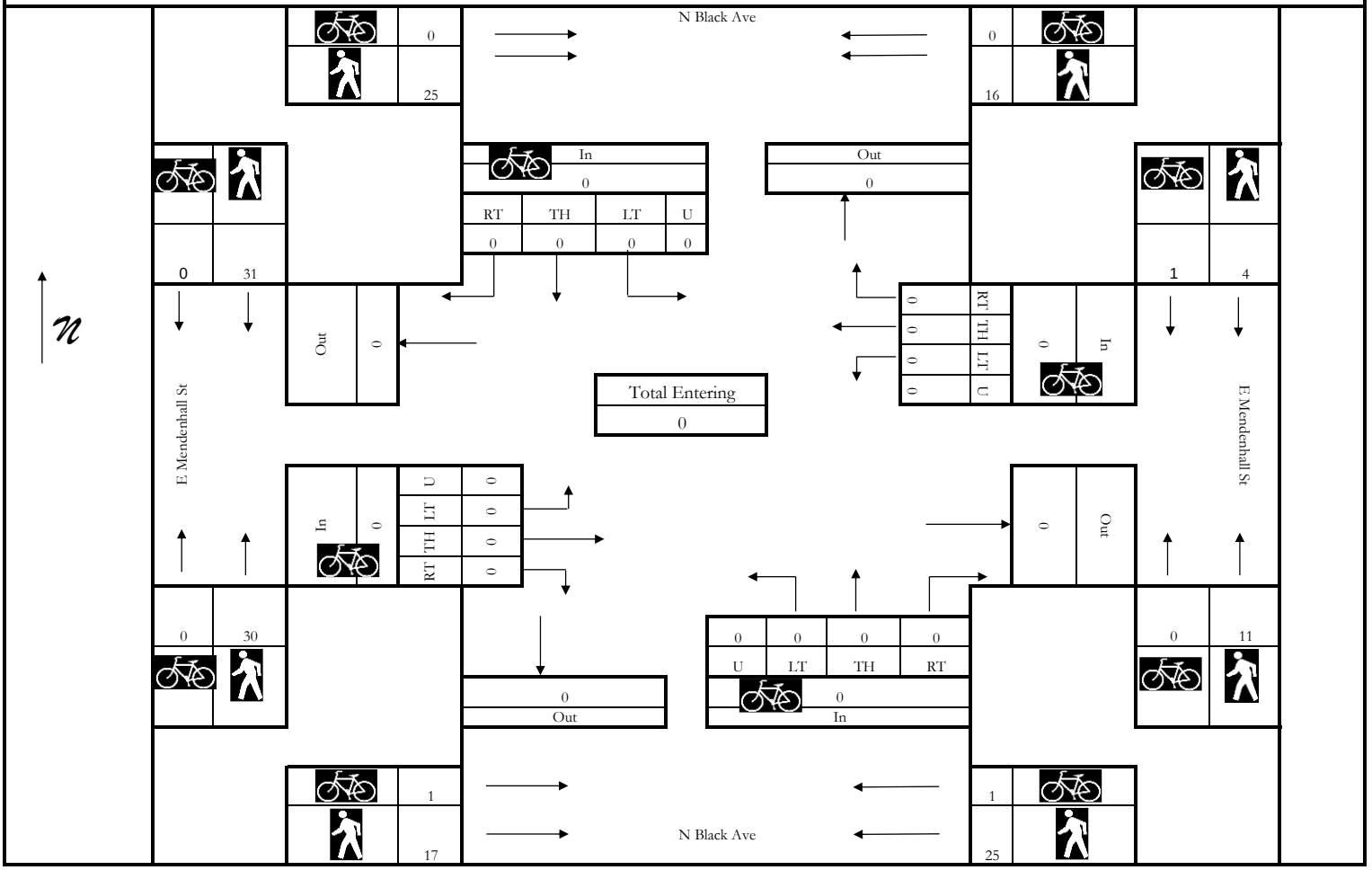
Counted By:	Wyatt Brown	Intersection:	Mendenhall St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	PM Peak Hour (2:15 - 3:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	N Black Ave	East/West Street:	E Mendenhall St

Bikes in Roadway

	N Black Ave Southbound					N Black Ave Northbound					E Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Black Ave Southbound					N Black Ave Northbound					E Mendenhall St Eastbound					E Mendenhall St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	8	0	7	15	0	2	0	2	4	0	4	0	8	12	0	3	0	4	7	38
6:45 PM	0	2	0	6	8	1	9	0	7	17	0	11	0	6	17	1	1	0	2	4	46
7:00 PM	0	12	0	0	12	0	2	0	3	5	0	10	0	2	12	0	0	0	2	2	31
7:15 PM	0	3	0	3	6	0	12	1	5	18	0	5	0	15	20	0	0	0	3	3	47
Grand Total	0	25	0	16	41	1	25	1	17	44	0	30	0	31	61	1	4	0	11	16	162



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

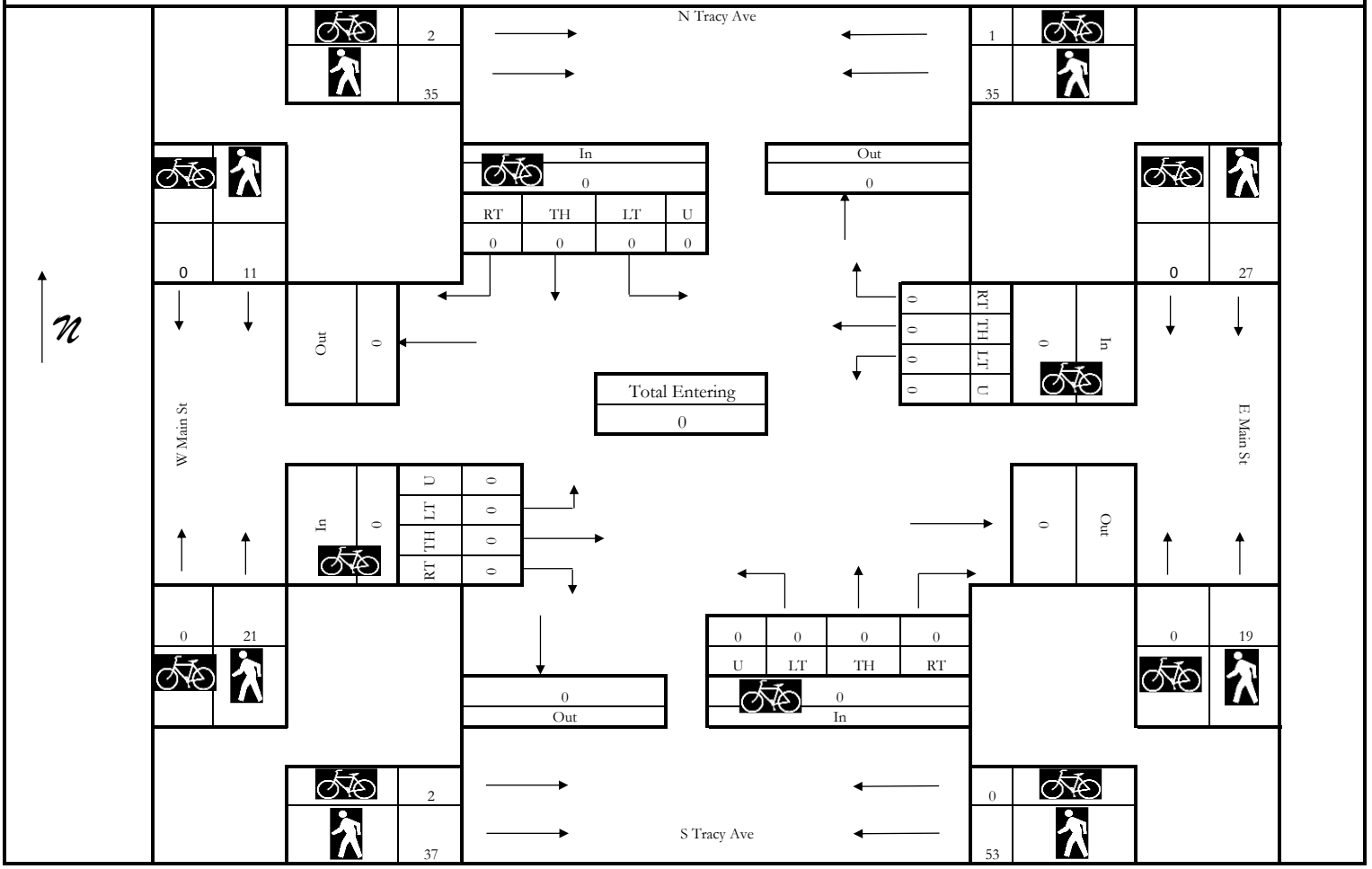
Counted By:	Wyatt Brown	Intersection:	Main St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Tracy Ave	East/West Street:	Main St

Bikes in Roadway

	N Tracy Ave Southbound					S Tracy Ave Northbound					W Main St Eastbound					E Main St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Tracy Ave Southbound					S Tracy Ave Northbound					W Main St Eastbound					E Main St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	1	4	1	6	12	0	8	0	6	14	0	4	0	1	5	0	4	0	6	10	41
8:45 AM	0	9	0	10	19	0	14	1	6	21	0	5	0	3	8	0	8	0	8	16	64
9:00 AM	1	12	0	12	25	0	19	1	12	32	0	6	0	3	9	0	9	0	3	12	78
9:15 AM	0	10	0	7	17	0	12	0	13	25	0	6	0	4	10	0	6	0	2	8	60
Grand Total	2	35	1	35	73	0	53	2	37	92	0	21	0	11	32	0	27	0	19	46	243



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

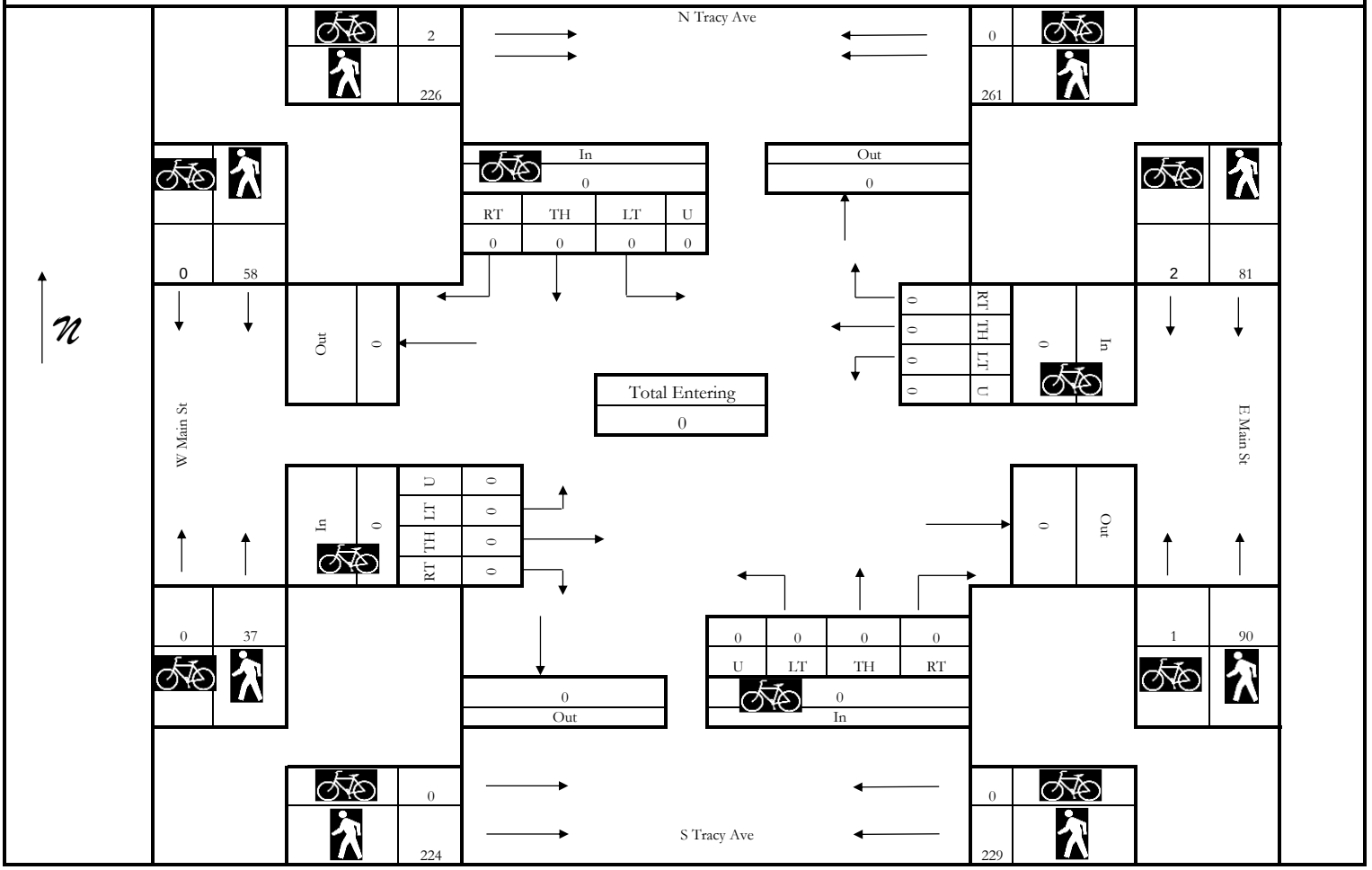
Counted By:	Wyatt Brown	Intersection:	Main St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	Noon Peak Hour (12:15 - 1:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Tracy Ave	East/West Street:	Main St

Bikes in Roadway

	N Tracy Ave Southbound					S Tracy Ave Northbound					W Main St Eastbound					E Main St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Tracy Ave Southbound					S Tracy Ave Northbound					W Main St Eastbound					E Main St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	2	48	0	74	124	0	51	0	53	104	0	13	0	13	26	1	29	0	16	46	300
12:30 PM	0	55	0	44	99	0	61	0	54	115	0	8	0	15	23	1	16	0	18	35	272
12:45 PM	0	51	0	57	108	0	66	0	50	116	0	15	0	11	26	0	14	1	39	54	304
1:00 PM	0	72	0	86	158	0	51	0	67	118	0	1	0	19	20	0	22	0	17	39	335
Grand Total	2	226	0	261	489	0	229	0	224	453	0	37	0	58	95	2	81	1	90	174	1211



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

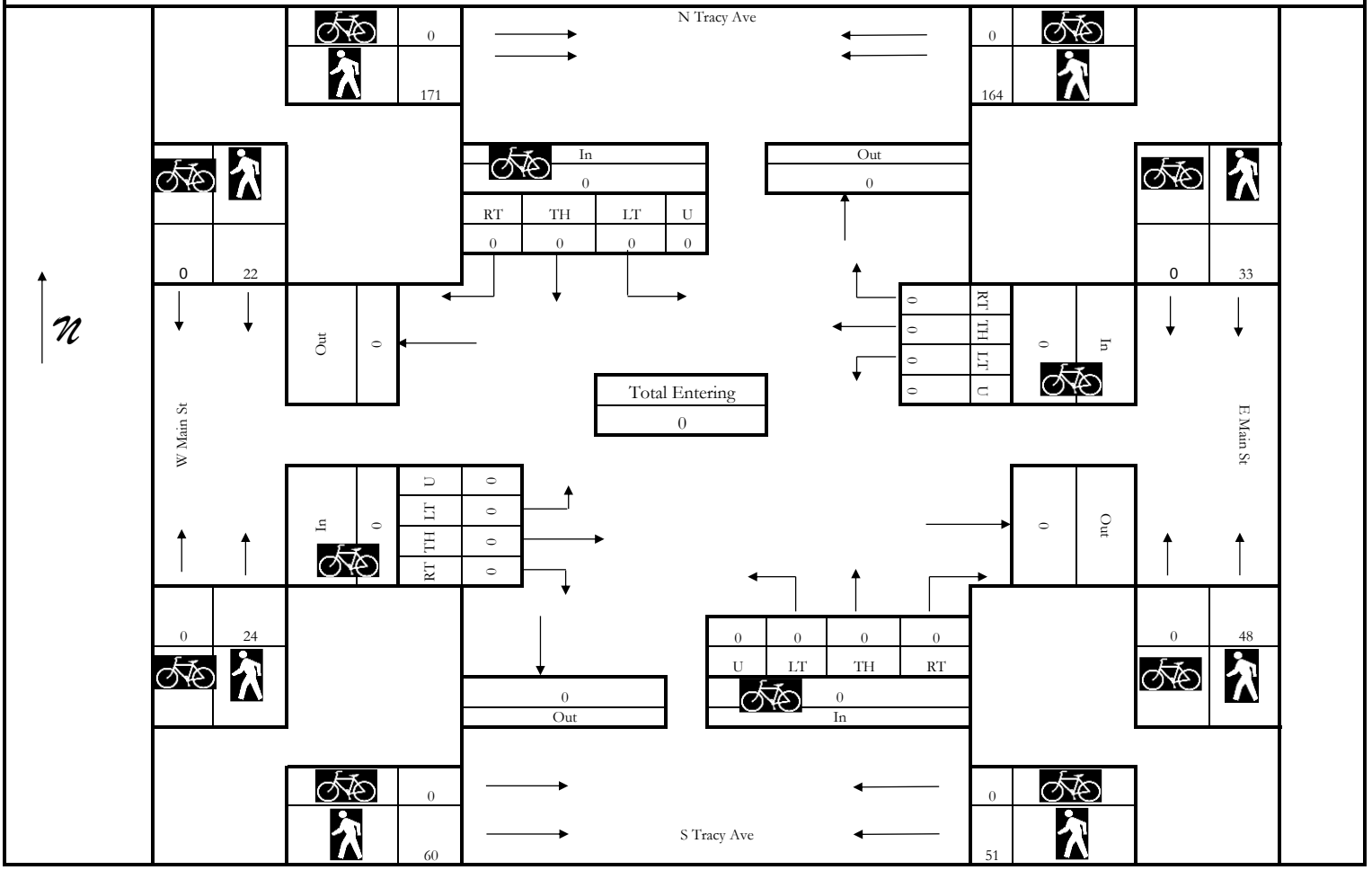
Counted By:	Wyatt Brown	Intersection:	Main St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	PM Peak Hour (2:15 - 3:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Tracy Ave	East/West Street:	Main St

Bikes in Roadway

	N Tracy Ave Southbound					S Tracy Ave Northbound					W Main St Eastbound					E Main St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Tracy Ave Southbound					S Tracy Ave Northbound					W Main St Eastbound					E Main St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	40	0	32	72	0	5	0	15	20	0	2	0	10	12	0	3	0	10	13	117
6:45 PM	0	37	0	54	91	0	16	0	16	32	0	11	0	1	12	0	9	0	6	15	150
7:00 PM	0	34	0	44	78	0	14	0	13	27	0	7	0	10	17	0	11	0	24	35	157
7:15 PM	0	60	0	34	94	0	16	0	16	32	0	4	0	1	5	0	10	0	8	18	149
Grand Total	0	171	0	164	335	0	51	0	60	111	0	24	0	22	46	0	33	0	48	81	573



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

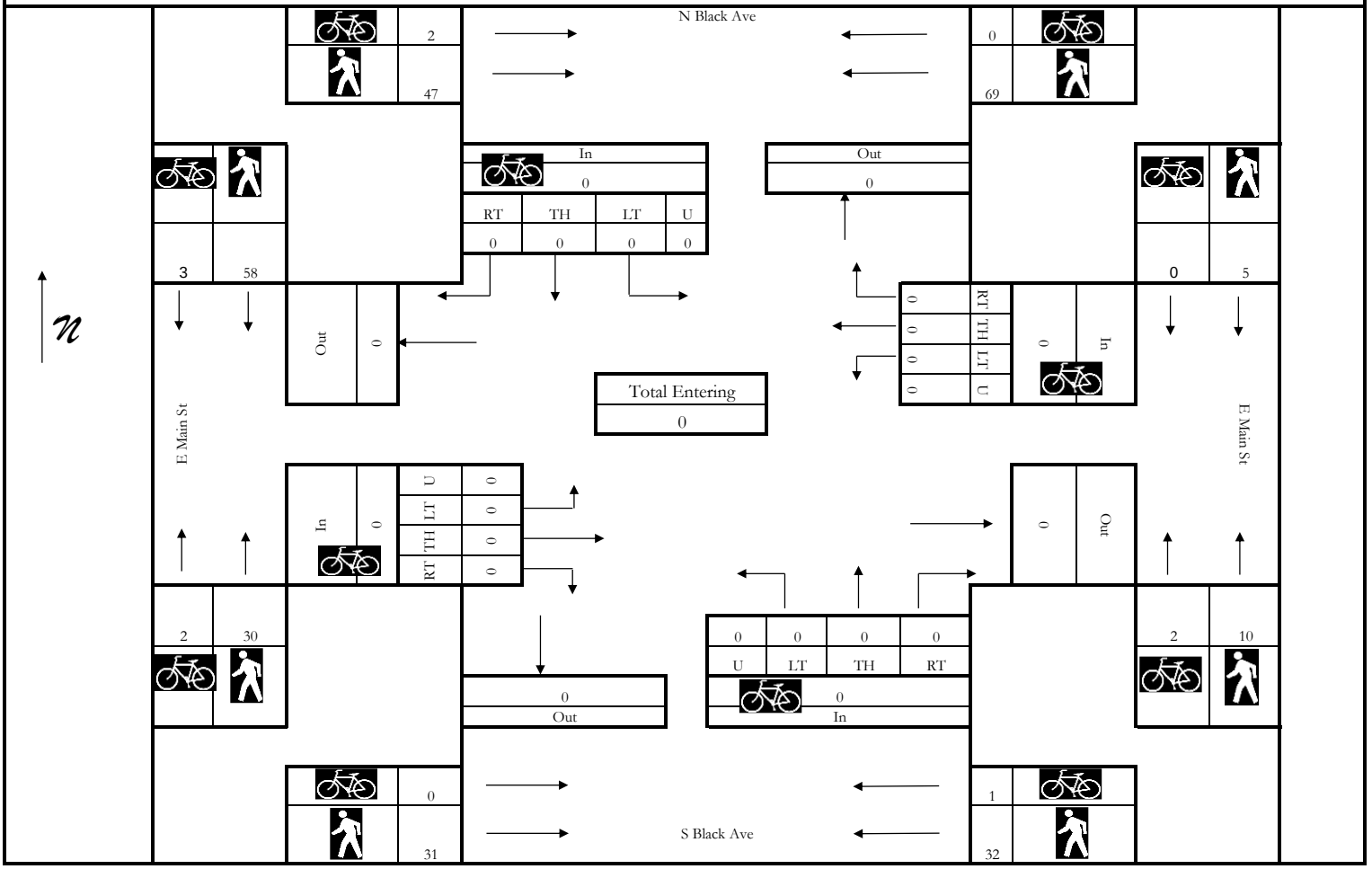
Counted By:	Wyatt Brown	Intersection:	Main St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Black Ave	East/West Street:	E Main St

Bikes in Roadway

	N Black Ave Southbound					S Black Ave Northbound					E Main St Eastbound					E Main St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Black Ave Southbound					S Black Ave Northbound					E Main St Eastbound					E Main St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	1	12	0	11	24	0	6	0	9	15	0	4	0	10	14	0	0	0	1	1	54
8:45 AM	0	6	0	15	21	1	15	0	7	23	1	7	0	18	26	0	3	0	4	7	77
9:00 AM	1	14	0	24	39	0	7	0	6	13	1	13	2	17	33	0	2	1	3	6	91
9:15 AM	0	15	0	19	34	0	4	0	9	13	0	6	1	13	20	0	0	1	2	3	70
Grand Total	2	47	0	69	118	1	32	0	31	64	2	30	3	58	93	0	5	2	10	17	292



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

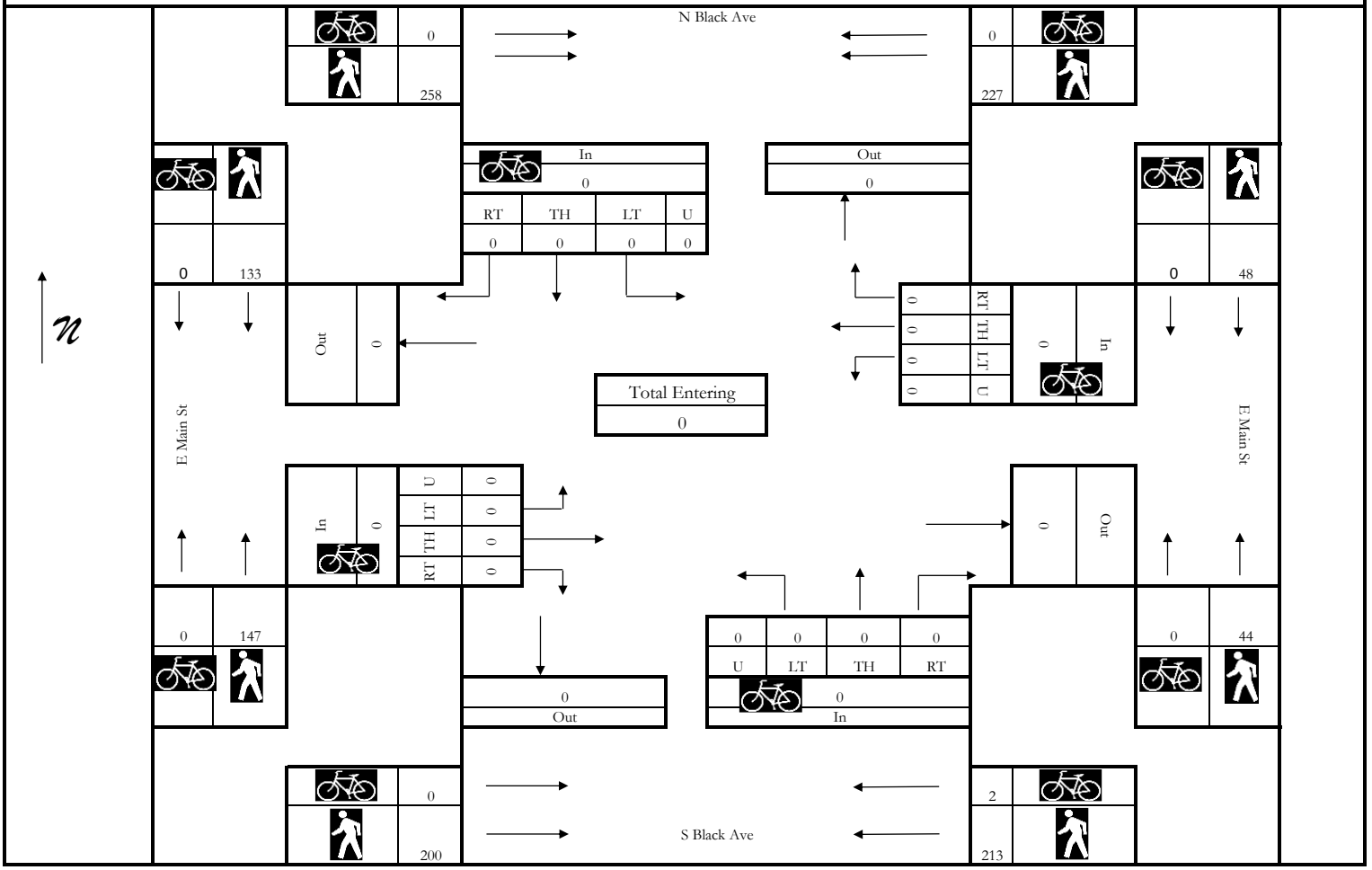
Counted By:	Wyatt Brown	Intersection:	Main St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	Noon Peak Hour (12:15 - 1:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Black Ave	East/West Street:	E Main St

Bikes in Roadway

	N Black Ave Southbound					S Black Ave Northbound					E Main St Eastbound					E Main St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Black Ave Southbound					S Black Ave Northbound					E Main St Eastbound					E Main St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	63	0	41	104	1	57	0	58	116	0	37	0	37	74	0	17	0	17	34	328
12:30 PM	0	93	0	59	152	0	43	0	47	90	0	47	0	32	79	0	17	0	7	24	345
12:45 PM	0	43	0	65	108	0	71	0	42	113	0	31	0	26	57	0	8	0	6	14	292
1:00 PM	0	59	0	62	121	1	42	0	53	96	0	32	0	38	70	0	6	0	14	20	307
Grand Total	0	258	0	227	485	2	213	0	200	415	0	147	0	133	280	0	48	0	44	92	1272



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

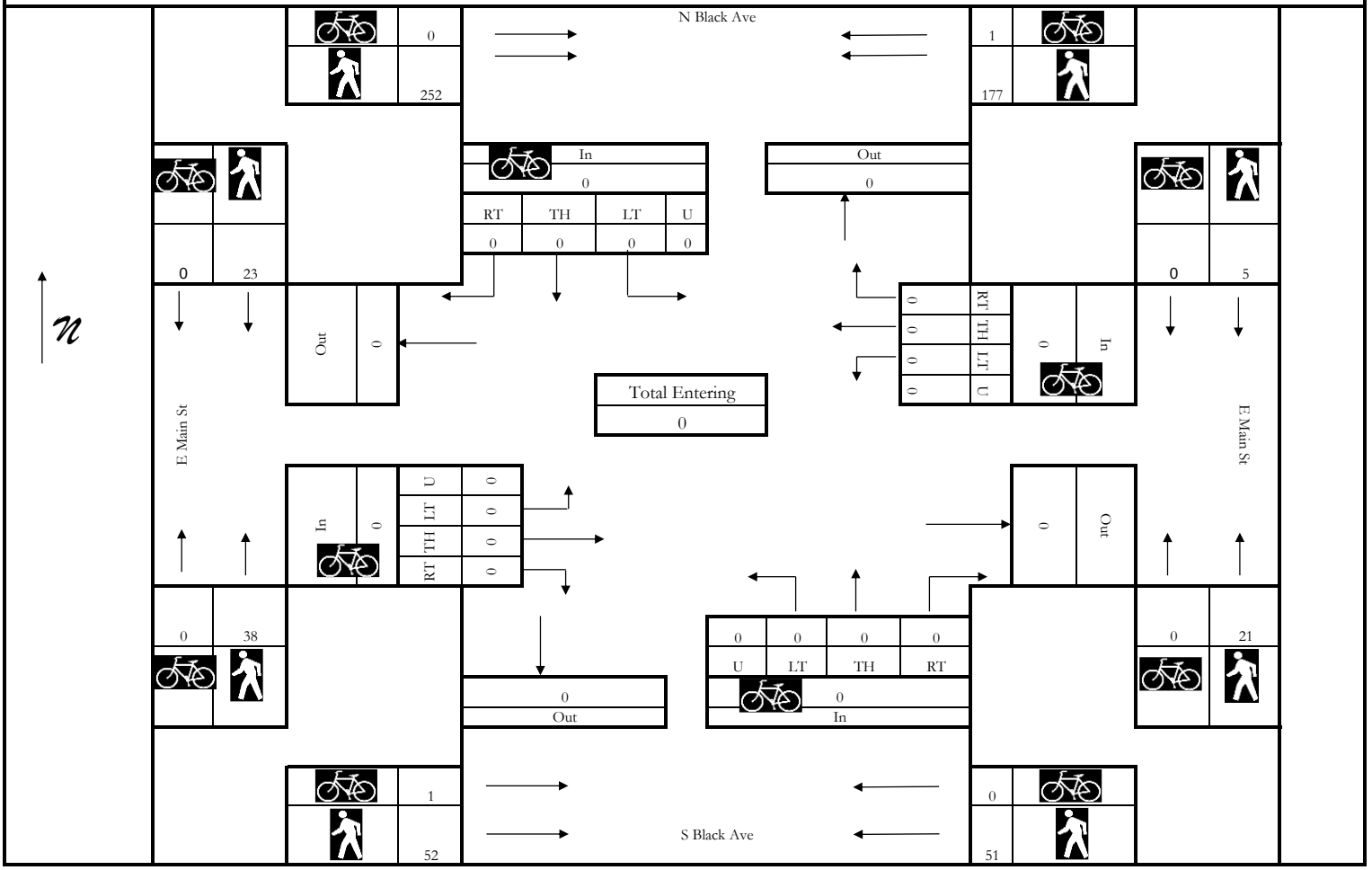
Counted By:	Wyatt Brown	Intersection:	Main St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	PM Peak Hour (2:15 - 3:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	Black Ave	East/West Street:	E Main St

Bikes in Roadway

	N Black Ave Southbound					S Black Ave Northbound					E Main St Eastbound					E Main St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	N Black Ave Southbound					S Black Ave Northbound					E Main St Eastbound					E Main St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	56	0	43	99	0	10	0	17	27	0	3	0	2	5	0	3	0	14	17	148
6:45 PM	0	48	1	59	108	0	14	0	10	24	0	17	0	5	22	0	2	0	4	6	160
7:00 PM	0	61	0	31	92	0	16	0	13	29	0	11	0	10	21	0	0	0	3	3	145
7:15 PM	0	87	0	44	131	0	11	1	12	24	0	7	0	6	13	0	0	0	0	0	168
Grand Total	0	252	1	177	430	0	51	1	52	104	0	38	0	23	61	0	5	0	21	26	621



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

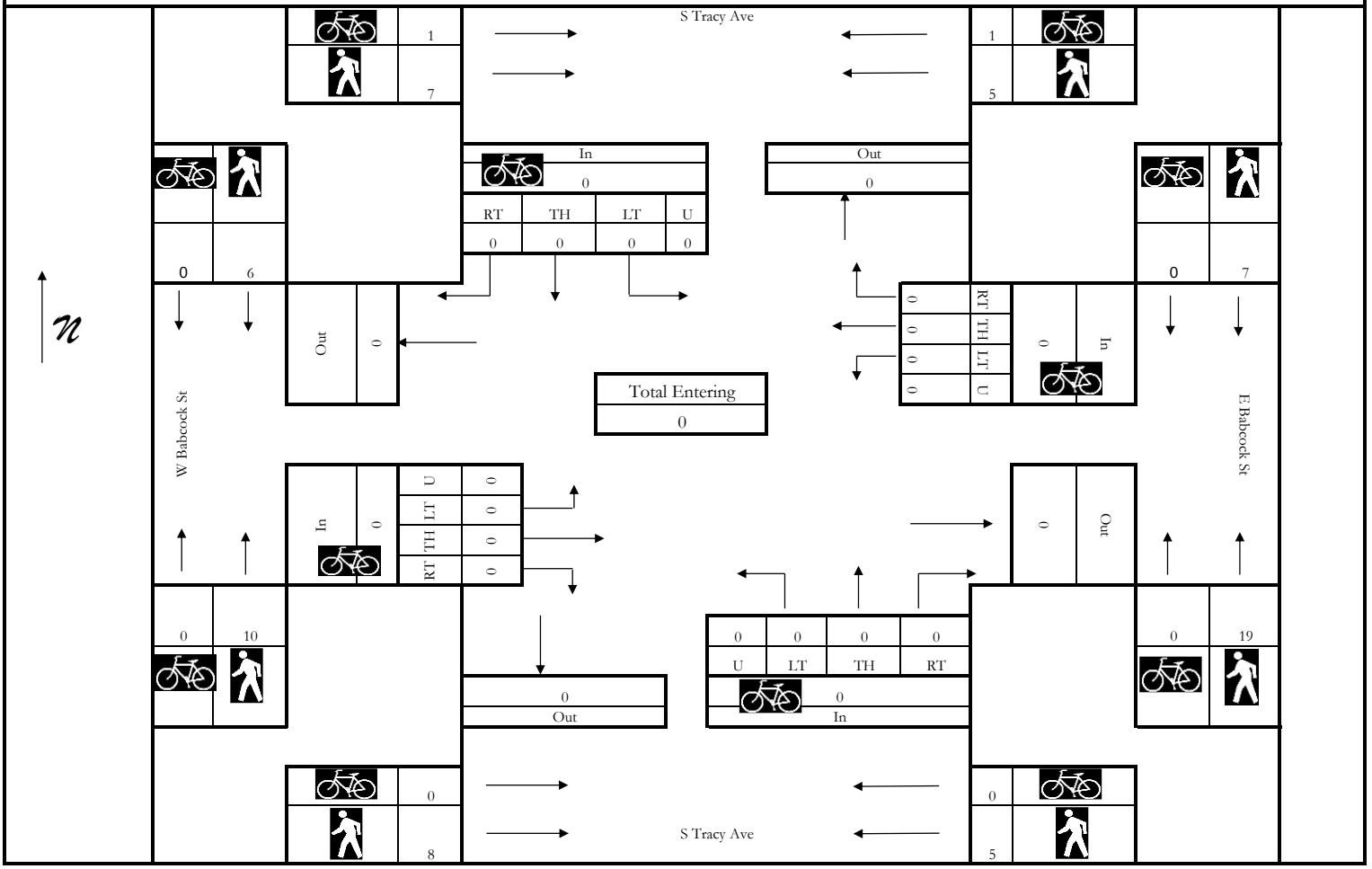
Counted By:	Wyatt Brown	Intersection:	Babcock St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Tracy Ave	East/West Street:	Babcock St

Bikes in Roadway

	S Tracy Ave Southbound					S Tracy Ave Northbound					W Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	S Tracy Ave Southbound					S Tracy Ave Northbound					W Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	2	0	2	4	6
8:45 AM	1	3	1	1	6	0	1	0	2	3	0	3	0	3	6	0	2	0	2	4	19
9:00 AM	0	3	0	0	3	0	2	0	3	5	0	4	0	1	5	0	1	0	7	8	21
9:15 AM	0	0	0	4	4	0	2	0	3	5	0	2	0	2	4	0	2	0	8	10	23
Grand Total	1	7	1	5	14	0	5	0	8	13	0	10	0	6	16	0	7	0	19	26	69



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

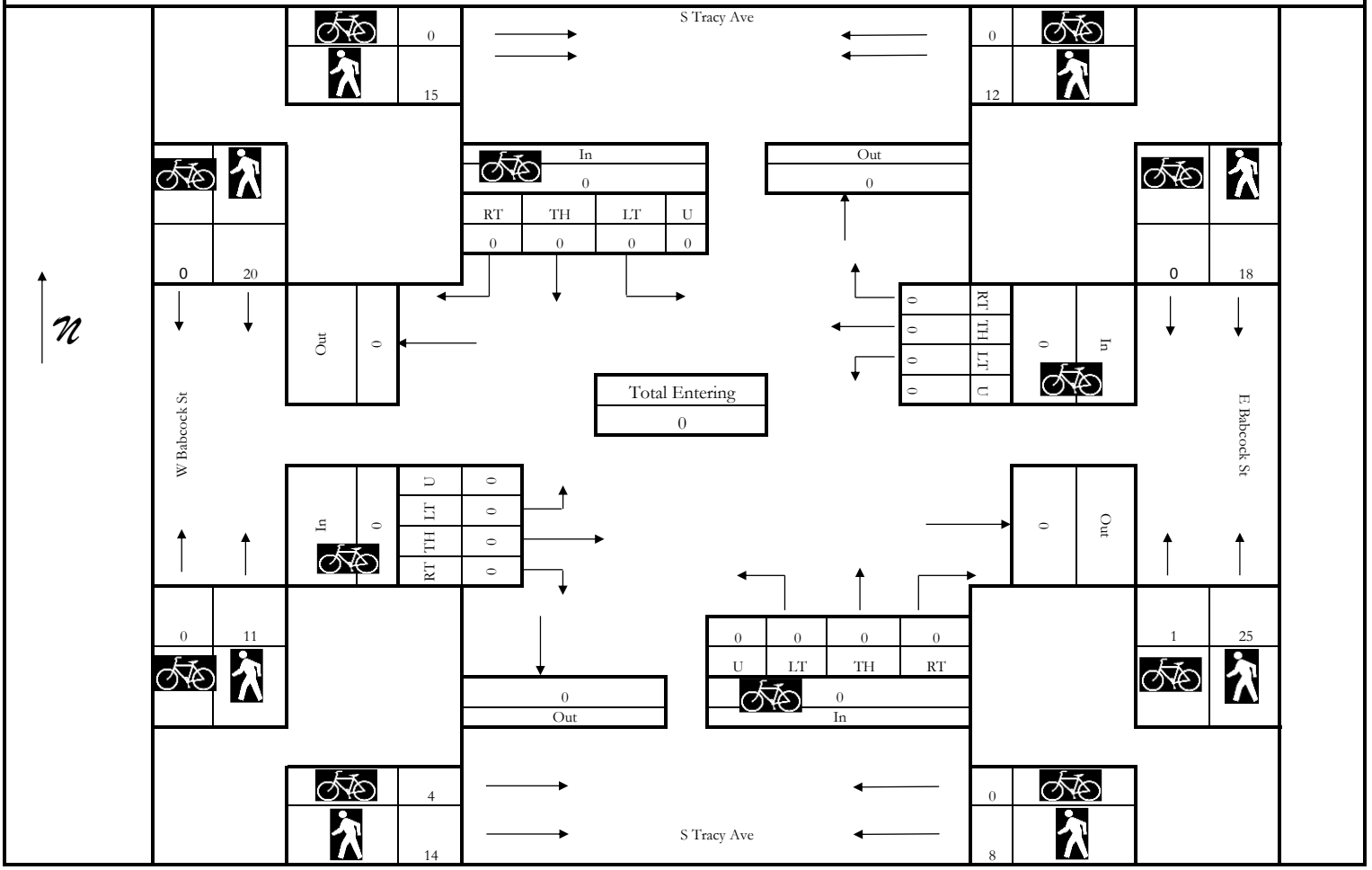
Counted By:	Wyatt Brown	Intersection:	Babcock St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	Noon Peak Hour (12:15 - 1:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Tracy Ave	East/West Street:	Babcock St

Bikes in Roadway

	S Tracy Ave Southbound					S Tracy Ave Northbound					W Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	S Tracy Ave Southbound					S Tracy Ave Northbound					W Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	4	0	4	8	0	1	1	5	7	0	3	0	3	6	0	3	0	4	7	28
12:30 PM	0	5	0	3	8	0	2	0	6	8	0	3	0	11	14	0	2	0	9	11	41
12:45 PM	0	3	0	3	6	0	4	2	2	8	0	5	0	4	9	0	6	0	7	13	36
1:00 PM	0	3	0	2	5	0	1	1	1	3	0	0	0	2	2	0	7	1	5	13	23
Grand Total	0	15	0	12	27	0	8	4	14	26	0	11	0	20	31	0	18	1	25	44	128



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

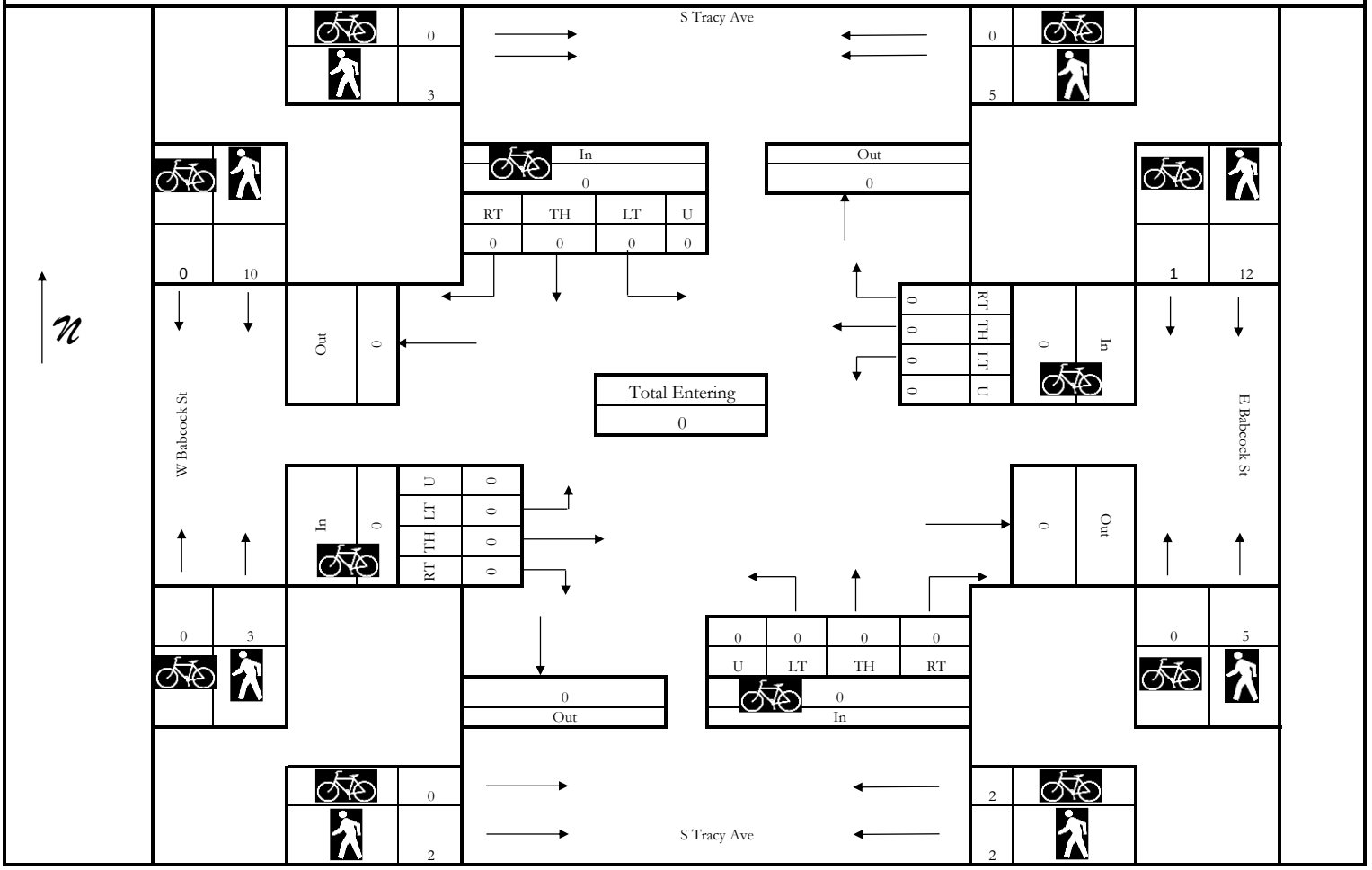
Counted By:	Wyatt Brown	Intersection:	Babcock St & Tracy Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	PM Peak Hour (2:15 - 3:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Tracy Ave	East/West Street:	Babcock St

Bikes in Roadway

	S Tracy Ave Southbound					S Tracy Ave Northbound					W Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	S Tracy Ave Southbound					S Tracy Ave Northbound					W Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	1	1	0	1	0	2	3	0	0	0	5	5	0	2	0	1	3	12
6:45 PM	0	1	0	1	2	0	0	0	0	0	0	0	0	1	1	0	3	0	0	3	6
7:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	3	3	0	3	0	1	4	8
7:15 PM	0	1	0	3	4	2	1	0	0	3	0	3	0	1	4	1	4	0	3	8	19
Grand Total	0	3	0	5	8	2	2	0	2	6	0	3	0	10	13	1	12	0	5	18	45



SANDERSON STEWART

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

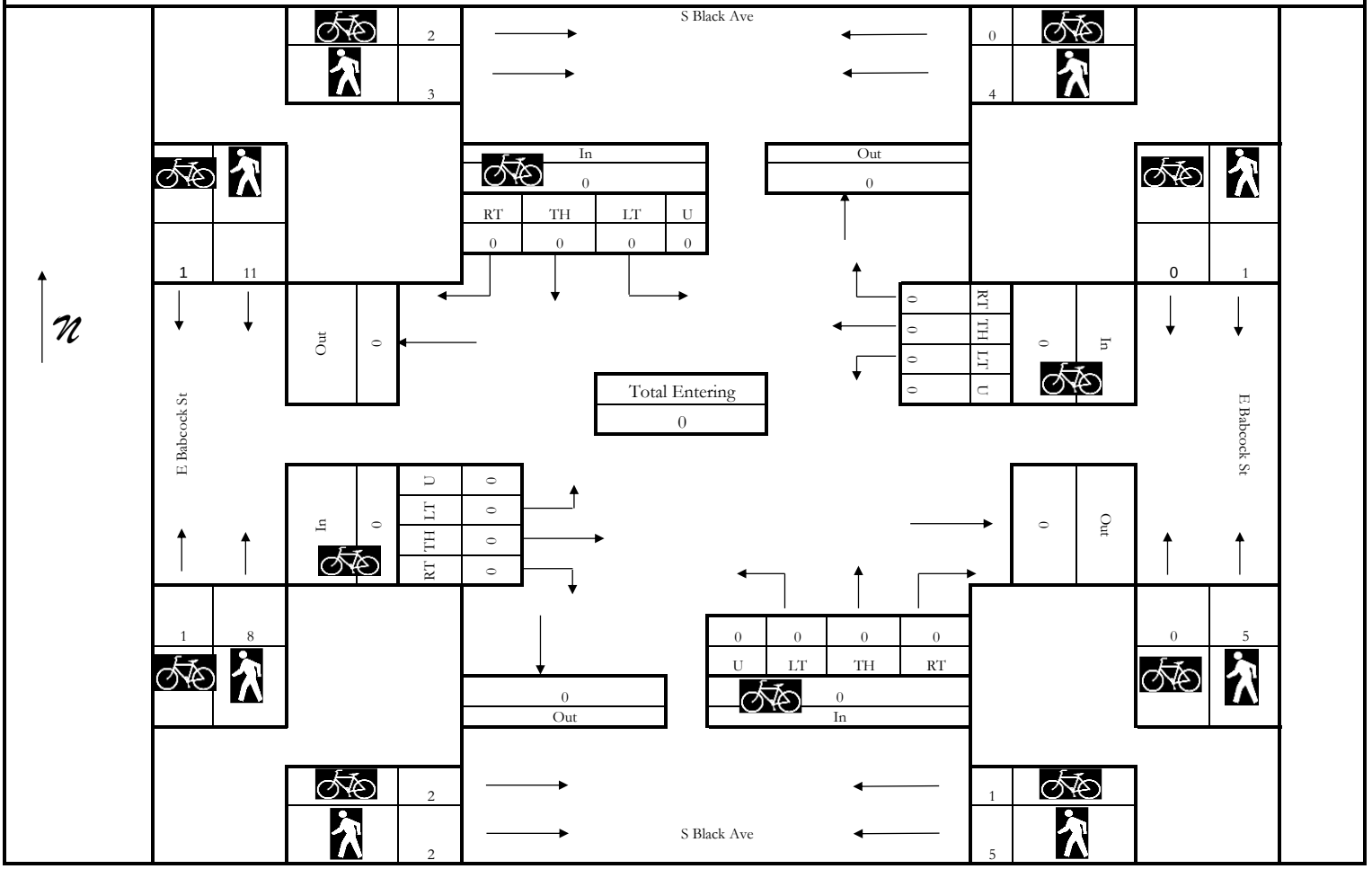
Counted By:	Wyatt Brown	Intersection:	Babcock St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	AM Peak Hour (8:30 - 9:30 AM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Black Ave	East/West Street:	E Babcock St

Bikes in Roadway

	S Black Ave Southbound					S Black Ave Northbound					E Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	S Black Ave Southbound					S Black Ave Northbound					E Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
8:30 AM	0	1	0	0	1	1	0	1	0	2	0	1	1	1	3	0	0	0	1	1	7
8:45 AM	1	1	0	1	3	0	0	1	0	1	0	4	0	1	5	0	1	0	1	2	11
9:00 AM	0	1	0	1	2	0	4	0	2	6	0	2	0	6	8	0	0	0	1	1	17
9:15 AM	1	0	0	2	3	0	1	0	0	1	1	1	0	3	5	0	0	0	2	2	11
Grand Total	2	3	0	4	9	1	5	2	2	10	1	8	1	11	21	0	1	0	5	6	46



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

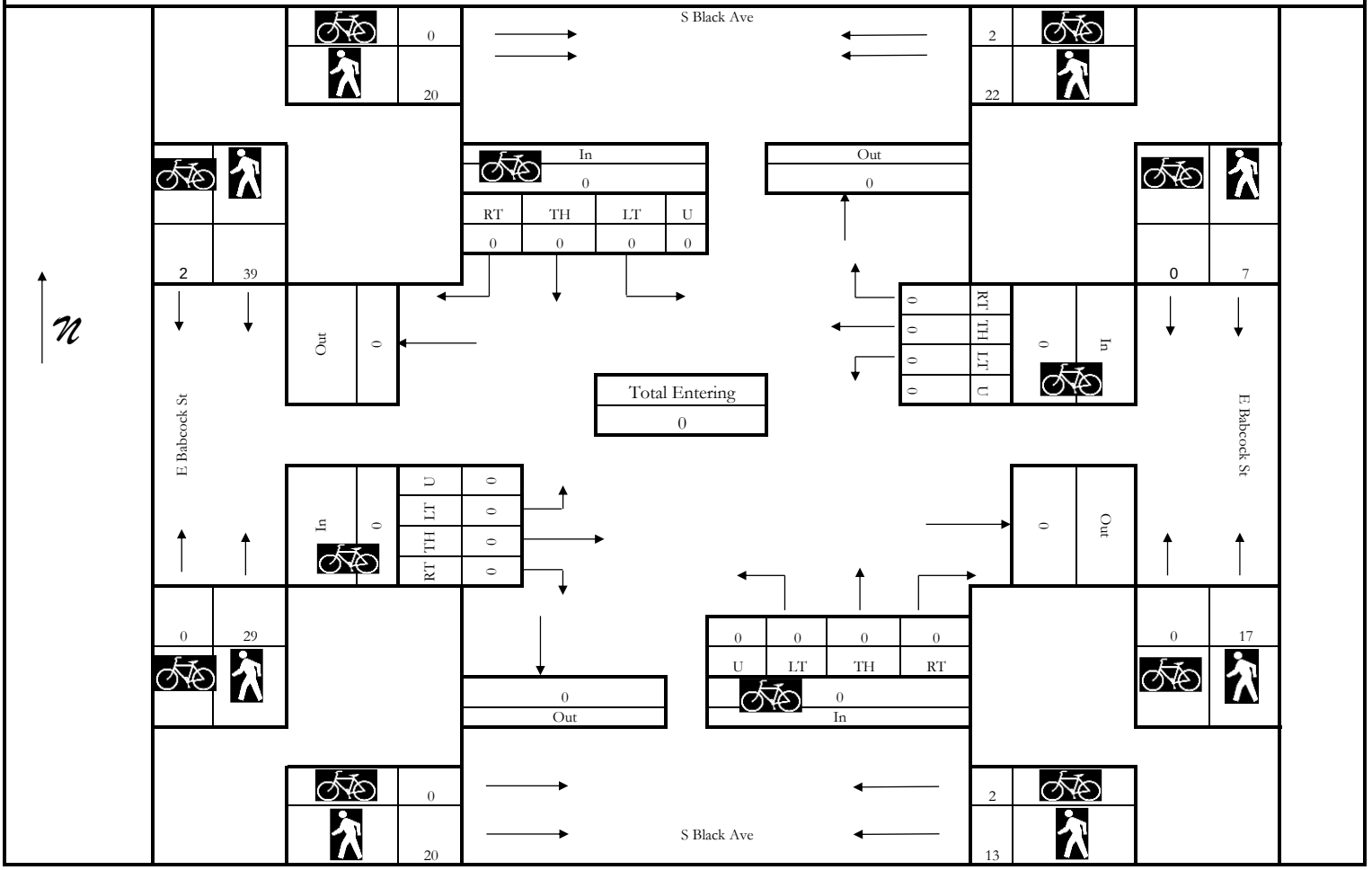
Counted By:	Wyatt Brown	Intersection:	Babcock St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	Noon Peak Hour (12:15 - 1:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Black Ave	East/West Street:	E Babcock St

Bikes in Roadway

	S Black Ave Southbound					S Black Ave Northbound					E Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	S Black Ave Southbound					S Black Ave Northbound					E Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
12:15 PM	0	2	1	4	7	0	2	0	5	7	0	8	0	8	16	0	3	0	2	5	35
12:30 PM	0	7	0	2	9	0	5	0	9	14	0	8	1	16	25	0	2	0	5	7	55
12:45 PM	0	6	1	7	14	0	4	0	3	7	0	10	0	6	16	0	1	0	2	3	40
1:00 PM	0	5	0	9	14	2	2	0	3	7	0	3	1	9	13	0	1	0	8	9	43
Grand Total	0	20	2	22	44	2	13	0	20	35	0	29	2	39	70	0	7	0	17	24	173



INTERSECTION TURNING MOVEMENT COUNT SUMMARY

General Information

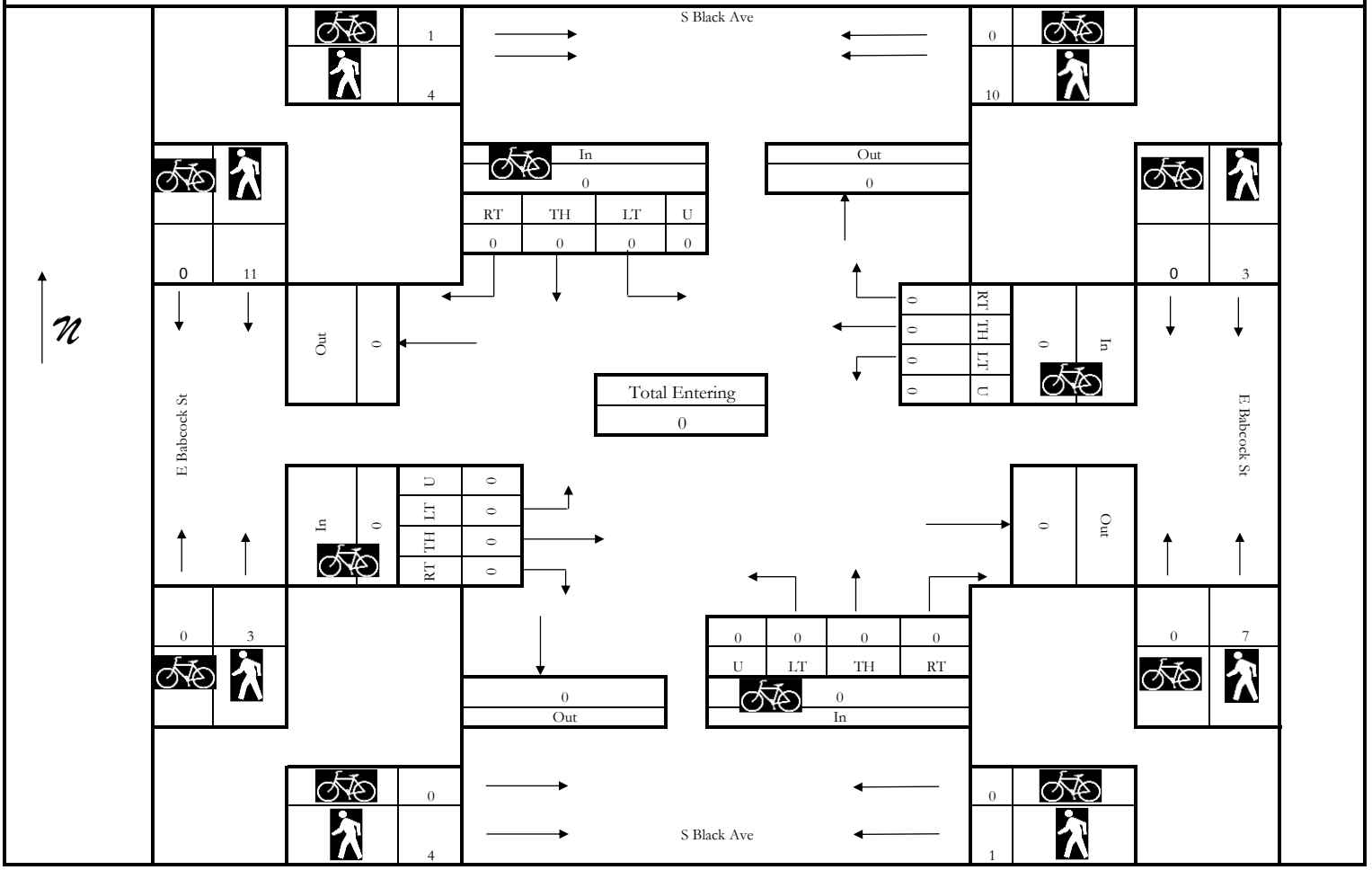
Counted By:	Wyatt Brown	Intersection:	Babcock St & Black Ave
Agency/Company:	Sanderson Stewart		
Date Performed:	Wednesday, July 13, 2022	Jurisdiction:	Bozeman, MT /MDT
Count Time Period:	PM Peak Hour (2:15 - 3:15 PM)		
Project Number:	18098.33	Project Description:	Babcock & Mendenhall Safety
North/South Street:	S Black Ave	East/West Street:	E Babcock St

Bikes in Roadway

	S Black Ave Southbound					S Black Ave Northbound					E Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Right	Thru	Left	U-turn	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bikes & Pedestrians in Crosswalk

	S Black Ave Southbound					S Black Ave Northbound					E Babcock St Eastbound					E Babcock St Westbound					Int.
Start Time	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	CW Bike	CW Ped	CCW Bike	CCW Ped	Total	Total
Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00		
6:30 PM	0	1	0	3	4	0	0	0	1	1	0	0	0	2	2	0	0	0	6	6	13
6:45 PM	0	0	0	3	3	0	0	0	2	2	0	0	0	5	5	0	1	0	0	1	11
7:00 PM	1	1	0	4	6	0	0	0	1	1	0	1	0	2	3	0	2	0	0	2	12
7:15 PM	0	2	0	0	2	0	1	0	0	1	0	2	0	2	4	0	0	0	1	1	8
Grand Total	1	4	0	10	15	0	1	0	4	5	0	3	0	11	14	0	3	0	7	10	44



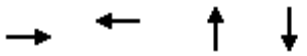
CAPACITY CALCULATIONS – EXISTING (2022)

APPENDIX C

ENDURING COMMUNITY DESIGN

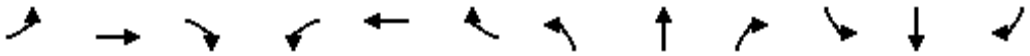
SANDERSON STEWART

Intersection	Approach	Existing (2022)								
		AM Peak			Noon Peak			PM Peak		
		Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)	Avg Delay (s/veh)	LOS	95th % Queue (veh)
Intersection Control		*Two-Way Stop-Control (NB/SB)*								
Mendenhall Street & Tracy Avenue	WB	0.9	A	1	1.2	A	1	0.6	A	1
	NB	12.5	B	1	23.4	C	2	18.2	C	1
	SB	11.8	B	1	15.2	C	1	14.9	B	1
	Intersection	3.7	A	--	6.6	A	--	4.0	A	--
Intersection Control		*Two-Way Stop-Control (NB/SB)*								
Mendenhall Street & Black Avenue	WB	0.7	A	1	0.9	A	1	0.7	A	1
	NB	13.0	B	1	17.7	C	2	17.3	C	1
	SB	11.1	B	1	13.2	B	1	13.8	B	1
	Intersection	4.7	A	--	5.6	A	--	4.4	A	--
Intersection Control		*Signalized*								
Main Street & Tracy Avenue	EB	6.2	A	2	8.4	A	4	7.4	A	3
	WB	0.4	A	1	0.7	A	2	0.5	A	2
	NB	24.3	C	2	25.2	C	3	26.3	C	3
	SB	24.7	C	3	25.9	C	4	26.3	C	3
	Intersection	6.2	A	--	7.9	A	--	7.2	A	--
Intersection Control		*Signalized*								
Main Street & Black Avenue	EB	0.6	A	2	0.8	A	2	0.6	A	1
	WB	7.2	A	2	7.8	A	4	6.9	A	3
	NB	22.7	C	2	26.4	C	3	26.8	C	3
	SB	23.0	C	3	27.2	C	4	26.9	C	3
	Intersection	6.3	A	--	7.3	A	--	6.8	A	--
Intersection Control		*Two-Way Stop-Control (NB/SB)*								
Babcock Street & Tracy Avenue	EB	0.5	A	0	0.6	A	1	0.5	A	1
	NB	11.5	B	1	13.4	B	1	12.5	B	1
	SB	13.5	B	1	17.7	C	2	13.8	B	1
	Intersection	3.5	A	--	5.3	A	--	3.5	A	--
Intersection Control		*Two-Way Stop-Control (NB/SB)*								
Babcock Street & Black Avenue	EB	0.4	A	0	0.4	A	0	0.5	A	1
	NB	11.4	B	1	13.9	B	1	13.2	B	1
	SB	13.6	B	1	16.2	C	1	15.8	C	1
	Intersection	2.8	A	--	3.5	A	--	4.3	A	--



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	451	389	50	73
v/c Ratio	0.20	0.17	0.29	0.41
Control Delay	3.2	2.0	26.1	30.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.2	2.0	26.1	30.8
Queue Length 50th (ft)	24	15	14	24
Queue Length 95th (ft)	48	24	43	59
Internal Link Dist (ft)	362	282	299	282
Turn Bay Length (ft)				
Base Capacity (vph)	2254	2292	435	451
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.20	0.17	0.11	0.16

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	368	31	18	326	22	17	14	16	17	34	18
Future Volume (veh/h)	25	368	31	18	326	22	17	14	16	17	34	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.96		0.93	0.98		0.93	0.94		0.93	0.94		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1709	1750	1750	1709	1750	1750	1654	1750	1668	1709	1668
Adj Flow Rate, veh/h	27	391	33	19	347	23	18	15	17	18	36	19
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	3	0	0	3	0	0	7	0	6	3	6
Cap, veh/h	134	1760	146	113	1827	119	146	113	100	110	187	84
Arrive On Green	0.64	0.64	0.64	1.00	1.00	1.00	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	125	2751	228	94	2855	186	383	538	474	240	889	397
Grp Volume(v), veh/h	235	0	216	203	0	186	50	0	0	73	0	0
Grp Sat Flow(s),veh/h/ln	1612	0	1493	1631	0	1505	1395	0	0	1526	0	0
Q Serve(g_s), s	0.0	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.3	0.0	4.6	0.0	0.0	0.0	2.0	0.0	0.0	2.8	0.0	0.0
Prop In Lane	0.11		0.15	0.09		0.12	0.36		0.34	0.25		0.26
Lane Grp Cap(c), veh/h	1085	0	956	1096	0	963	359	0	0	381	0	0
V/C Ratio(X)	0.22	0.00	0.23	0.19	0.00	0.19	0.14	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	1085	0	956	1096	0	963	492	0	0	526	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.99	0.00	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.6	0.0	5.7	0.0	0.0	0.0	24.2	0.0	0.0	24.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.5	0.4	0.0	0.4	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	1.3	0.1	0.0	0.1	0.7	0.0	0.0	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.1	0.0	6.2	0.4	0.0	0.4	24.3	0.0	0.0	24.7	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		451			389			50			73	
Approach Delay, s/veh		6.2			0.4			24.3			24.7	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		53.3		21.7		53.3		21.7				
Change Period (Y+Rc), s		* 5.3		5.9		* 5.3		5.9				
Max Green Setting (Gmax), s		* 41		23.1		* 41		23.1				
Max Q Clear Time (g_c+I1), s		6.6		4.8		2.0		4.0				
Green Ext Time (p_c), s		3.0		0.3		2.6		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	34	257	16	25	35	0	0	23	16
Future Vol, veh/h	0	0	0	34	257	16	25	35	0	0	23	16
Conflicting Peds, #/hr	18	0	21	21	0	18	22	0	41	41	0	22
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	6	5	0	0	3	0	0	9	25
Mvmt Flow	0	0	0	36	271	17	26	37	0	0	24	17

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	21	0	0	263	399	-	-	391	184
Stage 1	-	-	-	21	21	-	-	370	-
Stage 2	-	-	-	242	378	-	-	21	-
Critical Hdwy	4.22	-	-	7.5	6.56	-	-	6.68	7.4
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.68	-
Critical Hdwy Stg 2	-	-	-	6.5	5.56	-	-	-	-
Follow-up Hdwy	2.26	-	-	3.5	4.03	-	-	4.09	3.55
Pot Cap-1 Maneuver	1564	-	-	674	535	0	0	528	760
Stage 1	-	-	-	-	-	0	0	601	-
Stage 2	-	-	-	746	611	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1533	-	-	608	501	-	-	494	747
Mov Cap-2 Maneuver	-	-	-	608	501	-	-	494	-
Stage 1	-	-	-	-	-	-	-	574	-
Stage 2	-	-	-	679	584	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0.9	12.5	11.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	541	1533	-	-	574
HCM Lane V/C Ratio	0.117	0.023	-	-	0.072
HCM Control Delay (s)	12.5	7.4	0.1	-	11.8
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.2

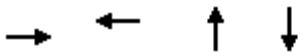
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	352	14	0	0	0	0	15	28	60	23	0
Future Vol, veh/h	19	352	14	0	0	0	0	15	28	60	23	0
Conflicting Peds, #/hr	14	0	13	13	0	14	16	0	26	26	0	16
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	2	0	0	0	0	0	0	0	2	0	0
Mvmt Flow	23	424	17	0	0	0	0	18	34	72	28	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	14	0	0	-	506	260	307	514	-
Stage 1	-	-	-	-	492	-	14	14	-
Stage 2	-	-	-	-	14	-	293	500	-
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.54	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.52	4	-
Pot Cap-1 Maneuver	1617	-	-	0	472	745	622	467	0
Stage 1	-	-	-	0	551	-	-	-	0
Stage 2	-	-	-	0	-	-	691	546	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1595	-	-	-	452	736	560	447	-
Mov Cap-2 Maneuver	-	-	-	-	452	-	560	447	-
Stage 1	-	-	-	-	534	-	-	-	-
Stage 2	-	-	-	-	-	-	625	529	-

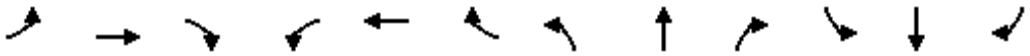
Approach	EB	NB	SB
HCM Control Delay, s	0.5	11.5	13.5
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	604	1595	-	-	523
HCM Lane V/C Ratio	0.086	0.014	-	-	0.191
HCM Control Delay (s)	11.5	7.3	0.1	-	13.5
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.7



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	470	449	60	80
v/c Ratio	0.22	0.19	0.33	0.43
Control Delay	2.4	3.3	26.5	30.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.4	3.3	26.5	30.9
Queue Length 50th (ft)	19	25	17	26
Queue Length 95th (ft)	32	47	48	62
Internal Link Dist (ft)	282	376	300	296
Turn Bay Length (ft)				
Base Capacity (vph)	2154	2312	413	424
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.22	0.19	0.15	0.19

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	351	29	14	362	23	18	18	18	18	36	18
Future Volume (veh/h)	38	351	29	14	362	23	18	18	18	18	36	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.90	0.95		0.90	0.90		0.88	0.90		0.88
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1709	1750	1750	1723	1750	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	43	394	33	16	407	26	20	20	20	20	40	20
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	3	0	0	2	0	0	0	0	0	0	0
Cap, veh/h	185	1577	131	86	1792	112	152	142	115	121	212	91
Arrive On Green	1.00	1.00	1.00	0.61	0.61	0.61	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	211	2590	215	57	2941	184	365	592	478	255	884	380
Grp Volume(v), veh/h	241	0	229	236	0	213	60	0	0	80	0	0
Grp Sat Flow(s),veh/h/ln	1526	0	1489	1672	0	1511	1435	0	0	1519	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	4.7	0.0	4.8	2.3	0.0	0.0	3.0	0.0	0.0
Prop In Lane	0.18		0.14	0.07		0.12	0.33		0.33	0.25		0.25
Lane Grp Cap(c), veh/h	986	0	907	1069	0	920	409	0	0	425	0	0
V/C Ratio(X)	0.24	0.00	0.25	0.22	0.00	0.23	0.15	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	986	0	907	1069	0	920	464	0	0	484	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.00	0.99	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	6.6	0.0	6.7	22.5	0.0	0.0	22.8	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.7	0.5	0.0	0.6	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.2	1.6	0.0	1.5	0.8	0.0	0.0	1.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.6	0.0	0.7	7.1	0.0	7.3	22.7	0.0	0.0	23.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		470			449			60			80	
Approach Delay, s/veh		0.6			7.2			22.7			23.0	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		51.0		24.0		51.0		24.0				
Change Period (Y+Rc), s		* 5.3		6.0		* 5.3		6.0				
Max Green Setting (Gmax), s		* 43		21.0		* 43		21.0				
Max Q Clear Time (g_c+I1), s		2.0		5.0		6.8		4.3				
Green Ext Time (p_c), s		3.3		0.3		3.0		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		6.3
HCM 6th LOS		A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	23	252	13	28	42	0	0	28	62
Future Vol, veh/h	0	0	0	23	252	13	28	42	0	0	28	62
Conflicting Peds, #/hr	8	0	30	30	0	8	25	0	22	22	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	5	8	4	2	0	0	0	3
Mvmt Flow	0	0	0	26	286	15	32	48	0	0	32	70

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	30	0	0	266	391	-	-	384	184
Stage 1	-	-	-	30	30	-	-	354	-
Stage 2	-	-	-	236	361	-	-	30	-
Critical Hdwy	4.1	-	-	7.58	6.54	-	-	6.5	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	6.58	5.54	-	-	-	-
Follow-up Hdwy	2.2	-	-	3.54	4.02	-	-	4	3.33
Pot Cap-1 Maneuver	1596	-	-	660	543	0	0	553	824
Stage 1	-	-	-	-	-	0	0	634	-
Stage 2	-	-	-	740	624	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1550	-	-	550	513	-	-	522	818
Mov Cap-2 Maneuver	-	-	-	550	513	-	-	522	-
Stage 1	-	-	-	-	-	-	-	616	-
Stage 2	-	-	-	629	607	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0.7	13	11.1
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	527	1550	-	-	695
HCM Lane V/C Ratio	0.151	0.017	-	-	0.147
HCM Control Delay (s)	13	7.4	0.1	-	11.1
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.5

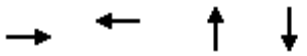
Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	18	354	30	0	0	0	0	16	36	16	34	0
Future Vol, veh/h	18	354	30	0	0	0	0	16	36	16	34	0
Conflicting Peds, #/hr	9	0	10	10	0	9	21	0	6	6	0	21
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	22	427	36	0	0	0	0	19	43	19	41	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	9	0	0	-	508	248	282	526	-
Stage 1	-	-	-	-	499	-	9	9	-
Stage 2	-	-	-	-	9	-	273	517	-
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1624	-	-	0	471	758	654	460	0
Stage 1	-	-	-	0	547	-	-	-	0
Stage 2	-	-	-	0	-	-	715	537	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1610	-	-	-	454	751	583	443	-
Mov Cap-2 Maneuver	-	-	-	-	454	-	583	443	-
Stage 1	-	-	-	-	532	-	-	-	-
Stage 2	-	-	-	-	-	-	638	522	-

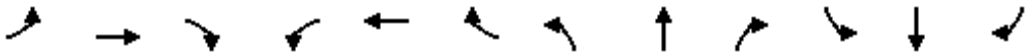
Approach	EB	NB	SB
HCM Control Delay, s	0.4	11.4	13.6
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	625	1610	-	-	480
HCM Lane V/C Ratio	0.1	0.013	-	-	0.126
HCM Control Delay (s)	11.4	7.3	0.1	-	13.6
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.4



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	553	531	83	114
v/c Ratio	0.26	0.25	0.45	0.58
Control Delay	4.2	2.6	35.5	38.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	4.2	2.6	35.5	38.9
Queue Length 50th (ft)	40	26	35	48
Queue Length 95th (ft)	77	36	74	93
Internal Link Dist (ft)	362	282	299	282
Turn Bay Length (ft)				
Base Capacity (vph)	2092	2101	363	379
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.26	0.25	0.23	0.30

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	448	53	22	441	42	29	36	13	39	42	28
Future Volume (veh/h)	24	448	53	22	441	42	29	36	13	39	42	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.91		0.82	0.96		0.82	0.86		0.83	0.85		0.83
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1695	1709	1750	1750	1695	1682	1695	1709	1750	1682	1750	1750
Adj Flow Rate, veh/h	25	472	56	23	464	44	31	38	14	41	44	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	4	3	0	0	4	5	4	3	0	5	0	0
Cap, veh/h	97	1624	188	94	1667	155	169	187	60	161	160	90
Arrive On Green	0.61	0.61	0.61	1.00	1.00	1.00	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	83	2644	307	79	2713	252	435	739	238	409	632	355
Grp Volume(v), veh/h	294	0	259	281	0	250	83	0	0	114	0	0
Grp Sat Flow(s),veh/h/ln	1615	0	1418	1613	0	1430	1412	0	0	1396	0	0
Q Serve(g_s), s	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0
Cycle Q Clear(g_c), s	6.8	0.0	7.3	0.0	0.0	0.0	3.5	0.0	0.0	5.2	0.0	0.0
Prop In Lane	0.09		0.22	0.08		0.18	0.37		0.17	0.36		0.25
Lane Grp Cap(c), veh/h	1038	0	872	1037	0	879	417	0	0	412	0	0
V/C Ratio(X)	0.28	0.00	0.30	0.27	0.00	0.28	0.20	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	1038	0	872	1037	0	879	441	0	0	436	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.97	0.00	0.97	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.6	0.0	7.7	0.0	0.0	0.0	25.0	0.0	0.0	25.5	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.9	0.6	0.0	0.8	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	2.2	0.2	0.0	0.2	1.3	0.0	0.0	1.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.3	0.0	8.6	0.6	0.0	0.8	25.2	0.0	0.0	25.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		553			531			83			114	
Approach Delay, s/veh		8.4			0.7			25.2			25.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		57.5		27.5		57.5		27.5				
Change Period (Y+Rc), s		* 5.3		5.9		* 5.3		5.9				
Max Green Setting (Gmax), s		* 51		23.1		* 51		23.1				
Max Q Clear Time (g_c+I1), s		9.3		7.2		2.0		5.5				
Green Ext Time (p_c), s		4.0		0.5		3.8		0.4				

Intersection Summary	
HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	6.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	65	398	24	58	63	0	0	31	41
Future Vol, veh/h	0	0	0	65	398	24	58	63	0	0	31	41
Conflicting Peds, #/hr	42	0	71	71	0	42	39	0	83	83	0	39
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	3	2	8	0	3	0	0	3	15
Mvmt Flow	0	0	0	70	428	26	62	68	0	0	33	44

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	71	0	0	481	707	-	-	694	308
Stage 1	-	-	-	71	71	-	-	623	-
Stage 2	-	-	-	410	636	-	-	71	-
Critical Hdwy	4.16	-	-	7.5	6.56	-	-	6.56	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.56	-
Critical Hdwy Stg 2	-	-	-	6.5	5.56	-	-	-	-
Follow-up Hdwy	2.23	-	-	3.5	4.03	-	-	4.03	3.45
Pot Cap-1 Maneuver	1520	-	-	473	357	0	0	363	651
Stage 1	-	-	-	-	-	0	0	474	-
Stage 2	-	-	-	595	468	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1417	-	-	357	298	-	-	303	625
Mov Cap-2 Maneuver	-	-	-	357	298	-	-	303	-
Stage 1	-	-	-	-	-	-	-	425	-
Stage 2	-	-	-	476	420	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	1.2	23.4	15.2
HCM LOS		C	C

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	324	1417	-	-	429
HCM Lane V/C Ratio	0.402	0.049	-	-	0.18
HCM Control Delay (s)	23.4	7.7	0.2	-	15.2
HCM Lane LOS	C	A	A	-	C
HCM 95th %tile Q(veh)	1.9	0.2	-	-	0.7

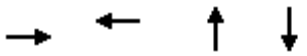
Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	451	10	0	0	0	0	34	49	80	50	0
Future Vol, veh/h	31	451	10	0	0	0	0	34	49	80	50	0
Conflicting Peds, #/hr	33	0	22	22	0	33	38	0	35	35	0	38
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	33	475	11	0	0	0	0	36	52	84	53	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	33	0	0	-	602	300	390	607	-
Stage 1	-	-	-	-	569	-	33	33	-
Stage 2	-	-	-	-	33	-	357	574	-
Critical Hdwy	4.16	-	-	-	6.56	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.56	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.23	-	-	-	4.03	3.3	3.5	4	-
Pot Cap-1 Maneuver	1570	-	-	0	410	702	548	414	0
Stage 1	-	-	-	0	502	-	-	-	0
Stage 2	-	-	-	0	-	-	639	506	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1521	-	-	-	377	687	445	381	-
Mov Cap-2 Maneuver	-	-	-	-	377	-	445	381	-
Stage 1	-	-	-	-	477	-	-	-	-
Stage 2	-	-	-	-	-	-	530	481	-

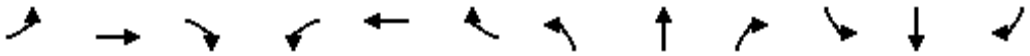
Approach	EB	NB	SB
HCM Control Delay, s	0.6	13.4	17.7
HCM LOS		B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	514	1521	-	-	418
HCM Lane V/C Ratio	0.17	0.021	-	-	0.327
HCM Control Delay (s)	13.4	7.4	0.1	-	17.7
HCM Lane LOS	B	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	1.4



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	570	594	76	101
v/c Ratio	0.28	0.27	0.42	0.55
Control Delay	2.7	4.1	35.3	38.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	2.7	4.1	35.3	38.4
Queue Length 50th (ft)	30	42	32	41
Queue Length 95th (ft)	42	80	68	85
Internal Link Dist (ft)	282	376	300	296
Turn Bay Length (ft)				
Base Capacity (vph)	2012	2228	340	340
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.28	0.27	0.22	0.30

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	445	24	16	494	30	23	35	12	35	35	23
Future Volume (veh/h)	50	445	24	16	494	30	23	35	12	35	35	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.97		0.82	0.91		0.82	0.76		0.70	0.74		0.70
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1709	1750	1750	1709	1750	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	55	489	26	18	543	33	25	38	13	38	38	25
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	0	3	0	0	3	0	0	0	0	0	0	0
Cap, veh/h	195	1631	86	75	1841	110	137	184	55	148	133	73
Arrive On Green	1.00	1.00	1.00	0.63	0.63	0.63	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	229	2580	136	47	2912	174	345	785	233	381	566	312
Grp Volume(v), veh/h	285	0	285	314	0	280	76	0	0	101	0	0
Grp Sat Flow(s),veh/h/ln	1451	0	1495	1655	0	1478	1363	0	0	1259	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	1.7	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	7.0	0.0	7.3	3.3	0.0	0.0	5.1	0.0	0.0
Prop In Lane	0.19		0.09	0.06		0.12	0.33		0.17	0.38		0.25
Lane Grp Cap(c), veh/h	967	0	945	1091	0	934	377	0	0	354	0	0
V/C Ratio(X)	0.29	0.00	0.30	0.29	0.00	0.30	0.20	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	967	0	945	1091	0	934	392	0	0	369	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.00	0.97	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	7.0	0.0	7.1	26.1	0.0	0.0	26.7	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.8	0.7	0.0	0.8	0.3	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.2	2.4	0.0	2.2	1.2	0.0	0.0	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.8	0.0	0.8	7.7	0.0	7.9	26.4	0.0	0.0	27.2	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		570			594			76			101	
Approach Delay, s/veh		0.8			7.8			26.4			27.2	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.0		26.0		59.0		26.0				
Change Period (Y+Rc), s		* 5.3		6.0		* 5.3		6.0				
Max Green Setting (Gmax), s		* 53		21.0		* 53		21.0				
Max Q Clear Time (g_c+I1), s		2.0		7.1		9.3		5.3				
Green Ext Time (p_c), s		4.3		0.4		4.3		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	51	380	20	58	58	0	0	39	54
Future Vol, veh/h	0	0	0	51	380	20	58	58	0	0	39	54
Conflicting Peds, #/hr	18	0	30	30	0	18	58	0	29	29	0	58
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	0	0	3	10	2	2	0	0	0	2
Mvmt Flow	0	0	0	53	396	21	60	60	0	0	41	56

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	30	0	0	413	571	-	-	561	285
Stage 1	-	-	-	30	30	-	-	531	-
Stage 2	-	-	-	383	541	-	-	30	-
Critical Hdwy	4.1	-	-	7.54	6.54	-	-	6.5	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-
Follow-up Hdwy	2.2	-	-	3.52	4.02	-	-	4	3.32
Pot Cap-1 Maneuver	1596	-	-	523	429	0	0	439	712
Stage 1	-	-	-	-	-	0	0	529	-
Stage 2	-	-	-	611	519	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1550	-	-	416	391	-	-	400	700
Mov Cap-2 Maneuver	-	-	-	416	391	-	-	400	-
Stage 1	-	-	-	-	-	-	-	497	-
Stage 2	-	-	-	493	487	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0.9	17.7	13.2
HCM LOS		C	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	403	1550	-	-	533
HCM Lane V/C Ratio	0.3	0.034	-	-	0.182
HCM Control Delay (s)	17.7	7.4	0.1	-	13.2
HCM Lane LOS	C	A	A	-	B
HCM 95th %tile Q(veh)	1.2	0.1	-	-	0.7

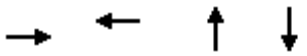
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	459	57	0	0	0	0	36	37	26	45	0
Future Vol, veh/h	24	459	57	0	0	0	0	36	37	26	45	0
Conflicting Peds, #/hr	33	0	34	34	0	33	91	0	18	18	0	91
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	25	473	59	0	0	0	0	37	38	27	46	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	33	0	0	-	620	318	356	649	-
Stage 1	-	-	-	-	587	-	33	33	-
Stage 2	-	-	-	-	33	-	323	616	-
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1592	-	-	0	407	684	580	391	0
Stage 1	-	-	-	0	500	-	-	-	0
Stage 2	-	-	-	0	-	-	669	485	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1542	-	-	-	373	662	481	358	-
Mov Cap-2 Maneuver	-	-	-	-	373	-	481	358	-
Stage 1	-	-	-	-	473	-	-	-	-
Stage 2	-	-	-	-	-	-	568	459	-

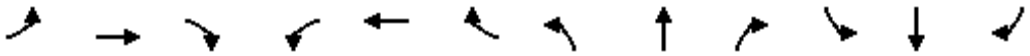
Approach	EB	NB	SB
HCM Control Delay, s	0.4	13.9	16.2
HCM LOS		B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	479	1542	-	-	395
HCM Lane V/C Ratio	0.157	0.016	-	-	0.185
HCM Control Delay (s)	13.9	7.4	0.1	-	16.2
HCM Lane LOS	B	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0.7



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	524	445	73	75
v/c Ratio	0.23	0.19	0.44	0.43
Control Delay	3.3	2.4	37.3	32.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	3.3	2.4	37.3	32.8
Queue Length 50th (ft)	32	16	30	26
Queue Length 95th (ft)	60	35	68	64
Internal Link Dist (ft)	362	282	299	282
Turn Bay Length (ft)				
Base Capacity (vph)	2286	2404	389	405
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.23	0.19	0.19	0.19

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	461	29	11	411	15	31	26	14	23	28	23
Future Volume (veh/h)	24	461	29	11	411	15	31	26	14	23	28	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.92		0.85	0.96		0.85	0.91		0.89	0.90		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1723	1750	1750	1736	1750	1750	1750	1559	1695	1750	1750
Adj Flow Rate, veh/h	24	470	30	11	419	15	32	27	14	23	29	23
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	2	0	0	1	0	0	0	14	4	0	0
Cap, veh/h	103	1813	114	67	1959	69	188	148	65	136	159	106
Arrive On Green	0.63	0.63	0.63	1.00	1.00	1.00	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	90	2862	180	35	3094	109	543	628	278	343	675	450
Grp Volume(v), veh/h	274	0	250	234	0	211	73	0	0	75	0	0
Grp Sat Flow(s),veh/h/ln	1636	0	1496	1701	0	1537	1449	0	0	1468	0	0
Q Serve(g_s), s	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.9	0.0	6.2	0.0	0.0	0.0	3.0	0.0	0.0	3.2	0.0	0.0
Prop In Lane	0.09		0.12	0.05		0.07	0.44		0.19	0.31		0.31
Lane Grp Cap(c), veh/h	1082	0	948	1122	0	973	401	0	0	400	0	0
V/C Ratio(X)	0.25	0.00	0.26	0.21	0.00	0.22	0.18	0.00	0.00	0.19	0.00	0.00
Avail Cap(c_a), veh/h	1082	0	948	1122	0	973	453	0	0	453	0	0
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.99	0.00	0.99	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.8	0.0	6.9	0.0	0.0	0.0	26.0	0.0	0.0	26.1	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.7	0.4	0.0	0.5	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	1.9	0.1	0.0	0.1	1.2	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.4	0.0	7.5	0.4	0.0	0.5	26.3	0.0	0.0	26.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		524			445			73			75	
Approach Delay, s/veh		7.4			0.5			26.3			26.3	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.1		25.9		59.1		25.9				
Change Period (Y+Rc), s		* 5.3		5.9		* 5.3		5.9				
Max Green Setting (Gmax), s		* 51		23.1		* 51		23.1				
Max Q Clear Time (g_c+I1), s		8.2		5.2		2.0		5.0				
Green Ext Time (p_c), s		3.7		0.3		3.0		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

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	0	0	0	35	454	21	38	39	0	0	30	29
Future Vol, veh/h	0	0	0	35	454	21	38	39	0	0	30	29
Conflicting Peds, #/hr	29	0	53	53	0	29	31	0	52	52	0	31
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	3	2	5	0	0	0	0	0	10
Mvmt Flow	0	0	0	40	516	24	43	44	0	0	34	33

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	53	0	0	439	702	-	-	690	330
Stage 1	-	-	-	53	53	-	-	637	-
Stage 2	-	-	-	386	649	-	-	53	-
Critical Hdwy	4.16	-	-	7.5	6.5	-	-	6.5	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.23	-	-	3.5	4	-	-	4	3.4
Pot Cap-1 Maneuver	1544	-	-	506	365	0	0	371	643
Stage 1	-	-	-	-	-	0	0	475	-
Stage 2	-	-	-	614	469	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1466	-	-	407	324	-	-	329	625
Mov Cap-2 Maneuver	-	-	-	407	324	-	-	329	-
Stage 1	-	-	-	-	-	-	-	444	-
Stage 2	-	-	-	516	438	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0.6	18.2	14.9
HCM LOS		C	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	360	1466	-	-	429
HCM Lane V/C Ratio	0.243	0.027	-	-	0.156
HCM Control Delay (s)	18.2	7.5	0.1	-	14.9
HCM Lane LOS	C	A	A	-	B
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.5

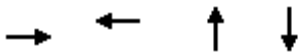
Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	365	14	0	0	0	0	31	22	37	35	0
Future Vol, veh/h	25	365	14	0	0	0	0	31	22	37	35	0
Conflicting Peds, #/hr	9	0	10	10	0	9	25	0	21	21	0	25
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	4	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	29	424	16	0	0	0	0	36	26	43	41	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	9	0	0	-	509	251	318	517	-
Stage 1	-	-	-	-	500	-	9	9	-
Stage 2	-	-	-	-	9	-	309	508	-
Critical Hdwy	4.18	-	-	-	6.5	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.24	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1595	-	-	0	470	755	616	465	0
Stage 1	-	-	-	0	546	-	-	-	0
Stage 2	-	-	-	0	-	-	682	542	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1581	-	-	-	450	748	544	445	-
Mov Cap-2 Maneuver	-	-	-	-	450	-	544	445	-
Stage 1	-	-	-	-	527	-	-	-	-
Stage 2	-	-	-	-	-	-	599	524	-

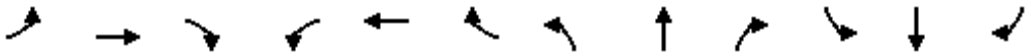
Approach	EB	NB	SB
HCM Control Delay, s	0.5	12.5	13.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	539	1581	-	-	491
HCM Lane V/C Ratio	0.114	0.018	-	-	0.171
HCM Control Delay (s)	12.5	7.3	0.1	-	13.8
HCM Lane LOS	B	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.6



Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	492	464	73	76
v/c Ratio	0.24	0.19	0.45	0.44
Control Delay	1.8	3.3	38.7	33.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	1.8	3.3	38.7	33.5
Queue Length 50th (ft)	16	28	31	27
Queue Length 95th (ft)	24	54	69	65
Internal Link Dist (ft)	282	376	300	296
Turn Bay Length (ft)				
Base Capacity (vph)	2091	2418	339	346
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.24	0.19	0.22	0.22

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	46	403	33	11	430	14	36	24	12	28	24	23
Future Volume (veh/h)	46	403	33	11	430	14	36	24	12	28	24	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.85	0.92		0.85	0.85		0.83	0.85		0.83
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1750	1709	1750	1750	1750	1750	1750	1750	1750	1654	1750	1750
Adj Flow Rate, veh/h	47	411	34	11	439	14	37	24	12	29	24	23
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	3	0	0	0	0	0	0	0	7	0	0
Cap, veh/h	197	1618	133	66	2005	63	204	122	52	155	121	95
Arrive On Green	1.00	1.00	1.00	0.64	0.64	0.64	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	229	2532	208	34	3138	99	616	537	227	425	531	415
Grp Volume(v), veh/h	251	0	241	244	0	220	73	0	0	76	0	0
Grp Sat Flow(s),veh/h/ln	1496	0	1473	1717	0	1553	1379	0	0	1372	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	5.1	0.0	0.0	0.0	0.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.0	0.0	5.0	0.0	5.1	3.1	0.0	0.0	3.4	0.0	0.0
Prop In Lane	0.19		0.14	0.05		0.06	0.51		0.16	0.38		0.30
Lane Grp Cap(c), veh/h	1007	0	941	1141	0	993	378	0	0	371	0	0
V/C Ratio(X)	0.25	0.00	0.26	0.21	0.00	0.22	0.19	0.00	0.00	0.20	0.00	0.00
Avail Cap(c_a), veh/h	1007	0	941	1141	0	993	404	0	0	397	0	0
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.00	0.98	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	0.0	0.0	6.4	0.0	6.5	26.5	0.0	0.0	26.6	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.6	0.4	0.0	0.5	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.2	1.7	0.0	1.6	1.2	0.0	0.0	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.6	0.0	0.6	6.9	0.0	7.0	26.8	0.0	0.0	26.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	C	A	A	C	A	A
Approach Vol, veh/h		492			464			73			76	
Approach Delay, s/veh		0.6			6.9			26.8			26.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		59.6		25.4		59.6		25.4				
Change Period (Y+Rc), s		* 5.3		6.0		* 5.3		6.0				
Max Green Setting (Gmax), s		* 53		21.0		* 53		21.0				
Max Q Clear Time (g_c+I1), s		2.0		5.4		7.1		5.1				
Green Ext Time (p_c), s		3.6		0.3		3.1		0.3				

Intersection Summary		
HCM 6th Ctrl Delay	6.8	
HCM 6th LOS	A	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	37	409	11	39	39	0	0	30	44
Future Vol, veh/h	0	0	0	37	409	11	39	39	0	0	30	44
Conflicting Peds, #/hr	30	0	52	52	0	30	29	0	28	28	0	29
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	5	2	0	0	0	0	0	0	0
Mvmt Flow	0	0	0	42	465	13	44	44	0	0	34	50

Major/Minor	Major2			Minor1			Minor2		
Conflicting Flow All	52	0	0	415	644	-	-	638	298
Stage 1	-	-	-	52	52	-	-	586	-
Stage 2	-	-	-	363	592	-	-	52	-
Critical Hdwy	4.2	-	-	7.5	6.5	-	-	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	2.25	-	-	3.5	4	-	-	4	3.3
Pot Cap-1 Maneuver	1530	-	-	527	394	0	0	397	704
Stage 1	-	-	-	-	-	0	0	500	-
Stage 2	-	-	-	634	497	0	0	-	-
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1454	-	-	417	349	-	-	352	684
Mov Cap-2 Maneuver	-	-	-	417	349	-	-	352	-
Stage 1	-	-	-	-	-	-	-	467	-
Stage 2	-	-	-	524	464	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0.7	17.3	13.8
HCM LOS		C	B

Minor Lane/Major Mvmt	NBLn1	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	380	1454	-	-	495
HCM Lane V/C Ratio	0.233	0.029	-	-	0.17
HCM Control Delay (s)	17.3	7.5	0.1	-	13.8
HCM Lane LOS	C	A	A	-	B
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0.6

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	392	26	0	0	0	0	38	38	38	50	0
Future Vol, veh/h	27	392	26	0	0	0	0	38	38	38	50	0
Conflicting Peds, #/hr	15	0	11	11	0	15	32	0	14	14	0	32
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	32	461	31	0	0	0	0	45	45	45	59	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	15	0	0	-	567	271	346	582	-
Stage 1	-	-	-	-	552	-	15	15	-
Stage 2	-	-	-	-	15	-	331	567	-
Critical Hdwy	4.1	-	-	-	6.5	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	-	4	3.3	3.5	4	-
Pot Cap-1 Maneuver	1616	-	-	0	436	733	589	427	0
Stage 1	-	-	-	0	518	-	-	-	0
Stage 2	-	-	-	0	-	-	662	510	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	1593	-	-	-	414	725	489	405	-
Mov Cap-2 Maneuver	-	-	-	-	414	-	489	405	-
Stage 1	-	-	-	-	498	-	-	-	-
Stage 2	-	-	-	-	-	-	550	491	-

Approach	EB	NB	SB
HCM Control Delay, s	0.5	13.2	15.8
HCM LOS		B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	527	1593	-	-	437
HCM Lane V/C Ratio	0.17	0.02	-	-	0.237
HCM Control Delay (s)	13.2	7.3	0.1	-	15.8
HCM Lane LOS	B	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0.1	-	-	0.9

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	65.0	65.0	40.0	40.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	2	2
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	16	23	46	36
Ped. Right-Left Flow Rate (p/h)	16	23	46	37
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	25	18	17	17
Veh. Perm. R. Flow in Walk (v/h)	31	22	16	18
Veh. RTOR Flow in Walk (v/h)	3	2	2	2
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	570.8	595.7	511.2	677.1
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	616.5	436.8	193.0	242.9
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	27.3	27.3	27.3	27.3
Pedestrian Compliance Code	Fair	Fair	Fair	Fair
Pedestrian Crosswalk Score	2.36	2.35	1.80	1.80
Pedestrian Crosswalk LOS	B	B	B	B

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	6.9
Level of Service	B

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	257
Ped Vol Crossed	22
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.64
Prob of Blocked Lane	0.40
Delay for adq Gap	16.80
Avg Ped Delay (s)	6.95

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	6.9
Level of Service	B

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	257
Ped Vol Crossed	41
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.64
Prob of Blocked Lane	0.40
Delay for adq Gap	16.80
Avg Ped Delay (s)	6.95

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	17.0
Level of Service	C

Crosswalk	
Length (ft)	50
Lanes Crossed	2
Veh Vol Crossed	352
Ped Vol Crossed	16
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	17.29
Prob of Delayed X-ing	0.82
Prob of Blocked Lane	0.57
Delay for adq Gap	34.24
Avg Ped Delay (s)	17.00

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	9.0
Level of Service	B

Crosswalk	
Length (ft)	36
Lanes Crossed	2
Veh Vol Crossed	352
Ped Vol Crossed	26
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	13.29
Prob of Delayed X-ing	0.73
Prob of Blocked Lane	0.48
Delay for adq Gap	19.22
Avg Ped Delay (s)	9.02

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	60.0	60.0	40.0	40.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	2	2
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	46	8	32	59
Ped. Right-Left Flow Rate (p/h)	47	9	32	59
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	38	14	18	18
Veh. Perm. R. Flow in Walk (v/h)	29	23	18	18
Veh. RTOR Flow in Walk (v/h)	3	2	2	2
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	447.2	522.8	883.1	328.5
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	203.5	1169.1	276.9	149.0
Crosswalk Circulation Code	A	A	A	A
Pedestrian Delay (s/p)	27.3	27.3	27.3	27.3
Pedestrian Compliance Code	Fair	Fair	Fair	Fair
Pedestrian Crosswalk Score	2.40	2.36	1.81	1.82
Pedestrian Crosswalk LOS	B	B	B	B

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	6.7
Level of Service	B

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	252
Ped Vol Crossed	25
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.64
Prob of Blocked Lane	0.40
Delay for adq Gap	16.53
Avg Ped Delay (s)	6.68

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	6.7
Level of Service	B

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	252
Ped Vol Crossed	22
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.64
Prob of Blocked Lane	0.40
Delay for adq Gap	16.53
Avg Ped Delay (s)	6.68

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	10.9
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	354
Ped Vol Crossed	21
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.76
Prob of Blocked Lane	0.51
Delay for adq Gap	22.99
Avg Ped Delay (s)	10.93

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	10.9
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	354
Ped Vol Crossed	6
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.76
Prob of Blocked Lane	0.51
Delay for adq Gap	22.99
Avg Ped Delay (s)	10.93

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	65.0	65.0	40.0	40.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	2	2
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	48	73	213	236
Ped. Right-Left Flow Rate (p/h)	49	73	213	235
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	24	22	29	39
Veh. Perm. R. Flow in Walk (v/h)	53	42	13	28
Veh. RTOR Flow in Walk (v/h)	5	4	2	3
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	119.2	98.0	107.3	108.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	171.0	115.2	33.7	28.4
Crosswalk Circulation Code	A	A	C	C
Pedestrian Delay (s/p)	32.2	32.2	32.2	32.2
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.43	2.42	1.86	1.88
Pedestrian Crosswalk LOS	B	B	B	B

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	12.9
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	398
Ped Vol Crossed	39
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.80
Prob of Blocked Lane	0.55
Delay for adq Gap	26.48
Avg Ped Delay (s)	12.93

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	12.9
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	398
Ped Vol Crossed	83
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.80
Prob of Blocked Lane	0.55
Delay for adq Gap	26.48
Avg Ped Delay (s)	12.93

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	22.3
Level of Service	D

Crosswalk	
Length (ft)	50
Lanes Crossed	2
Veh Vol Crossed	451
Ped Vol Crossed	38
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	17.29
Prob of Delayed X-ing	0.89
Prob of Blocked Lane	0.66
Delay for adq Gap	50.07
Avg Ped Delay (s)	22.32

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	12.7
Level of Service	C

Crosswalk	
Length (ft)	36
Lanes Crossed	2
Veh Vol Crossed	451
Ped Vol Crossed	35
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	13.29
Prob of Delayed X-ing	0.81
Prob of Blocked Lane	0.56
Delay for adq Gap	25.78
Avg Ped Delay (s)	12.74

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	60.0	60.0	40.0	40.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	2	2
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	127	44	185	251
Ped. Right-Left Flow Rate (p/h)	127	44	185	251
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	50	16	23	35
Veh. Perm. R. Flow in Walk (v/h)	24	30	12	23
Veh. RTOR Flow in Walk (v/h)	2	3	2	2
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	96.7	103.4	139.0	76.3
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	62.8	193.5	39.8	27.2
Crosswalk Circulation Code	A	A	C	C
Pedestrian Delay (s/p)	32.2	32.2	32.2	32.2
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.49	2.43	1.82	1.87
Pedestrian Crosswalk LOS	B	B	B	B

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	12.1
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	380
Ped Vol Crossed	58
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.78
Prob of Blocked Lane	0.53
Delay for adq Gap	24.99
Avg Ped Delay (s)	12.06

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	12.1
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	380
Ped Vol Crossed	29
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.78
Prob of Blocked Lane	0.53
Delay for adq Gap	24.99
Avg Ped Delay (s)	12.06

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	20.7
Level of Service	D

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	459
Ped Vol Crossed	91
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.88
Prob of Blocked Lane	0.65
Delay for adq Gap	44.97
Avg Ped Delay (s)	20.74

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	15.7
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	459
Ped Vol Crossed	18
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.84
Prob of Blocked Lane	0.60
Delay for adq Gap	32.21
Avg Ped Delay (s)	15.72

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	65.0	65.0	40.0	40.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	2	2
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	19	43	111	161
Ped. Right-Left Flow Rate (p/h)	20	43	111	161
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	24	11	31	23
Veh. Perm. R. Flow in Walk (v/h)	29	15	14	23
Veh. RTOR Flow in Walk (v/h)	3	2	2	2
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	259.1	158.5	216.6	181.9
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	443.5	207.7	66.4	44.9
Crosswalk Circulation Code	A	A	A	B
Pedestrian Delay (s/p)	32.2	32.2	32.2	32.2
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.41	2.38	1.83	1.82
Pedestrian Crosswalk LOS	B	B	B	B

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	15.6
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	454
Ped Vol Crossed	31
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.84
Prob of Blocked Lane	0.60
Delay for adq Gap	31.70
Avg Ped Delay (s)	15.56

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	15.6
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	454
Ped Vol Crossed	52
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.84
Prob of Blocked Lane	0.60
Delay for adq Gap	31.70
Avg Ped Delay (s)	15.56

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	18.0
Level of Service	C

Crosswalk	
Length (ft)	50
Lanes Crossed	2
Veh Vol Crossed	365
Ped Vol Crossed	25
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	17.29
Prob of Delayed X-ing	0.83
Prob of Blocked Lane	0.58
Delay for adq Gap	35.99
Avg Ped Delay (s)	18.04

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	9.4
Level of Service	B

Crosswalk	
Length (ft)	36
Lanes Crossed	2
Veh Vol Crossed	365
Ped Vol Crossed	21
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	13.29
Prob of Delayed X-ing	0.74
Prob of Blocked Lane	0.49
Delay for adq Gap	19.98
Avg Ped Delay (s)	9.41

Approach	EB	WB	NB	SB
Crosswalk Length (ft)	60.0	60.0	40.0	40.0
Crosswalk Width (ft)	12.0	12.0	12.0	12.0
Total Number of Lanes Crossed	4	4	2	2
Number of Right-Turn Islands	0	0	0	0
Type of Control	Pretimed	Pretimed	Pretimed	Pretimed
Corresponding Signal Phase	4	8	2	6
Effective Walk Time (s)	11.0	11.0	11.0	11.0
Right Corner Size A (ft)	9.0	9.0	9.0	9.0
Right Corner Size B (ft)	9.0	9.0	9.0	9.0
Right Corner Curb Radius (ft)	0.0	0.0	0.0	0.0
Right Corner Total Area (sq.ft)	81.00	81.00	81.00	81.00
Ped. Left-Right Flow Rate (p/h)	65	24	84	165
Ped. Right-Left Flow Rate (p/h)	65	25	84	166
Ped. R. Sidewalk Flow Rate (p/h)	0	0	0	0
Veh. Perm. L. Flow in Walk (v/h)	46	11	36	28
Veh. Perm. R. Flow in Walk (v/h)	33	14	12	23
Veh. RTOR Flow in Walk (v/h)	3	2	2	2
85th percentile speed (mph)	30	30	30	30
Right Corner Area per Ped (sq.ft)	224.5	171.7	315.9	138.0
Right Corner Quality of Service	A	A	A	A
Ped. Circulation Area (sq.ft)	123.7	360.4	87.9	43.1
Crosswalk Circulation Code	A	A	A	B
Pedestrian Delay (s/p)	32.2	32.2	32.2	32.2
Pedestrian Compliance Code	Poor	Poor	Poor	Poor
Pedestrian Crosswalk Score	2.44	2.37	1.83	1.83
Pedestrian Crosswalk LOS	B	B	B	B

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	13.5
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	409
Ped Vol Crossed	29
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.81
Prob of Blocked Lane	0.56
Delay for adq Gap	27.44
Avg Ped Delay (s)	13.50

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	13.5
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	409
Ped Vol Crossed	28
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.81
Prob of Blocked Lane	0.56
Delay for adq Gap	27.44
Avg Ped Delay (s)	13.50

Approach	
Approach Direction	EB
Median Present?	No
Approach Delay(s)	12.6
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	392
Ped Vol Crossed	32
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.79
Prob of Blocked Lane	0.54
Delay for adq Gap	25.98
Avg Ped Delay (s)	12.63

Approach	
Approach Direction	WB
Median Present?	No
Approach Delay(s)	12.6
Level of Service	C

Crosswalk	
Length (ft)	40
Lanes Crossed	2
Veh Vol Crossed	392
Ped Vol Crossed	14
Yield Rate(%)	50
Ped Platooning	No
Critical Headway (s)	14.43
Prob of Delayed X-ing	0.79
Prob of Blocked Lane	0.54
Delay for adq Gap	25.98
Avg Ped Delay (s)	12.63

TRAFFIC SIGNAL WARRANTS – EXISTING (2022)

APPENDIX D

ENDURING COMMUNITY DESIGN

SANDERSON STEWART

TRAFFIC SIGNAL WARRANTS		Existing Volumes (2022)			
		E Mendenhall Street & N Tracy Avenue	**E Mendenhall Street & N Black Avenue**	**E Babcock Street & S Tracy Avenue**	**E Babcock Street & S Black Avenue**
1. Eight-Hour Vehicular Volume		x	x	x	x
2. Four-Hour Vehicular Volume		x	x	x	x
3. Peak Hour		x	x	x	x
4. Pedestrian Volume		x	x	x	x
5. School Crossing		--	--	--	--
6. Coordinated Signal System		x	x	x	x
7. Crash History		x	x	x	x
8. Roadway Network		x	x	x	x
9. Intersection Near a Grade Crossing		--	--	--	--
Signals Warranted	**Yes**				
	No	**x**	**x**	**x**	**x**

Warrant 1: Eight-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Tracy Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	3	7	0	29	29	7
1:00	3	3	0	21	21	3
2:00	1	0	0	7	7	1
3:00	0	1	0	6	6	1
4:00	1	3	0	8	8	3
5:00	14	8	0	27	27	14
6:00	8	9	0	66	66	9
7:00	40	34	0	182	182	40
8:00	43	40	0	293	293	43
9:00	82	41	0	296	296	82
10:00	103	67	0	318	318	103
11:00	86	77	0	409	409	86
12:00	130	77	0	488	488	130
13:00	89	75	0	444	444	89
14:00	97	71	0	385	385	97
15:00	72	65	0	417	417	72
16:00	76	62	0	422	422	76
17:00	73	56	0	514	514	73
18:00	84	75	0	335	335	84
19:00	64	45	0	259	259	64
20:00	42	29	0	240	240	42
21:00	36	30	0	194	194	36
22:00	23	16	0	122	122	23
23:00	11	8	0	65	65	11
TOTAL	**1181**	**899**	**0**	**5547**	**5547**	**1189**

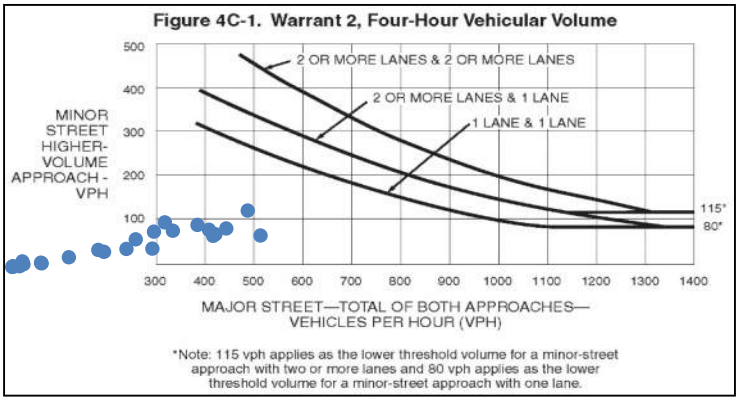
		Hrs
Condition A - Minimum Vehicular Volume (100% Columns):		
Major Street Total > 600 and Higher Minor Street Total > 150 for 8 hours?	**No**	**0**
Condition B - Interruption of Continuous Traffic (100% Columns):		
Major Street Total > 900 and Higher Minor Street Total > 75 for 8 hours?	**No**	**0**
Combination of Conditions A & B (80% Columns):		
Major Street Total > 480 and Higher Minor Street Total > 120 for 8 hours?	**No**	**1**
Major Street Total > 720 and Higher Minor Street Total > 60 for 8 hours?	**No**	**0**
Warrant 1 Satisfied?	**No**	

Warrant 2: Four-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Tracy Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	3	7	0	29	29	7
1:00	3	3	0	21	21	3
2:00	1	0	0	7	7	1
3:00	0	1	0	6	6	1
4:00	1	3	0	8	8	3
5:00	14	8	0	27	27	14
6:00	8	9	0	66	66	9
7:00	40	34	0	182	182	40
8:00	43	40	0	293	293	43
9:00	82	41	0	296	296	82
10:00	103	67	0	318	318	103
11:00	86	77	0	409	409	86
12:00	130	77	0	488	488	130
13:00	89	75	0	444	444	89
14:00	97	71	0	385	385	97
15:00	72	65	0	417	417	72
16:00	76	62	0	422	422	76
17:00	73	56	0	514	514	73
18:00	84	75	0	335	335	84
19:00	64	45	0	259	259	64
20:00	42	29	0	240	240	42
21:00	36	30	0	194	194	36
22:00	23	16	0	122	122	23
23:00	11	8	0	65	65	11
TOTAL	**1181**	**899**	**0**	**5547**	**5547**	**1189**



Meets warrant criteria on graph for minimum of 4 hours (100% thresholds)? **No (0 hrs)**

Warrant 2 Satisfied? **No**

Warrant 3: Peak Hour

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Tracy Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

AM Peak Hour	**8:30 - 9:30 AM**
High Minor Total Stopped Time Delay (hrs)	**0.21**
Total Volume of Major Approaches (vehs)	**307**
High Minor Approach Volume (vehs)	**60**
Total Entering Volume (vehs)	**367**

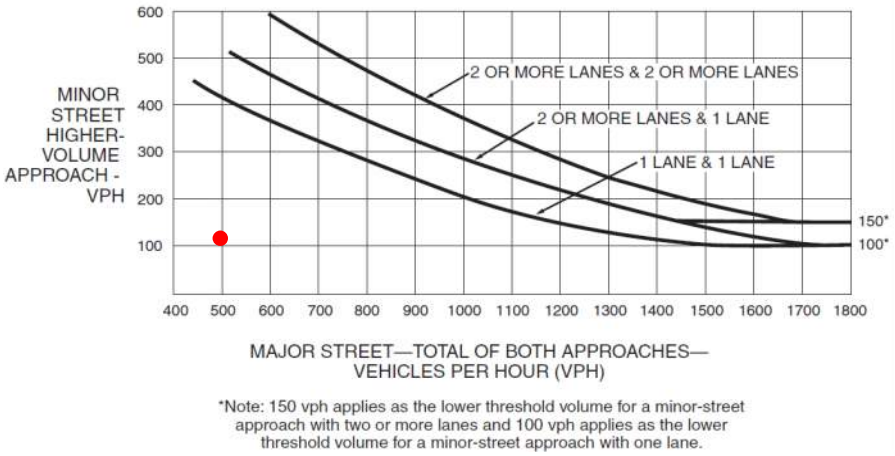
PM Peak Hour	**4:45 - 5:45 PM**
High Minor Total Stopped Time Delay (hrs)	**0.61**
Total Volume of Major Approaches (vehs)	**487**
High Minor Approach Volume (vehs)	**121**
Total Entering Volume (vehs)	**608**

Category A: Peak Period: AM

Total stopped time delay for minor approach > 4 veh-hrs?	**No (0.61)**
High minor approach volume > 100 for peak hour?	**Yes (121)**
Total entering volume > 800 for peak hour?	**No (608)**
Category A warrant satisfied?	**No**

Category B:

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Meets warrant criteria on graph for minimum of one hour (100% thresholds)?	**No**
Warrant 3 Satisfied?	**No**

Warrant 4: Pedestrian Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Tracy Avenue (1 lane)
Analysis Year/Case:	Design Year (2042)

This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Hour Begin	Major Street Total Traffic	Pedestrian Volume Crossing Major Street
0:00	43	0
1:00	31	0
2:00	10	0
3:00	9	0
4:00	12	0
5:00	40	4
6:00	98	16
7:00	270	30
8:00	435	53
9:00	440	61
10:00	473	67
11:00	608	110
12:00	725	187
13:00	660	214
14:00	572	160
15:00	620	135
16:00	627	100
17:00	764	108
18:00	498	158
19:00	385	227
20:00	357	207
21:00	288	199
22:00	181	28
23:00	97	0
TOTAL	**8,243**	**2064**

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

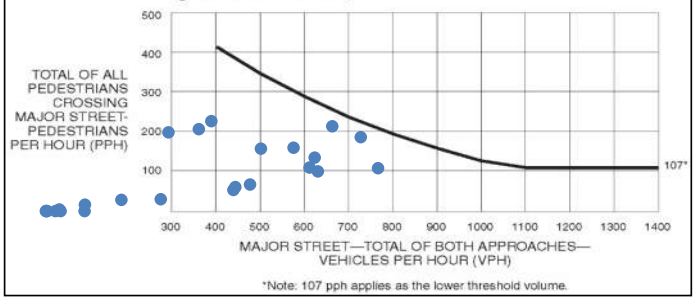
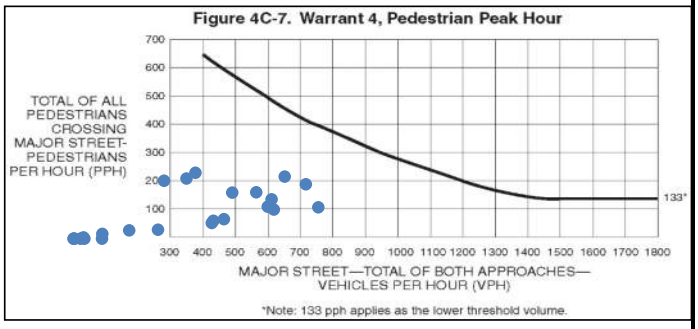


Figure 4C-7. Warrant 4, Pedestrian Peak Hour



For each of any 4 hours of an average day, do the plotted points representing representing the vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-5? **No**

For 1 hour of an average day, does the plotted point representing vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-7? **No**

Warrant 4 Satisfied? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Tracy Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 5: School Crossing

This warrant is intended for application where the fact that school children (elementary through high school students) cross the major street is the principle reason to consider installing a traffic signal. This warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless it can be shown that the proposed traffic signal would not restrict the progressive movement of traffic.

Is the number of adequate gaps in the major crossing traffic steam during the primary crossing period less than the number of minutes in that crossing period? **N/A**

Do 20 or more students cross at this location during the highest crossing hour? **N/A**

Warrant 5 Satisfied? **N/A**

Warrant 6: Coordinated Signal System

This warrant is intended for application where installation of a traffic signal would help to provide proper platooning of vehicles and therefore provide progressive movement in a coordinated signal system.

Are any adjacent traffic signals located so far away that they do not provide a necessary degree of platooning and/or progressive operation? **No**

Warrant 6 Satisfied? **No**

Warrant 7: Crash Experience

This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal

Have adequate trials of alternatives failed to reduce the crash frequency? **N/A**

Have 5 or more crashes, of types susceptible to correction by a signal, occurred within a 12-month period? **No**

Is Condition A criterion met for 80% columns of Warrant 1 met? **No**

Is Condition B criterion met for 80% columns of Warrant 1 met? **No**

Are observed pedestrian volumes equal to or greater than 80% of what is required for Warrant 4? **No**

Warrant 7 Satisfied? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Tracy Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 8: Roadway Network

This warrant is intended for application where installation of a traffic signal could be justified in order to encourage concentration and organization of traffic flow on a roadway network

Do two or more of the intersecting routes at this location have at least one of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
B. It includes rural or suburban highways outside, entering, or traversing a City; or
C. It appears as a major route on an official plan.

No

Does this intersection have an existing or immediately projected total entering volume of a least 1000 vehicles during a weekday typical peak hour and have a 5-year projected traffic volume that meets one or more of Warrants 1, 2, and 3 during an average weekday? **No**

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vph for each of any 5 hours of a Saturday or Sunday? **N/A**

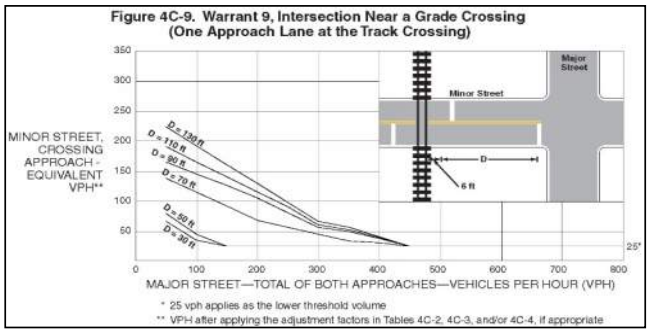
Warrant 8 Satisfied? **No**

Warrant 9: Intersection Near a Grade Crossing

This warrant is intended for application where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

Does a grade crossing exist on an approach controlled by a STOP or YIELD sign whereby the center of the track nearest to the intersection is within 140 feet of the stop or yield line?

No



During the highest traffic volume hour during which the rail traffic uses the crossing, does the plotted point representing vehicles per hour on the major street and the corresponding vehicles per hour on the minor-street approach that crosses the track fall above the applicable curve in Figure 4C-9 or 4C-10 (whichever is applicable) for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance? **N/A**

Warrant 9 Satisfied? **N/A**

Warrant 1: Eight-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	5	6	0	20	20	6
1:00	3	2	0	15	15	3
2:00	1	0	0	6	6	1
3:00	0	1	0	5	5	1
4:00	1	6	0	5	5	6
5:00	6	7	0	24	24	7
6:00	15	19	0	63	63	19
7:00	36	37	0	172	172	37
8:00	68	94	0	268	268	94
9:00	64	57	0	287	287	64
10:00	86	71	0	307	307	86
11:00	104	69	0	421	421	104
12:00	114	91	0	450	450	114
13:00	102	76	0	390	390	102
14:00	90	50	0	359	359	90
15:00	96	63	0	383	383	96
16:00	66	69	0	372	372	69
17:00	78	74	0	454	454	78
18:00	62	97	0	309	309	97
19:00	42	64	0	213	213	64
20:00	34	37	0	182	182	37
21:00	28	27	0	143	143	28
22:00	20	23	0	99	99	23
23:00	10	5	0	60	60	10
TOTAL	**1131**	**1045**	**0**	**5007**	**5007**	**1236**

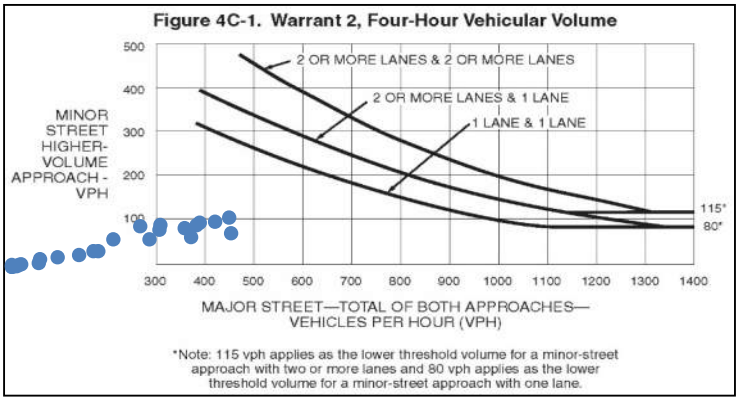
		Hrs
Condition A - Minimum Vehicular Volume (100% Columns):		
Major Street Total > 600 and Higher Minor Street Total > 150 for 8 hours?	**No**	**0**
Condition B - Interruption of Continuous Traffic (100% Columns):		
Major Street Total > 900 and Higher Minor Street Total > 75 for 8 hours?	**No**	**0**
Combination of Conditions A & B (80% Columns):		
Major Street Total > 480 and Higher Minor Street Total > 120 for 8 hours?	**No**	**0**
Major Street Total > 720 and Higher Minor Street Total > 60 for 8 hours?	**No**	**0**
Warrant 1 Satisfied?	**No**	

Warrant 2: Four-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	5	6	0	20	20	6
1:00	3	2	0	15	15	3
2:00	1	0	0	6	6	1
3:00	0	1	0	5	5	1
4:00	1	6	0	5	5	6
5:00	6	7	0	24	24	7
6:00	15	19	0	63	63	19
7:00	36	37	0	172	172	37
8:00	68	94	0	268	268	94
9:00	64	57	0	287	287	64
10:00	86	71	0	307	307	86
11:00	104	69	0	421	421	104
12:00	114	91	0	450	450	114
13:00	102	76	0	390	390	102
14:00	90	50	0	359	359	90
15:00	96	63	0	383	383	96
16:00	66	69	0	372	372	69
17:00	78	74	0	454	454	78
18:00	62	97	0	309	309	97
19:00	42	64	0	213	213	64
20:00	34	37	0	182	182	37
21:00	28	27	0	143	143	28
22:00	20	23	0	99	99	23
23:00	10	5	0	60	60	10
TOTAL	**1131**	**1045**	**0**	**5007**	**5007**	**1236**



Meets warrant criteria on graph for minimum of 4 hours (100% thresholds)? **No (0 hrs)**

Warrant 2 Satisfied? **No**

Warrant 3: Peak Hour

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

AM Peak Hour	**8:30 - 9:30 AM**
High Minor Total Stopped Time Delay (hrs)	**0.33**
Total Volume of Major Approaches (vehs)	**288**
High Minor Approach Volume (vehs)	**90**
Total Entering Volume (vehs)	**378**

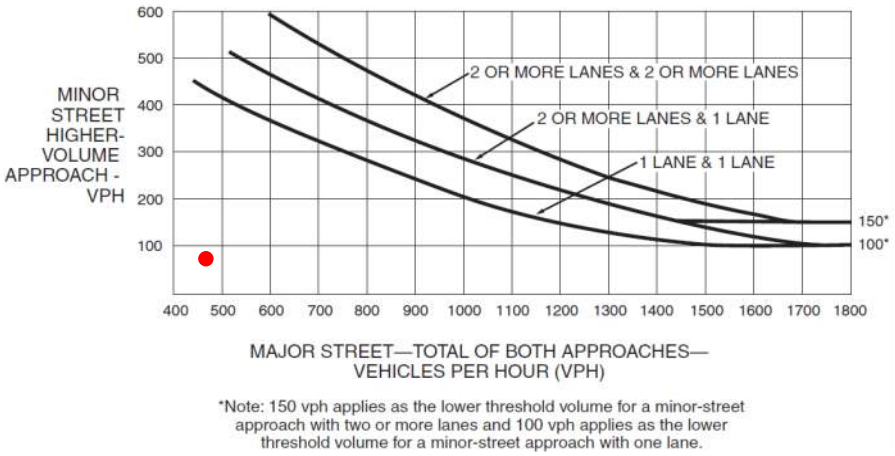
PM Peak Hour	**4:45 - 5:45 PM**
High Minor Total Stopped Time Delay (hrs)	**0.37**
Total Volume of Major Approaches (vehs)	**457**
High Minor Approach Volume (vehs)	**78**
Total Entering Volume (vehs)	**535**

Category A: Peak Period: AM

Total stopped time delay for minor approach > 4 veh-hrs?	**No (0.37)**
High minor approach volume > 100 for peak hour?	**No (78)**
Total entering volume > 800 for peak hour?	**No (535)**
Category A warrant satisfied?	**No**

Category B:

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Meets warrant criteria on graph for minimum of one hour (100% thresholds)?	**No**
Warrant 3 Satisfied?	**No**

Warrant 4: Pedestrian Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Design Year (2042)

This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Hour Begin	Major Street Total Traffic	Pedestrian Volume Crossing Major Street
0:00	30	0
1:00	22	0
2:00	9	0
3:00	7	0
4:00	7	0
5:00	36	12
6:00	94	12
7:00	256	45
8:00	398	61
9:00	426	40
10:00	456	52
11:00	626	76
12:00	669	73
13:00	580	98
14:00	533	97
15:00	569	103
16:00	553	89
17:00	675	113
18:00	459	106
19:00	317	101
20:00	270	175
21:00	212	128
22:00	147	97
23:00	89	0
TOTAL	**7,440**	**1478**

Warrant 4 Satisfied? **No**

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

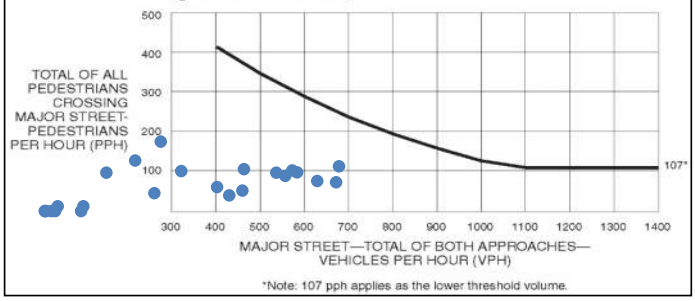
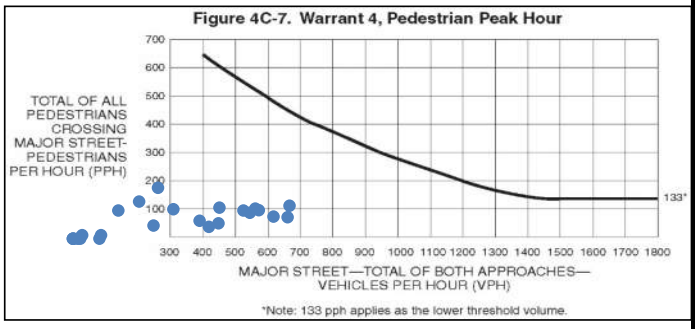


Figure 4C-7. Warrant 4, Pedestrian Peak Hour



For each of any 4 hours of an average day, do the plotted points representing representing the vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-5? **No**

For 1 hour of an average day, does the plotted point representing vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-7? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 5: School Crossing

This warrant is intended for application where the fact that school children (elementary through high school students) cross the major street is the principle reason to consider installing a traffic signal. This warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless it can be shown that the proposed traffic signal would not restrict the progressive movement of traffic.

Is the number of adequate gaps in the major crossing traffic steam during the primary crossing period less than the number of minutes in that crossing period? **N/A**

Do 20 or more students cross at this location during the highest crossing hour? **N/A**

Warrant 5 Satisfied? **N/A**

Warrant 6: Coordinated Signal System

This warrant is intended for application where installation of a traffic signal would help to provide proper platooning of vehicles and therefore provide progressive movement in a coordinated signal system.

Are any adjacent traffic signals located so far away that they do not provide a necessary degree of platooning and/or progressive operation? **No**

Warrant 6 Satisfied? **No**

Warrant 7: Crash Experience

This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal

Have adequate trials of alternatives failed to reduce the crash frequency? **N/A**

Have 5 or more crashes, of types susceptible to correction by a signal, occurred within a 12-month period? **No**

Is Condition A criterion met for 80% columns of Warrant 1 met? **No**

Is Condition B criterion met for 80% columns of Warrant 1 met? **No**

Are observed pedestrian volumes equal to or greater than 80% of what is required for Warrant 4? **No**

Warrant 7 Satisfied? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Mendenhall Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 8: Roadway Network

This warrant is intended for application where installation of a traffic signal could be justified in order to encourage concentration and organization of traffic flow on a roadway network

Do two or more of the intersecting routes at this location have at least one of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
B. It includes rural or suburban highways outside, entering, or traversing a City; or
C. It appears as a major route on an official plan.

No

Does this intersection have an existing or immediately projected total entering volume of a least 1000 vehicles during a weekday typical peak hour and have a 5-year projected traffic volume that meets one or more of Warrants 1, 2, and 3 during an average weekday? **No**

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vph for each of any 5 hours of a Saturday or Sunday? **N/A**

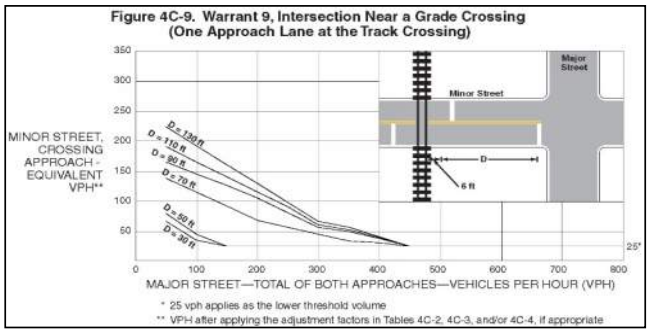
Warrant 8 Satisfied? **No**

Warrant 9: Intersection Near a Grade Crossing

This warrant is intended for application where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

Does a grade crossing exist on an approach controlled by a STOP or YIELD sign whereby the center of the track nearest to the intersection is within 140 feet of the stop or yield line?

No



During the highest traffic volume hour during which the rail traffic uses the crossing, does the plotted point representing vehicles per hour on the major street and the corresponding vehicles per hour on the minor-street approach that crosses the track fall above the applicable curve in Figure 4C-9 or 4C-10 (whichever is applicable) for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance? **N/A**

Warrant 9 Satisfied? **N/A**

Warrant 1: Eight-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	2	0	8	0	8	2
1:00	0	3	8	0	8	3
2:00	2	0	3	0	3	2
3:00	0	1	3	0	3	1
4:00	1	1	8	0	8	1
5:00	7	5	46	0	46	7
6:00	13	24	90	0	90	24
7:00	23	35	269	0	269	35
8:00	31	76	383	0	383	76
9:00	58	91	352	0	352	91
10:00	61	117	358	0	358	117
11:00	84	124	430	0	430	124
12:00	93	127	502	0	502	127
13:00	78	107	433	0	433	107
14:00	67	97	378	0	378	97
15:00	76	84	393	0	393	84
16:00	68	56	371	0	371	68
17:00	52	71	402	0	402	71
18:00	33	60	289	0	289	60
19:00	23	33	194	0	194	33
20:00	16	28	128	0	128	28
21:00	11	19	75	0	75	19
22:00	4	7	44	0	44	7
23:00	6	10	19	0	19	10
TOTAL	**809**	**1176**	**5186**	**0**	**5186**	**1194**

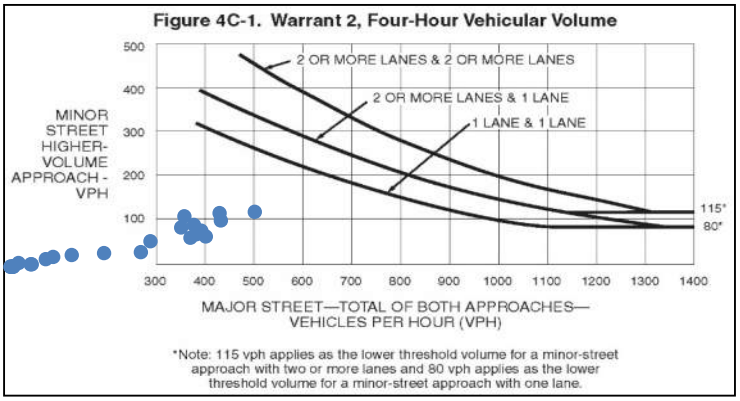
Condition A - Minimum Vehicular Volume (100% Columns):		**Hrs**
Major Street Total > 600 and Higher Minor Street Total > 150 for 8 hours?	**No**	**0**
Condition B - Interruption of Continuous Traffic (100% Columns):		
Major Street Total > 900 and Higher Minor Street Total > 75 for 8 hours?	**No**	**0**
Combination of Conditions A & B (80% Columns):		
Major Street Total > 480 and Higher Minor Street Total > 120 for 8 hours?	**No**	**1**
Major Street Total > 720 and Higher Minor Street Total > 60 for 8 hours?	**No**	**0**
Warrant 1 Satisfied?	**No**	

Warrant 2: Four-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	2	0	8	0	8	2
1:00	0	3	8	0	8	3
2:00	2	0	3	0	3	2
3:00	0	1	3	0	3	1
4:00	1	1	8	0	8	1
5:00	7	5	46	0	46	7
6:00	13	24	90	0	90	24
7:00	23	35	269	0	269	35
8:00	31	76	383	0	383	76
9:00	58	91	352	0	352	91
10:00	61	117	358	0	358	117
11:00	84	124	430	0	430	124
12:00	93	127	502	0	502	127
13:00	78	107	433	0	433	107
14:00	67	97	378	0	378	97
15:00	76	84	393	0	393	84
16:00	68	56	371	0	371	68
17:00	52	71	402	0	402	71
18:00	33	60	289	0	289	60
19:00	23	33	194	0	194	33
20:00	16	28	128	0	128	28
21:00	11	19	75	0	75	19
22:00	4	7	44	0	44	7
23:00	6	10	19	0	19	10
TOTAL	**809**	**1176**	**5186**	**0**	**5186**	**1194**



Meets warrant criteria on graph for minimum of 4 hours (100% thresholds)? **No (0 hrs)**

Warrant 2 Satisfied? **No**

Warrant 3: Peak Hour

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

AM Peak Hour	**8:30 - 9:30 AM**
High Minor Total Stopped Time Delay (hrs)	**0.31**
Total Volume of Major Approaches (vehs)	**385**
High Minor Approach Volume (vehs)	**83**
Total Entering Volume (vehs)	**468**

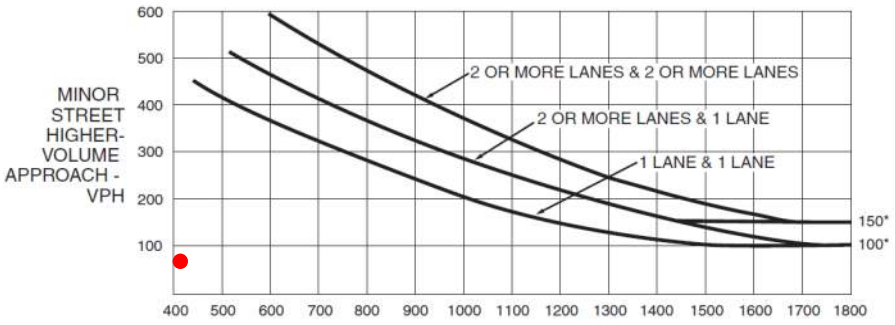
PM Peak Hour	**4:45 - 5:45 PM**
High Minor Total Stopped Time Delay (hrs)	**0.28**
Total Volume of Major Approaches (vehs)	**404**
High Minor Approach Volume (vehs)	**72**
Total Entering Volume (vehs)	**476**

Category A: Peak Period: AM

Total stopped time delay for minor approach > 4 veh-hrs?	**No (0.31)**
High minor approach volume > 100 for peak hour?	**No (72)**
Total entering volume > 800 for peak hour?	**No (476)**
Category A warrant satisfied?	**No**

Category B:

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Meets warrant criteria on graph for minimum of one hour (100% thresholds)?	**No**
Warrant 3 Satisfied?	**No**

Warrant 4: Pedestrian Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Design Year (2042)

This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Hour Begin	Major Street Total Traffic	Pedestrian Volume Crossing Major Street
0:00	12	0
1:00	12	0
2:00	4	0
3:00	4	0
4:00	12	0
5:00	68	4
6:00	134	15
7:00	400	24
8:00	569	33
9:00	523	85
10:00	532	76
11:00	639	92
12:00	746	120
13:00	643	86
14:00	562	85
15:00	584	73
16:00	551	59
17:00	597	61
18:00	429	45
19:00	288	36
20:00	190	24
21:00	111	6
22:00	65	6
23:00	28	0
TOTAL	**7,703**	**930**

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

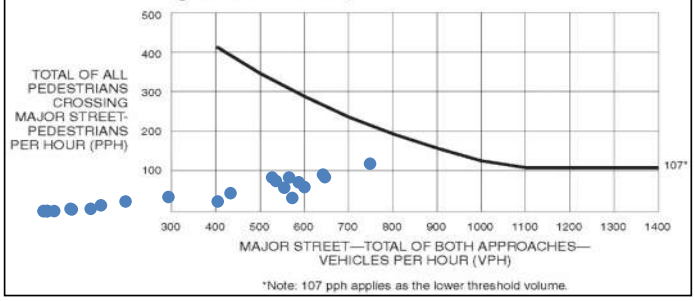
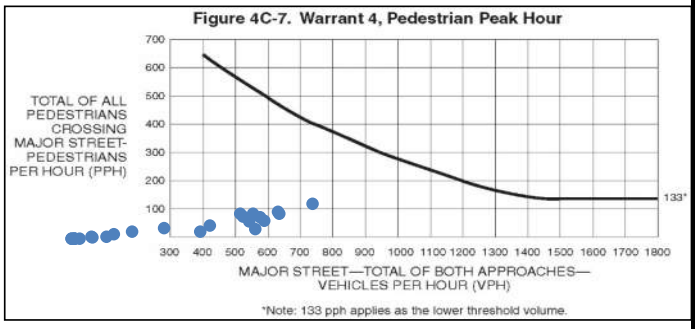


Figure 4C-7. Warrant 4, Pedestrian Peak Hour



For each of any 4 hours of an average day, do the plotted points representing representing the vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-5? **No**

For 1 hour of an average day, does the plotted point representing vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-7? **No**

Warrant 4 Satisfied? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 5: School Crossing

This warrant is intended for application where the fact that school children (elementary through high school students) cross the major street is the principle reason to consider installing a traffic signal. This warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless it can be shown that the proposed traffic signal would not restrict the progressive movement of traffic.

Is the number of adequate gaps in the major crossing traffic steam during the primary crossing period less than the number of minutes in that crossing period? **N/A**

Do 20 or more students cross at this location during the highest crossing hour? **N/A**

Warrant 5 Satisfied? **N/A**

Warrant 6: Coordinated Signal System

This warrant is intended for application where installation of a traffic signal would help to provide proper platooning of vehicles and therefore provide progressive movement in a coordinated signal system.

Are any adjacent traffic signals located so far away that they do not provide a necessary degree of platooning and/or progressive operation? **No**

Warrant 6 Satisfied? **No**

Warrant 7: Crash Experience

This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal

Have adequate trials of alternatives failed to reduce the crash frequency? **N/A**

Have 5 or more crashes, of types susceptible to correction by a signal, occurred within a 12-month period? **No**

Is Condition A criterion met for 80% columns of Warrant 1 met? **No**

Is Condition B criterion met for 80% columns of Warrant 1 met? **No**

Are observed pedestrian volumes equal to or greater than 80% of what is required for Warrant 4? **No**

Warrant 7 Satisfied? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 8: Roadway Network

This warrant is intended for application where installation of a traffic signal could be justified in order to encourage concentration and organization of traffic flow on a roadway network

Do two or more of the intersecting routes at this location have at least one of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
B. It includes rural or suburban highways outside, entering, or traversing a City; or
C. It appears as a major route on an official plan.

No

Does this intersection have an existing or immediately projected total entering volume of a least 1000 vehicles during a weekday typical peak hour and have a 5-year projected traffic volume that meets one or more of Warrants 1, 2, and 3 during an average weekday? **No**

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vph for each of any 5 hours of a Saturday or Sunday? **N/A**

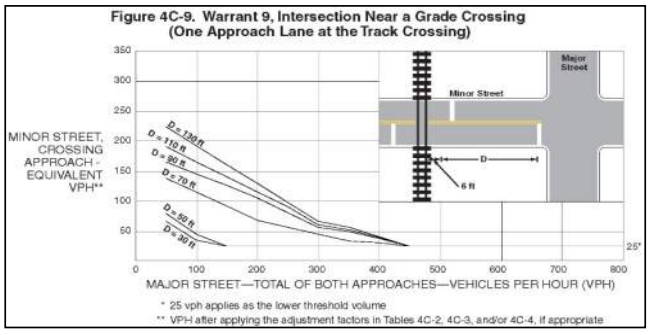
Warrant 8 Satisfied? **No**

Warrant 9: Intersection Near a Grade Crossing

This warrant is intended for application where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

Does a grade crossing exist on an approach controlled by a STOP or YIELD sign whereby the center of the track nearest to the intersection is within 140 feet of the stop or yield line?

No



During the highest traffic volume hour during which the rail traffic uses the crossing, does the plotted point representing vehicles per hour on the major street and the corresponding vehicles per hour on the minor-street approach that crosses the track fall above the applicable curve in Figure 4C-9 or 4C-10 (whichever is applicable) for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance? **N/A**

Warrant 9 Satisfied? **N/A**

Warrant 1: Eight-Hour Vehicular Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	0	2	9	0	9	2
1:00	0	2	8	0	8	2
2:00	0	1	3	0	3	1
3:00	0	0	3	0	3	0
4:00	0	0	5	0	5	0
5:00	3	2	54	0	54	3
6:00	13	11	105	0	105	13
7:00	22	20	278	0	278	22
8:00	34	36	405	0	405	36
9:00	54	36	369	0	369	54
10:00	58	72	409	0	409	72
11:00	56	70	507	0	507	70
12:00	74	63	553	0	553	74
13:00	70	74	475	0	475	74
14:00	59	71	410	0	410	71
15:00	53	54	449	0	449	54
16:00	60	62	408	0	408	62
17:00	70	86	447	0	447	86
18:00	44	43	298	0	298	44
19:00	23	41	210	0	210	41
20:00	10	20	128	0	128	20
21:00	10	16	80	0	80	16
22:00	7	8	45	0	45	8
23:00	3	6	19	0	19	6
TOTAL	**723**	**796**	**5677**	**0**	**5677**	**831**

		Hrs
Condition A - Minimum Vehicular Volume (100% Columns):		
Major Street Total > 600 and Higher Minor Street Total > 150 for 8 hours?	**No**	**0**
Condition B - Interruption of Continuous Traffic (100% Columns):		
Major Street Total > 900 and Higher Minor Street Total > 75 for 8 hours?	**No**	**0**
Combination of Conditions A & B (80% Columns):		
Major Street Total > 480 and Higher Minor Street Total > 120 for 8 hours?	**No**	**0**
Major Street Total > 720 and Higher Minor Street Total > 60 for 8 hours?	**No**	**0**
Warrant 1 Satisfied?	**No**	

Warrant 2: Four-Hour Vehicular Volume

General Information

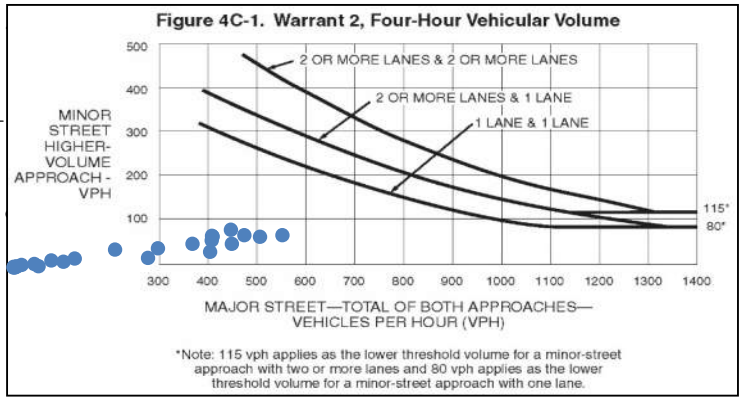
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Hour Begin	Avg. Entering Volume				Major Street Total (Both Approaches)	Higher Volume Minor Approach
	NB	SB	EB	WB		
0:00	0	2	9	0	9	2
1:00	0	2	8	0	8	2
2:00	0	1	3	0	3	1
3:00	0	0	3	0	3	0
4:00	0	0	5	0	5	0
5:00	3	2	54	0	54	3
6:00	13	11	105	0	105	13
7:00	22	20	278	0	278	22
8:00	34	36	405	0	405	36
9:00	54	36	369	0	369	54
10:00	58	72	409	0	409	72
11:00	56	70	507	0	507	70
12:00	74	63	553	0	553	74
13:00	70	74	475	0	475	74
14:00	59	71	410	0	410	71
15:00	53	54	449	0	449	54
16:00	60	62	408	0	408	62
17:00	70	86	447	0	447	86
18:00	44	43	298	0	298	44
19:00	23	41	210	0	210	41
20:00	10	20	128	0	128	20
21:00	10	16	80	0	80	16
22:00	7	8	45	0	45	8
23:00	3	6	19	0	19	6
TOTAL	**723**	**796**	**5677**	**0**	**5677**	**831**

Condition A

Condition B -

Combination



Meets warrant criteria on graph for minimum of 4 hours (100% thresholds)? **No (0 hrs)**

Warrant 2 Satisfied? **No**

Warrant 3: Peak Hour

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

AM Peak Hour	**8:30 - 9:30 AM**
High Minor Total Stopped Time Delay (hrs)	**0.20**
Total Volume of Major Approaches (vehs)	**402**
High Minor Approach Volume (vehs)	**52**
Total Entering Volume (vehs)	**454**

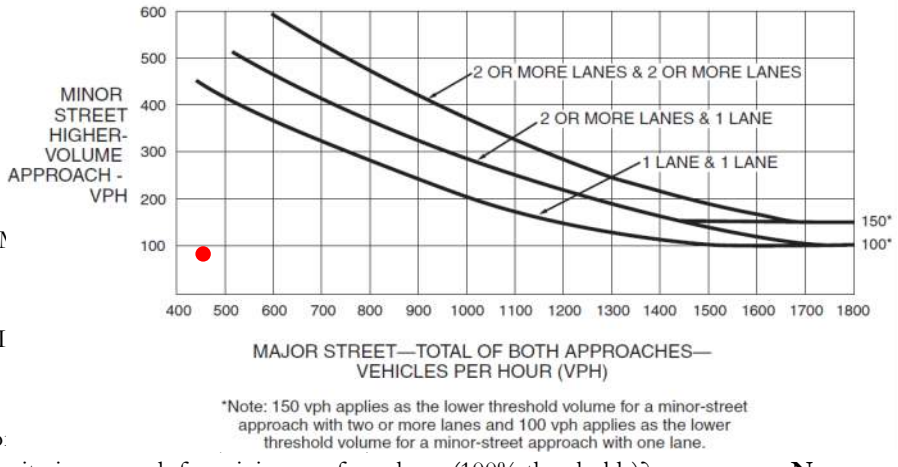
PM Peak Hour	**4:45 - 5:45 PM**
High Minor Total Stopped Time Delay (hrs)	**0.39**
Total Volume of Major Approaches (vehs)	**445**
High Minor Approach Volume (vehs)	**88**
Total Entering Volume (vehs)	**533**

Category A: Peak Period: AM

Total stopped time delay for minor approach > 4 veh-hrs?	**No (0.39)**
High minor approach volume > 100 for peak hour?	**No (88)**
Total entering volume > 800 for peak hour?	**No (533)**
Category A warrant satisfied?	**No**

Category B:

Figure 4C-3. Warrant 3, Peak Hour



Condition A - M

Condition B - I

Combination o

Meets warrant criteria on graph for minimum of one hour (100% thresholds)? **No**

Warrant 3 Satisfied? **No**

Warrant 4: Pedestrian Volume

General Information

Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Design Year (2042)

This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Hour Begin	Major Street Total Traffic	Pedestrian Volume Crossing Major Street
0:00	13	0
1:00	12	0
2:00	4	0
3:00	4	0
4:00	7	0
5:00	80	7
6:00	156	3
7:00	413	15
8:00	602	31
9:00	548	55
10:00	608	71
11:00	753	94
12:00	822	153
13:00	706	120
14:00	609	106
15:00	667	103
16:00	606	59
17:00	664	64
18:00	443	24
19:00	312	37
20:00	190	40
21:00	119	12
22:00	67	9
23:00	28	0
um Vehicular	**8,433**	**1003**

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

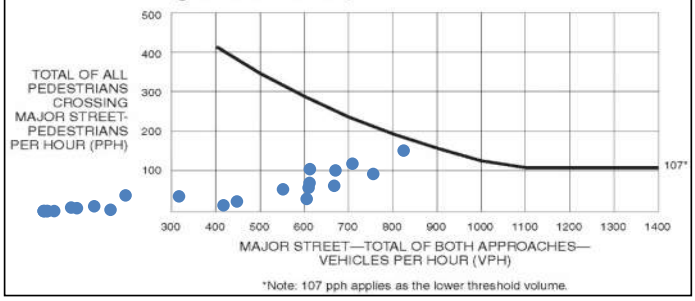
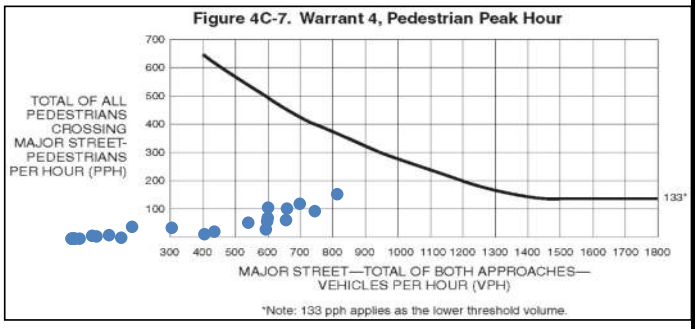


Figure 4C-7. Warrant 4, Pedestrian Peak Hour



For each of any 4 hours of an average day, do the plotted points representing representing the vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-5? **No**

For 1 hour of an average day, does the plotted point representing vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-7? **No**

Condition B - Interruption of Continuous Traffic (100% Columns):

Warrant 4 Satisfied? **No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 5: School Crossing

This warrant is intended for application where the fact that school children (elementary through high school students) cross the major street is the principle reason to consider installing a traffic signal. This warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless it can be shown that the proposed traffic signal would not restrict the progressive movement of traffic.

Is the number of adequate gaps in the major crossing traffic steam during the primary crossing period less than the number of minutes in that crossing period?	**N/A**
Do 20 or more students cross at this location during the highest crossing hour?	**N/A**
Warrant 5 Satisfied?	**N/A**

Warrant 6: Coordinated Signal System

This warrant is intended for application where installation of a traffic signal would help to provide proper platooning of vehicles and therefore provide progressive movement in a coordinated signal system.

Are any adjacent traffic signals located so far away that they do not provide a necessary degree of platooning and/or progressive operation?	**No**
Warrant 6 Satisfied?	**No**

Warrant 7: Crash Experience

This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal

Have adequate trials of alternatives failed to reduce the crash frequency?	**N/A**
Have 5 or more crashes, of types susceptible to correction by a signal, occurred within a 12-month period?	**No**
Condition A - Minimum Vehicular Volume (100% Columns):	**No**
Is Condition B criterion met for 80% columns of Warrant 1 met?	**No**
Interruption Are observed pedestrian volumes equal to or greater than 80% of what is required for Warrant 4?	**No**
Combination of Conditions A & B (80% Columns):	
Warrant 7 Satisfied?	**No**

General Information	
Agency/Company:	Sanderson Stewart
Date:	9/27/2022
Project Number:	18098.33
Project Description:	Babcock and Mendenhall Safety Improvements
Jurisdiction:	City of Bozeman/MDT
Major Street Speed Limit:	25 mph
Major Street (Approach Lanes):	Babcock Street (2 lane)
Minor Street (Approach Lanes):	Black Avenue (1 lane)
Analysis Year/Case:	Existing (2022)

Warrant 8: Roadway Network

This warrant is intended for application where installation of a traffic signal could be justified in order to encourage concentration and organization of traffic flow on a roadway network

Do two or more of the intersecting routes at this location have at least one of the following characteristics:

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
B. It includes rural or suburban highways outside, entering, or traversing a City; or
C. It appears as a major route on an official plan.

No

Does this intersection have an existing or immediately projected total entering volume of a least 1000 vehicles during a weekday typical peak hour and have a 5-year projected traffic volume that meets one or more of Warrants 1, 2, and 3 during an average weekday? **No**

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vph for each of any 5 hours of a Saturday or Sunday? **N/A**

Warrant 8 Satisfied? **No**

Warrant 9: Intersection Near a Grade Crossing

This warrant is intended for application where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

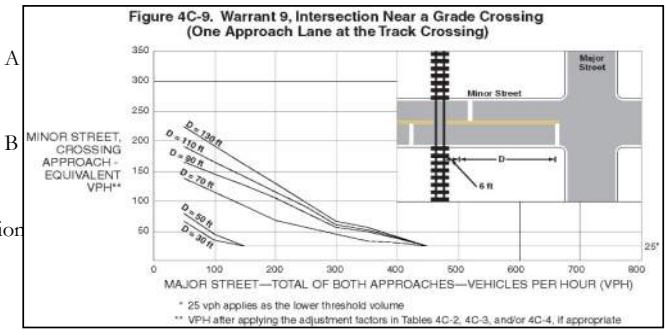
Does a grade crossing exist on an approach controlled by a STOP or YIELD sign whereby the center of the track nearest to the intersection is within 140 feet of the stop or yield line?

No

Condition A

Condition B

Combination



During the highest traffic volume hour during which the rail traffic uses the crossing, does the plotted point representing vehicles per hour on the major street and the corresponding vehicles per hour on the minor-street approach that crosses the track fall above the applicable curve in Figure 4C-9 or 4C-10 (whichever is applicable) for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance? **N/A**

Warrant 9 Satisfied? **N/A**

SPEED DATA – EXISTING (2022)

APPENDIX E

ENDURING COMMUNITY DESIGN

SANDERSON STEWART

	Mendenhall - 3rd & Grand	Mendenhall - Bozeman & Rouse	Babcock - Black & Bozeman	Babcock - 3rd & Grand
Date	7/11-13/2022	7/13-15/2022	7/13-15/2022	7/11-13/2022
Direction of Vehicles	Westbound	Westbound	Eastbound	Eastbound
ADT (veh)	5,148	4,355	5,774	4,497
85th Percentile Speed (mph)	30	27	28	30
Max speed (mph)	49	55	49	48
50th Percentile Speed (mph)	26	23	24	26

TRAFFIC ANALYSIS REPORT

For Project: Mendenhall 3rd and Grand
Projects Notes/Address:
Location/Name: Merged
Report Generated: 1/19/2023 10:27:33 AM
Speed Intervals = 1 MPH
Time Intervals = Instant

Traffic Report From 7/11/2022 01:00:00 PM through 7/13/2022 01:59:59 PM

85th Percentile Speed = 30.0 MPH
85th Percentile Vehicles = 8,934 counts
Max Speed = 79.0 MPH on 7/13/2022 9:59:33 AM
Total Vehicles =10,511 counts
AADT: 5148.3

Volumes - weekly vehicle counts

	Time	5 Day	7 Day
Average Daily		3,503	3,503
AM Peak	11:00 to 12:00	386	386
PM Peak	05:00 to 06:00	422	422

Speed
Speed Limit: 25 MPH
85th Percentile Speed: 30.0 MPH
50th Percentile Speed: 26.0 MPH
10 MPH Pace Interval: 20.0 MPH to 30.0 MPH
Average Speed: 25.4 MPH

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	1675	2569	1065	N/A	N/A	N/A	N/A
% over limit	54.0	49.6	47.7	N/A	N/A	N/A	N/A
Avg Speeder	28.8	28.8	29.7	N/A	N/A	N/A	N/A

Class Counts

	Number	%
VEH_SM	41	0.4
VEH_MED	10208	97.1
VEH_LG	262	2.5

[VEH_SM = motorcycle, VEH_MED = sedan, VEH_LG = truck]

85th percentile speeds, counts and total counts by hour:

Date/Time Ending	85th pctl(MPH)	85th pctl counts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/11/2022 02:00:00 PM	28.0	115	135	37	28.2	37.0%
7/11/2022 03:00:00 PM	28.0	342	402	37	28.4	41.8%
7/11/2022 04:00:00 PM	29.0	371	436	36	28.4	43.1%
7/11/2022 05:00:00 PM	30.0	346	407	40	28.7	55.3%
7/11/2022 06:00:00 PM	30.0	402	473	39	28.9	65.1%
7/11/2022 07:00:00 PM	30.0	278	327	43	28.9	60.9%
7/11/2022 08:00:00 PM	29.0	246	289	37	28.4	51.9%
7/11/2022 09:00:00 PM	32.0	188	221	44	30.1	60.2%
7/11/2022 10:00:00 PM	30.0	179	211	37	28.9	60.2%
7/11/2022 11:00:00 PM	31.0	108	127	39	29.4	64.6%
7/12/2022 12:00:00 AM	31.0	65	76	35	29.5	59.2%
7/12/2022 01:00:00 AM	32.0	26	31	37	30.1	71.0%
7/12/2022 02:00:00 AM	31.0	19	22	42	29.8	68.2%
7/12/2022 03:00:00 AM	33.0	6	7	33	30.0	100.0%
7/12/2022 04:00:00 AM	28.0	4	5	32	29.3	60.0%
7/12/2022 05:00:00 AM	29.0	7	8	39	29.4	87.5%
7/12/2022 06:00:00 AM	32.0	29	34	44	29.9	76.5%
7/12/2022 07:00:00 AM	32.0	59	69	39	29.6	69.6%
7/12/2022 08:00:00 AM	30.0	150	177	43	29.3	70.1%
7/12/2022 09:00:00 AM	30.0	206	242	46	28.8	57.4%
7/12/2022 10:00:00 AM	29.0	228	268	55	28.9	42.9%
7/12/2022 11:00:00 AM	28.0	253	298	51	28.9	37.9%
7/12/2022 12:00:00 PM	27.0	298	351	40	28.1	34.2%
7/12/2022 01:00:00 PM	28.0	329	387	56	28.5	33.9%
7/12/2022 02:00:00 PM	29.0	314	369	41	28.5	38.5%
7/12/2022 03:00:00 PM	28.0	304	358	59	29.0	42.7%
7/12/2022 04:00:00 PM	29.0	314	369	59	28.7	42.0%
7/12/2022 05:00:00 PM	29.0	320	376	47	28.6	45.2%
7/12/2022 06:00:00 PM	30.0	316	372	38	28.5	61.6%
7/12/2022 07:00:00 PM	30.0	300	353	42	28.7	65.2%
7/12/2022 08:00:00 PM	30.0	257	302	41	28.8	53.0%
7/12/2022 09:00:00 PM	29.0	267	314	44	28.7	58.0%
7/12/2022 10:00:00 PM	31.0	200	235	40	29.1	56.2%
7/12/2022 11:00:00 PM	30.0	129	152	40	28.8	65.8%
7/13/2022 12:00:00 AM	30.0	66	78	40	29.1	60.3%
7/13/2022 01:00:00 AM	31.0	29	34	36	29.6	76.5%
7/13/2022 02:00:00 AM	30.0	15	18	40	29.7	61.1%
7/13/2022 03:00:00 AM	30.0	8	9	31	29.4	77.8%
7/13/2022 04:00:00 AM	32.0	5	6	40	32.4	83.3%
7/13/2022 05:00:00 AM	28.0	8	10	30	28.2	60.0%
7/13/2022 06:00:00 AM	31.0	20	24	36	29.8	58.3%
7/13/2022 07:00:00 AM	33.0	60	70	38	30.1	67.1%
7/13/2022 08:00:00 AM	32.0	142	167	72	30.1	71.9%
7/13/2022 09:00:00 AM	30.0	184	217	49	28.9	59.9%
7/13/2022 10:00:00 AM	29.0	212	250	79	30.6	44.4%
7/13/2022 11:00:00 AM	29.0	248	292	66	29.3	45.9%
7/13/2022 12:00:00 PM	29.0	359	422	74	29.8	42.9%
7/13/2022 01:00:00 PM	29.0	369	434	62	29.4	40.8%
7/13/2022 02:00:00 PM	29.0	237	279	70	30.2	34.8%

85th percentile speeds, counts and total counts by day:

Date/Time Ending	85th pctl(MPH)	85th pctl cnts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/12/2022 12:00:00 AM	30.0	2638	3104	44	28.8	54.0%
7/13/2022 12:00:00 AM	29.0	4400	5176	59	28.8	49.6%
7/13/2022 01:59:59 PM	30.0	1896	2231	79	29.7	47.7%

TRAFFIC ANALYSIS REPORT

For Project: Mendenhall Bozeman and Rouse
Projects Notes/Address:
Location/Name: Merged
Report Generated: 1/19/2023 10:31:11 AM
Speed Intervals = 1 MPH
Time Intervals = Instant

Traffic Report From 7/13/2022 02:00:00 PM through 7/15/2022 02:59:59 PM

85th Percentile Speed = 27.0 MPH
85th Percentile Vehicles = 7,559 counts
Max Speed = 55.0 MPH on 7/13/2022 9:04:08 PM
Total Vehicles =8,893 counts
AADT: 4355.8

Volumes - weekly vehicle counts

	Time	5 Day	7 Day
Average Daily		2,964	2,964
AM Peak	11:00 to 12:00	308	308
PM Peak	05:00 to 06:00	451	451

Speed
Speed Limit: 25 MPH
85th Percentile Speed: 27.0 MPH
50th Percentile Speed: 23.0 MPH
10 MPH Pace Interval: 18.0 MPH to 28.0 MPH
Average Speed: 22.9 MPH

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	N/A	N/A	460	1099	586	N/A	N/A
% over limit	N/A	N/A	23.3	22.0	30.5	N/A	N/A
Avg Speeder	N/A	N/A	27.7	27.9	27.8	N/A	N/A

Class Counts

	Number	%
VEH_SM	88	1.0
VEH_MED	8595	96.6
VEH_LG	210	2.4

[VEH_SM = motorcycle, VEH_MED = sedan, VEH_LG = truck]

85th percentile speeds, counts and total counts by hour:

Date/Time Ending	85th pctl(MPH)	85th pctl counts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/13/2022 03:00:00 PM	27.0	139	163	33	27.6	23.3%
7/13/2022 04:00:00 PM	27.0	285	335	33	27.3	23.9%
7/13/2022 05:00:00 PM	27.0	269	317	33	27.8	24.6%
7/13/2022 06:00:00 PM	26.0	311	366	34	27.8	24.3%
7/13/2022 07:00:00 PM	26.0	219	258	37	27.6	24.0%
7/13/2022 08:00:00 PM	27.0	143	168	34	27.8	25.6%
7/13/2022 09:00:00 PM	26.0	139	163	35	28.0	22.1%
7/13/2022 10:00:00 PM	26.0	80	94	55	29.8	16.0%
7/13/2022 11:00:00 PM	26.0	58	68	36	27.8	19.1%
7/14/2022 12:00:00 AM	25.0	35	41	30	27.3	14.6%
7/14/2022 01:00:00 AM	26.0	22	26	30	27.2	19.2%
7/14/2022 02:00:00 AM	28.0	8	9	29	28.5	22.2%
7/14/2022 03:00:00 AM	26.0	9	11	29	27.7	27.3%
7/14/2022 04:00:00 AM	23.0	3	4	28	28.0	25.0%
7/14/2022 05:00:00 AM	26.0	6	7	28	26.4	71.4%
7/14/2022 06:00:00 AM	26.0	22	26	31	28.2	19.2%
7/14/2022 07:00:00 AM	29.0	36	42	33	28.5	40.5%
7/14/2022 08:00:00 AM	27.0	109	128	32	27.8	35.2%
7/14/2022 09:00:00 AM	28.0	173	204	37	27.9	42.6%
7/14/2022 10:00:00 AM	27.0	170	200	36	28.1	32.0%
7/14/2022 11:00:00 AM	27.0	185	218	34	27.8	30.3%
7/14/2022 12:00:00 PM	27.0	252	297	34	27.7	28.6%
7/14/2022 01:00:00 PM	27.0	288	339	42	28.2	23.0%
7/14/2022 02:00:00 PM	27.0	278	327	37	27.7	25.7%
7/14/2022 03:00:00 PM	26.0	304	358	36	27.6	23.7%
7/14/2022 04:00:00 PM	26.0	279	328	36	27.7	18.3%
7/14/2022 05:00:00 PM	26.0	416	489	40	28.5	17.6%
7/14/2022 06:00:00 PM	26.0	456	537	39	27.9	20.9%
7/14/2022 07:00:00 PM	26.0	334	393	36	27.7	17.3%
7/14/2022 08:00:00 PM	25.0	314	370	38	28.6	12.2%
7/14/2022 09:00:00 PM	25.0	247	291	35	28.1	12.7%
7/14/2022 10:00:00 PM	26.0	196	230	43	28.5	15.7%
7/14/2022 11:00:00 PM	25.0	86	101	32	27.6	13.9%
7/15/2022 12:00:00 AM	25.0	57	67	30	27.2	13.4%
7/15/2022 01:00:00 AM	25.0	37	43	30	29.0	14.0%
7/15/2022 02:00:00 AM	25.0	26	30	45	32.3	13.3%
7/15/2022 03:00:00 AM	25.0	16	19	33	28.3	15.8%
7/15/2022 04:00:00 AM	25.0	3	4	26	26.0	25.0%
7/15/2022 05:00:00 AM	29.0	4	5	30	29.0	60.0%
7/15/2022 06:00:00 AM	27.0	20	24	29	27.7	29.2%
7/15/2022 07:00:00 AM	27.0	40	47	39	28.6	34.0%
7/15/2022 08:00:00 AM	28.0	71	84	34	27.5	46.4%
7/15/2022 09:00:00 AM	28.0	105	123	32	27.9	39.8%
7/15/2022 10:00:00 AM	28.0	186	219	33	27.7	35.2%
7/15/2022 11:00:00 AM	27.0	230	270	33	27.6	32.6%
7/15/2022 12:00:00 PM	27.0	272	320	39	27.7	27.8%
7/15/2022 01:00:00 PM	27.0	277	326	42	28.1	25.8%
7/15/2022 02:00:00 PM	27.0	235	276	33	27.8	29.0%
7/15/2022 03:00:00 PM	27.0	112	132	33	27.7	30.3%

85th percentile speeds, counts and total counts by day:

Date/Time Ending	85th pctl(MPH)	85th pctl cnts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/14/2022 12:00:00 AM	27.0	1677	1973	55	27.7	23.3%
7/15/2022 12:00:00 AM	27.0	4249	4999	43	27.9	22.0%
7/15/2022 02:59:59 PM	27.0	1633	1921	45	27.8	30.5%

TRAFFIC ANALYSIS REPORT

For Project: Babcock Black and Bozeman
Projects Notes/Address:
Location/Name: Merged
Report Generated: 1/19/2023 10:05:20 AM
Speed Intervals = 1 MPH
Time Intervals = Instant

Traffic Report From 7/13/2022 03:00:00 PM through 7/15/2022 03:59:59 PM

85th Percentile Speed = 28.0 MPH
85th Percentile Vehicles = 10,021 counts
Max Speed = 49.0 MPH on 7/15/2022 2:42:33 PM
Total Vehicles =11,789 counts
AADT: 5774.2

Volumes - weekly vehicle counts

	Time	5 Day	7 Day
Average Daily		3,929	3,929
AM Peak	11:00 to 12:00	425	425
PM Peak	05:00 to 06:00	523	523

Speed
Speed Limit: 25 MPH
85th Percentile Speed: 28.0 MPH
50th Percentile Speed: 24.0 MPH
10 MPH Pace Interval: 18.0 MPH to 28.0 MPH
Average Speed: 23.6 MPH

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	N/A	N/A	747	1775	1200	N/A	N/A
% over limit	N/A	N/A	40.0	28.0	33.5	N/A	N/A
Avg Speeder	N/A	N/A	28.5	28.3	28.5	N/A	N/A

Class Counts

	Number	%
VEH_SM	331	2.8
VEH_MED	11251	95.4
VEH_LG	207	1.8

[VEH_SM = motorcycle, VEH_MED = sedan, VEH_LG = truck]

85th percentile speeds, counts and total counts by hour:

Date/Time Ending	85th pctl(MPH)	85th pctl counts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/13/2022 04:00:00 PM	28.0	181	213	45	28.5	29.1%
7/13/2022 05:00:00 PM	29.0	314	369	45	28.4	39.6%
7/13/2022 06:00:00 PM	28.0	368	433	37	28.3	33.3%
7/13/2022 07:00:00 PM	28.0	264	311	45	28.3	41.5%
7/13/2022 08:00:00 PM	30.0	190	224	44	28.9	51.3%
7/13/2022 09:00:00 PM	28.0	125	147	35	28.0	42.9%
7/13/2022 10:00:00 PM	29.0	81	95	34	28.4	46.3%
7/13/2022 11:00:00 PM	30.0	45	53	39	29.1	52.8%
7/14/2022 12:00:00 AM	31.0	20	23	35	29.3	69.6%
7/14/2022 01:00:00 AM	29.0	19	22	33	28.4	54.5%
7/14/2022 02:00:00 AM	31.0	8	9	32	29.8	55.6%
7/14/2022 03:00:00 AM	21.0	4	5	25	0.0	0.0%
7/14/2022 04:00:00 AM	26.0	1	1	26	26.0	100.0%
7/14/2022 05:00:00 AM	30.0	6	7	32	29.8	57.1%
7/14/2022 06:00:00 AM	30.0	46	54	35	29.1	72.2%
7/14/2022 07:00:00 AM	32.0	106	125	39	29.6	72.0%
7/14/2022 08:00:00 AM	31.0	259	305	38	29.2	61.0%
7/14/2022 09:00:00 AM	29.0	329	387	36	28.4	53.0%
7/14/2022 10:00:00 AM	28.0	328	386	35	27.7	35.5%
7/14/2022 11:00:00 AM	27.0	241	284	38	28.2	26.8%
7/14/2022 12:00:00 PM	27.0	366	431	48	28.4	27.1%
7/14/2022 01:00:00 PM	26.0	338	398	37	28.1	17.6%
7/14/2022 02:00:00 PM	27.0	386	454	40	28.1	28.0%
7/14/2022 03:00:00 PM	27.0	364	428	34	27.8	22.7%
7/14/2022 04:00:00 PM	27.0	361	425	40	27.9	25.9%
7/14/2022 05:00:00 PM	26.0	383	451	38	27.7	18.6%
7/14/2022 06:00:00 PM	27.0	522	614	43	28.2	26.2%
7/14/2022 07:00:00 PM	25.0	428	503	35	27.9	14.7%
7/14/2022 08:00:00 PM	25.0	332	391	35	27.6	14.3%
7/14/2022 09:00:00 PM	25.0	253	298	33	27.7	14.8%
7/14/2022 10:00:00 PM	26.0	193	227	38	28.1	19.4%
7/14/2022 11:00:00 PM	27.0	69	81	34	28.3	23.5%
7/15/2022 12:00:00 AM	27.0	48	57	35	28.5	29.8%
7/15/2022 01:00:00 AM	30.0	25	29	33	28.2	55.2%
7/15/2022 02:00:00 AM	28.0	20	24	33	28.2	37.5%
7/15/2022 03:00:00 AM	30.0	13	15	34	30.0	33.3%
7/15/2022 04:00:00 AM	32.0	3	4	34	32.0	75.0%
7/15/2022 05:00:00 AM	29.0	8	9	32	28.5	66.7%
7/15/2022 06:00:00 AM	32.0	42	50	46	30.2	82.0%
7/15/2022 07:00:00 AM	31.0	88	104	37	29.4	63.5%
7/15/2022 08:00:00 AM	30.0	207	243	40	28.8	70.4%
7/15/2022 09:00:00 AM	29.0	321	378	41	28.5	51.9%
7/15/2022 10:00:00 AM	28.0	312	367	39	28.4	40.1%
7/15/2022 11:00:00 AM	27.0	326	384	36	27.9	25.3%
7/15/2022 12:00:00 PM	26.0	357	420	40	27.9	19.8%
7/15/2022 01:00:00 PM	26.0	366	430	33	27.4	18.8%
7/15/2022 02:00:00 PM	28.0	374	440	45	28.6	28.9%
7/15/2022 03:00:00 PM	26.0	367	432	49	28.6	18.3%
7/15/2022 04:00:00 PM	27.0	213	251	37	28.1	29.1%

85th percentile speeds, counts and total counts by day:

Date/Time Ending	85th pctl(MPH)	85th pctl cnts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/14/2022 12:00:00 AM	29.0	1588	1868	45	28.5	40.0%
7/15/2022 12:00:00 AM	27.0	5391	6342	48	28.3	28.0%
7/15/2022 03:59:59 PM	28.0	3042	3579	49	28.5	33.5%

TRAFFIC ANALYSIS REPORT

For Project: Babcock 3rd and Grand
Projects Notes/Address:
Location/Name: Merged
Report Generated: 1/19/2023 10:03:30 AM
Speed Intervals = 1 MPH
Time Intervals = Instant

Traffic Report From 7/11/2022 01:00:00 PM through 7/13/2022 01:59:59 PM

85th Percentile Speed = 30.0 MPH
85th Percentile Vehicles = 7,806 counts
Max Speed = 48.0 MPH on 7/12/2022 7:00:58 PM
Total Vehicles =9,183 counts
AADT: 4497.8

Volumes - weekly vehicle counts

	Time	5 Day	7 Day
Average Daily		3,061	3,061
AM Peak	11:00 to 12:00	368	368
PM Peak	12:00 to 01:00	423	423

Speed
Speed Limit: 25 MPH
85th Percentile Speed: 30.0 MPH
50th Percentile Speed: 26.0 MPH
10 MPH Pace Interval: 21.0 MPH to 31.0 MPH
Average Speed: 25.5 MPH

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Count over limit	1231	2467	1167	N/A	N/A	N/A	N/A
% over limit	54.5	52.8	51.8	N/A	N/A	N/A	N/A
Avg Speeder	28.7	28.7	29.0	N/A	N/A	N/A	N/A

Class Counts

	Number	%
VEH_SM	589	6.4
VEH_MED	8313	90.5
VEH_LG	281	3.1

[VEH_SM = motorcycle, VEH_MED = sedan, VEH_LG = truck]

85th percentile speeds, counts and total counts by hour:

Date/Time Ending	85th pctl(MPH)	85th pctl counts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/11/2022 02:00:00 PM	29.0	215	253	36	28.5	56.1%
7/11/2022 03:00:00 PM	30.0	278	327	42	28.6	57.2%
7/11/2022 04:00:00 PM	29.0	267	314	43	28.4	52.9%
7/11/2022 05:00:00 PM	30.0	283	333	47	28.8	52.9%
7/11/2022 06:00:00 PM	29.0	302	355	41	28.5	53.8%
7/11/2022 07:00:00 PM	31.0	182	214	40	29.0	61.2%
7/11/2022 08:00:00 PM	30.0	156	184	41	28.9	55.4%
7/11/2022 09:00:00 PM	30.0	99	117	38	29.1	52.1%
7/11/2022 10:00:00 PM	31.0	72	85	37	29.9	44.7%
7/11/2022 11:00:00 PM	29.0	44	52	43	30.0	48.1%
7/12/2022 12:00:00 AM	30.0	20	23	33	28.8	52.2%
7/12/2022 01:00:00 AM	28.0	13	15	32	28.5	40.0%
7/12/2022 02:00:00 AM	28.0	3	4	29	27.5	100.0%
7/12/2022 03:00:00 AM	26.0	4	5	28	26.5	80.0%
7/12/2022 04:00:00 AM	26.0	2	2	26	26.0	50.0%
7/12/2022 05:00:00 AM	32.0	4	5	33	29.8	80.0%
7/12/2022 06:00:00 AM	31.0	17	20	34	29.5	65.0%
7/12/2022 07:00:00 AM	33.0	52	61	39	30.0	73.8%
7/12/2022 08:00:00 AM	32.0	172	202	40	29.6	70.8%
7/12/2022 09:00:00 AM	30.0	286	336	44	29.0	60.1%
7/12/2022 10:00:00 AM	30.0	237	279	40	29.0	53.0%
7/12/2022 11:00:00 AM	30.0	274	322	45	28.9	57.8%
7/12/2022 12:00:00 PM	29.0	298	350	40	28.6	47.1%
7/12/2022 01:00:00 PM	29.0	342	402	38	28.2	47.3%
7/12/2022 02:00:00 PM	29.0	318	374	38	28.5	44.4%
7/12/2022 03:00:00 PM	29.0	307	361	38	28.5	50.4%
7/12/2022 04:00:00 PM	30.0	309	364	36	28.8	48.1%
7/12/2022 05:00:00 PM	30.0	330	388	35	28.6	52.8%
7/12/2022 06:00:00 PM	30.0	360	423	39	28.6	57.7%
7/12/2022 07:00:00 PM	29.0	243	286	35	28.4	55.9%
7/12/2022 08:00:00 PM	30.0	167	196	48	29.3	51.5%
7/12/2022 09:00:00 PM	29.0	116	136	37	28.7	44.1%
7/12/2022 10:00:00 PM	30.0	61	72	36	29.0	47.2%
7/12/2022 11:00:00 PM	29.0	36	42	36	29.3	33.3%
7/13/2022 12:00:00 AM	28.0	26	30	31	27.5	50.0%
7/13/2022 01:00:00 AM	28.0	8	9	32	28.8	44.4%
7/13/2022 02:00:00 AM	30.0	6	7	30	28.8	57.1%
7/13/2022 03:00:00 AM	23.0	2	2	23	0.0	0.0%
7/13/2022 04:00:00 AM	26.0	2	2	26	26.0	100.0%
7/13/2022 05:00:00 AM	36.0	5	6	37	31.8	83.3%
7/13/2022 06:00:00 AM	29.0	18	21	36	28.9	61.9%
7/13/2022 07:00:00 AM	32.0	55	65	36	30.1	73.8%
7/13/2022 08:00:00 AM	32.0	184	217	38	29.7	67.7%
7/13/2022 09:00:00 AM	31.0	273	321	37	29.0	65.4%
7/13/2022 10:00:00 AM	30.0	268	315	40	29.1	55.9%
7/13/2022 11:00:00 AM	29.0	258	303	41	28.6	49.5%
7/13/2022 12:00:00 PM	29.0	329	387	39	28.7	39.5%
7/13/2022 01:00:00 PM	29.0	377	444	38	28.6	41.9%
7/13/2022 02:00:00 PM	29.0	129	152	46	28.4	45.4%

85th percentile speeds, counts and total counts by day:

Date/Time Ending	85th pctl(MPH)	85th pctl cnts	Total Cnts	Max Speed	Avg Speeder	% Speeders
7/12/2022 12:00:00 AM	30.0	1918	2257	47	28.7	54.5%
7/13/2022 12:00:00 AM	30.0	3974	4675	48	28.7	52.8%
7/13/2022 01:59:59 PM	30.0	1913	2251	46	29.0	51.8%

ENDURING COMMUNITY DESIGN

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