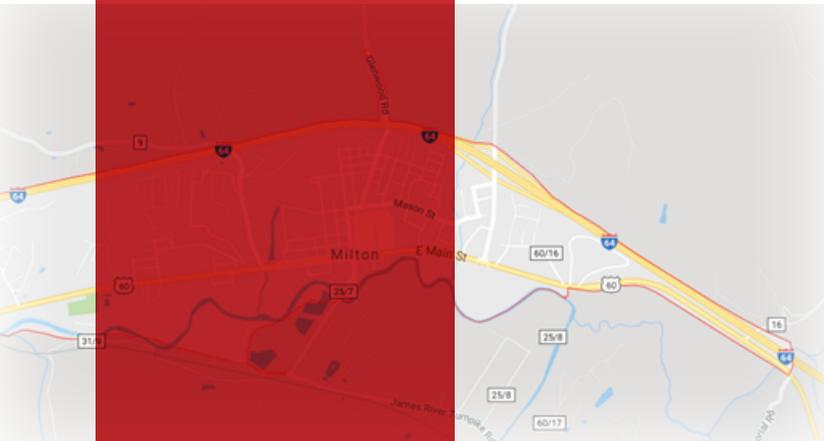




Milton Traffic Mobility Study

For the City of Milton, West Virginia

June 2019



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Executive Summary

A. Purpose and Background

This purpose of this study was to evaluate the mobility and circulation of traffic in Milton. The study incorporates existing Milton transportation conditions, expected and proposed developments, previously completed transportation studies and current issues identified within Milton.

B. Analysis

Field observations were conducted to witness the extent of the issues identified within Milton and to identify any additional issues with mobility and circulation. The planning-level impacts of the traffic from expected and proposed development was analyzed. This analysis was used in conjunction with previously completed studies in the area in order to recommend improvements that will be needed to maintain a safe, efficient, and effective roadway network. The data and analysis provided to the City of Milton and KYVOA in this study support the below recommendations needed to ensure that Milton grows in a smart and safe manner.

C. Recommendations

Key Improvements:

1. Implementation of the Culloden Interchange
2. John Morris Road
 - a. Access Management
 - b. Widening of roadway to five lanes
 - c. Improvements to the John Morris Road and US-60 intersection
3. Morris Memorial Road (Required as part of The Grand Patrician Resort development)
 - a. Curve warning signs and advisory speed plates
 - b. Replacement of the existing one-lane bridge with a two-lane bridge or culvert
4. Sight Distance Improvements on US-60 east of John Morris Road

Minor Improvements:

1. Restrict the Trenol Road loop to one-way
2. Pavement marking improvements to the intersection of Pine Haven Drive and US-60
3. Installation of vehicle detection for the northbound left turn lane of the Harbour Way and John Morris intersection
4. Installation of stop bars at the intersection of Harbour Way and John Morris Road
5. Support of the expansion efforts of TTA

Other Improvements:

Implement the major recommendations from the CDM Smith Non-Motorized Mobility Study.

For Future Study

1. The Grand Patrician Resort Traffic Impact Study
2. Eastbound Left Turn Lane on US-60 onto North Main Street West End
3. North Main Street Operations



I. Purpose of Report & Study Goals

As stated in their Request for Proposals Specifications, KYOVA desired a study to evaluate traffic mobility and circulation in Milton, West Virginia. KYOVA selected Carpenter Marty Transportation, Inc. to conduct this study. The study area includes the Milton City Limits as well as part of James River Turnpike Road east of the City Limits to Morris Memorial Road. **Figure 1** shows the location of Milton in West Virginia and **Figure 2** shows Milton and its City Limits.

Figure 1 - Location of Milton In West Virginia

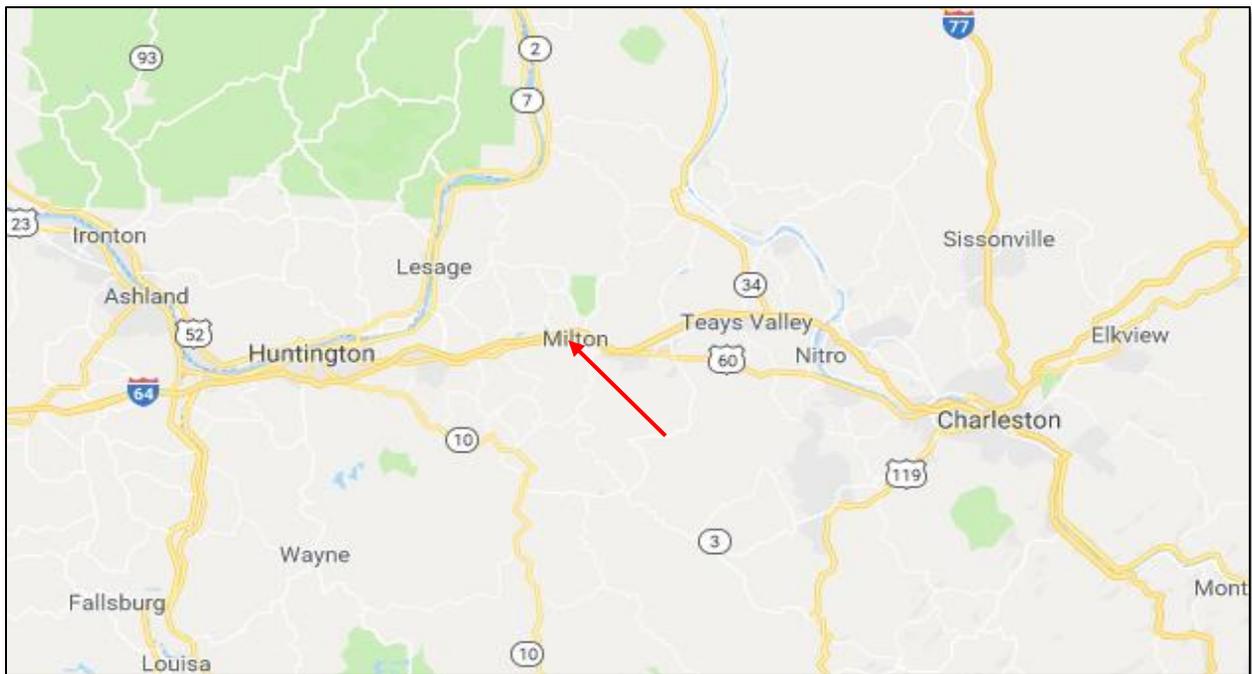
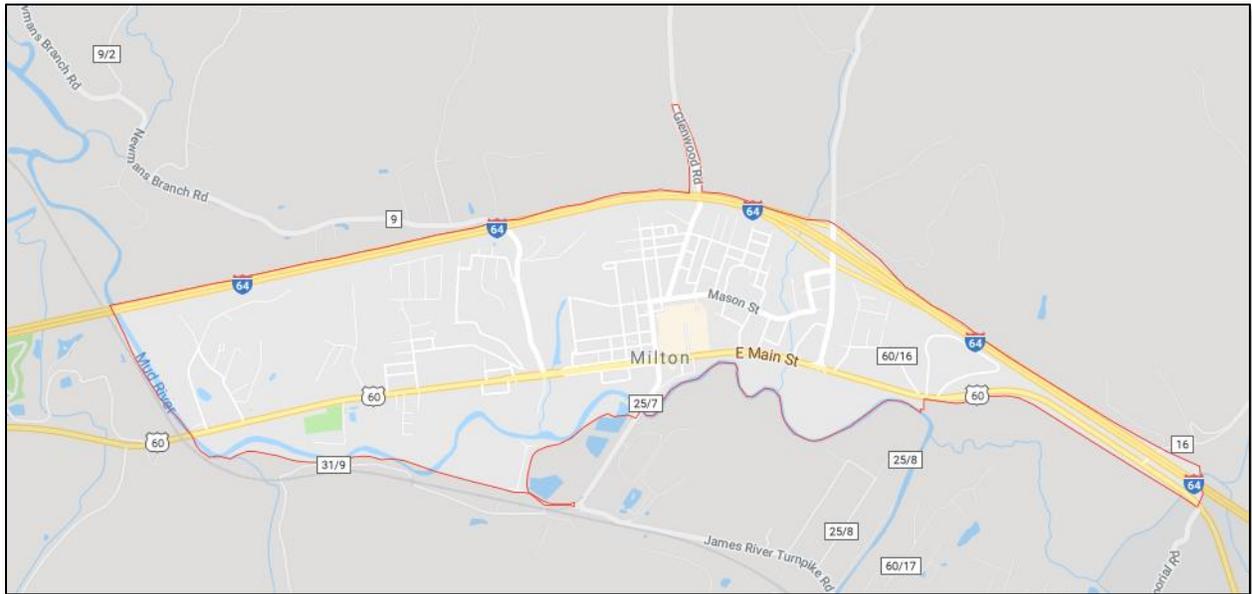


Figure 2 - Milton City Limits



This project conducts a traffic study to evaluate the mobility and circulation of traffic in Milton. The planning level impacts of the traffic from expected and proposed development was analyzed. The study will be used to recommend improvements that will be needed to maintain a safe, efficient, and effective roadway network. Promoting development is important for cities but being able to handle the additional traffic that comes with that development is equally as important. This study will give the City of Milton and KYOVA the data, analysis, and recommendations needed to ensure that Milton grows in a smart and safe manner.

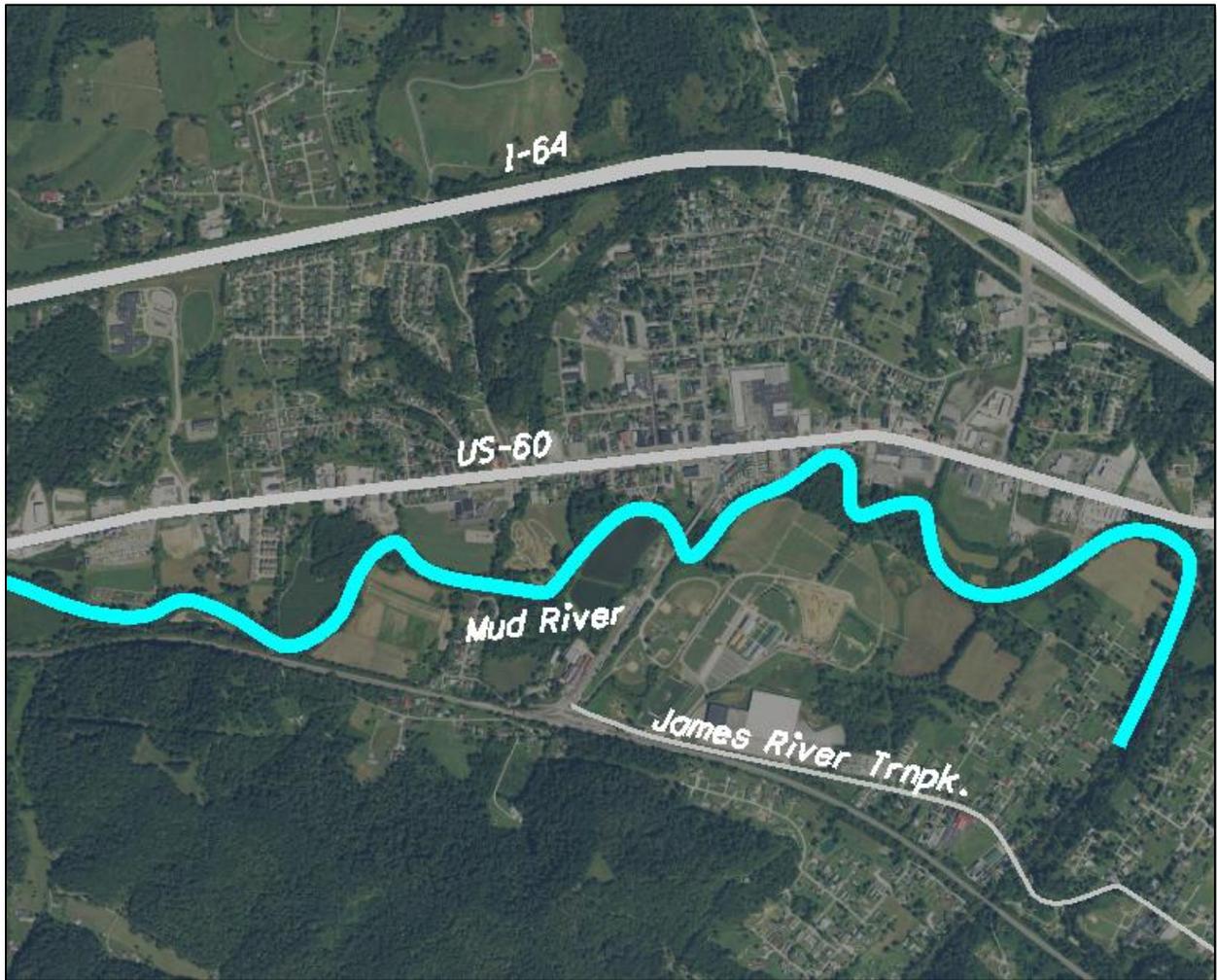
II. Background

A. Milton Transportation Conditions

Milton is a linear city dominated by the parallel routes of US-60 and I-64. These two routes are also generally paralleled by the Mud River, which further defines Milton and its travel routes. James River Turnpike Road also parallels these features to the south of the Mud River. This linear nature creates unique traffic demand issues in that most drivers travel US-60 for almost all in-town trips and I-64 for most out-of-town trips.

A lack of river crossings between US-60 and James River Turnpike Road also limits Milton circulation. With this transportation system character, development will likely have impacts on US-60 and its connection to I-64, which are already experiencing heavy traffic volumes. **Figure 3** below shows the parallel features of the City of Milton.

Figure 3 – Parallel Features of Milton



B. Milton Development

The Grand Patrician Resort

The largest and most significant development proposed in the City of Milton is the Grand Patrician Resort. This proposed development will encompass the former Morris Memorial Hospital and the surrounding 189± acres. The impacts of a development this large are considered significant in any city, and they will be especially noteworthy to a city the size of Milton. The development is roughly 20% of the total land area of Milton. **Figure 4** shows the location of the proposed Grand Patrician Resort land area in Milton.

Figure 4 - Location of the Grand Patrician Resort



This development is expected to reach full build within the 20-year horizon used in this study. Work on the conversion of the former Morris Memorial Hospital to a conference center with a wedding chapel and hotel began in 2018 and is ongoing at the time of this report. **Figure 5** shows a planning-level graphic of the proposed development and its various land uses. For purposes of analysis, a possible future warehouse was included as a part of the Grand Patrician Resort.

The Grand Patrician Resort has been compared to The Greenbrier located in White Sulphur Springs, WV. However, at that resort, visitors typically stay on site, so it does not have a significant impact on the surrounding community. The Grand Patrician Resort, with its baseball and soccer complex, will also have visitors that stay at other area hotels, eat in Milton, and shop at the Huntington Mall. These extra trips could increase the impact of the Grand Patrician Resort on the surrounding community as compared to The Greenbrier.

Figure 5 - Planning-Level Site Plan



C. Other Developments

North Main Street

Along North Main Street in downtown Milton, several existing multistory buildings are being redeveloped for possible restaurant/retail on the ground level with office or residential on the other floors. These are existing buildings which were reasonably occupied when Milton's roadway network was planned and constructed. **Figure 6** shows this general location.

Figure 6 - North Main Street Redevelopment



John Morris Road Development

On the east side of John Morris Road, a 15,000 SF medical center/office building is currently under development by Valley Health. It will replace the Mountaineer Opry House. **Figure 7** shows this location. Office and medical uses have relatively low traffic generation, and this development is expected to have localized impacts on John Morris Road.

Figure 7 - John Morris Road Development



Harbour Way Development

There is vacant property being marketed along Harbour Way for development; however, there are no proposed developments. **Figure 8** shows some of the developable land. The expectation is that it may develop once the Grand Patrician Resort begins generating significant traffic.

Figure 8 - Harbour Way Development



The developments listed above are small in comparison to the Grand Patrician Resort. In total, they likely cover less than 5% of the development area of the Grand Patrician Resort. Some are also in existing and once occupied buildings. Consideration is being given to their localized impact because their citywide impacts will be relatively small. The Grand Patrician Resort traffic will be the driver of citywide impacts and larger future areawide needs for the Milton roadway network. These impacts will be considered in much more detail and on an areawide basis.

Development Due to Flood Wall

The WV Corps of Engineers has proposed building a flood wall to protect Milton north of the Mud River. Large portions of Milton are within the flood plain. Much of the vacant land north of the flood wall will be developable once it is completed. The land south of the intersection of US-60 and John Morris Road is one example.

The flood wall project is expected to be completed sometime between 2024 and 2029. **Figure 9** shows the floodwall conceptual plan and the flood plain.

Figure 9 - Flood Wall Concept Plan



There are many developments that are almost certain to occur or are currently underway. The medical center on the Mountaineer Opry site and parts of the Grand Patrician Resort are underway. The remainder of the Grand Patrician Resort and some redevelopment of North Main Street buildings are likely to occur. Part of the land made developable due to the addition of the floodwall may develop. Many of the developments listed are partially dependent upon the successful and timely completion of the Grand Patrician and its continued operation. The likelihood that all stated developments would be fully built and producing a healthy traffic load in 20 years is unlikely. Due to this, planning level growth factors were estimated assuming full build of the Grand Patrician and partial build of all other developments discuss above. This was done to obtain realistic results.

D. Significant Transportation Studies

Culloden Interchange

An interchange on I-64 in Culloden, WV has been discussed and studied for decades. Recently, it has received serious consideration by the West Virginia Division of Highways (DOH). The size of the Grand Patrician development may be part of the reason behind this momentum.

In April 2015, AECOM completed a study for the DOH to assess the impacts of a new interchange on I-64 in Culloden, WV. The impacts of a new interchange this close to Milton will lead to significant changes in travel patterns especially on the east end of the city. The Culloden Interchange Study shows significant improvements may be necessary at major Milton intersections, such as US-60 and John Morris Road.

Image from Culloden Interchange Study by AECOM

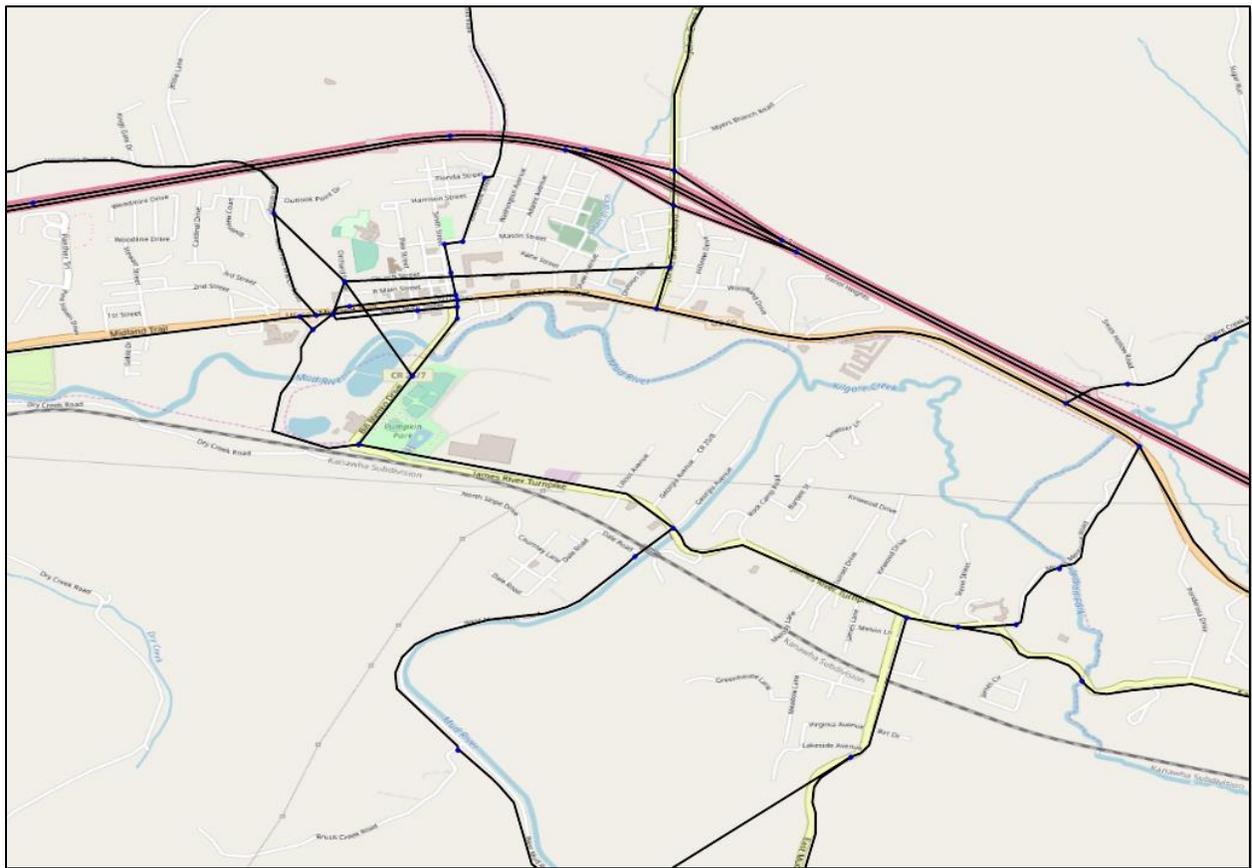


Data, analysis, and results from that study were utilized in this report. It was assumed that this interchange will be completed and fully operational by the 20-year horizon utilized in this study.

KYOVA Travel Demand Model

The KYOVA travel demand model is a forecasting tool used for regional transportation analysis. The model uses mathematical algorithms to forecast travel demand from input data. This model was last updated by Kimley-Horn to have a validated opening year of 2015 and a horizon year of 2040. The opening year represents the year that corresponds to the existing conditions. The horizon year is then compared to the base year to depict changes to travel patterns. The model's opening year and horizon year output data were provided to Carpenter Marty Transportation by KYOVA to assist in the completion of the Milton Mobility Study. The model does not include turning movement data at intersections, only roadway link Average Daily Traffic (ADT) data. **Figure 10** shows the roadway network of Milton from the model.

Figure 10 - KYOVA Travel Demand Model in Milton Area



Milton Non-Motorized Transportation Study

In June 2018, CDM Smith completed the Milton Non-Motorized Transportation Study for KYOVA. This study looked at proposed locations for sidewalks, bike lanes, ADA crossings, and other non-motorized mobility options. Data, analysis, and results were utilized in this report.

E. Current Issues

A kick-off meeting was held with the City of Milton on 12/19/18 to discuss this project, obtain their concerns, and to obtain information usable in this study. Milton expressed several concerns for consideration:

1. Issues with westbound right turns on US-60 at Pine Haven Drive
2. Redevelopment of office buildings along North Main Street in Downtown Milton into retail, residential, and/or office and its traffic impacts
3. Lack of westbound protected left turn (turn arrow) at John Morris Road and US-60
4. Wrong way traffic at the east end of North Main Street in Downtown Milton
5. Lack of pedestrian crossings on US-60
6. Unsafe feeling when making a northbound left turn from Morris Memorial Road onto westbound US-60
7. Lack of capacity of Bill Blinko Drive's bridge over the Mud River
8. Valley Health development on the east side of John Morris Road south of I-64
9. Development on Newmans Branch Road, north of I-64, that is expected to bring truck traffic
10. Developable area around Harbour Way
11. Lack of sidewalks along Pine Haven Drive between US-60 and the middle school
12. Lack of sidewalk coverage in area surrounding the elementary school
13. Pumpkin Festival traffic
14. Perry Morris Square access may need a traffic signal with access consolidation

KYOVA would like to consider all the above items for Milton. However, some of these concerns are significant enough to justify their own study. For instance, analysis of the Pumpkin Festival traffic (item 13) would be a significant effort and cannot be covered in this study. A signal warrant analysis with and without access consolidation at Perry Morris Square (item 14) is typically an independent study. Concerns related to pedestrians, like items 11 and 12, are outside of this study scope which only addresses motorized mobility. Non-motorized mobility was covered by the Milton Non-Motorized Transportation Study, which will be discussed in this report.

III. Analysis

A. Methods

Field Analysis

AM, PM, and off-peak mobility conditions in Milton were observed by two traffic engineers independently. School start and release times were also observed. This was done to observe issues expressed by Milton and identify any other concerns.

Planning-Level Capacity Analysis

ADT's were obtained from the model data and the Culloden interchange study. ADT's were then projected to 2039 using estimates of the Grand Patrician Resort's traffic distributed to Milton's major roadways. The effects of the Culloden interchange were also considered. A planning level linear

growth rate was applied to account for all other possible developments. The growth is expected by 2039 (not including the Grand Patrician Resort traffic which was added separately):

- 0.50% on John Morris Road between US-60 and I-64
- 0.25% on US-60 east of John Morris Road and from John Morris Road to Morris Memorial Road
- 0.10% on Bill Blenko Drive and James River Turnpike Road

This background growth was estimated based on the expected/potential developments that may occur which are discussed in the Other Developments section, their size, land use, and location.

Review of Prior Studies

Both the Milton Non-Motorized Transportation Study and Culloden Interchange Study discussed above were thoroughly investigated for items that could be utilized or restated in this study.

Public Meeting

A public meeting was held on 5/2/19 to obtain input from the public on mobility issues in Milton. This meeting was publicized in the Herald Dispatch, Milton's Facebook page, on KYOVA's website, and posted at the Milton Library.

B. Results

Field Analysis

Westbound right turns from US-60 to Pine Haven Drive

Observations did indicate that significant queuing occurs on the east, west, and north leg of this intersection. The signal operates efficiently, and traffic clears each cycle. Specific to westbound right turns, queues were observed that did not clear on a signal cycle. Those appeared to be created by a geometric situation at the intersection and not a capacity issue. The north leg of this intersection has no pavement markings. However, southbound traffic sometimes will assume there is a left turn lane area and a through/right turn lane area. When this occurs, drivers in the left turn lane area are left of center. This makes it impossible for westbound buses turning right to make this turn to head north to the middle school. These buses will sit until vehicles can back up or otherwise clear their turning path. These stopped/stalled busses also block westbound through traffic as there is only one lane westbound at this intersection.

Southbound queuing on John Morris Road

The most significant southbound queueing on John Morris Road was observed during AM peak times but was not present during other times of the day. Further observations identified the traffic signal operation at John Morris Road and Harbour Way to be partially culpable. The northbound approach to the traffic signal has one through lane and one left turn lane. The left turn lane has a protected left turn phase (a green arrow). This is not unusual and is likely necessary due to the success of the Sheets facility and the traffic produced. However, what is not typical is that this protected phase (arrow) comes on when there are no vehicles in the northbound left turn lane waiting to make that turn. When this phase (arrow) is on, southbound through and right turning traffic must be stopped. This protected phase (arrow) coming on when it is not needed creates unnecessary delay to southbound traffic on John Morris Road which could be easily remedied.

There are also no stop bars at this intersection to indicate where drivers should stop at a red light. This was not seen as a big concern; however, this lack of stop bars may leave unfamiliar drivers with

less of a visual warning that they are approaching an intersection and may be required to stop. The signal heads provide the visual queue as well, but they are always coupled with stop bars. Without the full complement of expected traffic control at an intersection, confusion may ensue and it is a relatively low-cost item that can reduce driver confusion.

North Main Street

North Main Street functions as a service road to protect US-60 from access points and serve the businesses along North Main Street. Without North Main Street, US-60 would not flow as well through the downtown. This design functions well until traffic volumes and safety/crashes become an issue. North Main Street has already been modified to make part of it one-way to help traffic flow primarily to/from the elementary school. This also improves safety and flow at North Main Street's east end near the Smith Street traffic signal. Its proximity to US-60 makes turns at both ends problematic due to the skewed angle of the intersection and tight turning radii. Field observations indicated many types of issues:

- eastbound left turn queues in US-60 through lanes at the west end of North Main Street (a safety concern)
- problems making right turns westbound on US-60 at the west end of North Main Street, especially for larger vehicles (a safety concern as vehicles swing wide)
- one-way street violations (a safety concern)
- confusion in how to maneuver the east end of North Main near the Smith Street signal

John Morris Road

Access along John Morris Road is not meet current access management best practices. Businesses, such as GoMart, have a curb cut that runs their entire frontage. This is known now to be problematic and should be avoided. The access to the GoMart, the building to the north of it, and 2nd Street are all very closely spaced and almost appear to be one large access point. This creates confusion and conflicts between drivers who enter/exit in ways other drivers may not be expecting. When these conflicts occur, it creates friction on John Morris Road as entering or exiting vehicles slow to avoid conflicts or oddly circulating drivers. Not as egregious, but also problematic, are the closely spaced intersections of 3rd Street and Exxon with the eastbound on/off ramps.

Morris Memorial Road

Morris Memorial Road has several issues that should be considered before The Grand Patrician Resort traffic grows.

- Northbound Morris Memorial Road at US-60 – making a left turn from Morris Memorial Road onto US-60 is unsafe. Proper sight distance is not available. The Grand Patrician Resort construction superintendent stated the hillside on the southeast corner of Morris Memorial Road and US-60 would be cut back to provide more sight distance.
- Morris Memorial Road currently has a one-lane bridge roughly half way between US-60 and James River Turnpike Road. It is also in a curved area of Morris Memorial Road, so leaving it as a rural feature for the Grand Patrician Resort is not a viable option without significant changes to the area. As volumes of unfamiliar drivers increase, this one-lane bridge area could be a safety and operations issue.
- Morris Memorial Road south of US-60 has many horizontal and vertical curves without any curve warning signs or advisory speed signs. As the traffic volumes of unfamiliar drivers increase, this could become a safety issue.

Trenol Road

Trenol Road is a narrow two-way road that loops from US-60, through a residential area, and returns to US-60. Its eastern intersection with US-60 has sight distance issues created by a hillside on the north side of US-60 to the east of Trenol Road. As traffic on US-60 increases, this could become more of a safety issue as the number of unfamiliar drivers and the probability of conflicts increase.

Capacity Analysis

Intersection capacity analysis was not performed as part of this study. Turning movement counts would be necessary for this analysis, and those counts were not part of this scope of work. However, the AECOM Culloden Interchange study did perform capacity analysis at the US-60 and John Morris Road intersection which is arguably the most important and also the most congested intersection in Milton.

Table 1 shows the Level of Service (LOS) criteria for a signalized and an unsignalized intersection.

Table 1 - Level of Service Criteria for Unsignalized and Signalized Intersections

Level of Service	Delay Range (seconds/vehicle)	
	Unsignalized Intersection	Signalized Intersection
A	≤10	≤10
B	>10 and ≤15	>10 and ≤20
C	>15 and ≤25	>20 and ≤35
D	>25 and ≤35	>35 and ≤55
E	>35 and ≤50	>55 and ≤80
F	>50	>80

Table 2 is reproduced using data from the AECOM Culloden Interchange study dated April 7, 2015.

Table 2 - Level of Service at US-60 & John Morris Road

Intersection	Approach	Movement	2015		2040			
			AM	PM	AM No Build	AM Build	PM No Build	PM Build
US-60 & Johns Morris Rd (CR-13)	Eastbound	Left	B/13.5	B/14.8	F/218.3	C/23.2	C/25.9	B/12.8
		Thru	A/2.9	A/5.9	E/57.1	A/4.8	A/6.5	A/6.1
		Total	B/10.2	B/10.8	F/165.9	B/18.2	B/16.9	A/9.3
	Westbound	Right	A/6.1	A/3.5	A/3.7	A/2.5	A/2.7	A/2.4
		Thru	B/12.9	A/9.9	B/15.7	B/14.1	B/10.6	B/10.9
		Total	A/8.6	A/9.9	B/15.7	B/2.5	B/10.6	B/10.9
	Southbound	Left	A/18.9	B/13.8	B/13.7	B/19.9	B/10.1	B/12.5
		Right	A/2.8	A/2.2	A/3.7	A/3.8	A/2.3	A/2.2
		Total	B/18.9	B/13.8	B/13.7	B/19.9	B/10.1	B/12.5
	Total	Overall	A/9.0	A/9.1	F/82.6	B/13.7	B/11.2	A/7.9

Table 2 shows that eastbound traffic at that intersection in the 2040 AM No Build peak hour will exhibit LOS of E and F. **Table 1** explains the LOS criteria. The entire intersection also exhibits a LOS of F. This is extreme congestion and unacceptable operational conditions. However, this table also shows that with the construction of the Culloden Interchange, this intersection improves significantly. The intersection is at LOS B (very good operations) with eastbound traffic being at LOS A through C (good operational conditions for a peak hour).

Table 2 shows expected conditions for the PM peak hour. Operations are much better during this peak, and the addition of the Culloden interchange improves the operations of the intersection from LOS B to LOS A. This would be considered extremely good operational conditions for the busiest intersection in a city. These LOS values for the PM peak current conditions are from 2015 with count data that may have been taken in 2014. They indicate the intersection is at LOS B even prior to the Culloden interchange being constructed. There is some congestion during the PM peak currently, and observations indicate it is not at LOS B. It is likely at LOS C in 2019.

The KYOVA model was utilized, as well as the Culloden Interchange study, to obtain Average Daily Traffic (ADT) volumes for the major roadways in Milton as well as part of James River Turnpike Road east of Milton. Data was available for:

- US-60
- John Morris Road
- Bill Blenko Drive
- James River Turnpike Road

Figure 11 shows the ADTs of Bill Blenko Drive, US-60, James River Turnpike Road, and John Morris Road in 2019 and its volume-to-capacity-ratio (V/C). Each roadway is color coded to indicate which routes are at or above the capacity of the roadway.

V/C is an indication of how a roadway is performing. A V/C value of 1.0 means the roadway is *at* capacity. It means the roadway has very congested conditions during parts of the day and would be associated with LOS F. A V/C of 0.7 indicates that there is congestion during parts of the day, but it is at acceptable levels. This might be associated with roadway conditions right before they fall into LOS D. Roadways under a V/C of 0.7 have good, acceptable operations with little congestion.

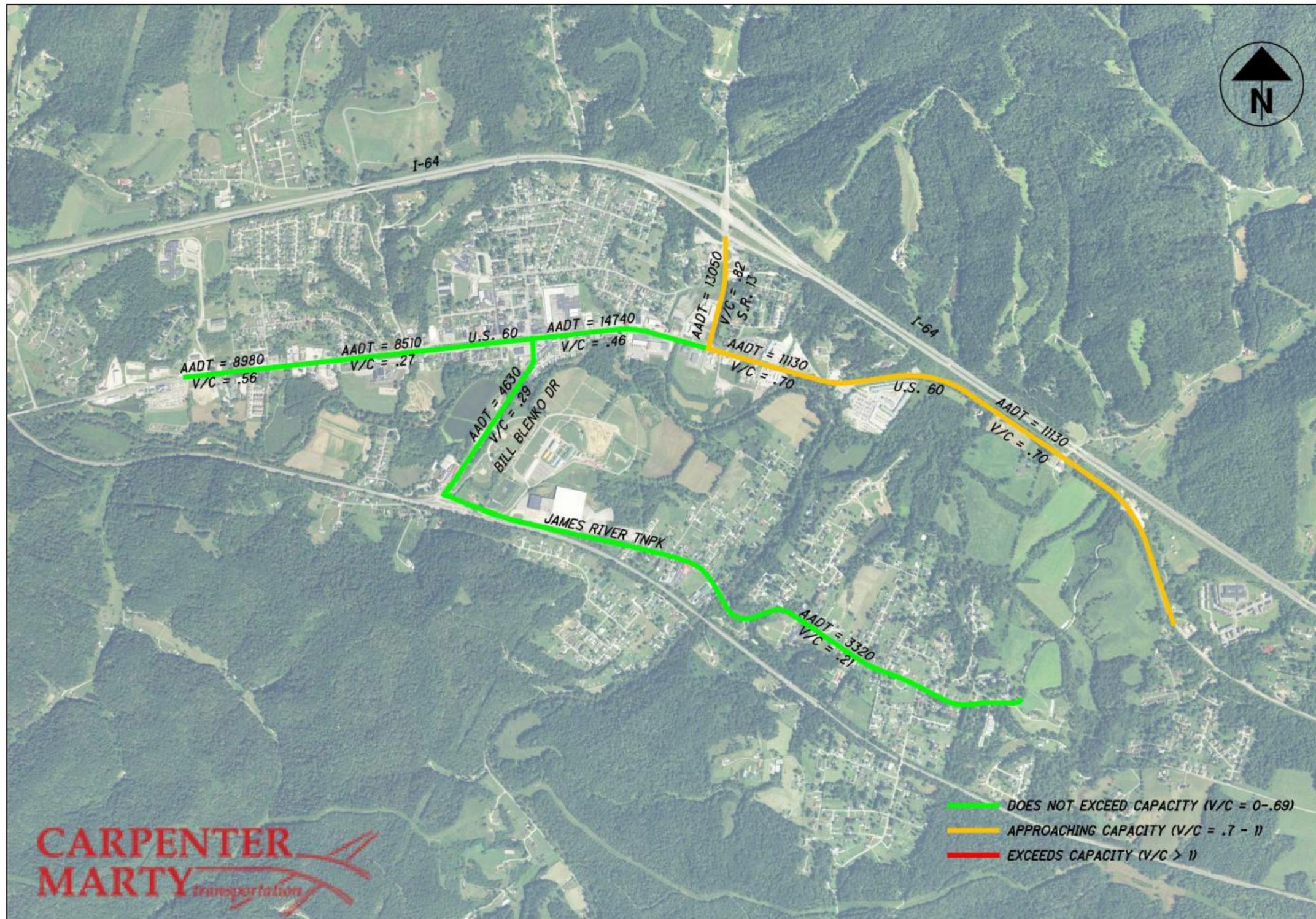
Table 3 shows the study segments with their relevant information. This data was taken from the AECOM study dated April 7, 2015.

Table 3 - Roadway Link Information

Segment	From	To	Class	Thru Lanes	Speed Limit	Capacity	Existing ADT	Existing V/C	Horizon Year ADT	Horizon Year V/C
North-South Corridors										
Bill Blenko Drive	James River	US-60	Major Collector	1/11	35	16000	4630	0.29	5580	0.35
SR-13	US-60	I-64	Minor Arterial	1/1	40	16000	13050	0.82	18530	1.16
East-West Corridors										
US-60	Project Limits	Sunset	Minor Arterial	1/1	40	16000	8980	0.56	10940	0.68
US-60	Sunset View	Stewart St	Minor Arterial	1/1T	40	16000	8510	0.53	10940	0.68
US-60	Stewart	Bill Blenko	Minor Arterial	2/2	40	32000	8510	0.27	10940	0.34
US-60	Bill Blenko	SR-13	Minor Arterial	2/2T	40	32000	14740	0.46	17480	0.55
US-60	SR-13	Trenol Rd	Minor Arterial	1/1T	40	16000	11130	0.70	16990	1.06
US-60	Trenol Rd	Morris Memorial	Minor Arterial	1/1	55	16000	11130	0.70	16990	1.06
US-60	Morris Memorial	Project Limits	Minor Arterial	1/1	55	16000	11130	0.70	14200	0.89
James River Tnpk	Bill Blenko	Morris Memorial	Major Collector	1/1	35	16000	3320	0.21	4260	0.27

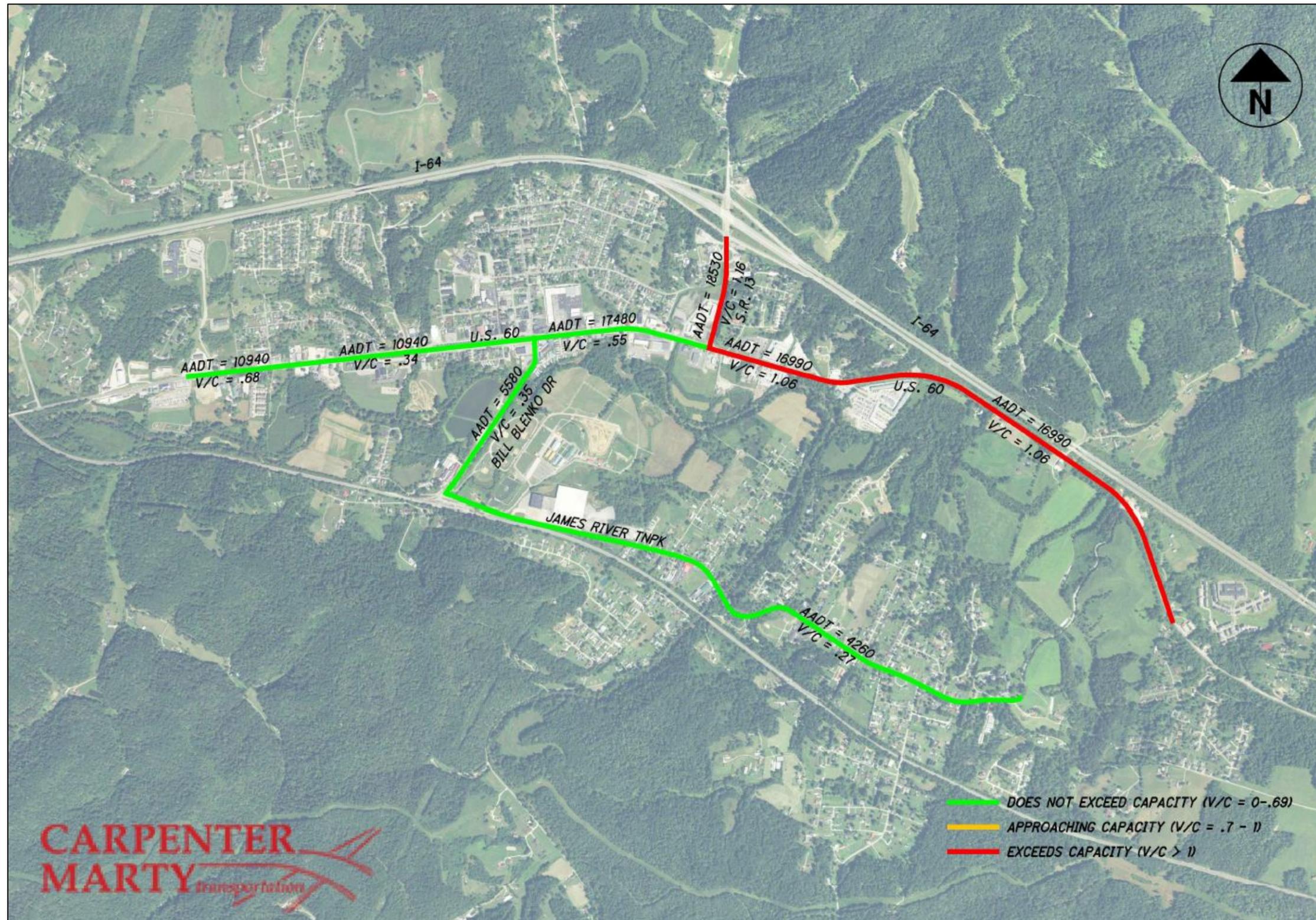
¹ Numbers indicate the number of through lanes in each direction. A "T" represents a two-way left-turn lane.

Figure 11 - 2019 V/C Map



**CARPENTER
MARTY** transportation

Figure 12 - 2039 V/C Map

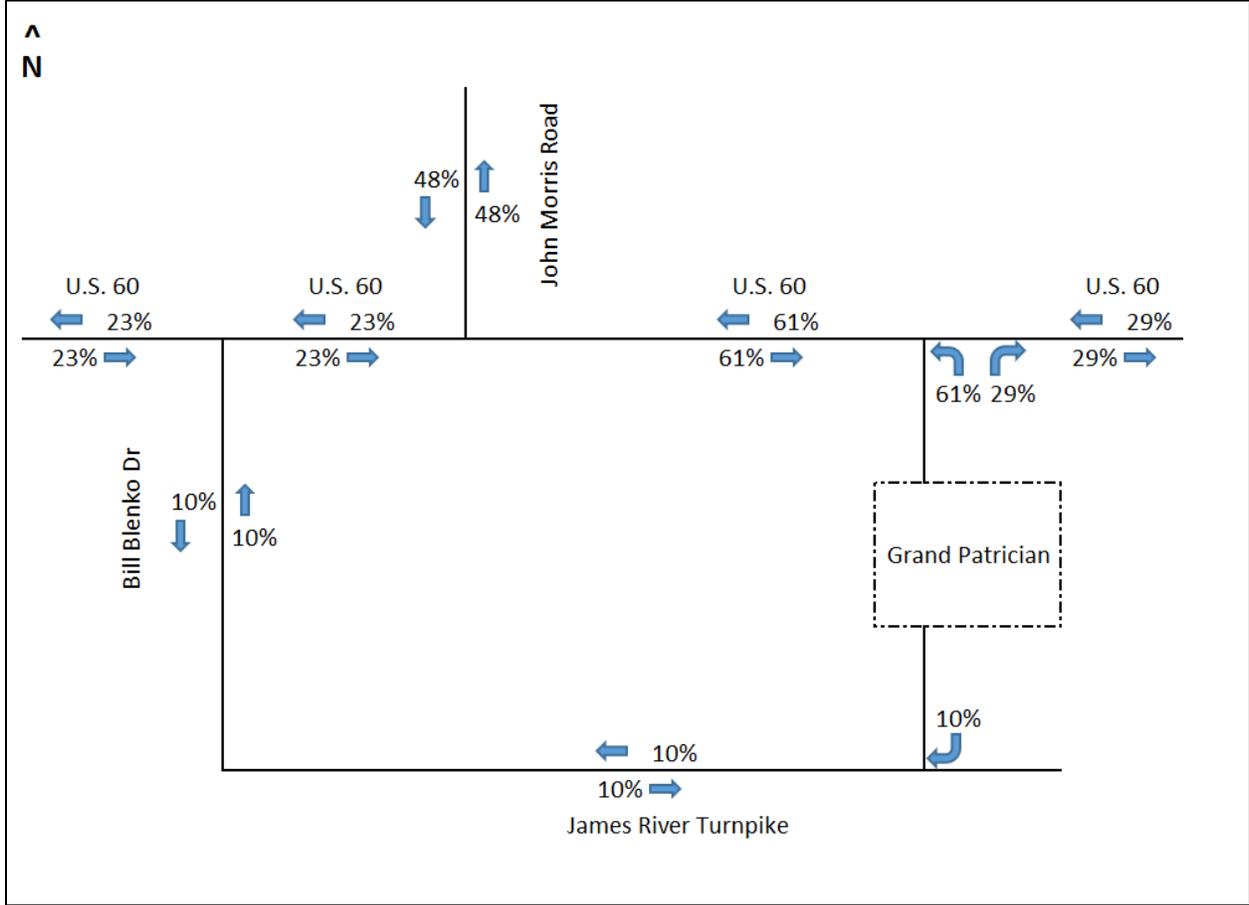


John Morris Road and US-60 between John Morris Road and Morris Memorial Road are estimated to be nearing capacity in 2019. **Figure 12** shows the same data for the horizon year of 2039. This assumes full-build of the Grand Patrician Resort. **Table 4** shows the traffic generated for each land use that makes up The Grand Patrician Resort as well as a potential future warehouse. This is based on national and industry-accepted data produced by the Institute of Transportation Engineers. **Figure 13** shows the estimate of how this traffic will distribute to the major roadways in Milton. **Figure 12** shows that John Morris Road and US-60, between John Morris Road and Morris Memorial Road, are expected to be over capacity in 2039. This indicates a need for future improvements. Other roadways are at acceptable levels of traffic.

Table 4 - Trip Generation, 10th edition

Land Use	Size	Daily Traffic	
		Entry	Exit
150 – Warehousing	81,000 SF Gross Floor Area	87	87
210 - Single Family Detached Housing	41 Dwelling Units	229	229
220 - Multifamily Housing (Low Rise)	90 Dwelling Units	320	320
265 – Timeshare	28 Dwelling Units	136	136
310 – Hotel	200 Rooms	916	916
430 – Golf Course	9 Holes	106	106
488 – Soccer Complex	6 Fields	214	214
710 – General Office Building	20,000 SF Gross Floor Area	111	111
820 – Shopping Center	22,000 SF Gross Floor Area	1074	1074
932 – High-Turnover (Sit Down) Restaurant	5,000 SF Gross Floor Area	280	280
Amphitheater (Non-ITE Source)	2,500 attendees (2.85 persons/veh.)	877	877
Total		4350	4350

Figure 13 - Grand Patrician Resort Traffic Distribution



Review of Prior Studies

AECOM Culloden Interchange Study (April 7, 2015)- Some of the results of this study which are applicable to Milton intersections are shown above in **Figure 13**. However, overall this study clearly shows that the addition of the Culloden interchange and its associated improvements will improve traffic conditions in Milton. With the Grand Patrician Resort being between the John Morris Road interchange and the Culloden interchange, its traffic will likely disperse to both interchanges, which will significantly improve conditions in Milton. The Grand Patrician Resort development will almost make the need for a Culloden interchange a necessity and not a desire.

CDM Smith’s Non-Motorized Mobility Study of Milton (June 2018)- This study found that Milton has many sidewalks but there is a need for connectivity to be added. US-60 and the Mud River pose a significant barrier to pedestrian connectivity. There is only one pedestrian crossing on US-60 and no crossing over the Mud River. Exclusive bicycle facilities do not exist in Milton. Paved shoulders along US-60 and other major routes are available. As with pedestrians, US-60 and the Mud River are a barrier to bicycle connectivity. **Table 5** presents data from this CDM Smith study and shows the motorized and non-motorized conditions in Milton.

Table 5 - Travel Conditions in Milton

Existing Conditions			
Roadway	Lane Configurations	Sidewalks	Paved Shoulders
US Route 60			
Electric Rd. to Pine Haven	2 & 3 lanes	None	Both Sides
Pine Haven Drive to Stewart St.	3 lanes	North Side Only	South Side
Stewart to Heck	4 lanes	None	Both Sides
Heck to 2nd St.	4 lanes	Both Sides	Both Sides
2nd to Main St.	4 lanes divided	Both Sides	None
Bill Blenko to John Morris Rd.	5 lanes	Both Sides of Roadway	Both Sides; wider on North Side
John Morris Rd. to Flea Market Rd	3 lanes	None	Narrow
Flea Market to Morris Memorial Rd.	2 lanes	None	None
North Main Street	1 lane	One Side (Adequate)	None
South Main Street	1 lane	One Side (Adequate)	None
Newman's Branch Road - SR 9	2 lanes	None	None
Bill Blenko Road	2 lanes	None	Narrow
John Morris Rd. / SR 13		None	
Pine Haven Drive/Panther Trail		None	
Morris Memorial Rd		None	None
Harrison St		Discontinuous	
Glenwood St		East Side	None
Mason Street		Generally present on both sides	
Smith Street		Generally present on both sides	
Pike Street		2 sides south of Mason	
Brickyard Ave		Discontinuous	
Joy Lane	1 lane	Yes	1 Lane Non-Motorized
Church Street		Discontinuous	

KYOVA MPO Transportation Improvement Program (TIP) 2018-2021 – every two years KYOVA updates this TIP document. No capacity projects are planned in Milton at this time.

Tri-State Transit Authority (TTA) Transit Impact Study – Overall, ridership is up since 2010 which is opposite the national trends. This study is considering increasing the number of trips during morning, mid-day, and evening to three. This is not expected to have a significant impact on traffic volumes and is considered negligible in this analysis.

Public Meeting

A public meeting to present results of this analysis and obtain feedback was held at 5:00 PM on 5/2/19 at the City of Milton City Hall. The public meeting was well attended (attendance sheet is provided in the **Appendix** along with meeting materials). However, no attendees logged any formal comments on the comment sheet provided for them. The construction supervisor of the Grand Patrician Resort project attended and provided valuable information on the development.

IV. Recommendations

The following recommendations are made based on the results of this study as well as those of the supporting studies.

A. Physical Projects and Operational Changes

Key Improvements

1. **Culloden Interchange**
 - a. This improvement will be needed prior to full build of the Grand Patrician Resort. Without it, John Morris Road and its intersection with US-60 will experience a significant increase in congestion and delay. The Grand Patrician Resort, in the long run, is expected to produce ancillary developments in Milton. Some ancillary developments may occur in Culloden as well. This interchange is needed to keep traffic traveling between I-64 and these developments from using the John Morris Road interchange only.
2. **John Morris Road**
 - a. Access management needs to be applied to this corridor as development occurs and volumes increase to improve flow and corridor safety.
 - b. The development of the Grand Patrician Resort as well as developments along John Morris Road will lead to a need to widen this roadway to a 5-lane section. A realistic and dependable estimate of when the 5-lane section is needed is not available due to the many factors that will affect the project's progress and the progress of ancillary developments. However, it is expected that the 5-lane section will need constructed prior to full-build of the Grand Patrician Resort with or without the opening of the Culloden interchange.
 - c. The intersection of John Morris Road and US-60 will likely need capacity improvements and/or operational changes and could be completed as part of the widening of John Morris Road to a 5-lane section. Determining the layout of this intersection should be a requirement of the Grand Patrician Resort traffic impact study.
3. **Morris Memorial Road** – Items to be required as part of The Grand Patrician Resort development

- a. Install curve warning signs and advisory speed plates in curves. This will be important as this roadway fills with unfamiliar drivers visiting the Grand Patrician Resort.
 - b. Replace the one-lane bridge with a two-lane bridge or culvert. Sight distance to this one-lane bridge is not adequate due to roadway curvature. Northbound and southbound conflicting vehicles have to stop somewhat abruptly to avoid an issue. When volumes increase, the probability of these conflicts occurring will increase substantially.
4. **Improvements to Sight Distance on US-60 east of John Morris Road**
 Making a northbound left turn from Morris Memorial Road onto US-60 can cause potential safety issues. Adequate sight distance is not provided due to the hillside on the southeast corner of this intersection. Sight distance analysis should be required in the Grand Patrician Resort traffic impact study. The development has plans to modify this hillside to increase sight distance. This proposal should be studied to determine if the sight distance provided meets requirements for the speeds on US-60.

Minor Improvements

- 1. Make the Trenol Road loop one-way to eliminate the sight distance issue on the eastern Trenol Road intersection with US-60. Exiting the eastern Trenol Road access can cause a potential safety issue due to sight distance limitations. As traffic on US-60 increases due to the Grand Patrician Resort, this will become more of a concern. The eastern Trenol Road intersection with US-60 would be the entrance to the Trenol Road loop, and the western Trenol Road intersection with US-60 would be the exit from the loop. Exiting the western access appears to have adequate sight distance. Trenol Road could remain two-way but the hillside on the north east corner of US-60 and the eastern Trenol Road access would need to be cut back to provide adequate sight distance for the speeds on US-60.
- 2. Pavement markings should be designed and applied to the southbound approach to the intersection of Pine Haven Drive and US-60. This is necessary to eliminate the westbound queuing created by right turning bus blockage. If a left turn lane is desired, its stop bar should be placed well back from the intersection to provide room for a westbound to northbound right turning bus. This distance from the intersection should be determined by a bus turning template for a westbound to northbound right turn. This will eliminate much of the westbound queuing created by the bus blockage at this intersection.
- 3. Vehicle detection should be installed in the northbound left turn lane of the Harbour Way and John Morris Road intersection. Adjustments will need made to the programming so that the northbound protected left turn phase (green arrow) can be skipped when no vehicles are present to make that turn. This will greatly decrease delay and queuing in the southbound direction on John Morris Road and increase capacity.
- 4. Stop bars should be installed at the Harbour Way and John Morris Road traffic signal. This is the typical application at a signalized intersection, and it will eliminate any potential confusion about being a defined intersection area and where to stop on a red indication.
- 5. Continue to support the expansion of TTA and their increase in trip frequency. Eventually their success will start to impact traffic volumes in Milton.

Other Improvements

Implement the major recommendations from the CDM Smith Non-Motorized Mobility Study in Milton. See that study for exact details.

- a. Provide non-motorized access from Downtown Milton to Pumpkin Park
- b. Provide geometric improvements to the intersection of US-60 and John Morris Road to make a more bicycle friendly intersection
- c. Provide non-motorized access to the Grand Patrician Resort from downtown Milton
- d. Provide a non-motorized network within downtown Milton
- e. Provide additional signalized and midblock crossings of US-60
- f. Improve ADA curb ramp compliance
- g. Provide non-motorized access to
 - i. middle school
 - ii. elementary school
 - iii. shopping centers

For Future Study

1. **The Grand Patrician Resort Traffic Impact Study** - Due to its size, the Grand Patrician Resort traffic impact study should cover at minimum:
 - a. Morris Memorial Road and US-60 – turning movement counts, sight distance, and capacity analysis
 - b. John Morris Road and US-60 – turning movement counts and capacity analysis to determine the ultimate layout of this intersection to accommodate the Grand Patrician Resort traffic as well as background growth
 - c. Harbour Way and John Morris Road – turning movement counts and capacity analysis to determine if improvements are needed
 - d. Morris Memorial Road and James River Turnpike Road – turning movement counts and capacity analysis and recommendations on traffic control and realignment
2. **Eastbound Left Turn Lane on US-60 onto North Main Street West End** - An eastbound left turn lane at the west end onto North Main Street would eliminate some congestion on US-60 and also improve safety. This should be studied further and considered. This left turn lane could be placed in the existing inside lane of US-60. Since US-60 is one lane eastbound west of this location, this one lane could continue eastbound allowing the inside lane to become the left turn lane. After that left turn lane, US-60 could then become two lanes eastbound.
3. **North Main Street Operations** – North Main Street will need further study that is outside the scope of this analysis. Half of its length is one-way, and the rest is two-way. The intersections at both ends are operationally challenging for drivers and could be a safety issue if/when traffic increases. As this area develops and non-locals patronize these businesses, they could be confused by North Main Street operations. Confusion generally leads to safety issues.
4. **Safety data** – Crash data of the Milton area should be analyzed to identify any safety issues in the surrounding area. These elements will be addressed in the Safety Study for Cabell and Wayne Counties study.

Appendix: Public Meeting Documents





Milton Traffic Mobility Study

INTRODUCTION

Carpenter Marty Transportation has been retained by KYOVA Interstate Planning Commission to conduct a planning-level study to evaluate traffic mobility and circulation in Milton, West Virginia. The study will be used to assess the impact of future traffic growth on the existing roadway system and identify areas for mobility improvement.

WHAT HAS BEEN DONE

The following work/analysis has been completed to date:

- A kickoff meeting was held with Milton, KYOVA, and Carpenter Marty Transportation in December 2018
- Historic traffic data was received and reviewed
- Field observations were conducted during AM, PM, school peaks, and other times
- Existing traffic volumes and conditions were analyzed
- Anticipated trips from potential future development in the area were generated and distributed through the City and added to the existing traffic volumes to create future traffic volumes
- A planning-level analysis of this future traffic was conducted
- A general safety review and coordination with other studies

PRELIMINARY RESULTS

The existing traffic and future traffic are shown on the additional handout and display boards. The volumes for each roadway were compared to the existing capacity of that roadway. Green roadways do not exceed capacity, yellow roadways are approaching capacity, and red roadways exceed capacity. Roadways that exceed capacity are recommended to be studied further and monitored for potential future improvements.

NEXT STEPS

- Receive input from the public – please fill out the comment sheet!
- Develop and submit a draft report

Questions can be directed to Bethany Wild of KYOVA
by phone: (304) 523-7434 or e-mail: bwild@kyovaio.org



Milton Traffic Mobility Study

May 2nd, 2019 from 5 PM to 7 PM

Comment Sheet

Name: _____

Address: _____

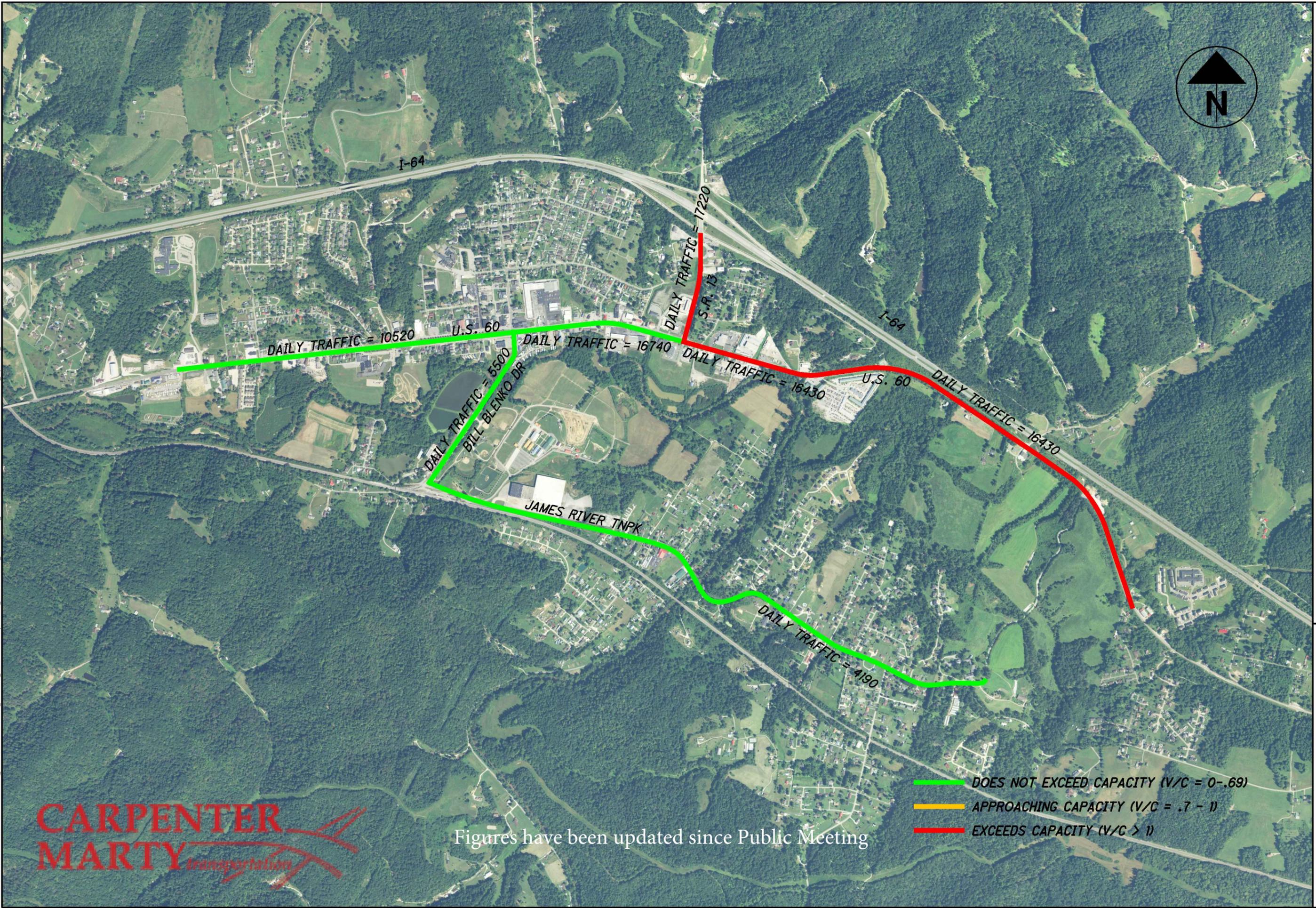
Phone: _____

Email: _____

How did you hear about this meeting? _____

Specific concerns/comments about Milton transportation: _____

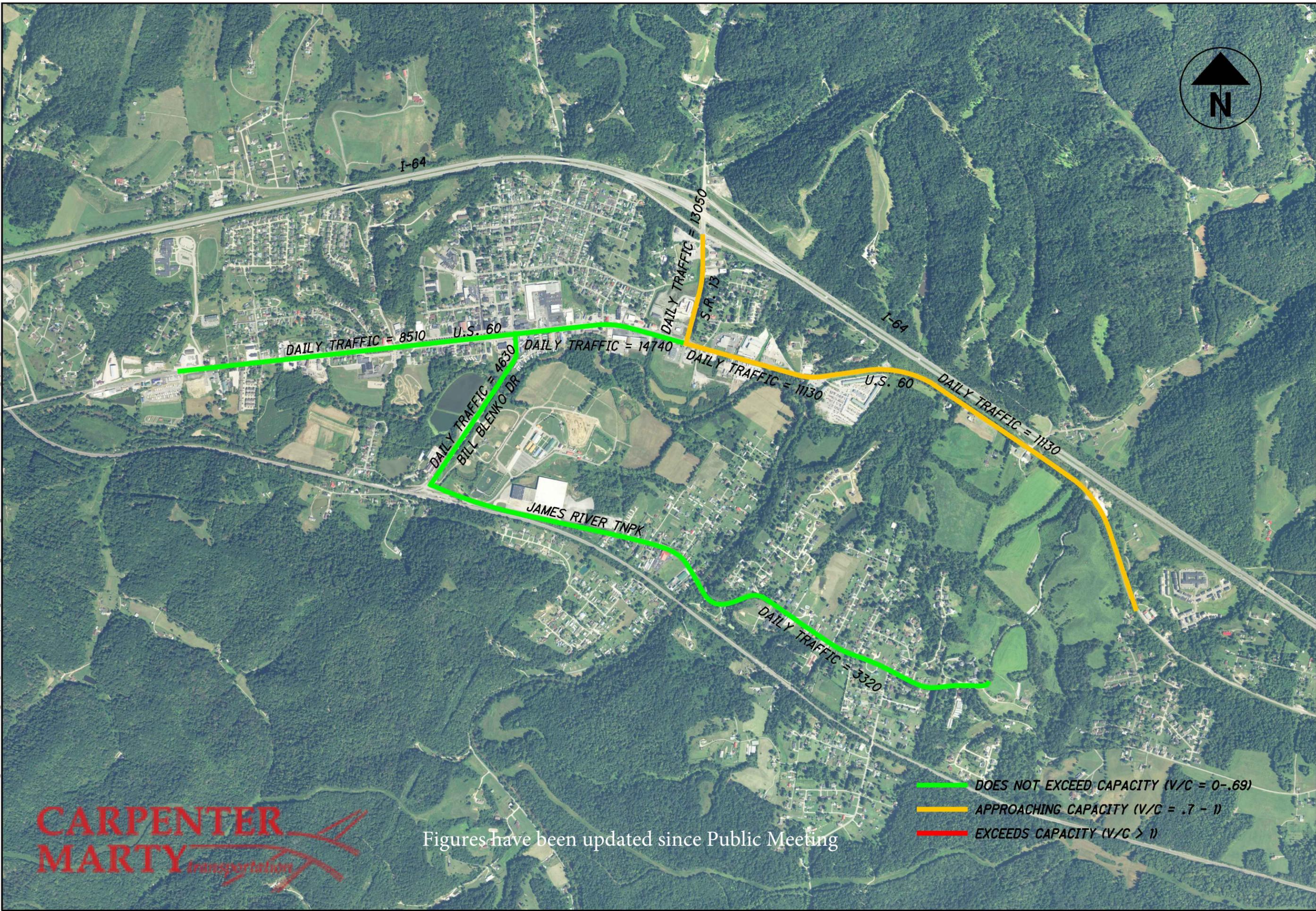
Questions and/or additional comments regarding today's open house and the Milton Traffic Mobility Study can be directed to Bethany Wild of KYOVA by phone: (304) 523-7434 or e-mail: bwild@kyovaioc.org



CARPENTER MARTY transportation

Figures have been updated since Public Meeting

- DOES NOT EXCEED CAPACITY (V/C = 0-.69)
- APPROACHING CAPACITY (V/C = .7 - 1)
- EXCEEDS CAPACITY (V/C > 1)



Figures have been updated since Public Meeting

- DOES NOT EXCEED CAPACITY (V/C = 0-.69)
- APPROACHING CAPACITY (V/C = .7 - 1)
- EXCEEDS CAPACITY (V/C > 1)

MILTON TRAFFIC MOBILITY PI MTG

SIGN IN SHEET

5/2/19

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