TRAFFIC IMPACT STUDY
PUT-IN-BAY

AUGUST 2024

PREPARED FOR:

VILLAGE OF PUT-IN-BAY
OTTAWA COUNTY, OHIO

Mannik Smith GROUP

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PREPARED BY: _____

JEAN HARTLINE, PE

Mannik Smith GROUP

EXECUTIVE SUMMARY

The Village of Put-In-Bay (PIB) has requested a traffic impact study to identify the current saturation of the Put-In-Bay Island.

The study area is located in the Downtown area of the Put-In-Bay Island. Traffic counts were collected on Wednesday, July 3rd, 2024 through Saturday, July 6th, 2024. From this four (4) day study period, the peak hour of traffic during the 4th of July week was identified. This peak hour of traffic was the focus of the operational analysis to determine if the Village intersections were operating a condition of saturation that would indicate a concern for the livability of the community and the safety for the motoring (golf carts and cars) and non-motorized (pedestrians and bicycles) user.

The following conclusions resulted from the study

- The percentage of golf carts entering each intersection is less than the percentage of cars with the intersections averaging 77%carts and 23% cars.
- Pedestrians in the intersection crosswalks were very high and would emulate, and exceed, numbers expected in large city downtown areas. Pedestrians are vulnerable populations when mixed with high volumes of motor vehicles.
- The only intersection that noted heavily congested is the Bayview Avenue and Catawba Avenue intersection. This intersection is operating at approximately 540% over capacity on he peak holiday periods. To caveat this statement, it is expected that peak holiday hours would be exceeding capacity, however, this is an operational issues that may be beyond acceptable for safety and livibility in the Village of Put-in-Bay.

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1.0 INTRODUCTION

1.1 Project Overview

At the request of The Village of Put-In-Bay (PIB), The Mannik and Smith Group (MSG) has conducted a traffic study to identify the current saturation of the island. By determining if the five (5) critical intersections in the study area shown in **Figure 1.1** are saturated, we can determine if the island is saturated with golf carts.

To determine the current saturation of the island, PIB has requested MSG to achieve the following objectives for the traffic study:

- Identify the number of golf carts passing through the five (5) intersections during the peak Fourth of July peak hours.
- Identify the number of golf carts passing through the five (5) intersections during the non-peak Fourth of July peak hours.
- Identify the relative congestion in terms of delay and level of service.

To accomplish these objectives, MSG performed the following to collect traffic data:

- Conducted traffic turn counts at the four major intersections downtown as shown in **Figure 1.1**
- Deploying a Jamar Black Cat Radar Unit on Bayview Avenue between Catawba Avenue and Hartford Avenue (location of radar deployment shown in **Figure 1.1**)

Figure 1.1 Study Area

2.0 STUDY AREA CHARACTERISTICS

2.1 Roadway Characteristics

The project study network include the following roadways in the downtown area.:

- SR 357 (Bayview Avenue);
- Catawba Avenue;
- Delaware Avenue;
- Toledo Avenue;
- Erie Street

Table 2.1 below presents the functional classification, controlling jurisdiction, posted speed and general lane description for each of the study area roadways.

Table 2.1 Roadway Characteristics

Characteristic	Study Roadway				
	Bayview Avenue (SR 357)	**Catawba Avenue**	**Delaware Avenue**	**Toledo Avenue**	**Erie Street**
Functional Classification	Major Collector	Local	Local	Major Collector	Local
Roadway Direction	East-West	North-South	East-West	North-South	Northwest-Southeast
Road Inventory	State Route	Municipal Route	Municipal Route	County Route	Municipal Route
Lane Description	2 Lanes	2 Lanes	2 Lanes	2 Lanes	2 Lanes
Posted Speed Limit	25 mph	25 mph	25 mph	25 mph	25 mph

(Traffic Sources: ODOT TIMS)

3.0 Existing Traffic Conditions

3.1 Traffic Data

Bayview Avenue 24-hour Radar Traffic Profile – Peak Hour Determination
By deploying a Black Cat Radar Unit on Bayview Avenue, which collected continuous traffic data from Wednesday July 3rd through Saturday July 6th, a traffic volume profile was able to be generated over the four (4) day period. This traffic volume profile was used to determine the peak and non-peak hours for each day. The results of the radar data are summarized in **Figure 3.1**. This traffic profiles identifed that the peak island traffic volumes occurred on Friday July 5, 2024 from 3PM-5PM. Withing this peak two hour period. The peak hour was identified to occur from 4:15 PM to 5:15 PM. This peak hour will be the focus on the operational analyses for the downtown intersections.

The radar data also provided an average travel speed of 12mph for vehicles on Bayview Avenue. This lower than normal roadway travel speed was used in the traffic modeling to more accurately simulate golf cars on the road.

Intersection Turn Counts
The recording period of the traffic count cameras was from July 3rd, 2024 to July 6th, 2024 for 24 hours at the following intersections, however, only the peak hours identified in the radar 4 day data collection (Friday July 5th from 4:15-5:15 PM) were processed for detailed evaluation:

- Intersection 1 – Catawba Avenue and Erie Street (Unsignalized)
  - This traffic count was used for the vehicular queue analysis.
- Intersection 2 – Catawba Avenue and the PIB Police Department Driveway (west leg) and the alley road south of the Island General Store (east leg) (Unsignalized)
- Intersection 3 – Catawba Avenue and Delaware Avenue (Unsignalized)
  - This intersection is one of the centers of congestion for the island which experiences extensive congestion with golf carts and pedestrian traffic.
- Intersection 4 – Catawba Avenue and Bayview Avenue (SR 357) and Boardwalk (Unsignalized)
  - This intersection is the second most congested intersection that experiences heavy golf cart and pedestrian traffic.
- Intersection 5 – Delaware Avenue and Toledo Avenue (Unsignalized – converted to a 1-way stop control to 3-way stop on July 8, 2024.)

The traffic volumes during the PM peak hour are presented in **Figure 3.1** with the following identified for the peak hour at each study area intersection:

- Catawba Avenue, Alley/Police Department – 4:30-5:30 PM
- Catawba Avenue & Delaware Avenue - 4:30-5:30 PM
- Catawba Avenue & Bayview Avenue – 4:15- 5:15 PM
- Delaware Avenue & Toledo Avenue – 3:34 – 4:45 PM

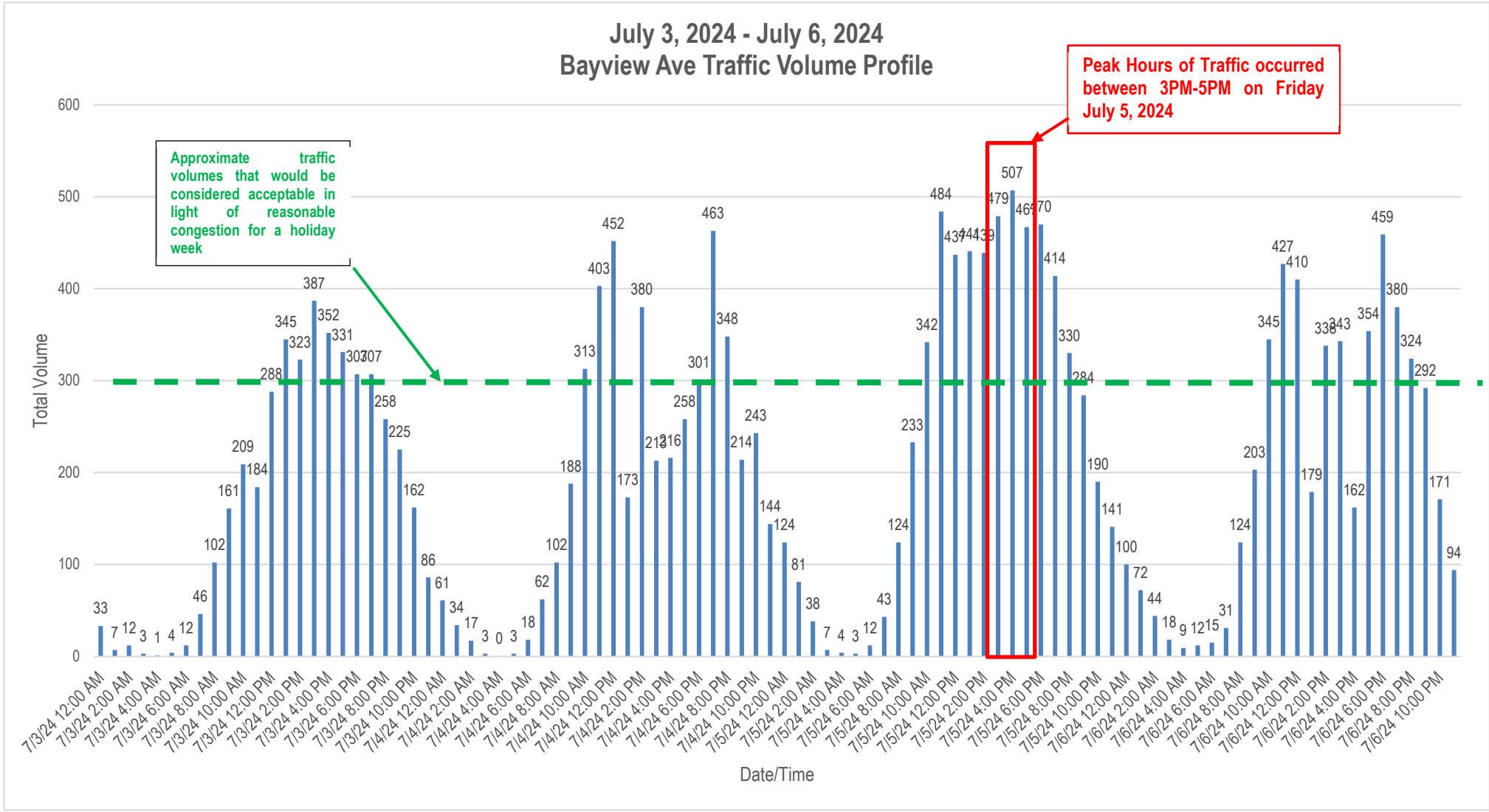


Figure 3.1 Bayview Avenue Traffic Volume Profile

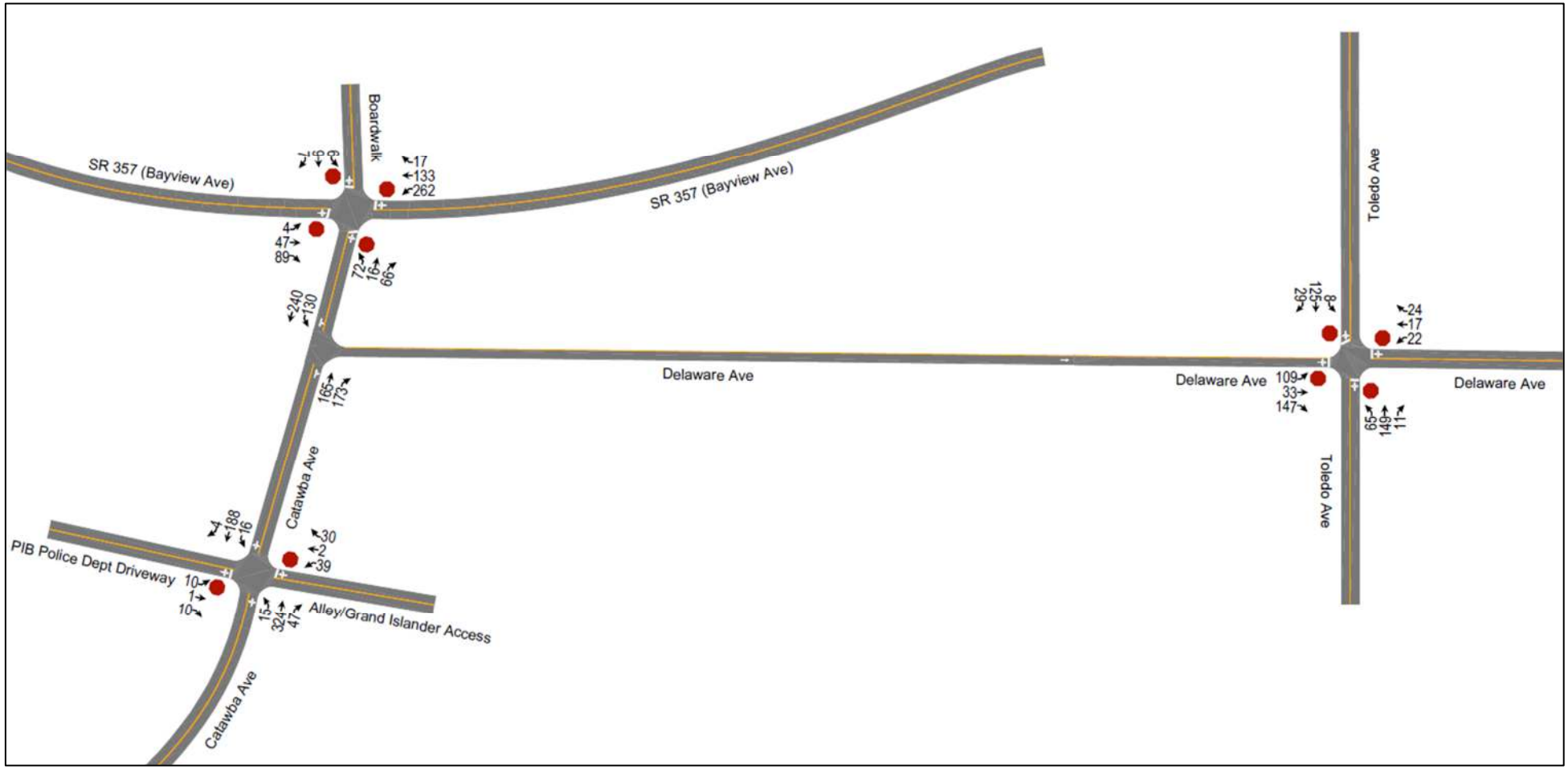


Figure 3.2 Existing PM Peak Hour Traffic Volume

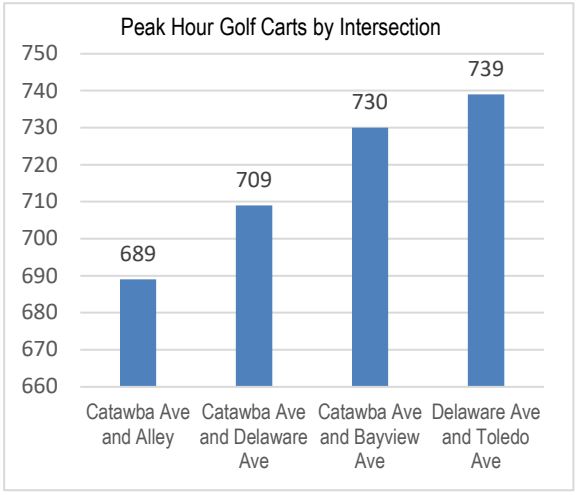
Based on the data shown in **Figure 3.2**, July 5th had the highest total of traffic volumes. Since July 5th had the most volumes, the traffic turn count data on July 5th during the PM peak period (3:30 – 5:30) was collected for Intersections 2, 3, 4, and 5. All counts were conducted in fifteen (15) minute intervals and included the classification of passenger cars, heavy vehicles (trucks), golf carts, bicycles on roadway and crosswalk, and pedestrians (see **Appendix A**). The data shown in **Table 3.1** shows the total number of vehicles, bikes, and pedestrians that entered each of the four traffic turn count intersections on Friday July 5th, 2024 during the PM peak hour period, and includes the percentages of vehicles that were golf carts, passenger cars, and heavy vehicles.

Table 3.1 July 5th Traffic Counts and Percentages

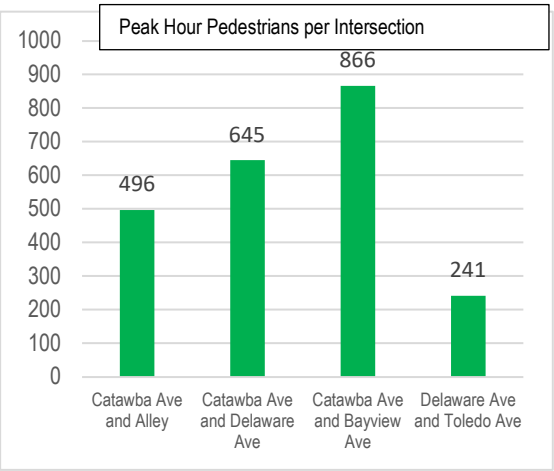
Intersection	Total Entering Vehicle	Total Golf Carts	% Golf Cart	Total Motorized Vehicles	% Motorized Vehicles	Bicycles	Pedestrians
Catawba Ave and Alley	689	506	73%	183	69%	50	496
Catawba Ave and Delaware Ave	709	564	80%	145	61%	54	645
Catawba Ave and Bayview Ave	730	589	81%	141	70%	37	866
Delaware Ave and Toledo Ave	739	560	76%	179	79%	33	241
Summary	**2867**	**2219**	**77%**	**648**	**23%**	**174**	**2248**

The following conclusions can be drawn from this data:

- 77% of the vehicles traveling in the downtown area are golf carts. Golf carts have lower traveling speeds (generally 10-15mph on a straightaway and 7-10 mph on a turning movement). Although golf carts are a smaller vehicle, from an operational perspective they function slower than a motor vehicle and hence have a larger impact on the capacity of the intersections.



- Pedestrian traffic is high at all four downtown study intersections. Pedestrians crossing in the intersection crosswalks reduce the capacity of the intersection as vehicles are delayed when yielding to pedestrians. The Catawba Avenue and Bayview Avenue intersection had the highest intersection count with 866 in the peak hour. This represents approximately 15 pedestrians in each minute of the peak hour.



The motorized vehicles and bicycles are the lesser percentage of the intersection traffic but still add to the demand at the intersection which affects the operational performance and intersection capacity.

While the traffic volumes (golf carts and cars) are the highest at the Delaware Avenue and Toledo Avenue intersection, the pedestrian volumes at this intersection are low. Additionally, the one-way pattern on Delaware established in 2023, results in pushing more traffic to Bayview Avenue. The one-way pattern, however, reduces traffic on Toledo Avenue and, thus, improving pedestrian safety on this busy corridor. Another benefit of this one-way pattern was the increase in on-street parking for golf carts. As a result this one pay pattern is desirable to retain.

The Catawba Avenue and Bayview Avenue intersection carries only slightly less traffic than the Delaware Avenue and Toledo Avenue intersection but carries significantly higher pedestrian traffic. The high pedestrian crossings significantly impede vehicular traffic flow as golf carts and cars must yield to the large masses of pedestrians. The operational characteristics of the vehicular and pedestrian flows and interactions will be explored in the next section of this report.

4.0 Existing Traffic Operational Analysis

To appropriately analyze each of the study intersections, Synchro 11 was used to evaluate intersection capacity and Levels-of-Service (LOS) during the AM and PM peak periods. Synchro provides several measures of effectiveness (MOEs) for a transportation network based on geometric configurations and operational conditions. The primary measure of effectiveness for this study's operational analysis will be level-of-service (LOS). LOS is measured by a letter grade that describes traffic operations based on the amount of delay experienced by vehicles at an intersection, along an intersection approach (e.g., eastbound, westbound), or in a specific lane group (e.g., eastbound right turn, eastbound through-left). For this study, the LOS documented was measured for lane groups and intersections using Synchro methodology.

LOS can range from A to F with LOS A representing the conditions in which vehicles experience the least amount of delay, and LOS F representing the conditions in which vehicles experience the most delay. Typically, when LOS is in the range from A to D this is an indication that the traffic network is performing satisfactorily, and no changes need to be made to improve conditions. The LOS D is typically used as a threshold for "acceptable" operations. When LOS is in the range from E to F, this is an indication that the traffic network is not performing satisfactorily and that changes need to be made to improve conditions. These operations are typically referred to as "unacceptable". **Table 4.1** provides information regarding the delay thresholds for LOS. It may be noted that in tables throughout this report, when intersections, approaches, and lane groups have LOS D, it will be shown in yellow, LOS E shown in orange, and LOS F shown in red.

Table 4.1 Level of Service Definitions and Criteria

Level-of-Service (LOS)	Un-Signalized Intersections Delay* (seconds)	Comment
A	< 10.0	Acceptable LOS
B	10.1 – 15.0	
C	15.1 – 25.0	
D	25.1 – 35.0	
E	35.1 – 50.0	Marginal LOS
F	> 50.0	Failing LOS

*** From Highway Capacity Manual 6th Edition**

4.1 SimTraffic Model Calibration Discussion

SimTraffic was used to generate numerous simulations that accurately portray the interactions between pedestrians and vehicles in order to portray the existing traffic flow of each intersection in the study area. SimTraffic uses many parameters that go into making simulation models, but for this project the parameters that were mainly adjusted were the vehicle parameters and the driver parameters. The calibration of the parameters for vehicles and drivers are shown in **Tables 4.2 and 4.3**. The parameters that went through adjustments and the reasons of their adjustments are summarized in **Table 4.4**.

Table 4.2 SimTraffic Vehicle Parameters

	Vehicle Type									
Parameter Name	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Vehicle Name	Car1	Car2	Truck SU	SemiTrk1	SemiTrk2	Truck DB	Bus	Carpool1	Carpool2	GolfCart
Vehicle Occurrence (%)	0.16	0.04	0.80	0.00	0.00	0.00	0.20	0.00	0.00	0.80
Acceleration	File	File	File	File	File	File	File	File	File	File
Vehicle Length (ft)	16.0	14.0	35.0	53.0	53.0	64.0	40.0	16.0	14.0	10.0
Vehicle Width (ft)	6.0	6.0	8.0	8.0	8.0	8.0	8.0	6.0	6.0	4.0
Vehicle Fleet	Car	Car	Trk	Trk	Trk	Trk	Bus	Pool	Pool	Car
Occupancy (# people)	1.3	1.3	1.2	1.2	1.2	1.2	20.0	2.8	2.8	3.0
Graphics Shape	Car	Car	Truck	SemiTrk	SemiTrk	DBTruck	Bus	Car	Car	Car
Table Index (1 to 7)	1	2	3	4	5	6	7	1	2	1

Table 4.3 SimTraffic Driver Parameters

	Driver Types									
Parameter Name	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Yellow Deceleration (ft/s^2)	12.0	12.0	12.0	12.0	12.0	11.0	10.0	9.0	8.0	7.0
Speed Factor (%)	0.85	0.88	0.92	0.95	0.98	1.02	1.05	1.08	1.12	0.60
Courtesy Deceleration (ft/s^2)	10.0	9.0	8.0	7.0	6.0	5.0	4.0	4.0	3.0	3.0
Yellow Reaction Time (s)	0.7	0.9	1.0	1.0	1.2	1.3	1.3	1.4	1.4	1.7
Green Reaction Time (s)	0.8	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.2
Headway at 0 mph (s)	0.65	0.63	0.60	0.58	0.55	0.45	0.42	0.40	0.37	0.35
Headway at 20 mph (s)	1.80	1.70	1.60	1.50	1.40	1.20	1.10	1.00	0.90	0.80
Headway at 50 mph (s)	2.20	2.00	1.90	1.80	1.70	1.50	1.40	1.30	1.20	1.00
Headway at 80 mph (s)	2.20	2.00	1.90	1.80	1.70	1.50	1.40	1.30	1.20	1.00
Gap Acceptance Factor	1.15	1.12	1.10	1.05	1.00	1.00	0.95	0.90	0.88	0.85
Positioning Advantage (veh)	15.0	15.0	15.0	15.0	15.0	2.0	2.0	2.0	1.2	1.2
Optional Advantage (veh)	2.3	2.3	2.3	1.0	1.0	1.0	1.0	1.0	0.5	0.5
Mandatory Distance Adjustment (%)	200	170	150	135	110	90	80	70	60	50
Positioning Distance Adjustment (%)	150	140	130	120	110	95	90	80	70	60
Average Lane Change Time (s)	55	50	45	40	35	30	25	20	15	10
Lane Change Variance +/- (%)	10	10	10	20	20	20	30	30	30	30

Table 4.4 SimTraffic Adjustment Summary Table

Synchro/SimTraffic Parameters	Default Setting Values	PIB Model Calibration Value	Type of Parameter Change	Reasons and Justification for the Value Changes
HV Occurrence			SimTraffic	Veh Types 3-4-5-6-7 must equal 100% -Assumed 80% Single Unit HV -Assumed 20% Bus -Changed Veh Types 4, 5, 6 to 0.00 occurrence
Small Vehicle Occurrence			SimTraffic	Veh Types 3-4-5-6-7 must equal 100% -Removed carpool % because it was a dead value for simulation purposes -Updated veh occurrence per % breakout by MioV TMC Report -Updated car1 and car2 occurrence based on % from MioV report of passenger vehicles (car1 and car2 should have same occurance proportion)
Speed Factor	0.85 - 1.15	0.6	SimTraffic	Change Speed Factor of Golf Cart to 0.6 to govern max link speed of 15 mph for golf carts only
Gap Acceptance Factor	0.85 - 1.15	0.85	SimTraffic	Change Gap Acceptance Factor from default value to 0.85 for less conservative drivers
Headway Factor		0.8	Synchro	Changed from default to 0.8 to decrease followup time between trailing/queued vehicles
Optional Advantage	0.5 - 2.3	0.5	SimTraffic	Changed from Default to 0.5 for more aggressive drivers
Headway at 0 mph	0.35 - 0.65		SimTraffic	Changed from default to 0.35 for cars only, trucks left on default
Turning Speed		Left turning speed - 7 mph Right turning speed - 8 mph	Synchro	
Ideal Sat Flow Rate	1900	1500, 1750	Synchro	Use 1500 for best emulated existing conditions- synchro makes appropriate factor adjustments based on lane and volume inputs As stated in the OATS manual, urban areas use a sat flow rate of 1900, and areas that are not urban use 1750.

4.2 Intersection Operational Performance

The resulting overall Level of Service (LOS) and delay, based on the criteria presented in **Table 4.1**, by intersection for the Existing PM Peak Hour Traffic are shown in **Table 4.5**. The SimTraffic LOS/Delay results were compared with the HCM 6 results to see how the overall LOS/Delay results are different based on pedestrian interaction realized in the SimTraffic analysis. The SimTraffic results include the pedestrian interaction because SimTraffic can accurately portray the interaction between pedestrians and vehicles, while the HCM 6 results does not include the pedestrian interaction. In all, the SimTraffic analysis provides the most relisting operational analysis of the intersections.

Table 4.5 2024 Existing Conditions LOS/Delay Results

SimTraffic & HCM LOS Results						
Intersection	Approach	Approach Control	5-Jul-24 PM (3:30P-4:30P) SimTraffic Results With Pedestrian Interaction		5-Jul-24 PM (3:30P-4:30P) HCM 6 Results Without Pedestrian Interaction	
			LOS	Delay (s/veh)	LOS	Delay (s/veh)
Catawba Ave and SR 357 (Bayview Ave)/Boardwalk (All Way Stop Control)	Eastbound	STOP	F	53.1	A	8.6
	Westbound	STOP	F	645.1	B	13.4
	Northbound	STOP	E	35.2	A	9.7
	Southbound	STOP	C	19.8	A	8.6
	Intersection Overall		F	324.4	B	11.5
Catawba Ave and Delaware Ave	Northbound	Free-Flow	A	5.6	C	18.8
	Southbound	Free-Flow	C	15.9	C	18.8
	Intersection Overall		A	9.8	C	18.8
Catawba Ave and PIB Police Dept Driveway/Alley/Grand Islander Access (All Way Stop Control)	Eastbound	STOP	B	10.2	D	26.6
	Westbound	STOP	C	16.5	D	28.0
	Northbound	Free-Flow	A	0.5	A	9.7
	Southbound	Free-Flow	A	1.0	A	9.5
	Intersection Overall		A	2.7	A	4.1
Toledo Ave and Delaware Ave (All Way Stop Control)	Eastbound	STOP	B	14.3	B	11.7
	Westbound	STOP	A	7.2	A	9.0
	Northbound	STOP	B	10.6	B	11.1
	Southbound	STOP	B	10.7	A	10.0
	Intersection Overall		B	11.8	B	10.9

The traffic operational results are as follows:

Catawba Avenue and SR 357 (Bayview Avenue) (Unsignalized – All Way Stop Control)

- SimTraffic: Result Overall – LOS F
- HCM 6: Result Overall – LOS B

Catawba Avenue and Delaware Avenue (Unsignalized – Free Flow)

- SimTraffic Result: Overall – LOS A
- HCM 6 Result: Overall – LOS C

Catawba Avenue and PIB Police Department Driveway and Alley Access (Unsignalized – All Way Stop Control)

- SimTraffic Result: Overall – LOS A
- HCM 6 Result: Overall – LOS A

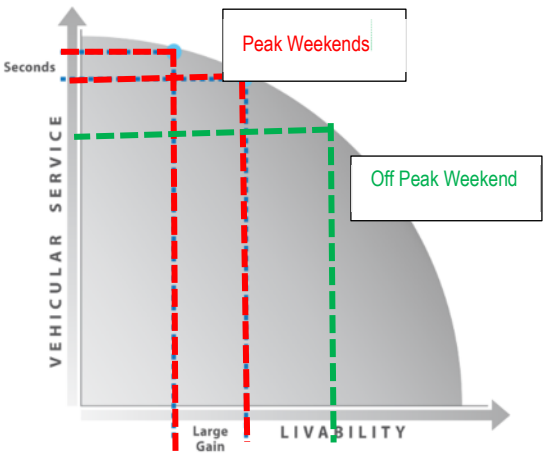
Toledo Avenue and Delaware Avenue (Unsignalized – All Way Stop Control)

- SimTraffic Result: Overall – LOS B
- HCM 6 Result: Overall – LOS B

The operational analyses provide the following conclusions:

- Due to the large volumes of pedestrians at the intersections, the SimTraffic analyses provide the best simulation of the study intersection. If there were no pedestrians in the intersections there would be no operational deficiencies.
- The "lynch pin" of the roadway capacity for the downtown intersections is Catawba Avenue and Bayview Avenue due to both the volume of motorized traffic and pedestrian traffic.
- Pedestrian traffic must be considered in the operational performance of the intersections due to the dramatic impact pedestrians have on operational performance.
- Since an acceptable level of service (Table 4.1) is LOS E with 50" of average delay per vehicle and the lynch pin intersection of Catawba Avenue and Bayview Avenue is in failure with a LOS F and 324.4". ***This means that the average delay to get through the intersection for a vehicle (golf cart or car) is 5.4 minutes in the peak hour. This intersection is approximately 540% over capacity based on delay (324.2 seconds delay/acceptable delay of 50").***

The adjacent figure provides an explanation the relationship of traffic congestion to community livability. When traffic volumes are high, they become the priority on the roadway. Non-motorized transportation (pedestrians and bicycles) take a backseat to the motorized traffic. This generally results in a degradation of the livability and roadway safety for all users. Put-in-Bay is a unique resort area where the balance of vehicular service to livability is stretched to uncomfortable limits on busy holiday weekends. Other weekends of the year the balance of traffic to livability is more balanced. ***Based on the operational analyses during peak weekend hours, the livability and safety of the roadway system is compromised by excessive motorized traffic, particularly involving golf carts which are the largest component of the motorized traffic***.



5.0 QUEUING ANALYSIS

SimTraffic was used to determine the 95th percentile queue length. The 95th percentile queue represents the maximum back of queue for 95th percentile traffic volumes (traffic volumes will be larger than this 5 percent of the time). Normally, this would be used as the design value for lane storage lengths at signalized intersections, but since the study area has no signalized intersections, adding turn lane storages is not an appropriate solution for this project. **Table 5.1** summarizes the SimTraffic results for the 95th percentile queue of each intersection.

Table 5.1 SimTraffic 95th Percentile Queue Results

SimTraffic 95th Percentile Queue Results				
Intersection	Approach	Approach Control	5-Jul-24 PM (3:30P-4:30P) 95th Percentile Queue (feet)	Existing Link Distance (ft)
Catawba Ave and SR 357 (Bayview Ave)/Boardwalk (All Way Stop Control)	Eastbound	STOP	154	856
	Westbound	STOP	1103	942
	Northbound	STOP	116	136
	Southbound	STOP	37	142
Catawba Ave and Delaware Ave	Northbound	Free-Flow	119	267
	Southbound	Free-Flow	122	136
Catawba Ave and PIB Police Dept Driveway/Alley/Grand Islander Access (All Way Stop Control)	Eastbound	STOP	37	257
	Westbound	STOP	60	221
	Northbound	Free-Flow	60	920
	Southbound	Free-Flow	39	267
Toledo Ave and Delaware Ave (All Way Stop Control)	Eastbound	STOP	132	352
	Westbound	STOP	47	298
	Northbound	STOP	94	308
	Southbound	STOP	81	418

The largest vehicle queue involved the westbound movement at the Catawba Avenue and Bayview Avenue intersection. These queue were observed to extend to B Dock and beyond.

5.1 Queue Discussion at SR 357 (Bayview Avenue) and Catawba Avenue

The SR 357 (Bayview Avenue) and Catawba Avenue intersection (Intersection 4) is where the queues are most occurring at. A SimTraffic simulation of the traffic flow showing the queue occurring at that intersection is shown in **Figure 5.1**.

Figure 5.1 SimTraffic Simulation of the SR 357 (Bayview Avenue) and Catawba Avenue Intersection

5.2 Catawba Avenue and Erie Street Queuing Discussion

The traffic video footage at the Catawba Avenue and Erie Street intersection (Intersection 1) was used to observe if vehicular queues were occurring at that intersection. It's been mentioned that the golf cart return queue to PIB Golf Carts at the end of the day creates a queue down Delaware Avenue and onto Catawba Avenue to Erie Street. However, from observing the video footage, there were no queues that extended to Intersection Catawba Avenue & Delaware Avenue..

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the data collected in this study report:

- The percentage of golf carts entering each intersection is less than the percentage of cars with the intersections averaging 77%carts and 23% cars.
- The only intersection that's heavily congested is the Bayview Avenue and Catawba Avenue intersection. This intersection is operating at approximately 540% over capacity on the peak holiday periods and is the lynch pin of the roadway network. To caveat this statement, it is expected that peak holiday hours would be exceeding capacity, however, this current peak traffic conditions are an operational issues that may be beyond acceptable for safety and livability in the Village of Put-in-Bay.

APPENDIX A
EXISTING TRAFFIC COUNTS

APPENDIX B

APPENDIX C

Study Name	SR 357 (Bayview Avenue) and Catawba Avenue
Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Site Code	

Overview

This report contains turning movement volume (TMV) data of vehicular traffic in the intersection of study.

Content

Summary	Contains a TMV summary of all vehicular traffic in the intersection for defined peak periods
TMV Table	Contains a pivot table of the TMV road and crosswalk data
TMV Data	Contains measured TMV data of all vehicular traffic in the intersection for each approach
Ped Data	Contains detected pedestrian information for the intersection's crosswalks

Traffic Study

Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Classification Categories	Lights, Other Vehicles, Bicycles on Road, Golf Carts, Bicycles on Crosswalk, Pedestrians
07/05/2024 PM Peaks	4:15 PM - 5:15 PM

Study Name	Catawba Avenue and PIB Police Dept Driveway and Alley/Grand Islander Access
Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Site Code	

Overview

This report contains turning movement volume (TMV) data of vehicular traffic in the intersection of study.

Content

Summary	Contains a TMV summary of all vehicular traffic in the intersection for defined peak periods
TMV Table	Contains a pivot table of the TMV road and crosswalk data
TMV Data	Contains measured TMV data of all vehicular traffic in the intersection for each approach
Ped Data	Contains detected pedestrian information for the intersection's crosswalks

Traffic Study

Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Classification Categories	Lights, Other Vehicles, Bicycles on Road, Golf Carts, Bicycles on Crosswalk, Pedestrians
07/05/2024 PM Peaks	4:30 PM - 5:30 PM

Study Name	Delaware Avenue and Catawba Avenue
Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Site Code	

Overview

This report contains turning movement volume (TMV) data of vehicular traffic in the intersection of study.

Content

Summary	Contains a TMV summary of all vehicular traffic in the intersection for defined peak periods
TMV Table	Contains a pivot table of the TMV road and crosswalk data
TMV Data	Contains measured TMV data of all vehicular traffic in the intersection for each approach
Ped Data	Contains detected pedestrian information for the intersection's crosswalks

Traffic Study

Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Classification Categories	Lights, Other Vehicles, Bicycles on Road, Golf Carts, Bicycles on Crosswalk, Pedestrians
07/05/2024 PM Peaks	4:30 PM - 5:30 PM

Study Name	Delaware Avenue and Toledo Avenue
Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Site Code	

Overview

This report contains turning movement volume (TMV) data of vehicular traffic in the intersection of study.

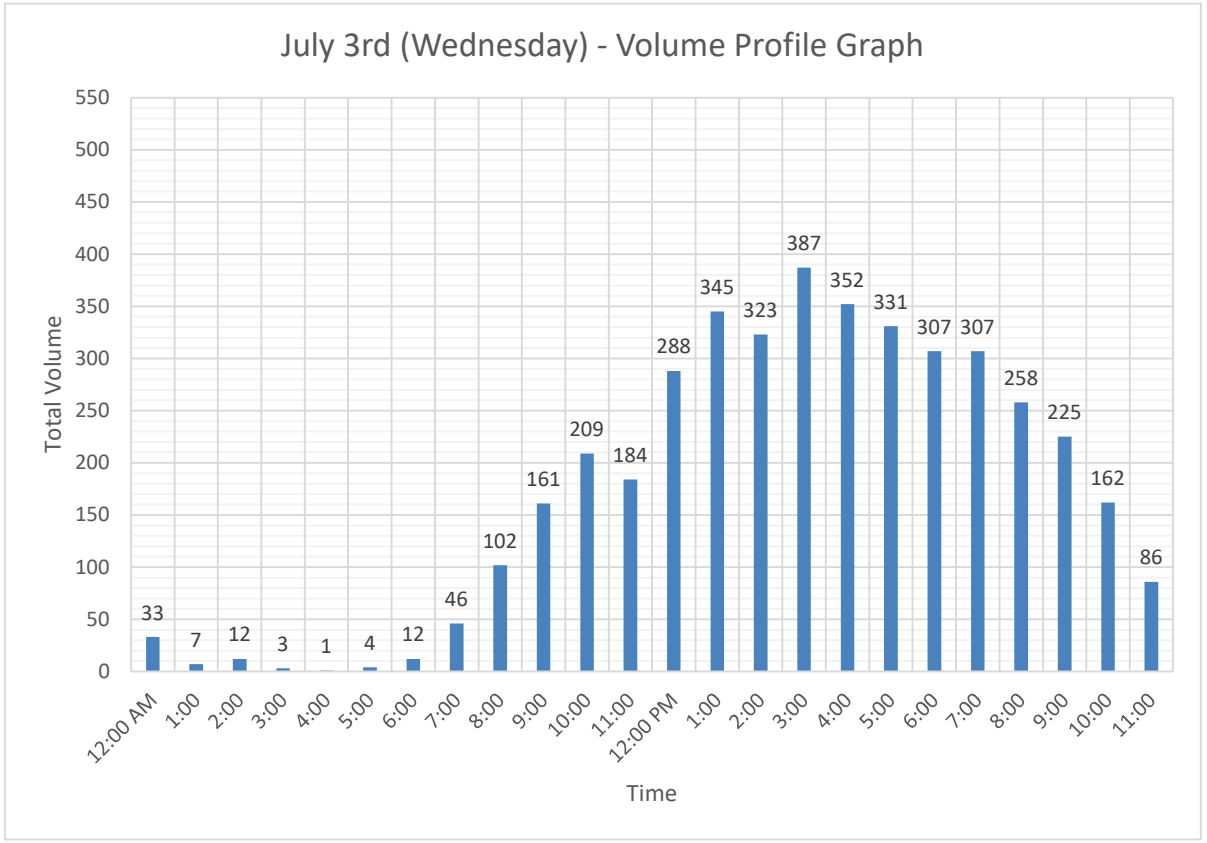
Content

Summary	Contains a TMV summary of all vehicular traffic in the intersection for defined peak periods
TMV Table	Contains a pivot table of the TMV road and crosswalk data
TMV Data	Contains measured TMV data of all vehicular traffic in the intersection for each approach
Ped Data	Contains detected pedestrian information for the intersection's crosswalks

Traffic Study

Start Date	Friday, July 05, 2024 3:30 PM
End Date	Friday, July 05, 2024 5:30 PM
Classification Categories	Lights, Other Vehicles, Bicycles on Road, Golf Carts, Bicycles on Crosswalk, Pedestrians
07/05/2024 PM Peaks	3:45 PM - 4:45 PM

Location 1: Bayview Ave
Location 2: Put-In-Bay
Location 3: Ottawa County
Location 4: Ohio

Latitude: 41.653722
Longitude: -82.817111

7/3/2024 Time	Direction EB	Direction WB	Both Directions Total
12:00 AM	6	27	33
1:00	1	6	7
2:00	5	7	12
3:00	1	2	3
4:00	0	1	1
5:00	4	0	4
6:00	6	6	12
7:00	4	42	46
8:00	30	72	102
9:00	46	115	161
10:00	65	144	209
11:00	37	147	184
12:00 PM	70	218	288
1:00	78	267	345
2:00	73	250	323
3:00	97	290	387
4:00	73	279	352
5:00	71	260	331
6:00	80	227	307
7:00	67	240	307
8:00	58	200	258
9:00	51	174	225
10:00	23	139	162
11:00	5	81	86
Total	951	3194	4145
Percent	22.9%	77.1%	
AM Peak	10:00	11:00	10:00
Volume	65	147	209
PM Peak	3:00	3:00	3:00
Volume	97	290	387