COLLEGE PARKWAY OPERATIONAL AND SAFETY STUDY

Anne Arundel County, MD

Anne Arundel County Department of Public Works | Contract H478858

AMT Project File 17-0059.019 | August 2024

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1. INTRODUCTION

The Anne Arundel County Department of Public Works (DPW) initiated a traffic safety and operational concerns study along the College Parkway corridor between Governor Ritchie Highway (MD 2) and Cape Saint Claire Road (MD 179). Residents who access College Parkway are concerned about traffic congestion and crashes during the summer period when the Chesapeake Bay Bridge backs up. Vehicular traffic travelling along MD 2 and US 50 often diverts onto College Parkway when congestion occurs during summer trips to the eastern shore. There are safety and operational concerns throughout the year. It is also expected that travel usage will change in the future with more recreational traffic expected as the Broadneck Trail Phase III is extended along the north side of College Parkway. This trail extension will result in additional new pedestrian and bicycle crossing facilities at various key points along the corridor. As a mitigation measure to date, DPW has lowered the speed limit from 50 miles per hour (MPH) to 40 MPH.

This study was divided into a safety component and a traffic operational component. The safety component identified the existing concerns, analyzed historical crash data, compared safety performance with similar arterials in the County, and recommended potential mitigation measures. The traffic operational component analyzed capacity and queueing at all signalized and unsignalized key intersections during both the summertime and regular school session periods and developed potential MDOT SHA Transportation System Management and Operations (TSMO) strategies.

1.1. Project Goals and Objectives

The College Parkway project was conducted to provide comprehensive corridor-wide operational and safety analyses; address seasonal congestion and trip diversions off MD 2 and US 50 onto College Parkway; address and mitigate the historical crash trends for all roadway users; integrate planned and ongoing multimodal improvements along the corridor; and ultimately support the County's Vision Zero and the PSAP program. While Vision Zero aims to eliminate all traffic fatalities and severe injuries on Maryland roadways, the PSAP improves pedestrian safety by providing specific actions and strategies and prioritizing corridors through a data-driven process guided by land use context and supported by community input.

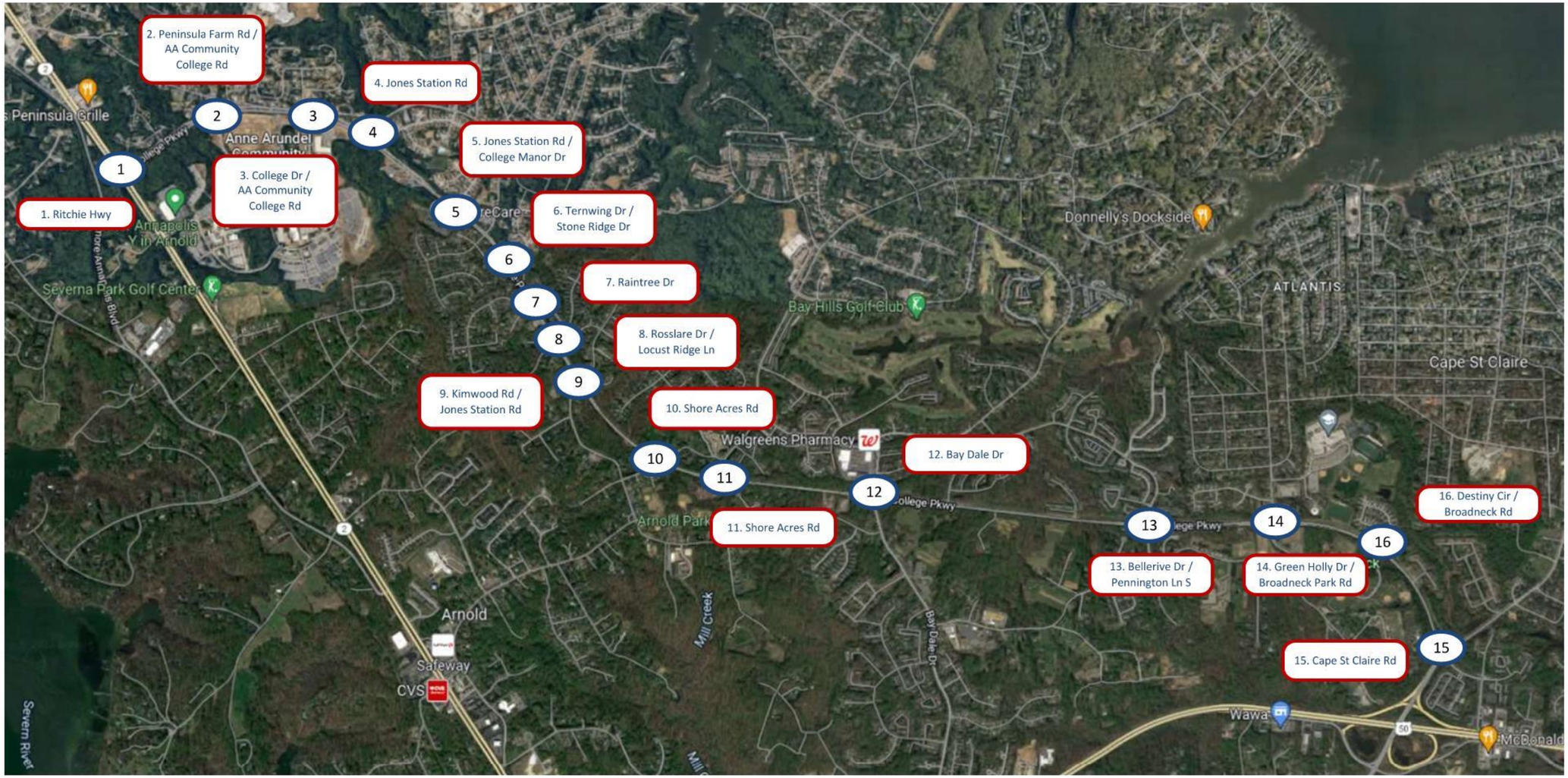
1.2. Study Area

The study area extends from Governor Ritchie Highway (MD 2) to Cape Saint Claire Road (MD 179), for an approximate length of 4.8 miles. Sixteen (16) key intersections were evaluated as part of the operational and safety tasks: ten (10) signalized intersections and six (6) stop-controlled intersections. All the stop-controlled intersections are stop-controlled at the minor street approaches.

The study area and key study intersections are listed below and shown on ***Figure 1***:

(Note: All stop-controlled intersections only have stop control on the side street approaches.)

1. MD 2 at College Parkway [SIGNAL]
2. College Parkway at Peninsula Farm Road / AA Community College Road [SIGNAL]
3. College Parkway at College Drive / AA Community College Road [SIGNAL]
4. College Parkway at Jones Station Road [STOP CONTROLLED]
5. College Parkway at Jones Station Road / College Manor Drive [SIGNAL]
6. College Parkway at Ternwing Drive [STOP CONTROLLED]
7. College Parkway at Raintree Drive [STOP CONTROLLED]
8. College Parkway at Rosslare Drive / Locust Ridge Lane [STOP CONTROLLED]
9. College Parkway at Kimwood Road / Jones Station Road [SIGNAL]
10. College Parkway at Shore Acres Road [STOP CONTROLLED]
11. College Parkway at Shore Acres Road [SIGNAL]
12. College Parkway at Bay Dale Drive [SIGNAL]
13. College Parkway at Bellerive Drive / Pennington Lane South [SIGNAL]
14. College Parkway at Green Holly Drive / Broadneck Park Road [SIGNAL]
15. College Parkway at Cape St Claire Road (MD 179) [SIGNAL]
16. College Parkway at Destiny Circle / Broadneck Road [STOP CONTROLLED]


2. Peninsula Farm Rd / AA Community College Rd
4. Jones Station Rd
5. Jones Station Rd / College Manor Dr
3. College Dr / AA Community College Rd
1. Ritchie Hwy
6. Ternwing Dr / Stone Ridge Dr
7. Raintree Dr
8. Rosslare Dr / Locust Ridge Ln
9. Kimwood Rd / Jones Station Rd
10. Shore Acres Rd
12. Bay Dale Dr
11. Shore Acres Rd
13. Bellerive Dr / Pennington Ln S
14. Green Holly Dr / Broadneck Park Rd
16. Destiny Cir / Broadneck Rd
15. Cape St Claire Rd
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Peninsula Grille
Anne Arundel
Annapolis Y in Arnold
Severna Park Golf Center
Donnelly's Dockside
ATLANTIS
Bay Hills Golf Club
Cape St Claire
Walgreens Pharmacy
College Pkwy
Arnold
Safeway
CVS
Mill Creek
Bay Dale Dr
Wawa
McDonald
Severn River
N
LEGEND
X
Study Intersection
NOT TO SCALE
College Parkway Operational and Safety Study
Site Location Map & Study Intersections
December 2023
FIGURE 1

1.3. Existing Roadway Network

College Parkway generally runs east/west and is classified as a minor arterial. It consists of signalized and stop-controlled intersections. The roadway typical section varies between a multi-lane divided roadway with curb and gutter, to an open-section two-lane undivided roadway with certain locations having a center two-way left turn lane. Most of the intersections along the corridor provide left turn storage bays with acceleration and deceleration lanes. The shoulder widths vary throughout the corridor. In 2022, the 4-lane and 2-lane sections of the corridor carried approximately 22,500 vehicles per day during the summer months. During the Fall period, the 4-lane section carried approximately 30,000 vehicles per day and the 2-lane section carried approximately 23,800 vehicles per day.

1.4. Project Background and Other Pertinent Ongoing Studies

MIIF Study Report

Anne Arundel County prepared the *MIIF Study Report (Major Intersections and Important Facilities)*, dated June 2016, which identified major corridors throughout the County where potential operational, safety, transit, pedestrian, and bicycle improvements could be implemented to improve existing concerns. College Parkway was identified as one of these corridors and potential improvements included roadway widening, specific intersection improvements, and bicycle/pedestrian improvements.

Move Anne Arundel!

The County's Transportation Functional Master Plan, *Move Ane Arundel!,* provides recommendations to create an efficient and sustainable multi-modal roadway network to provide residents, commuters, and visitors with travel choices and connectivity. This study follows the concepts/guidelines of the master plan as it assesses possible policies, strategies, and funding to address the corridor's congestion, multi-modal safety, and accessibility for all users. This initiative includes the goals for mode-shift away from single-occupant vehicles and towards walking, biking, and transit. The Broadneck Trail will provide safe walking/biking alternatives to driving, especially for short trips to schools, shopping, recreation, and employment. This is one way to mitigate traffic on College Parkway.

Safe Routes to School

Safe Routes to School (SRTS) programs are federally funded, sustained efforts by community members and governments to enable and encourage children to safely walk, roll or bicycle to school. Federal funds allocated to this program are reimbursable and available for infrastructure and non-infrastructure projects that benefit elementary and middle school children in grades K-8. The purpose of the Safe Routes to School Projects is: 1) to enable and encourage children, including those with disabilities, to walk, roll, and bicycle to school; 2) to make bicycling, walking, and rolling to school a safer and more appealing transportation alternative, and 3) to facilitate the planning, development, and implementation of projects that will improve safety and reduce traffic. With multiple elementary schools having access from College Parkway, this is another way to improve safety for school children.

Broadneck Elementary School, located at 470 Shores Acres Road, was one of the schools included in the most recent SRTS study. Most of the proposed safety and operational improvements are located at or near the school and do not impact the College Parkway corridor. These include new sidewalks, speed management measures, new rectangular rapid flashing beacons, new crosswalks, new stop bars, etc. One improvement is located new

the College Parkway corridor and includes the installation of new sidewalks along Shore Acres Road from College Parkway to the Bay Hills area.

Trails Spurs and Connectors Study

Anne Arundel County Recreation and Parks has grown and developed a trail network that covers large portions of the County and links together areas of North, East, and West County. This trail network continues to grow and is used by County residents for recreation and as a mode of alternative transportation. This includes the Broadneck Peninsula Trail which is a paved trail located within the right of way of College Parkway. The Anne Arundel County Trail Spurs and Connectors Study (draft dated March 2024) reviewed the existing trail network with the goal to expand access to the County's trail network for residents and visitors. Ultimately, the idea was to extend or connect the existing County trails with parks, other trails, schools and community hubs, and other public facilities and commercial centers. The study reviewed various County plans with an eye towards recommendations for trail expansions and the overall development of the trail system. A desktop review of the County trail system was conducted, including the existing, designed, and planned trails. The surrounding neighborhoods and facilities were reviewed so that potential future connections could be identified. A prioritized list of up to 25 trail connections and/or extensions was developed and prioritized. Lastly, an initial site assessment of the proposed connections/extensions was conducted, and concept plans and cost estimates were developed for each potential future extension and/or connection.

MDOT SHA Ramp Management Pilot Projects along US 50

To reduce the number of motorists that divert off MD 2 and US 50 onto College Parkway during the peak summer days (typically Thursdays to Saturdays during the Summer months) to bypass delays and congestion on US 50 mainline to access the Chesapeake Bay Bridge, MDOT SHA has implemented various *Pilot Projects along US 50*.

- In 2022, traffic signals were installed as ramp metering devices at the on-ramps to US 50 eastbound at Exit 32 (Oceanic Drive - the last exit before the Bay Bridge). The goal of the ramp metering project was to hinder all motorists that used College Parkway and/or the US 50 service roads to bypass the US 50 eastbound mainline travel lanes. The project was deemed a success as travel time surveys revealed that it took motorists who remained on US 50 eastbound mainline approximately eight (8) minutes to access the Bay Bridge from the MD 2 interchange, versus 45+ minutes for motorists who diverted off US 50 onto College Parkway and/or the service roads to the ramp-metered signals at Exit 32.

- In 2023, all on-ramps to US 50 eastbound at Exits 30 (Whitehall Road) and 32 (Oceanic Drive) were closed to prevent motorists from diverting out of the mainline travel lanes and jumping back on closer to the Bay Bridge. The on- and off-ramps at Exit 31 (Whitehall Road/Skidmore Drive) were also closed permanently. The last exit to access US 50 eastbound mainline was Exit 29 (MD 179/Cape St Claire Road). This project saw a reduction in eastbound traffic traveling along College Parkway at Cape St Claire Road to access the College Parkway service road of approximately 2,000 vehicles per day during the peak summer days (typically Thursday to Saturdays during the Summer months).

Destiny Circle

The stop-controlled intersection at *Destiny Circle/Broadneck Park Road* was recently improved with new flashing Rectangular Rapid Flashing Beacons (RRFB) and a new marked crosswalk across the west leg of College Parkway. There is also an ongoing multi-year geometric project at this location that will add new right and left turn lanes along College Parkway, as well as an overhanging pedestrian signal. The signal will flash yellow during all times

of the day until activated by a pedestrian to cross College Parkway, where it will turn red. Side traffic from Destiny Circle is expected to yield to the pedestrian crossing movement as needed.

Broadneck Trail Phase III

The *Broadneck Trail Phase III* project includes the extension of the 10-foot wide shared-use trail along the north side of College Parkway from Peninsula Farm Road to Bay Dale Drive, for approximately 2.47 miles (refer to Figure 2 on the next page). The trail will connect the B&A Trail to Sandy Point State Park. The trail will ensure the ADA compliance is provided at each intersection along College Parkway. Four (4) pedestrian/bicycle crossings are proposed along the corridor: Jones Station Road (where a new traffic signal is also proposed); Raintree Drive; Locust Ridge Lane/Rosslare Drive; and Jones Station Road/Kimwood Road. The trail extension will switch to the south side of the road west of the new signal at Jonest Station Road to provide direct access to the AA Community College.

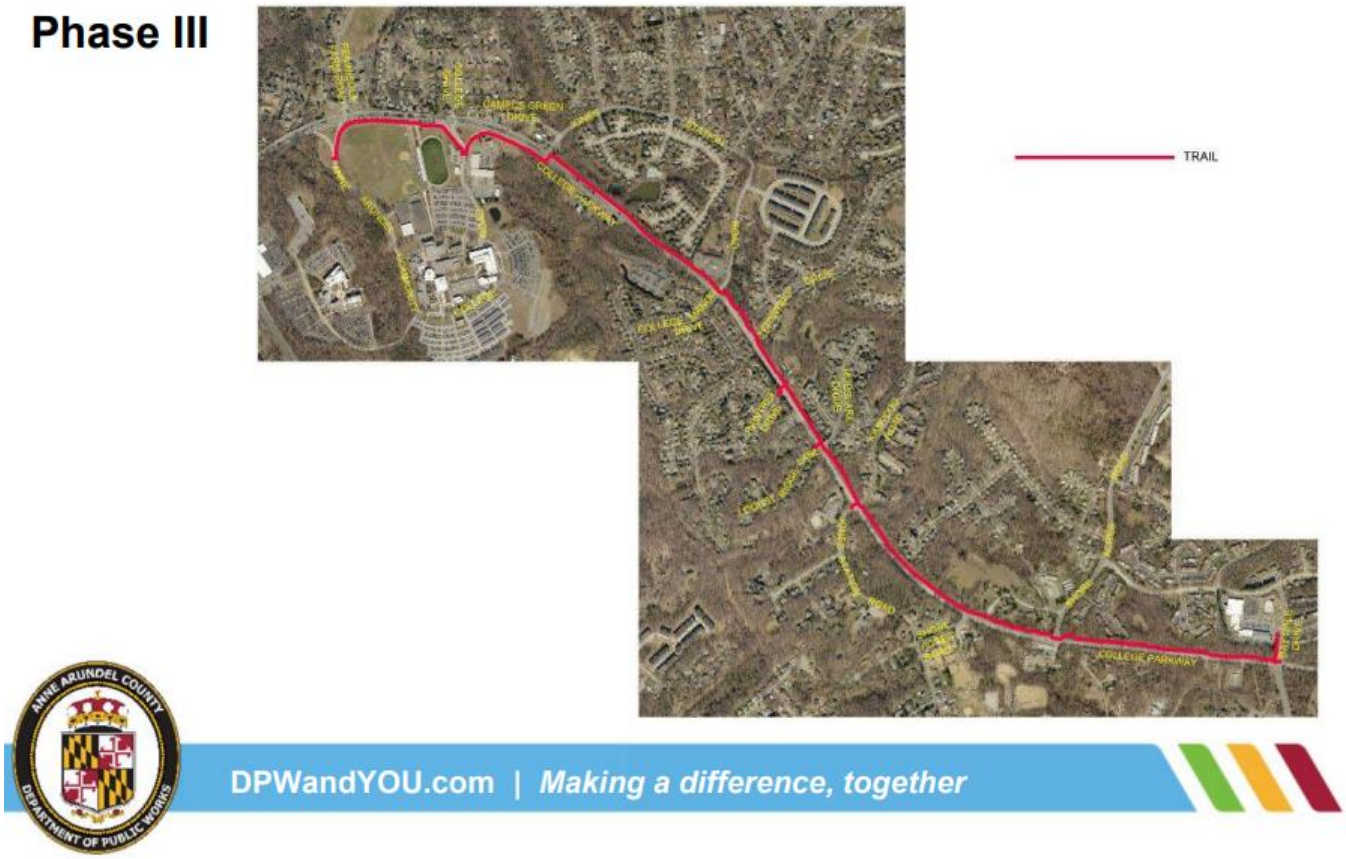


Figure 2: Broadneck Trail Phase III Study Limits

Source: *https://www.aacounty.org/recreation-parks/capital-projects/broadneck-peninsula-trail*

2. EXISTING PROJECT INFORMATION

2.1. Existing Traffic Information

Intersection Turning Movement Counts

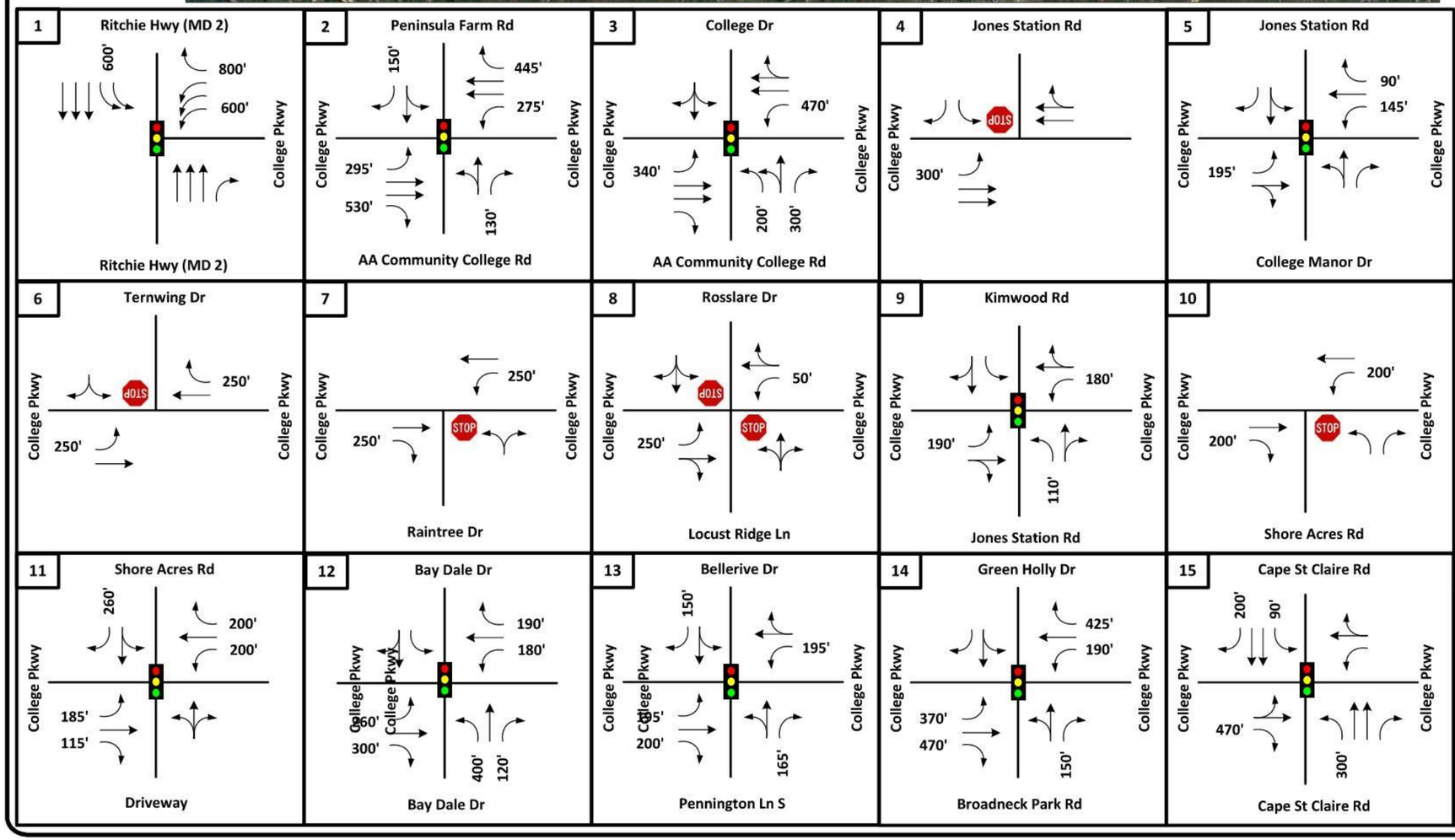
As previously stated, this project studied operational conditions during both the summertime and the regular school session periods. Turning movement counts were collected at all the study intersections for a continuous 24-hours, and AM and PM peak hours were determined. The traffic data during the summertime period was collected on Friday July 22nd, 2022 to ensure that the most conservative traffic data was gathered as motorists traveled towards the Bay Bridge and the Eastern Shore. Traffic data was also collected during the Fall period on November 10th, 2022. The Fall traffic data was collected on a typical weekday (Tuesday to Thursday) when Anne Arundel County public schools were operating on a normal school schedule and no inclement weather or special events where expected.

The traffic data was collected using non-intrusive MioVision Scout cameras, which provide near 99% accuracy. Photographs of all key intersections are included in ***Appendix A***, along with the raw traffic data sheets for the summertime and Fall data collection periods.

The existing lane use and traffic control at each study intersection is shown on ***Figure 3***. The existing AM and PM peak hour volumes for the summertime period are shown on ***Figure 4a***. The existing AM and PM peak hour volumes for the Fall period are shown on ***Figure 4b***.

Traffic data at College Parkway at Destiny Circle/Broadneck Park Road was only collected during the Fall period. No traffic data was collected at this location during the summertime period. This key intersection was added to the list of study intersections after the summertime data collection was collected; therefore, only Fall traffic data was collected.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Anne Arundel Community College
Chesapeake
Bay Hills Golf Club
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa


1
Ritchie Hwy (MD 2)
600'
800'
600'
College Pkwy
Ritchie Hwy (MD 2)
2
Peninsula Farm Rd
150'
445'
275'
295'
530'
130'
College Pkwy
AA Community College Rd
3
College Dr
470'
340'
200'
300'
College Pkwy
AA Community College Rd
4
Jones Station Rd
STOP
300'
College Pkwy
5
Jones Station Rd
90'
145'
195'
College Pkwy
College Manor Dr
6
Ternwing Dr
STOP
250'
250'
College Pkwy
7
250'
250'
STOP
College Pkwy
Raintree Dr
8
Rosslare Dr
STOP
50'
250'
STOP
College Pkwy
Locust Ridge Ln
9
Kimwood Rd
180'
190'
110'
College Pkwy
Jones Station Rd
10
200'
200'
STOP
College Pkwy
Shore Acres Rd
11
Shore Acres Rd
260'
200'
200'
185'
115'
College Pkwy
Driveway
12
Bay Dale Dr
190'
180'
260'
300'
400'
120'
College Pkwy
Bay Dale Dr
13
Bellerive Dr
150'
195'
195'
200'
165'
College Pkwy
Pennington Ln S
14
Green Holly Dr
425'
190'
370'
470'
150'
College Pkwy
Broadneck Park Rd
15
Cape St Claire Rd
200'
90'
470'
300'
College Pkwy
Cape St Claire Rd
16
Destiny Cir
125'
STOP
STOP
125'
College Pkwy
Broadneck Rd
College Parkway Operational and Safety Study
Existing Lane Configurations
July 2024
FIGURE 3
NOT TO SCALE
LEGEND
Existing Traffic Control
Existing Roadway
XXX'
Storage Bay Length
Existing Laneage
AMT


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
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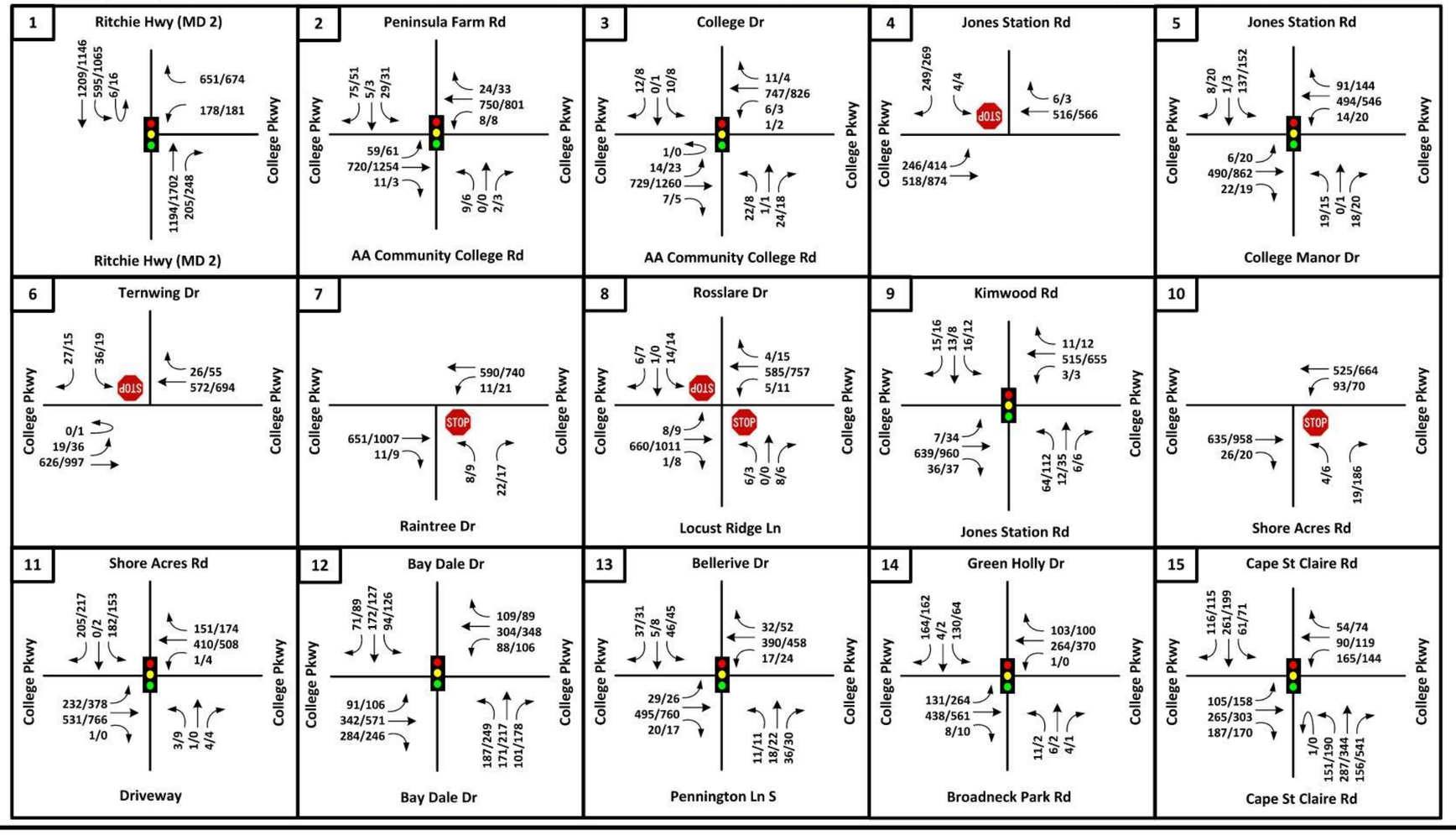
15


1 Ritchie Hwy (MD 2)
1209/1146
595/1065
6/16
651/674
178/181
1194/1702
205/248
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
75/51
5/3
29/31
24/33
750/801
8/8
59/61
720/1254
11/3
9/6
0/0
2/3
College Pkwy
AA Community College Rd
3 College Dr
12/8
0/1
10/8
11/4
747/826
6/3
1/2
1/0
14/23
729/1260
7/5
22/8
1/1
24/18
College Pkwy
AA Community College Rd
4 Jones Station Rd
249/269
4/4
STOP
6/3
516/566
246/414
518/874
College Pkwy
5 Jones Station Rd
8/20
1/3
137/152
91/144
494/546
14/20
6/20
490/862
22/19
19/15
0/1
18/20
College Pkwy
College Manor Dr
6 Ternwing Dr
27/15
36/19
STOP
26/55
572/694
0/1
19/36
626/997
College Pkwy
7
590/740
11/21
651/1007
11/9
STOP
8/9
22/17
College Pkwy
Raintree Dr
8 Rosslare Dr
6/7
1/0
14/14
STOP
4/15
585/757
5/11
8/9
660/1011
1/8
STOP
6/3
0/0
8/6
College Pkwy
Locust Ridge Ln
9 Kimwood Rd
15/16
13/8
16/12
11/12
515/655
3/3
7/34
639/960
36/37
64/112
12/35
6/6
College Pkwy
Jones Station Rd
10
525/664
93/70
635/958
26/20
STOP
4/6
19/186
College Pkwy
Shore Acres Rd
11 Shore Acres Rd
205/217
0/2
182/153
151/174
410/508
1/4
232/378
531/766
1/0
3/9
1/0
4/4
College Pkwy
Driveway
12 Bay Dale Dr
71/89
172/127
94/126
109/89
304/348
88/106
91/106
342/571
284/246
187/249
171/217
101/178
College Pkwy
Bay Dale Dr
13 Bellerive Dr
37/31
5/8
46/45
32/52
390/458
17/24
29/26
495/760
20/17
11/11
18/22
36/30
College Pkwy
Pennington Ln S
14 Green Holly Dr
164/162
4/2
130/64
103/100
264/370
1/0
131/264
438/561
8/10
11/2
6/2
4/1
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
116/115
261/199
61/71
54/74
90/119
165/144
105/158
265/303
187/170
1/0
151/190
287/344
156/541
College Pkwy
Cape St Claire Rd
LEGEND
XX/XX AM/PM Peak Hour Traffic Volumes
Existing Traffic Control
Existing Roadway
College Parkway Operational and Safety Study
2022 Existing Summer AM/PM Peak Hour Volumes
July 2024
FIGURE 4a
NOT TO SCALE
AMT


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
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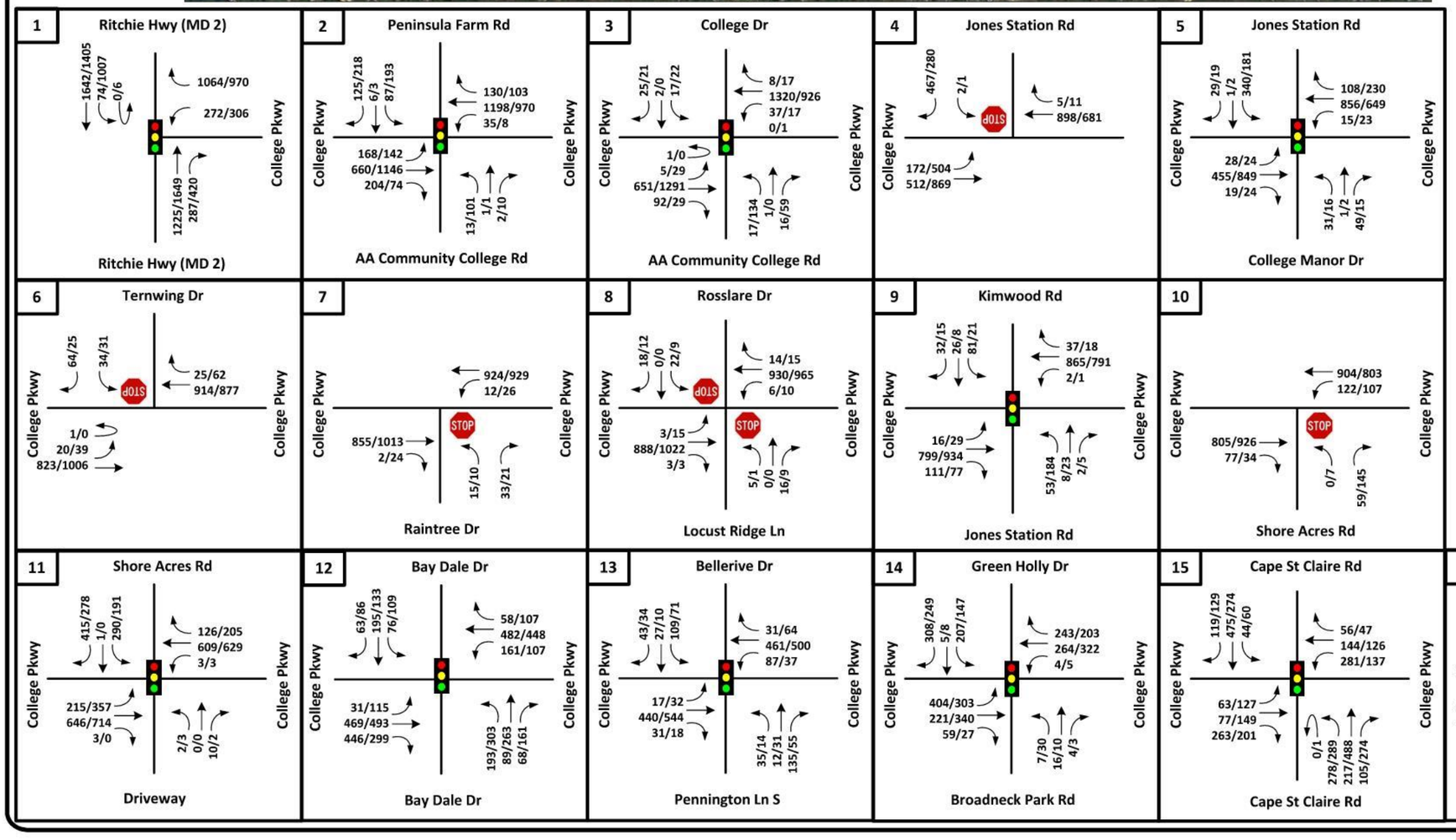

1 Ritchie Hwy (MD 2)
1642/1405
74/1007
0/6
1064/970
272/306
1225/1649
287/420
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
125/218
6/3
87/193
130/103
1198/970
35/8
168/142
660/1146
204/74
13/101
1/1
2/10
AA Community College Rd
3 College Dr
25/21
2/0
17/22
8/17
1320/926
37/17
0/1
1/0
5/29
651/1291
92/29
17/134
1/0
16/59
AA Community College Rd
4 Jones Station Rd
467/280
2/1
STOP
5/11
898/681
172/504
512/869
5 Jones Station Rd
29/19
1/2
340/181
108/230
856/649
15/23
28/24
455/849
19/24
31/16
1/2
49/15
College Manor Dr
6 Ternwing Dr
64/25
34/31
STOP
25/62
914/877
1/0
20/39
823/1006
7
924/929
12/26
855/1013
2/24
STOP
15/10
33/21
Raintree Dr
8 Rosslare Dr
18/12
0/0
22/9
STOP
14/15
930/965
6/10
3/15
888/1022
3/3
STOP
5/1
0/0
16/9
Locust Ridge Ln
9 Kimwood Rd
32/15
26/8
81/21
37/18
865/791
2/1
16/29
799/934
111/77
53/184
8/23
2/5
Jones Station Rd
10
904/803
122/107
805/926
77/34
STOP
0/7
59/145
Shore Acres Rd
11 Shore Acres Rd
415/278
1/0
290/191
126/205
609/629
3/3
215/357
646/714
3/0
2/3
0/0
10/2
Driveway
12 Bay Dale Dr
63/86
195/133
76/109
58/107
482/448
161/107
31/115
469/493
446/299
193/303
89/263
68/161
Bay Dale Dr
13 Bellerive Dr
43/34
27/10
109/71
31/64
461/500
87/37
17/32
440/544
31/18
35/14
12/31
135/55
Pennington Ln S
14 Green Holly Dr
308/249
5/8
207/147
243/203
264/322
4/5
404/303
221/340
59/27
7/30
16/10
4/3
Broadneck Park Rd
15 Cape St Claire Rd
119/129
475/274
44/60
56/47
144/126
281/137
63/127
77/149
263/201
0/1
278/289
217/488
105/274
Cape St Claire Rd
16 Destiny Cir
2/8
0/0
6/5
STOP
1/8
506/518
34/14
2/7
424/465
5/18
STOP
0/0
2/4
0/0
7/10
Broadneck Rd
College Parkway Operational and Safety Study
2022 Existing Fall AM/PM Peak Hour Volumes
July 2024
FIGURE 4b
NOT TO SCALE
AM/PM Peak Hour Traffic Volumes
XX/XX
LEGEND
Existing Traffic Control
Existing Roadway
STOP
AMT

College Parkway Bidirectional Speed Data

To identify any speeding concerns along both the 4-lane and 2-lane sections of College Parkway, bidirectional pneumatic tubes were installed at three (3) locations:

1. College Parkway between Jones Station Road and College Parkway Baptist Church (4-LANE SECTION)
2. College Parkway between Shore Acres Road and Bay Dale Drive (2-LANE SECTION)
3. College Parkway between Destiny Circle and Cape St Claire Road (2-LANE SECTION)

The speed data was collected on Thursday July 20th and Friday July 21st, 2023. A full 48-hours of consecutive data were captured to ensure that no potential traffic incidents would affect the speed data. The following speed data was collected and summarized:

Thursday 7/20/23

Peak Hour	Volume (veh)		Average Speed		85th Percentile Speed	
	EB	WB	EB	WB	EB	WB
8AM-9AM	405	**674**	47 MPH	48 MPH	52 MPH	53 MPH
9AM-10AM	**487**	493	47 MPH	48 MPH	53 MPH	53 MPH
4PM-5PM	**824**	610	44 MPH	48 MPH	50 MPH	54 MPH
5PM-6PM	814	**622**	43 MPH	49 MPH	51 MPH	53 MPH

Friday 7/21/23

Peak Hour	Volume (veh)		Average Speed		85th Percentile Speed	
	EB	WB	EB	WB	EB	WB
11AM-noon	**510**	**554**	46 MPH	48 MPH	51 MPH	52 MPH
3PM-4PM	**951**	492	41 MPH	48 MPH	50 MPH	53 MPH
4PM-5PM	862	**554**	46 MPH	48 MPH	52 MPH	53 MPH

Table 1: Site 1 - College Parkway between Jones Station Road and College Parkway Baptist Church (4-LANE SECTION)

Thursday 7/20/23

Peak Hour	Volume (veh)		Average Speed		85th Percentile Speed	
	EB	WB	EB	WB	EB	WB
8AM-9AM	**780**	**542**	43 MPH	40 MPH	48 MPH	46 MPH
4PM-5PM	**898**	**745**	39 MPH	38 MPH	46 MPH	44 MPH

Friday 7/21/23

Peak Hour	Volume (veh)		Average Speed		85th Percentile Speed	
	EB	WB	EB	WB	EB	WB
9AM-10AM	557	**494**	44 MPH	39 MPH	49 MPH	46 MPH
11AM-noon	**681**	493	44 MPH	41 MPH	49 MPH	46 MPH
3PM-4PM	**959**	539	29 MPH	34 MPH	44 MPH	44 MPH
5PM-6PM	876	**577**	40 MPH	39 MPH	47 MPH	45 MPH

Table 2: Site 2 - College Parkway between Shore Acres Road and Bay Dale Drive (2-LANE SECTION)

Thursday 7/20/23

Peak Hour	Volume (veh)		Average Speed		85th Percentile Speed	
	EB	WB	EB	WB	EB	WB
8AM-9AM	**422**	306	45 MPH	41 MPH	51 MPH	47 MPH
9AM-10AM	363	**352**	45 MPH	43 MPH	49 MPH	48 MPH
4PM-5PM	**477**	**526**	44 MPH	42 MPH	49 MPH	47 MPH

Friday 7/21/23

Peak Hour	Volume (veh)		Average Speed		85th Percentile Speed	
	EB	WB	EB	WB	EB	WB
9AM-10AM	319	**310**	46 MPH	43 MPH	52 MPH	48 MPH
noon-1PM	**428**	308	45 MPH	43 MPH	49 MPH	48 MPH
4PM-5PM	**675**	**412**	44 MPH	42 MPH	48 MPH	48 MPH

Table 3: Site 3 - College Parkway between Destiny Circle and Cape St Claire Road (2-LANE SECTION)

Speed metrics are based on vehicles with acceptable time gaps. These include 10 MPH pace speeds and the 85th percentile speeds. The speed data collected at the three locations along College Parkway indicates that motorists along both the 4-lane section and the 2-lane section of College Parkway travel at speeds higher than the posted speed limit of 40MPH.

The 85th percentile speeds represent the speed at or below which 85-percent of the drivers travel. The 10MPH pace speed is the range of how fast the vehicles are actual traveling. All 85th percentile speeds for the 4-lane section of College Parkway are 50MPH and above, indicating that speeding along this section of College Parkway is a concern.

Site 1 - College Parkway between Jones Station Road and College Parkway Baptist Church

- During the summer period (Thursday and Friday), vehicles are traveling at speeds 10MPH to 14MPH higher than the posted speed limit along both eastbound and westbound College Parkway.

Site 2 - College Parkway between Shore Acres Road and Bay Dale Drive

- During the summer period (Thursday and Friday), vehicles are traveling at speeds 4MPH to 9MPH higher than the posted speed limit along both eastbound and westbound College Parkway. The reduction of the through lanes from two-lanes to one-lane operates as a traffic calming strategy as all vehicles are forced to merge into a single lane and follow the vehicle in front of them (deters excessive speeding).
- On Friday, an average speed of 29MPH is observed in the eastbound direction. This is expected due to the higher traffic volumes from the seasonal traffic heading to the Eastern Shore (higher traffic volumes typically result in slower traveling speeds). The 2022 and 2023 MDOT SHA traffic data collection at the Bay Bridge indicated that overall, the Friday afternoon peak hour occurred between 1PM and 4PM. These motorists likely exit at Bay Dale Drive to then access US 50. Traffic speeds returned close to the posted speed limits at 5PM once the seasonal traffic rush had ended.

Site 3 - College Parkway between Destiny Circle and Cape St Claire Road

- During the summer period (Thursday and Friday), vehicles are traveling at speeds 7MPH to 12MPH higher than the posted speed limit along both eastbound and westbound College Parkway. Higher speeds are observed during this section of College Parkway since less seasonal traffic was using College Parkway as a detour to access US 50 due to the on-going 2023 MDOT SHA Bay Bridge Pilot Project.

The speed data printouts and photos of the pneumatic equipment along College Parkway are included in *Appendix A*.

In addition to the speed data collected using pneumatic tubes, speed data was also extrapolated from RITIS/INRIX big data. RITIS (Regional Integrated Transportation Information System) collects and complies transportation system information from various sources (public, military, private) to assist in effective decision making for various planning projects. Types of data collected include traffic volumes, classification of vehicles, speed data, weather, transit, signal timings, travel time, freight, etc. INRIX specializes in collecting traffic and transportation information such as traffic data (volumes, speeds, etc.), parking data, crash data, trip analytics, drive times (travel time), etc. Most of the vehicle data is collected via GPS-enabled devices.

Table 4 summarizes the average speed data that was pulled from INRIX for the July 2023 period to compare it with the pneumatic tube data. No data is currently available in the 4-lane section of the corridor. The INRIX data confirmed the reduction in speeds during the PM peak hour along the eastbound and westbound directions of College Parkway between Shire Acres Road and Bay Dale Drive. Note that the INRIX data will not match exactly with the pneumatic tube data – the tubes recorded every single vehicle, while the INRIX data can only record the speeds of vehicles equipped with a GPS device (smart phone, GPS in car, etc.), which means that a smaller number of vehicles will be recorded compared to the pneumatic tubes.

Location	Peak Hours (AM/PM)	TRAFFIC DATA COLLECTED BY AMT (JULY 2023)		RITIS/INRIX DATA (JULY 2023)	
		Average Speed		Average Speed	
		EB	WB	EB	WB
Site 1 - College Parkway btw Jones Station Road and College Parkway Baptist Church (4-lane section)	11AM-noon	46 MPH	48 MPH		
	4PM-5PM	46 MPH	48 MPH		
Site 2 - College Parkway btw Shore Acres Road and Bay Dale Drive (2-lane section)	11AM-noon	44 MPH	41 MPH	35 MPH	35 MPH
	4PM-5PM	20 MPH	33 MPH	19 MPH	33 MPH
Site 3 - College Parkway btw Shore Destiny Circle and Cape St. Claire Road (2-lane section)	11AM-noon	45 MPH	43 MPH	36 MPH	40 MPH
	4PM-5PM	44 MPH	42 MPH	31 MPH	30 MPH

Table 4: Pneumatic Tube Speed data vs. INRIX Speed Data

College Parkway Travel Time Data

No travel time data was collected along the study corridor for purposes of this project.

College Parkway "Bottlenecks"

A traffic "bottleneck" is a localized segment of roadway or intersection where motorists travel at reduced speeds and experience operational delays due to a specific geometric cause or an incident. During the field visits and the traffic data collection efforts in the Summer and in the Fall, bottlenecks were observed at the signalized intersection of College Parkway at MD 2. This results from high traffic volumes and insufficient signal green times (however, very little improvement can be implemented since this signal is part of the larger MD 2 coordinated signal system).

The video footage from the data collection was carefully reviewed during the Summer and Fall periods and no other bottlenecks were observed along the study corridor (even within the segment of College Parkway where the eastbound lanes are reduced from 4-lanes down to 2-lanes).

Broadneck High School Traffic Operations:

The Broadneck High School is located at the northeast quadrant of the College Parkway and Green Holly Drive/Broadneck Road intersection. During school hours, long eastbound left turn queues are observed along College Parkway and queues extend beyond the existing storage lane and into the adjacent through lane. The eastbound left turn green phase is not long enough to allow all vehicles to clear out from the intersection resulting in some vehicles having to wait at the intersection through multiple cycle lengths. Field visits and video footage shows vehicles make an eastbound right turn and continue south along Broadneck Road, make a U-Turn and then continue north across the intersection and along Green Holly Drive to access the school. This is primarily because drivers find this movement to be shorter than waiting to make an eastbound left turn at the signal. Optimizing the signal timing to provide more green time to the left turn movement. should help mitigate this issue. During the PM peak hour, before the school is dismissed, school buses are also observed to be waiting along Green Holly Drive.

Pedestrian and Bicycle Safety

Pedestrian and bicyclist safety is high priority within in the state of Maryland and all the way down to the local county and city governments. MDOT SHA over the years has developed and executed many safety campaigns targeted at all roadway users to remind them to be aware of the surroundings and obey all traffic laws. As projects move forward in incorporating multi-modal facilities, motorists, pedestrians, and bicyclists have to learn how to share the roadway, sidewalks, and trails in order for there to be a safe haven for those traversing our communities. On average, there are approximately 100 pedestrians killed each year in Maryland and many of those crashes are preventable.

While this study provides a focus on traffic operations, it also shares an equally important focus on vehicular, pedestrian, and bicycle safety. College Parkway is a minor arterial carrying significant summer traffic between MD 2 and Cape Saint Claire Road that is diverted due to congestion along MD 2 and US 50. Pedestrian and bicyclist safety concerns were born out of traffic congestion with the new Broadneck Trail being built and schools within the adjacent neighborhoods along the corridor.

Pedestrian and bicycle traffic volume is expected to increase along the corridor once the Broadneck Trail Phase III is completed. Crosswalks have been proposed across the intersections where the Broadneck Trail passes to increase safety for pedestrians and bicycles. At every signalized intersection, the walk and the Flashing Don't Walk (FDW) time has been calculated and additional time has been proposed where required to increase pedestrian safety as they (including school children at Broadneck High School) cross the intersection. At intersections with heavy pedestrian volume, Leading Pedestrian Interval or LPI has been proposed to increase safety. Additional signage such as "Yield to Pedestrians" and "No Turn on Red" has also been proposed at intersections with high pedestrian volume.

2.2. Existing Crash Information

Historical crash history (based on "police-reported" crashes) was provided by DPW from the year 2012 to the year 2020. This The crash data was sorted and tabulated for the corridor overall, as well as separately for the 4-lane section and the 2-lane section. A total of 521-crashes occurred along the College Parkway corridor and at the study intersection over the nine (9) year period. Refer to ***Section 3. Safety Assessment*** for more details.

3. SAFETY ASSESSMENT

A historical crash data analysis was performed by comparing the College Parkway crash rates to the countywide average crash rates for similar roadways. Based upon the results of the crash analyses, concerns/issues at specific intersections have been identified and potential countermeasures have been recommended through HSM methodologies and other applicable crash modification factors. A safety performance resulting from motor vehicle crashes at the intersection was performed utilizing accepted FHWA safety analysis procedures and the *Highway Safety Manual* (HSM; published by the American Association of State Highway and Transportation Officials AASHTO) guidelines – refer to ***Section 5.2. Safety Improvements and Assessment*** for more details. The main objective of the Highway Safety Manual is to assist in reducing the frequency and severity of crashes on various types of roadways using multiple tools in planning and project development – such as the selection of various safety countermeasures, prioritizing projects, the comparison of alternatives, quantifying and predicting the safety performance of various roadway elements.

3.1. Historic Crash Information

3.1.1 Summary of the Overall Corridor

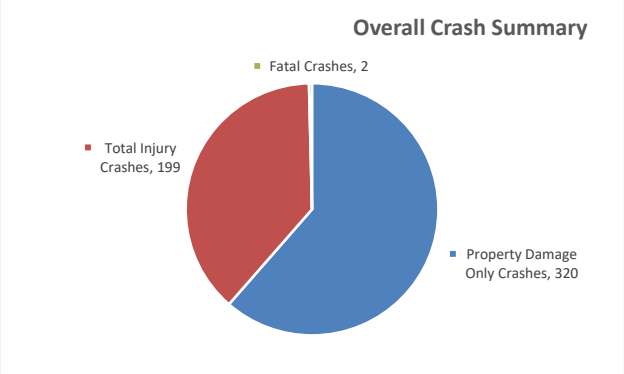
Crash history along the College Parkway corridor over a nine (9) year period (2012 to 2020) indicates that a total of five-hundred and twenty-one (521) crashes have occurred along segments of the corridor and at the key study intersections. Historical crash data is based on police-reported crashes. A detailed summary of the crashes in included in ***Appendix B***.

There have been two (2) fatal crashes, 199 crashes resulting in at least one injury, and 320 property-damage only crashes as shown on ***Figure 5a*** which summarizes all the high-level crashes reported. Crashes resulting in injury are broken down into 3 categories - 20 resulted in at least one person involved being disabled/incapacitated, 89 injured but not incapacitated, and 90 possibly injured, as shown on ***Figure 5b*** which summarizes crashes by severity.

High Level Crash Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	521	100.00%
Property Damage Only Crashes	320	61.42%
Total Injury Crashes	199	38.20%
Fatal Crashes	2	0.38%

Figure 5a: High Level Crash Summary (Overall Corridor)



Crash Severity Summary

Crash Type	Number of Crashes	Percent of Total
Total	521	100.00%
Property Damage Only	320	61.42%
Possible Injury	90	17.27%
Injured, not Incapacitated	89	17.08%
Disabled/Incapacitated	20	3.84%
Fatal	2	0.38%

Figure 5b: Crash Severity Summary (Overall Corridor)

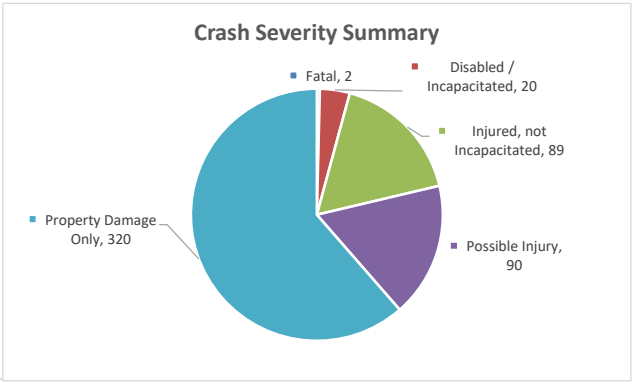


Figure 5c summarizes crashes by type. Over 41% of the crashes are rear-end collisions. The most likely contributing factors include distracted driving / texting, speeding, improper lane changes, tailgating, etc. Countermeasures could include improved/enhance signing, flashing beacons to warn motorists of an approaching stop- or traffic signal device, providing separate turn lanes where appropriate, additional lighting, etc.

Crash Type Summary		
Accident Type	Number of Crashes	Percent of Total
Rear End	224	42.99%
Single Vehicle	90	17.27%
Left-Turn	76	14.59%
Right Angle	70	13.44%
Sideswipe	25	4.80%
Pedalcyclist	12	2.30%
Right Turn	10	1.92%
Head On	8	1.54%
Pedestrian	5	0.96%
Backing Up	3	0.58%
Unknown/Other	3	0.58%

Right-angle collisions account for close to 13% of the overall crashes. These occur at intersections when vehicles arrive on perpendicular roads and collide. There are two main types of right-angle crashes – one where entering traffic has stopped, and one where entering traffic disregards a stop sign or a signal.

Left-turn collisions also account for close to 15% of the overall crashes. Most of these crashes occur due to vehicles turning left and colliding with a vehicle traveling in the opposite direction.

Figure 5c: Crash Type Summary (Overall Corridor)

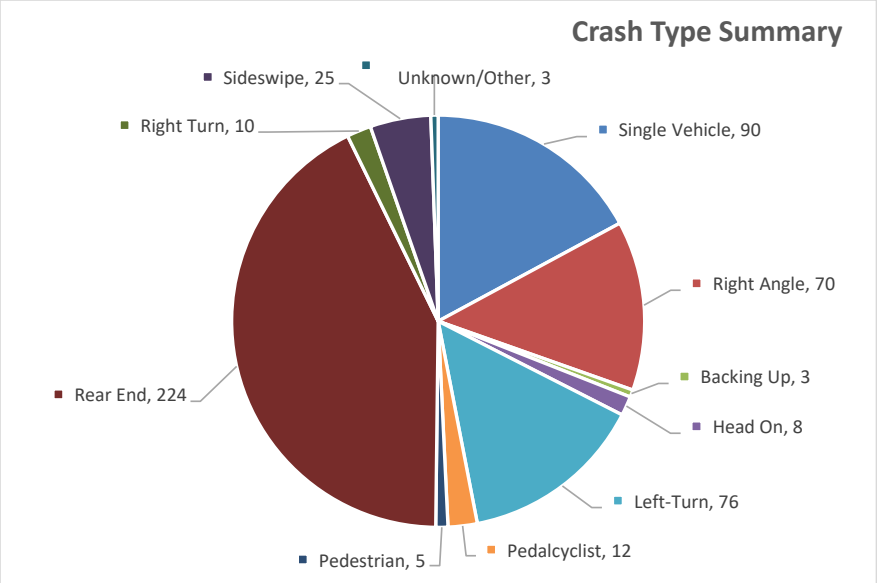


Figure 5d summarizes crash totals by year from 2012 to 2020. As shown in ***Figure 5d,*** the years 2013, 2016, 2017, and 2018 experienced the highest number of crashes (50+ crashes per year). Fatal crashes occurred in the years 2013 and 2014. The crash data from the year 2020 is the lowest of all nine (9) years of data. Likewise, the number of crashes resulting in injury in 2020 is the lowest in the time span; however, it is important to note that while the percentage of all crashes in 2020 resulting in injury is on the lower end compared to the results from other years in the study period, the crash rate based on traffic volumes is higher since most roadways in MD experienced a significant reduction in overall volumes while the pandemic was occurring.

Crash Totals by Year

Year	Total Crashes	Fatal Crashes	Injury Crashes	Property Damage Only Crashes
2012	58	0	23	35
2013	65	1	33	31
2014	58	1	20	37
2015	52	0	20	32
2016	60	0	21	39
2017	63	0	23	40
2018	60	0	19	41
2019	59	0	24	35
2020	46	0	16	30
Total	521	2	199	320

Figure 5d: Crash Summary by Year (Overall Corridor)

As shown in ***Figure 5e***, a total of 163 crashes occurred at night (accounts for 31% of all crashes) and a total of 122 crashes occurred during wet pavement conditions (accounts for 23% of all crashes).

Light and Road Conditions Summary

Condition	Dry	Wet	Total
Day	285	73	358
Dark	114	49	163
Total	399	122	521

Figure 5e: Light and Road Conditions Summary (Overall Corridor)

As shown on ***Figure 5f*** below, most of the crashes also occur on weekdays, as opposed to the weekends (average of 78 crashes on weekdays vs. average of 65 crashes on weekend days). The day of the week experiencing the highest crashes is Friday.

Daily Summary

Day	Number of Crashe	Percent of Total
Mon	49	9.40%
Tue	89	17.08%
Wed	87	16.70%
Thu	73	14.01%
Fri	93	17.85%
Sat	69	13.24%
Sun	61	11.71%

Figure 5f: Weekday and Weekend Summary (Overall Corridor)

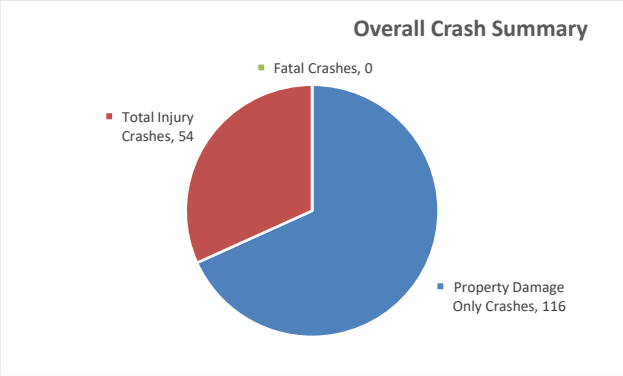
3.1.2 Summary of the 4-Lane Section of College Parkway

Crash history along the 4-lane section of the College Parkway corridor over a nine (9) year period (2012 to 2020) indicates that a total of one-hundred and seventy (170) crashes have occurred between MD 2 and the College Parkway Baptist Church. A summary of the crashes in included in ***Appendix B***.

There have been no fatal crashes, 54 injury-related crashes, and 116 property-damage only crashes as shown on ***Figure 6a***. Crashes resulting in injury are broken down into 3 categories - 5 resulted in at least one person involved being disabled/incapacitated, 26 injured but not incapacitated, and 23 possibly injured, as shown on ***Figure 6b***.

High Level Crash Summary		
Crash Type	Number of Crashes	Percent of Total
Total Crashes	170	100.00%
Property Damage Only Crashes	116	68.24%
Total Injury Crashes	54	31.76%
Fatal Crashes	0	0.00%

Figure 6a: High Level Crash Summary (4-Lane Section)



Crash Severity Summary		
Crash Type	Number of Crashes	Percent of Total
Total	170	100.00%
Property Damage Only	116	68.24%
Injured, not Incapacitate	26	15.29%
Possible Injury	23	13.53%
Disabled/Incapacitated	23	13.53%
Fatal	0	0.00%

Figure 6b: Crash Severity Summary (4-Lane Section)

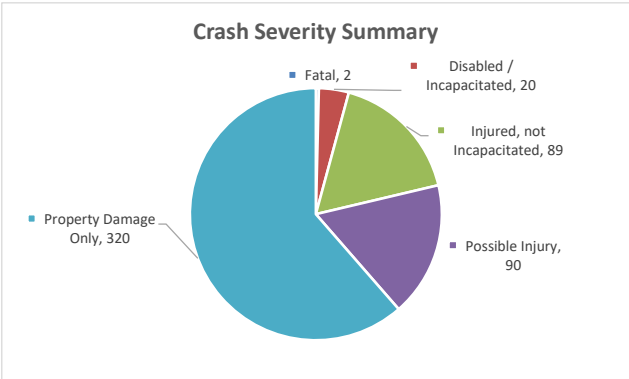


Figure 6c summarizes crashes by type. Over 37% of the crashes are rear-end collisions. Right-angle collisions account for close to 13% of the overall crashes. These occur at intersections when vehicles arrive on perpendicular roads and collide. There are two main types of right-angle crashes – one where entering traffic has stopped, and one where entering traffic disregards a stop sign or a signal. Left-turn collisions also account for 10% of the overall crashes. Most of these crashes occur due to vehicles turning left and colliding with a vehicle traveling in the opposite direction.

Crash Type Summary		
Accident Type	Number of Crashes	Percent of Total
Rear End	63	37.06%
Single Vehicle	47	27.65%
Right Angle	22	12.94%
Left-Turn	17	10.00%
Sideswipe	8	4.71%
Right Turn	4	2.35%
Head On	3	1.76%
Pedacyclist	3	1.76%
Backing Up	2	1.18%
Pedestrian	1	0.59%
Unknown/Other	0	0.00%

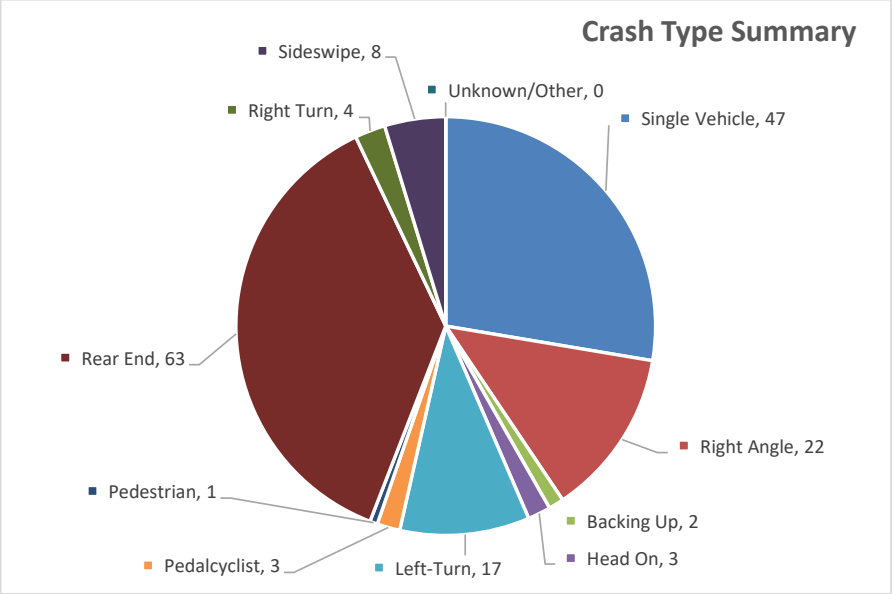


Figure 6c: Crash Type Summary (4-Lane Section)

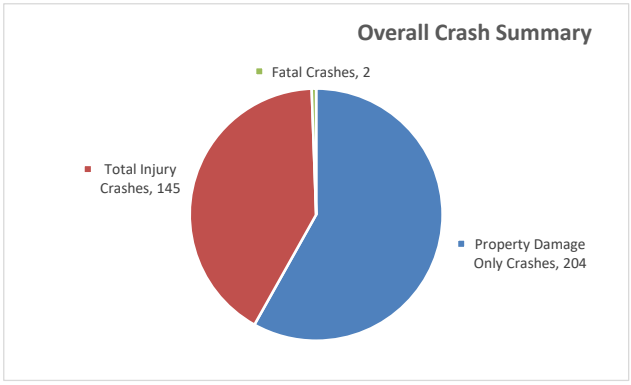
3.1.3 Summary of the 2-Lane Section of College Parkway

Crash history along the 2-lane section of the College Parkway corridor over a nine (9) year period (2012 to 2020) indicates that a total of three-hundred and fifty-one (351) crashes have occurred between the College Parkway Baptist Church and MD 179/Cape St Claire Road. A summary of the crashes in included in ***Appendix B***.

There have been two (2) fatal crashes, 145 injury-related crashes, and 204 property-damage only crashes as shown on ***Figure 7a***. Crashes resulting in injury are broken down into 3 categories - 15 resulted in at least one person involved being disabled/incapacitated, 63 injured but not incapacitated, and 67 possibly injured, as shown on ***Figure 7b***.

High Level Crash Summary		
Crash Type	Number of Crashes	Percent of Total
Total Crashes	351	100.00%
Property Damage Only Crashes	204	58.12%
Total Injury Crashes	145	41.31%
Fatal Crashes	2	0.57%

Figure 7a: High Level Crash Summary (2-Lane Section)



Crash Severity Summary		
Crash Type	Number of Crashes	Percent of Total
Total	351	100.00%
Property Damage Only	204	58.12%
Possible Injury	67	19.09%
Injured, not Incapacitate	63	17.95%
Disabled/Incapacitated	15	4.27%
Fatal	2	0.57%

Figure 7b: Crash Severity Summary (2-Lane Section)

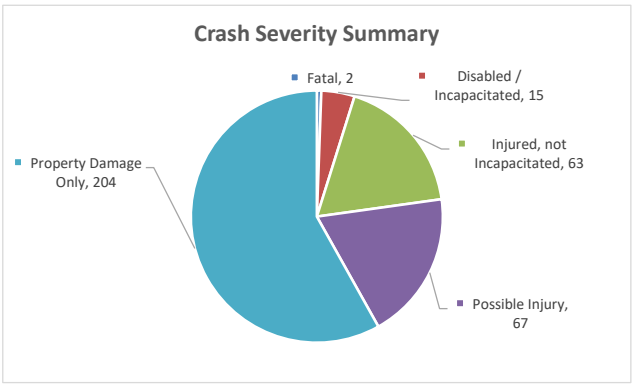


Figure 7c summarizes crashes by type. Over 45% of the crashes are rear-end collisions. Right-angle collisions account for close to 13% of the overall crashes. These occur at intersections when vehicles arrive on perpendicular roads and collide. There are two main types of right-angle crashes – one where entering traffic has stopped, and one where entering traffic disregards a stop sign or a signal. Left-turn collisions also account for close to 17% of the overall crashes. Most of these crashes occur due to vehicles turning left and colliding with a vehicle traveling in the opposite direction.

Crash Type Summary		
Accident Type	Number of Crashes	Percent of Total
Rear End	161	45.87%
Left-Turn	59	16.81%
Right Angle	44	12.54%
Single Vehicle	42	11.97%
Sideswipe	17	4.84%
Pedalcyclist	9	2.56%
Right Turn	6	1.71%
Head On	5	1.42%
Pedestrian	4	1.14%
Unknown/Other	3	0.85%
Backing Up	1	0.28%

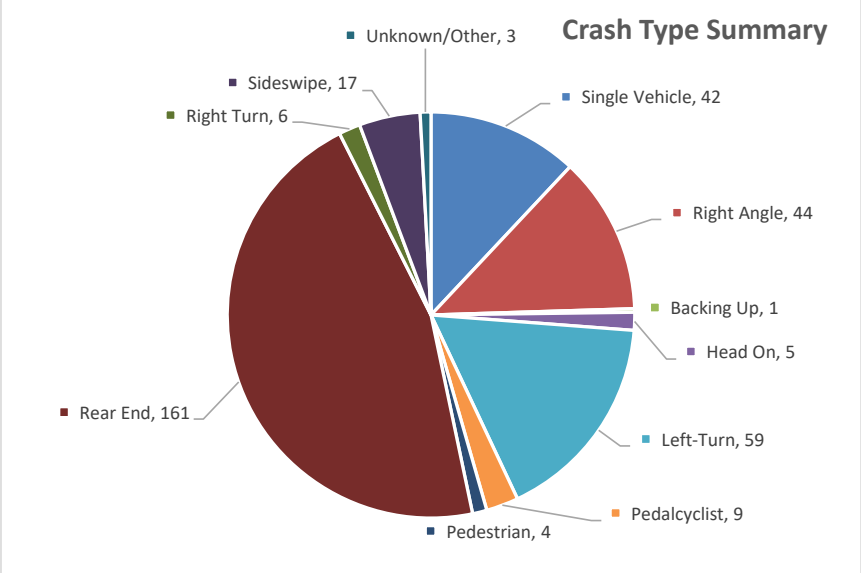


Figure 7c: Crash Type Summary

3.2. Corridor versus County Crash Rates

The historical crash data analysis was used to compare the specific College Parkway crash rates to the County average crash rates for both the four-lane and two-lane sections of the corridor. ***Table 5*** indicates that the four-lane section of College Parkway was found to have a crash rate *lower* than the County average crash rate for similar roadway types. It also indicates that that the two-lane section of College Parkway was found to have a crash rate *higher* than the County average crash rate for similar roadway types.

Segment	Length (MI)	Average Daily Traffic (vehicles/day)	Total Crashes	Years	Crash Rate (crashes per 100 million vehicle miles) [Study Segment]	Countywide Average Crash Rate	Segment Rate Above Countywide Average?
4-Lane	1.10	31,554	67	4	132	161	FALSE
2-Lane	3.70	17,042	162	4	176	146	TRUE
Total	4.80	24,298	229	4	134	149	FALSE

Table 5: College Parkway vs County Crash Rates

3.3. Specific Intersection Crash Data

The historical crash data was also studied at each specific key intersection and the Intersection Crash Rates (Crashes Per Million Entering Vehicles) (CPMEV) were determined to identify areas where a significantly higher number of crashes are occurring today. Based on the FHWA guidelines, the crash rate is determined as follows:

$$CPMEV = \frac{Total\ Crashes\ x\ 1{,}000{,}000}{\text{ADT x 365 x \# of Years of Data}}$$

Table 6 below identifies that the intersections of College Parkway with Bay Dale Drive and with Green Holly Drive / Broadneck Park Road experience more crashes than all other intersections along College Parkway.

COLLEGE PARKWAY INTERSECTION CRASH RATES

Intersection	Daily Hourly Vehicles	Average Daily Traffic	Total Crashes	Years	Crash Rate (CPMEV)	Total Injuries	Injury Rate	Total Fatal & Disabled / Incapacitated Crashes	Fatal & Disabled / Incapacitated Crash Rate
College Parkway with MD 2	3,155	31,554	7	9	0.07	1	0.01	0	0.00
College Parkway with Deer Creek Run	3,155	31,554	6	9	0.06	2	0.02	0	0.00
College Parkway with Ring Road/Peninsula Farm Road	3,155	31,554	20	9	0.19	10	0.10	0	0.00
College Parkway with College Drive	3,155	31,554	21	9	0.20	10	0.10	1	0.01
College Parkway with Jones Station Road	3,155	31,554	18	9	0.17	6	0.06	0	0.00
College Parkway with College Manor Drive/Jones Station Road	1,704	17,042	13	9	0.23	5	0.09	0	0.00
College Parkway with Ternwing Drive	1,704	17,042	16	9	0.29	8	0.14	0	0.00
College Parkway with Raintree Drive	1,704	17,042	12	9	0.21	10	0.18	0	0.00
College Parkway with Locust Ridge Lane/Rosslare Drive	1,704	17,042	1	9	0.02	1	0.02	0	0.00
College Parkway with Jones Station Road/Kimwood Road	1,704	17,042	20	9	0.36	10	0.18	1	0.02
College Parkway with Shore Acres Road (NB)	1,704	17,042	24	9	0.43	15	0.27	0	0.00
College Parkway with Shore Acres Road (SB)	1,704	17,042	19	9	0.34	8	0.14	0	0.00
College Parkway with Bay Dale Drive	1,704	17,042	59	9	1.05	23	0.41	2	0.04
College Parkway with Bellerive Drive	1,704	17,042	20	9	0.36	18	0.32	1	0.02
College Parkway with Falcon Nest Court	1,704	17,042	6	9	0.11	6	0.11	0	0.00
College Parkway with Pennington Lane S/Bellerive Drive	1,704	17,042	21	9	0.38	10	0.18	0	0.00
College Parkway with Broadneck Park Road/Green Holly Drive	1,704	17,042	32	9	0.57	12	0.21	1	0.02
College Parkway with Broadneck Park Road/Destiny Court	1,704	17,042	9	9	0.16	8	0.14	0	0.00
College Parkway with Commanders Way	1,704	17,042	5	9	0.09	1	0.02	1	0.02
College Parkway with Cape Saint Claire Road	1,704	17,042	0	9	0.00	0	0.00	0	0.00

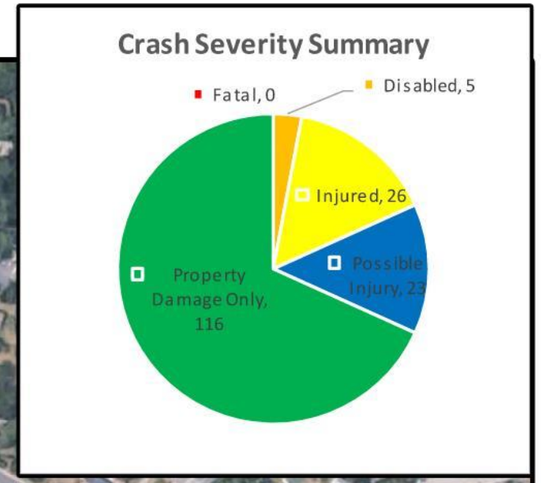
Table 6: College Parkway Intersection Crash Rates

Figure 8 illustrates the specific CPMEV at each key intersection located in the four-lane section of College Parkway, as well as the crash type and crash severity summaries. Higher crash rates are found in the vicinity of the AA Community College access points. *Figure 9* identifies the location of each pedestrian and bicyclist related crash along the four-lane section. The completion of the Broadneck Trail Phase III is expected to mitigate these pedestrian and bicyclist-related crashes.

Intersection #	Intersection
1	College Parkway with MD 2
2	College Parkway with Deer Creek Run
3	College Parkway with Ring Road/Peninsula Farm Road
4	College Parkway with College Drive
5	College Parkway with Jones Station Road

Countywide
4-Lane Road Avg Crash Rate:
161 CPHMVM (2012-2020)

College Parkway
4-Lane Section Crash Rate:
149 CPHMVM (2012-2020)



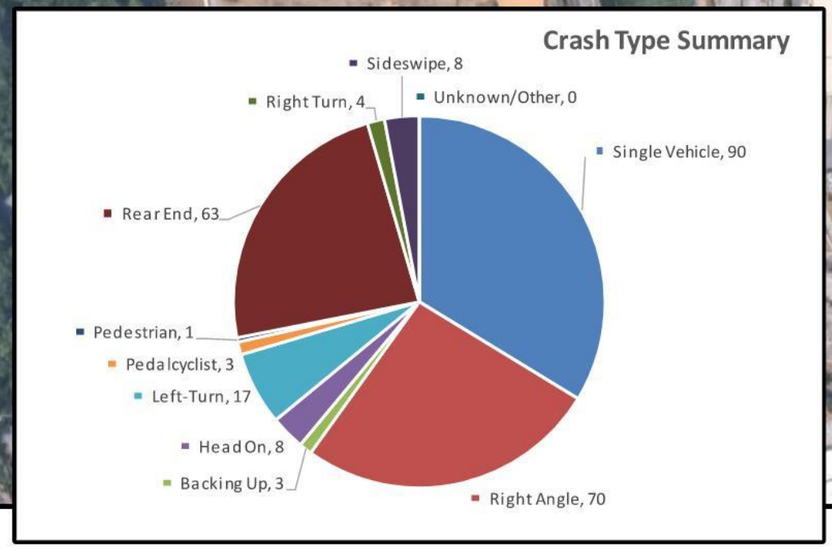
1 0.07 CPMEV

2 0.06 CPMEV

3 0.19 CPMEV

4 0.20 CPMEV

5 0.17 CPMEV



LEGEND

X.XX Intersection Crash Rate (Crashes Per Million Entering Vehicles) (#) Intersection Number

X.XX Section Crash Rate (Crashes Per Hundred Million Vehicle Miles)

NOTE: Intersection Crash Rates & Charts utilize 2012-2020 data

AMT

N

NOT TO SCALE

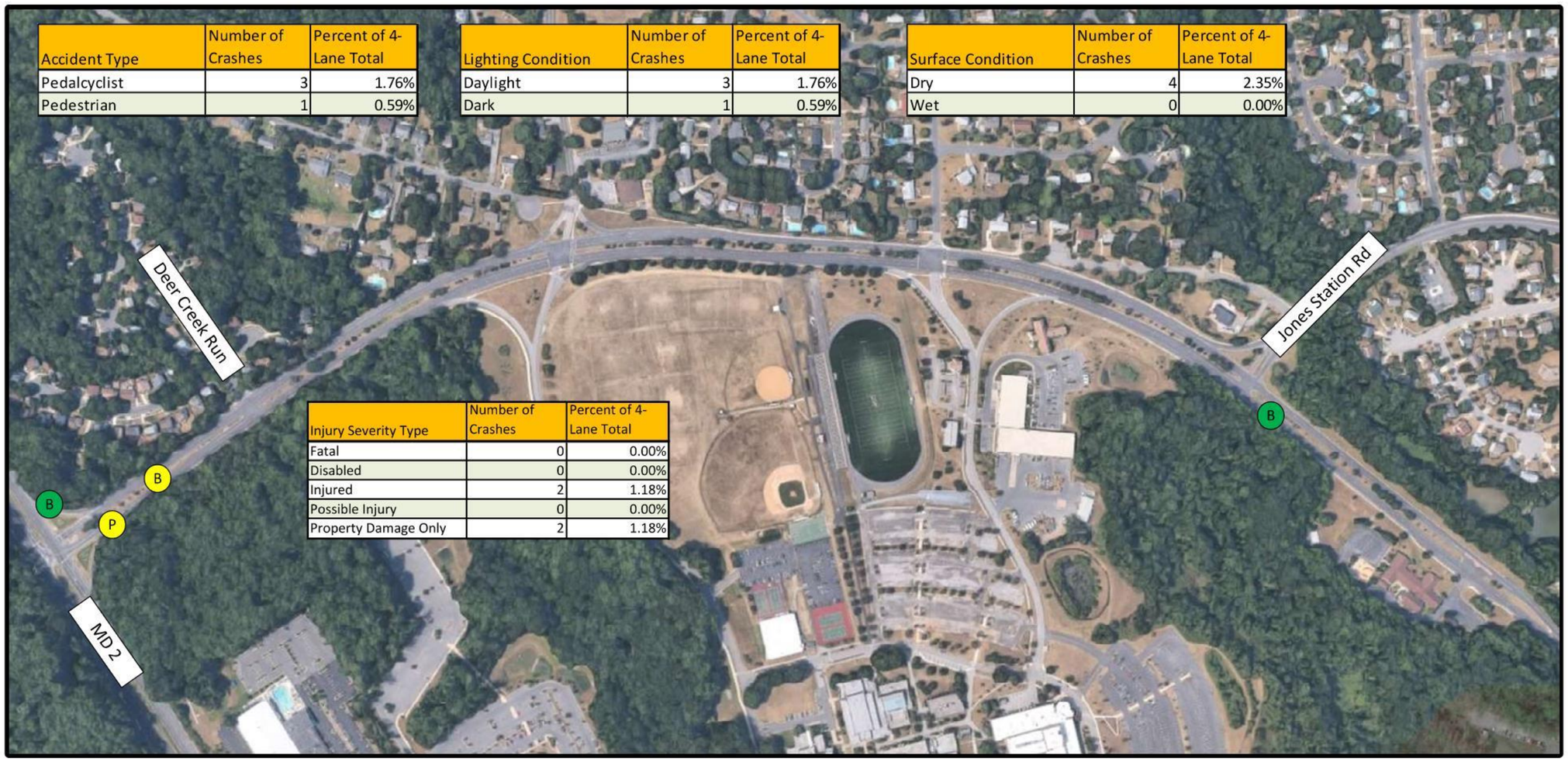
College Parkway Operational and Safety Study
Crash Rates – 4-Lane Segment
DATE: July 2024
FIGURE 8

Accident Type	Number of Crashes	Percent of 4-Lane Total
Pedalcyclist	3	1.76%
Pedestrian	1	0.59%

Lighting Condition	Number of Crashes	Percent of 4-Lane Total
Daylight	3	1.76%
Dark	1	0.59%

Surface Condition	Number of Crashes	Percent of 4-Lane Total
Dry	4	2.35%
Wet	0	0.00%

Injury Severity Type	Number of Crashes	Percent of 4-Lane Total
Fatal	0	0.00%
Disabled	0	0.00%
Injured	2	1.18%
Possible Injury	0	0.00%
Property Damage Only	2	1.18%



Legend

- Fatal Crash
- Disabled/Incapacitated
- Injured/Not Incapacitated
- Possible Injury
- Property Damage Only
- (P) Pedestrian Involved
- (B) Pedalcyclist Involved

NOTE: Intersection Crash Rates & Charts utilize 2012-2020 data

N

NOT TO SCALE

College Parkway Operational and Safety Study

Pedestrian and Bicycle Crash Locations – 4-Lane Segment

DATE: July 2024

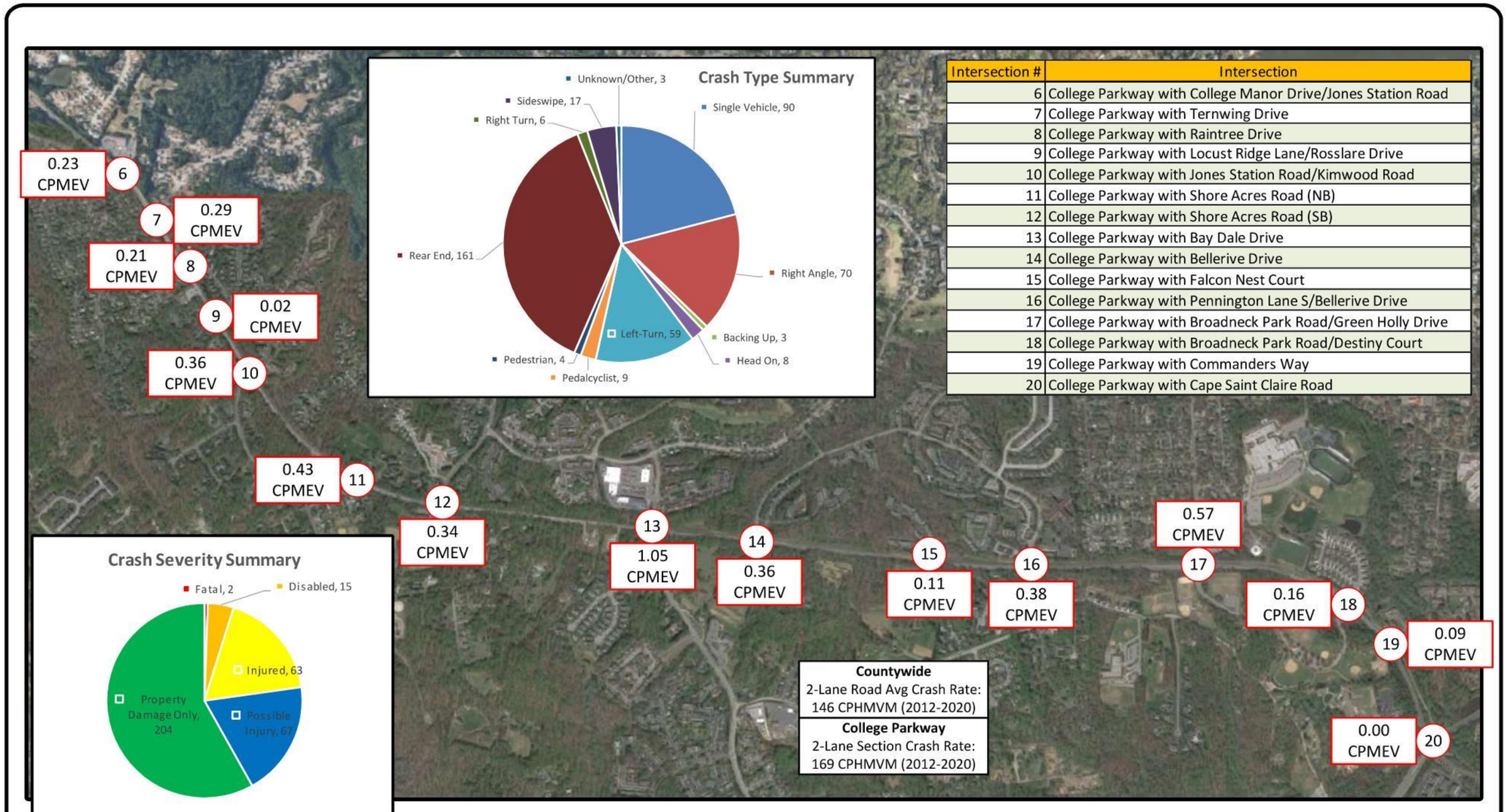
FIGURE 9

Figure 10 illustrates the specific CPMEV at each key intersection located in the two-lane section of College Parkway, as well as the crash type and crash severity summaries. As previously stated, higher crash rates are found at Bay Dale Drive (1.05) and Green Holly Drive / Broadneck Park Road (0.57). ***Figure 11*** identifies the location of each pedestrian and bicyclist related crash along the two-lane section. Once again, the completion of the Broadneck Trail Phase III is expected to mitigate these pedestrian and bicyclist-related crashes from Ternwing Drive to Bay Dale Drive. Additional mitigation will be discussed in Section 5 for the intersections located east of Bay Dale Drive, especially at the Green Holly Drive / Broadneck Park Road intersection.

3.3.1 College Parkway at Bay Dale Drive

The signalized intersection of Bay Dale Drive experiences the highest crash rates along the College Parkway corridor. While no fatal crashes have occurred at this intersection, a total of 59 separate crashes have occurred at this location in the last nine years.

Figure 12a illustrates the crash severity map at the intersection, while ***Figure 12b*** includes the collision diagrams for each crash. Most of the crashes at this location are rear-end and left turn crashes. ***Figure 12c*** indicates that one pedestrian-related and one bicyclist-related crashes have occurred at the intersection. These resulted in possible injuries/injuries to the respective non-motorized road users.



Intersection #	Intersection
6	College Parkway with College Manor Drive/Jones Station Road
7	College Parkway with Ternwing Drive
8	College Parkway with Raintree Drive
9	College Parkway with Locust Ridge Lane/Rosslare Drive
10	College Parkway with Jones Station Road/Kimwood Road
11	College Parkway with Shore Acres Road (NB)
12	College Parkway with Shore Acres Road (SB)
13	College Parkway with Bay Dale Drive
14	College Parkway with Bellerive Drive
15	College Parkway with Falcon Nest Court
16	College Parkway with Pennington Lane S/Bellerive Drive
17	College Parkway with Broadneck Park Road/Green Holly Drive
18	College Parkway with Broadneck Park Road/Destiny Court
19	College Parkway with Commanders Way
20	College Parkway with Cape Saint Claire Road

LEGEND

X.XX Intersection Crash Rate (Crashes Per Million Entering Vehicles)

(#) Intersection Number

X.XX Section Crash Rate (Crashes Per Hundred Million Vehicle Miles)

NOTE: Intersection Crash Rates & Charts utilize 2012-2020 data

N

NOT TO SCALE

College Parkway Operational and Safety Study

Crash Rates – 2-Lane Segment

DATE: July 2024

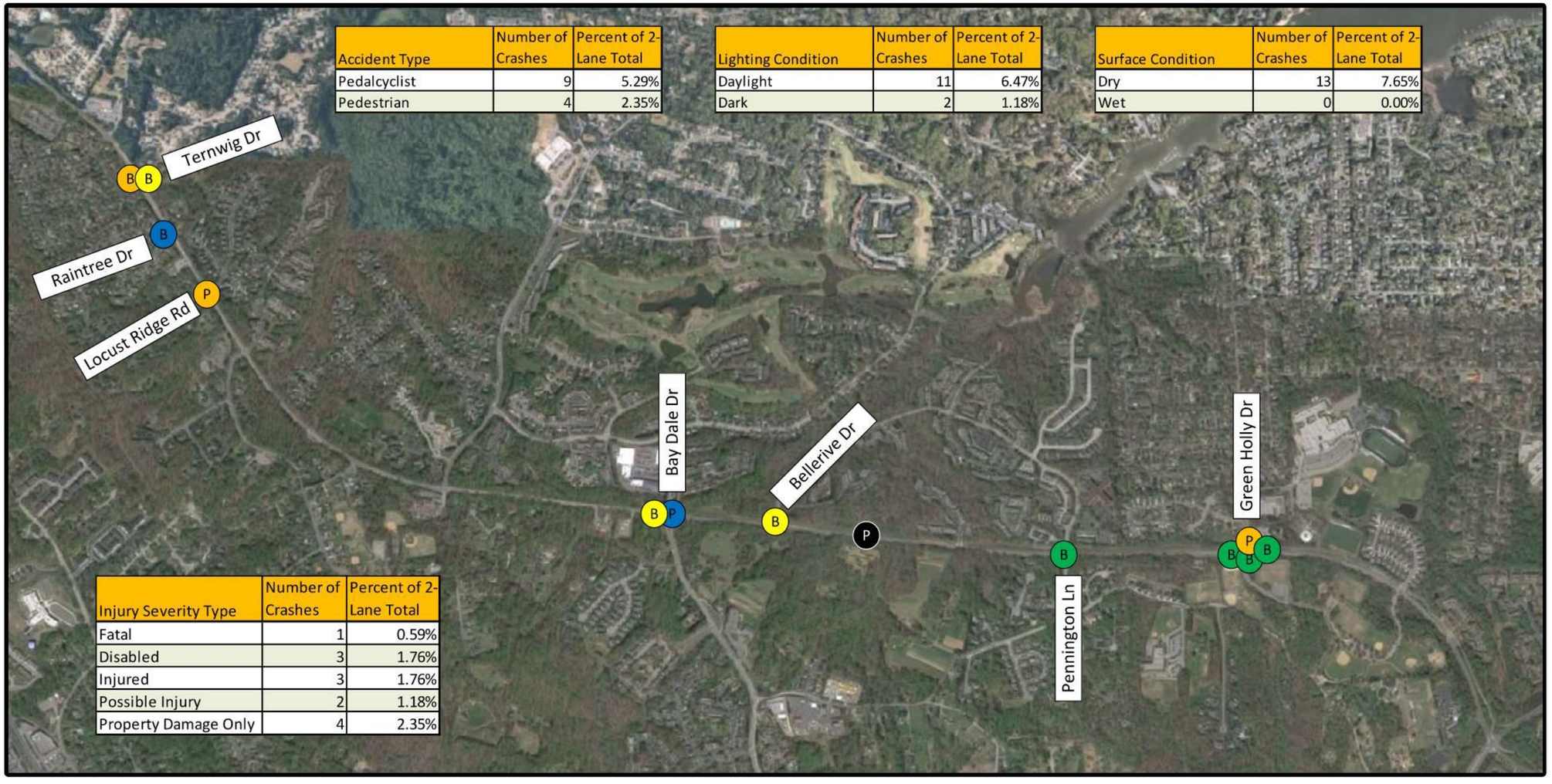
FIGURE 10

Accident Type	Number of Crashes	Percent of 2-Lane Total
Pedalcyclist	9	5.29%
Pedestrian	4	2.35%

Lighting Condition	Number of Crashes	Percent of 2-Lane Total
Daylight	11	6.47%
Dark	2	1.18%

Surface Condition	Number of Crashes	Percent of 2-Lane Total
Dry	13	7.65%
Wet	0	0.00%

Injury Severity Type	Number of Crashes	Percent of 2-Lane Total
Fatal	1	0.59%
Disabled	3	1.76%
Injured	3	1.76%
Possible Injury	2	1.18%
Property Damage Only	4	2.35%



Legend
- Fatal Crash
- Disabled/Incapacitated
- Injured/Not Incapacitated
- Possible Injury
- Property Damage Only
- (P) Pedestrian Involved
- (B) Pedalcyclist Involved

NOTE: Intersection Crash Rates & Charts utilize 2012-2020 data

N

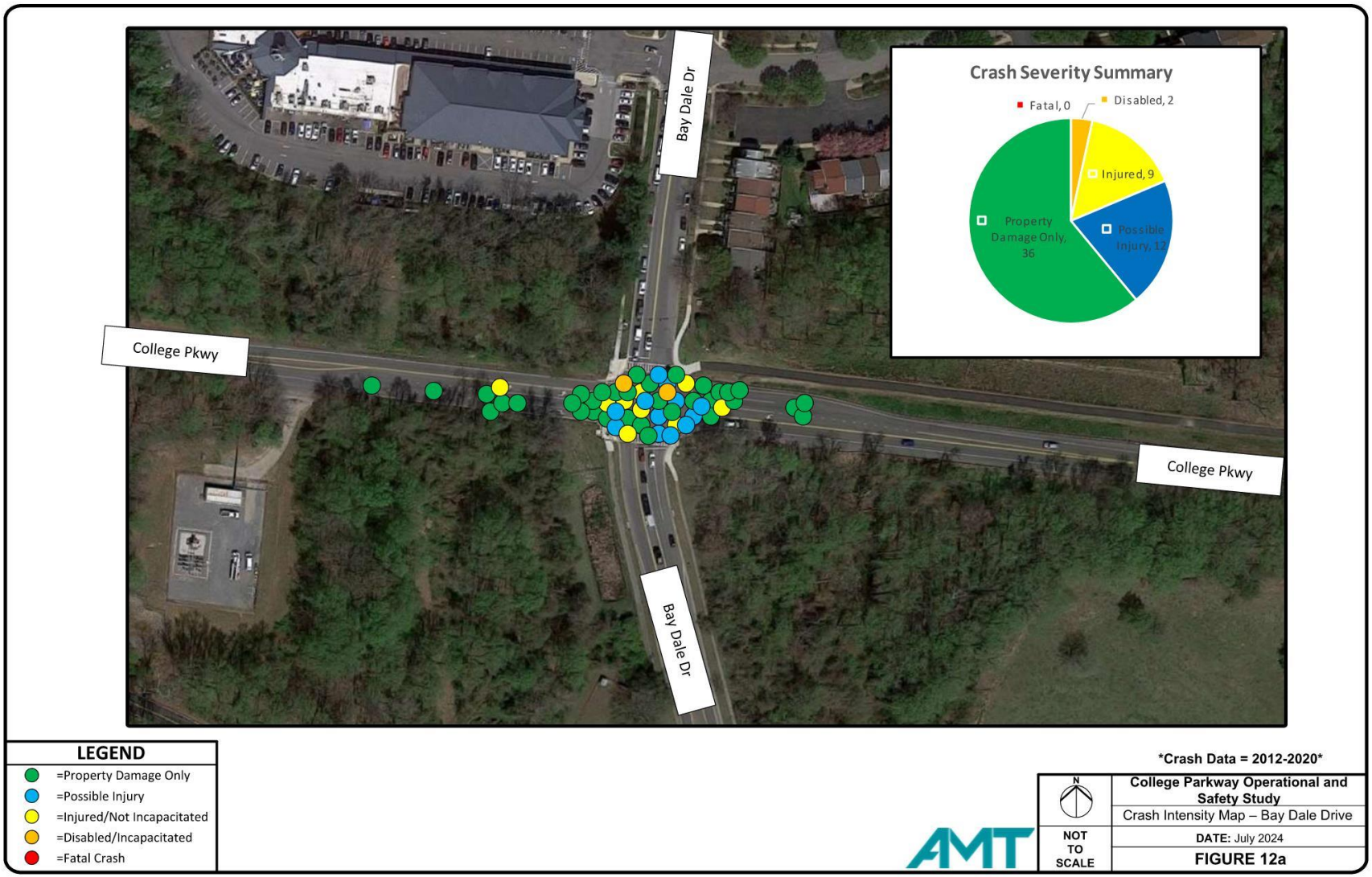
NOT TO SCALE

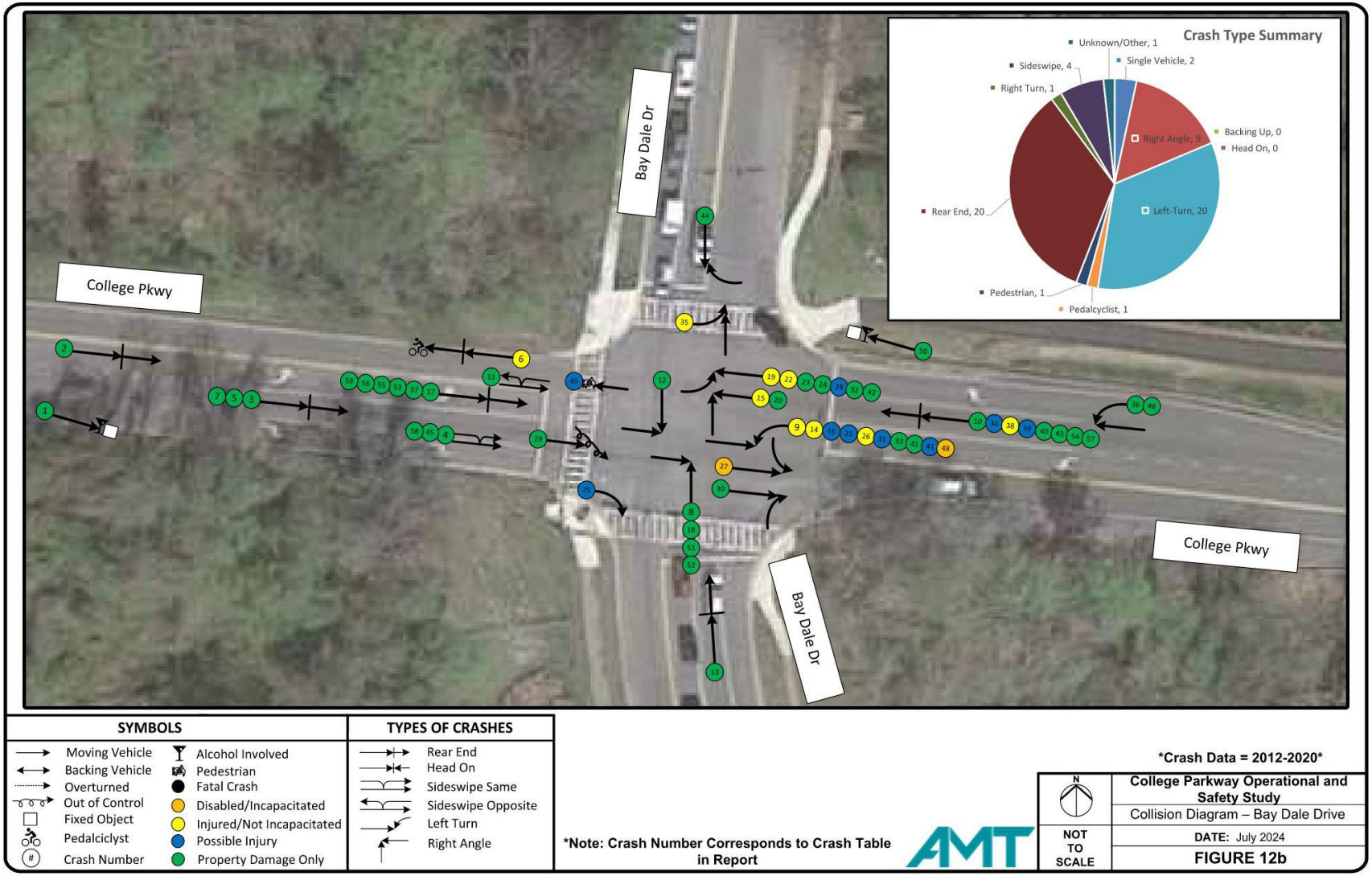
College Parkway Operational and Safety Study

Pedestrian and Bicycle Crash Locations – 2-Lane Segment

DATE: July 2024

FIGURE 11


Crash Severity Summary
Fatal, 0
Disabled, 2
Injured, 9
Possible Injury, 12
Property Damage Only, 36
College Pkwy
Bay Dale Dr
College Pkwy
Bay Dale Dr
LEGEND
=Property Damage Only
=Possible Injury
=Injured/Not Incapacitated
=Disabled/Incapacitated
=Fatal Crash
Crash Data = 2012-2020
N
NOT TO SCALE
College Parkway Operational and Safety Study
Crash Intensity Map – Bay Dale Drive
DATE: July 2024
FIGURE 12a

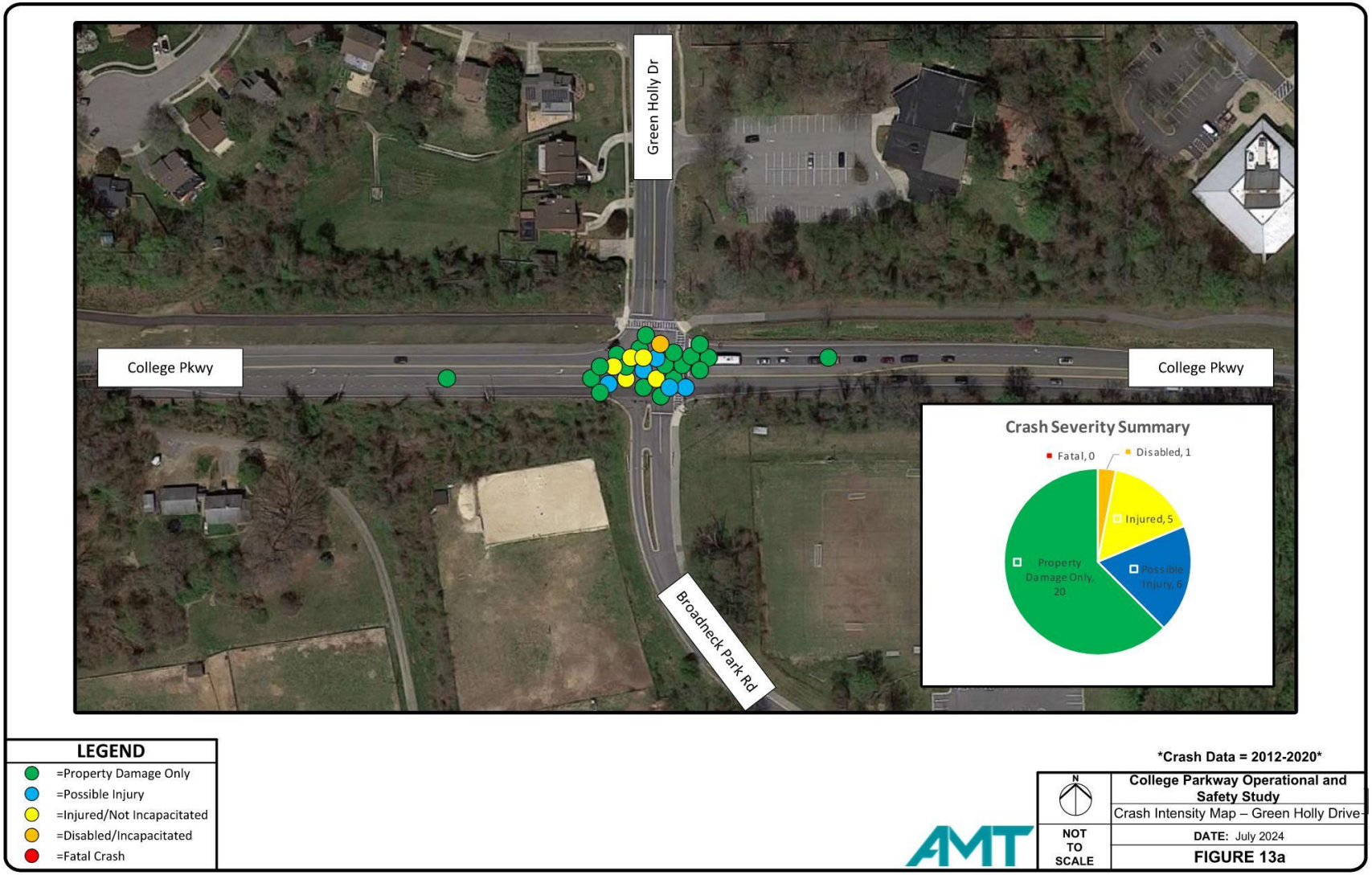

Crash Type Summary
Unknown/Other, 1
Single Vehicle, 2
Sideswipe, 4
Right Turn, 1
Right Angle, 9
Backing Up, 0
Head On, 0
Rear End, 20
Left-Turn, 20
Pedestrian, 1
Pedalcyclist, 1
College Pkwy
Bay Dale Dr
College Pkwy
Bay Dale Dr
SYMBOLS
Moving Vehicle
Backing Vehicle
Overturned
Out of Control
Fixed Object
Pedalciclyst
Crash Number
Alcohol Involved
Pedestrian
Fatal Crash
Disabled/Incapacitated
Injured/Not Incapacitated
Possible Injury
Property Damage Only
TYPES OF CRASHES
Rear End
Head On
Sideswipe Same
Sideswipe Opposite
Left Turn
Right Angle
*Note: Crash Number Corresponds to Crash Table in Report
Crash Data = 2012-2020
N
NOT TO SCALE
College Parkway Operational and Safety Study
Collision Diagram – Bay Dale Drive
DATE: July 2024
FIGURE 12b

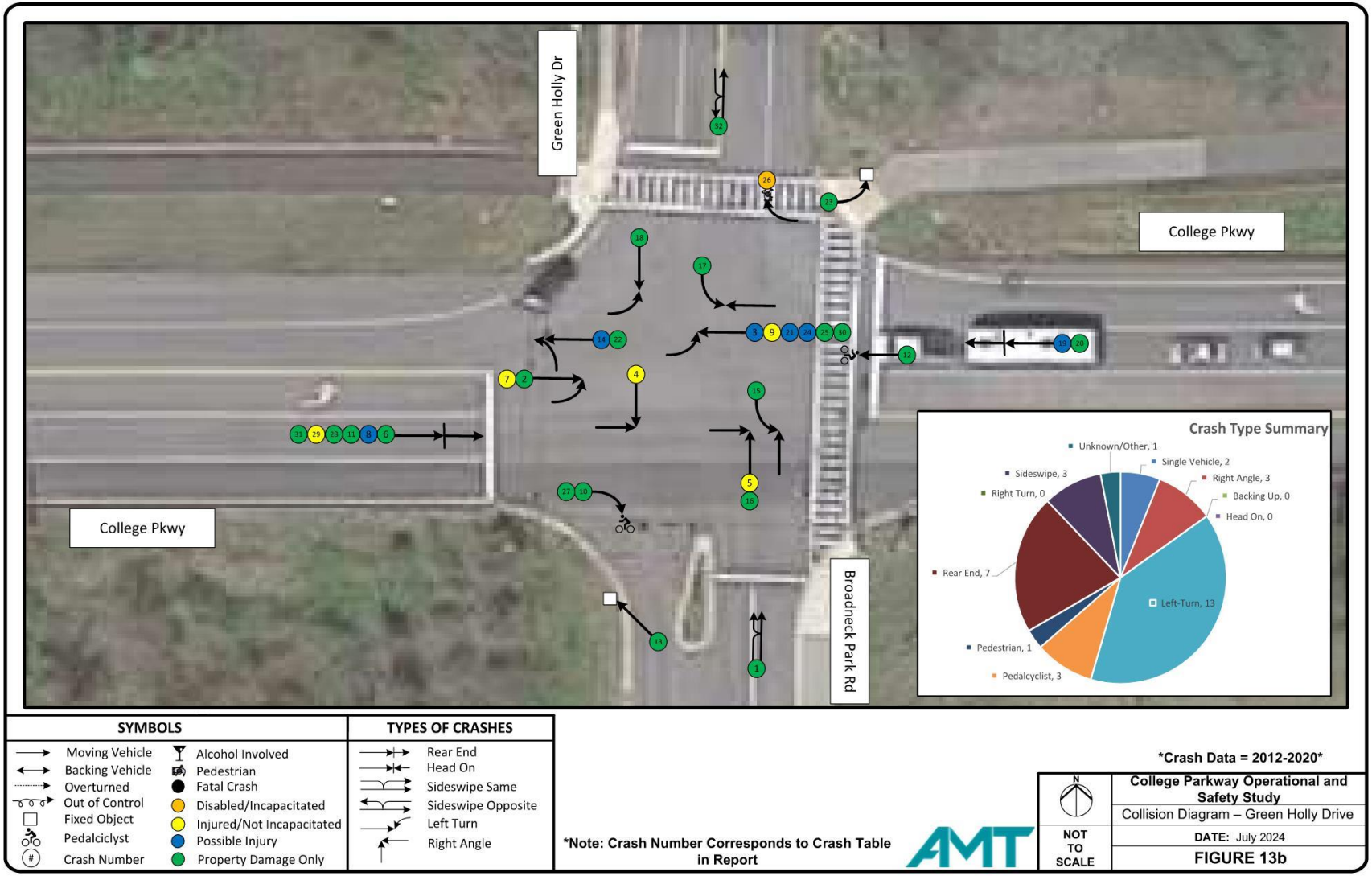

Bay Dale Dr
College Pkwy
6
5/14/17, 12:00, Daylight, Dry
49
4/19/19, 12:14, Daylight, Dry
College Pkwy
Bay Dale Dr
SYMBOLS
Moving Vehicle
Backing Vehicle
Overturned
Out of Control
Fixed Object
Pedalciclyst
Crash Number
Alcohol Involved
Pedestrian
Fatal Crash
Disabled/Incapacitated
Injured/Not Incapacitated
Possible Injury
Property Damage Only
TYPES OF CRASHES
Rear End
Head On
Sideswipe Same
Sideswipe Opposite
Left Turn
Right Angle
*Note: Crash Number Corresponds to Crash Table in Report
Crash Data = 2012-2020
N
NOT TO SCALE
College Parkway Operational and Safety Study
Pedestrian and Bicycle Collision Diagram – Bay Dale Drive
DATE: July 2024
FIGURE 12c

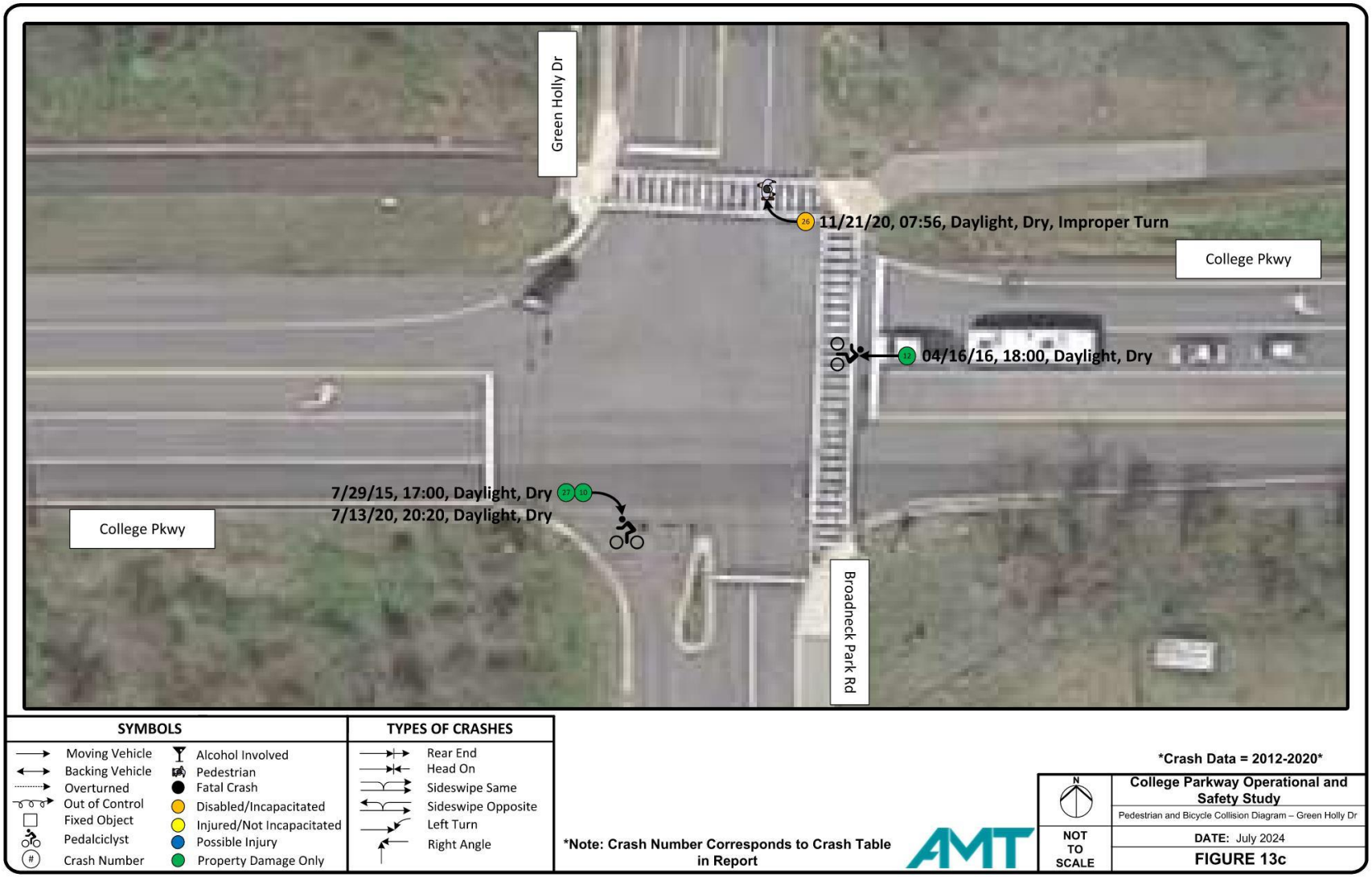
3.3.2 College Parkway at Green Holly Drive / Broadneck Park Road

The signalized intersection of Green Holly Drive / Broadneck Park Road experiences the second highest crash rates along the College Parkway corridor. While no fatal crashes have occurred at this intersection, a total of 32 separate crashes have occurred at this location in the last nine years. This is significant since Broadneck High School is located north of this location and many student drivers access this intersection to get to/from school.

Figure 13a illustrates the crash severity map at the intersection, while ***Figure 13b*** includes the collision diagrams for each crash. Most of the crashes at this location are left turn and rear-end crashes. ***Figure 13c*** indicates that one pedestrian-related and two bicyclist-related crashes have occurred at the intersection. The pedestrian crash resulted in incapacitation of the non-motorized road user. The bicyclist crashes resulted in property damage only.


Green Holly Dr
College Pkwy
College Pkwy
Broadneck Park Rd
Crash Severity Summary
Fatal, 0
Disabled, 1
Injured, 5
Possible Injury, 6
Property Damage Only, 20
LEGEND
=Property Damage Only
=Possible Injury
=Injured/Not Incapacitated
=Disabled/Incapacitated
=Fatal Crash
Crash Data = 2012-2020
N
NOT TO SCALE
College Parkway Operational and Safety Study
Crash Intensity Map – Green Holly Drive
DATE: July 2024
FIGURE 13a


Green Holly Dr
College Pkwy
College Pkwy
Broadneck Park Rd
Crash Type Summary
Unknown/Other, 1
Single Vehicle, 2
Sideswipe, 3
Right Angle, 3
Right Turn, 0
Backing Up, 0
Head On, 0
Rear End, 7
Left-Turn, 13
Pedestrian, 1
Pedalcyclist, 3
SYMBOLS
Moving Vehicle
Backing Vehicle
Overturned
Out of Control
Fixed Object
Pedalciclyst
Crash Number
Alcohol Involved
Pedestrian
Fatal Crash
Disabled/Incapacitated
Injured/Not Incapacitated
Possible Injury
Property Damage Only
TYPES OF CRASHES
Rear End
Head On
Sideswipe Same
Sideswipe Opposite
Left Turn
Right Angle
*Note: Crash Number Corresponds to Crash Table in Report
Crash Data = 2012-2020
N
NOT TO SCALE
College Parkway Operational and Safety Study
Collision Diagram – Green Holly Drive
DATE: July 2024
FIGURE 13b


Green Holly Dr
College Pkwy
Broadneck Park Rd
College Pkwy
26
11/21/20, 07:56, Daylight, Dry, Improper Turn
12
04/16/16, 18:00, Daylight, Dry
7/29/15, 17:00, Daylight, Dry
7/13/20, 20:20, Daylight, Dry
SYMBOLS
Moving Vehicle
Backing Vehicle
Overturned
Out of Control
Fixed Object
Pedalciclyst
Crash Number
Alcohol Involved
Pedestrian
Fatal Crash
Disabled/Incapacitated
Injured/Not Incapacitated
Possible Injury
Property Damage Only
TYPES OF CRASHES
Rear End
Head On
Sideswipe Same
Sideswipe Opposite
Left Turn
Right Angle
*Note: Crash Number Corresponds to Crash Table in Report
Crash Data = 2012-2020
N
NOT TO SCALE
College Parkway Operational and Safety Study
Pedestrian and Bicycle Collision Diagram – Green Holly Dr
DATE: July 2024
FIGURE 13c

4. TRAFFIC OPERATIONAL ASSESSMENT (EXISTING AND NO-BUILD)

A traffic operational assessment was conducted along the College Parkway corridor as follows:

1) Evaluate existing conditions during the summertime and Fall peak AM and PM periods to identify intersections where operational concerns exist today (i.e.: levels of service operating worse than a "D" and/or lengthy motorist delays and 95th percentile queues).
2) Develop the future peak hour forecasts for the years 2028 and 2032 for both the summertime and Fall periods based on historical traffic data, the BMC travel demand model AADT's, approved developments in the vicinity of the study area, and other relevant information pertaining to the College Parkway corridor.
3) Evaluate No-Build conditions for the years 2028 and 2032 at each key intersection to identify operational concerns expected in the future with no improvements proposed.

4.1. Existing Summer and Fall Peak Hour Volumes

Existing traffic counts were collected in July and November 2022. Copies of the existing traffic data and peak hour volumes are provided in ***Appendix A***. The existing lane use and traffic control at each study intersection is shown on ***Figure 3***. The existing AM and PM peak hour volumes for the summertime period are shown on ***Figure 4a***. The existing AM and PM peak hour volumes for the Fall period are shown on ***Figure 4b***.

4.2. Future Years 2028 and 2032 Summer and Fall Peak Hour Forecasts

The future peak hour forecasts for the years 2028 and 2032 for both the summertime and Fall periods were developed for all key intersection along College Parkway to identify operational concerns expected in the future with no improvements proposed. Several sources of information were used to develop the forecasts:

MDOT SHA i-TMS (Internet - Traffic Monitoring System): The portal was used for corridor counts and not intersection counts.

Recent historic counts along College Parkway between MD 2 and Jones Station Road indicate a growth rate in the vicinity of 0.6% per year between the years 2021-2022, and the growth ranges between 0.3% and 1% per year between the years 2021-2023 in the 4-lane section of College Parkway, as shown in ***Table 7***. Note that since no new traffic counts have been collected by MDOT SHA since 2018 along College Parkway, various applicable internal growth trends and seasonal factors have been applied to the latest field collected AADT to produce the future year AADT values. Many motorist and roadway factors impact these trends – teleworking, homeschooling, varied work hours, construction projects, etc., hence the varied growth ranges observed along the corridor.

There are no SHA count stations in the 2-lane section of the corridor, so other literature such as the BMC travel demand model AADT's needed to be used as the basis for the growth rate recommendations.

	2019 AADT	2020 AADT	2021 AADT	2022 AADT	2023 AADT
College Pkwy (east of MD 2)	30,271	25,282	28,923	29,104	29,545
Growth Rate 2018-2019	**-16.48%**				
Growth Rate 2019-2020		**14.40%**			
Growth Rate 2020-2021			**0.63%**		
				1.52%	
College Pkwy (east of Jones Station Rd)	16,753	13,994	16,015	16,115	16,120
Growth Rate 2018-2019	**-16.47%**				
Growth Rate 2019-2020		**14.44%**			
Growth Rate 2020-2021			**0.62%**		
				0.03%	

Location	Growth rate (2019-2021)	Growth rate (2019-2022)	Growth rate (2021-2022)	Growth rate (2021-2023)
College Pkwy (east of MD 2)	-2.25%	-1.30%	0.63%	1.07%
College Pkwy (east of Jones Station Rd)	-2.23%	-1.29%	0.62%	0.33%

Table 7: MDOT SHA DSD i-TMS Historic AADT's

As noted in ***Table 7*** above, only the growth between the years 2021, 2022, and 2023 (noted in red in the top table) should be considered. The growth calculated between the years 2019, 2020, and 2021 (noted in black) were influenced by the COVID-19 pandemic and should not be considered (large decrease in traffic between 2019-2020, followed by a large increase in traffic between 2020-2021). Similarly, growth trends between various year-periods were calculated in the lower table – the values in red between the years 2021 to 2023 should be considered as they were not influenced by the COVID-19 pandemic (those values are represented by the negative values in black).

BMC Travel Demand Model: The BMC travel demand model provides estimated future AADT's along College Parkway by sections of the corridor for the years 2020, 2030, 2040, and 2045. Looking at the 2-lane section of the corridor (identified by the red box in the lower section of ***Table 8***), a growth increase of 0.8% to 2.1% is expected by the year 2030. The largest increase of 2.1% is located near Bellerive Road, where the County's Development Activity GIS map identifies many parcels of green space that could be developed in the next 10-20 years.

	2020 AADT	2030 AADT	2040 AADT	2045 AADT
College Pkwy (btw MD 2 & Peninsula Farm Rd)	27,010	29,755	31,898	29,193
Growth Rate 2020-2030	**0.97%**			
Growth Rate 2030-2040		**0.70%**		
Growth Rate 2040-2045			**-1.76%**	
College Pkwy (btw Peninsula Farm Rd & Jones Station Rd)	24,490	27,131	28,985	26,349
Growth Rate 2020-2030	**1.03%**			
Growth Rate 2030-2040		**0.66%**		
Growth Rate 2040-2045			**-1.89%**	
College Pkwy (btw Jones Station Rd & Shores Acress Rd (signal))	22,509	24,592	26,282	22,256
Growth Rate 2020-2030	**0.89%**			
Growth Rate 2030-2040		**0.67%**		
Growth Rate 2040-2045			**-3.27%**	
College Pkwy (btw Shores Acress Rd (signal) & Bay Dale Dr)	24,532	26,572	28,510	24,584
Growth Rate 2020-2030	**0.80%**			
Growth Rate 2030-2040		**0.71%**		
Growth Rate 2040-2045			**-2.92%**	
College Pkwy (btw Bay Dale Dr & Bellerive Road)	13,198	15,865	17,989	16,121
Growth Rate 2020-2030	**1.86%**			
Growth Rate 2030-2040		**1.26%**		
Growth Rate 2040-2045			**-2.17%**	
College Pkwy (btw Bellerive Road & Broadneck Road)	11,537	14,215	16,106	14,376
Growth Rate 2020-2030	**2.11%**			
Growth Rate 2030-2040		**1.26%**		
Growth Rate 2040-2045			**-2.25%**	
College Pkwy (btw Broadneck Road & Cape Saint Claire Road)	14,625	16,385	16,752	15,565
Growth Rate 2020-2030	**1.14%**			
Growth Rate 2030-2040		**0.22%**		
Growth Rate 2040-2045			**-1.46%**	

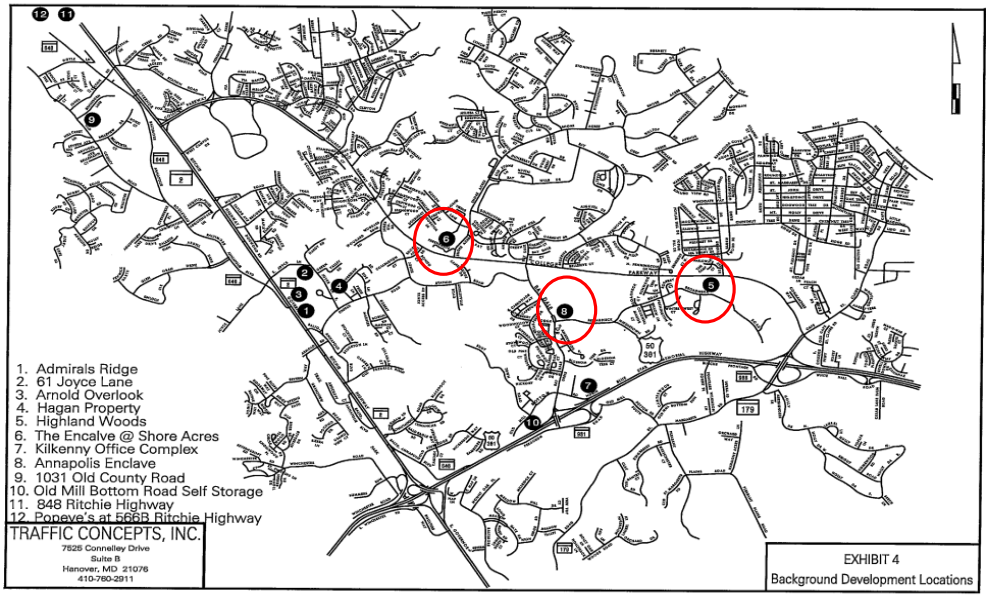
Location	Growth rate (2020-2030)	Growth rate (2020-2040)	Growth rate (2030-2040)
College Pkwy (btw MD 2 & Peninsula Farm Rd)	0.97%	0.84%	0.70%
College Pkwy (btw Peninsula Farm Rd & Jones Station Rd)	1.03%	0.85%	0.66%
College Pkwy (btw Jones Station Rd & Shores Acress Rd (signal))	0.89%	0.78%	0.67%
College Pkwy (btw Shores Acress Rd (signal) & Bay Dale Dr)	0.80%	0.75%	0.71%
College Pkwy (btw Bay Dale Dr & Bellerive Road)	1.86%	1.56%	1.26%
College Pkwy (btw Bellerive Road & Broadneck Road)	2.11%	1.68%	1.26%
College Pkwy (btw Broadneck Road & Cape Saint Claire Road)	1.14%	0.68%	0.22%
Average	**1.26%**	**1.02%**	**0.78%**

Table 8: BMC Travel Demand Model AADT's

The AADT volumes decrease between the years 2040 and 2045. This is likely due to long-term planned roadway improvements and/or roadway widenings in the general area of this project that would pull traffic away from College Parkway back to MD 2, US 50, etc.

Approved Developments:

Three (3) developments were initially identified as being approved for construction during the scoping process of this project. Of the three projects, two were identified as being built and occupied at the time of the data collection efforts. The third project, consisting of 10 single family homes, was assumed to be accounted for with the application of the growth rate. The location of the approved development is provided in ***Figure 14a***.



5 Highland Woods	8 SF Homes	COMPLETED
6 The Enclave at Shores Acres	10 SF Homes	COMPLETED
8 Annapolis Enclave	10 SF Homes	NOT BUILT YET?

Tommy's Express Car Wash (Traffic Concepts Nov 2019)

Figure 14a: Approved Developments

The Freshfields development was the fourth development that was recently approved. This development includes a trail connector for providing safe neighborhood access to the Broadneck Trail. The sketch plan for this development is provided in ***Figure 14b*** on the next page.

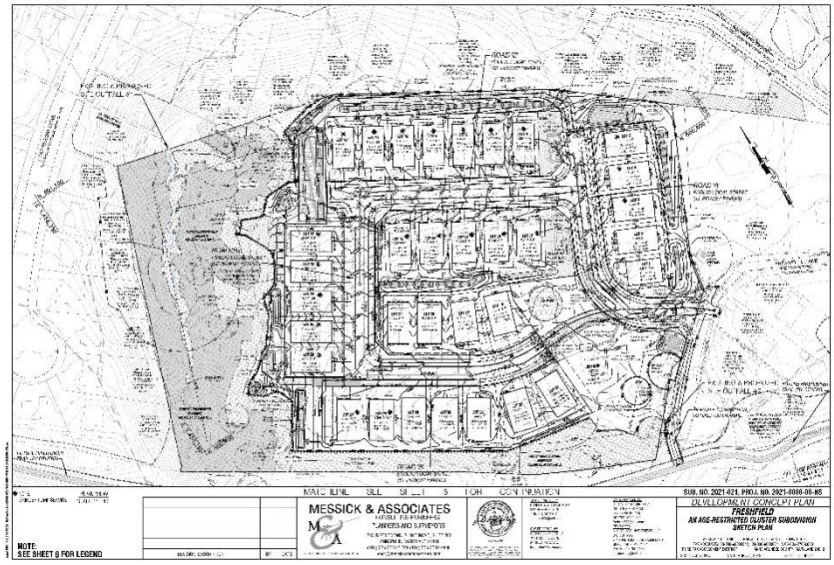


Figure 14b: The Freshfields Development Site Plan

MDOT SHA US 50 Pilot Projects: Both US 50 pilot projects in 2022 and 2023 were successful at decreasing the number of vehicles diverting off MD 2 and US 50 onto College Parkway. However, currently, there are no definite funded plans in place to continue to implement any future pilot projects. For purposes of this study, it was assumed that by the year 2028, MDOT SHA will have improvements in place during the summertime months to prevent as much commuter traffic from diverting off MD 2 and US 50 onto College Parkway.

Since the BMC-derived growth rates and the i-TMS derived growth rates differ significantly, a conservative 0.75% growth rate compounded annually was applied to both the Summer and Fall peak hour traffic volumes for each key intersection to account for any future trips up to the years 2028 and 2032.

The 2028 Summer no-build peak hour forecasts are shown on ***Figure 15***.

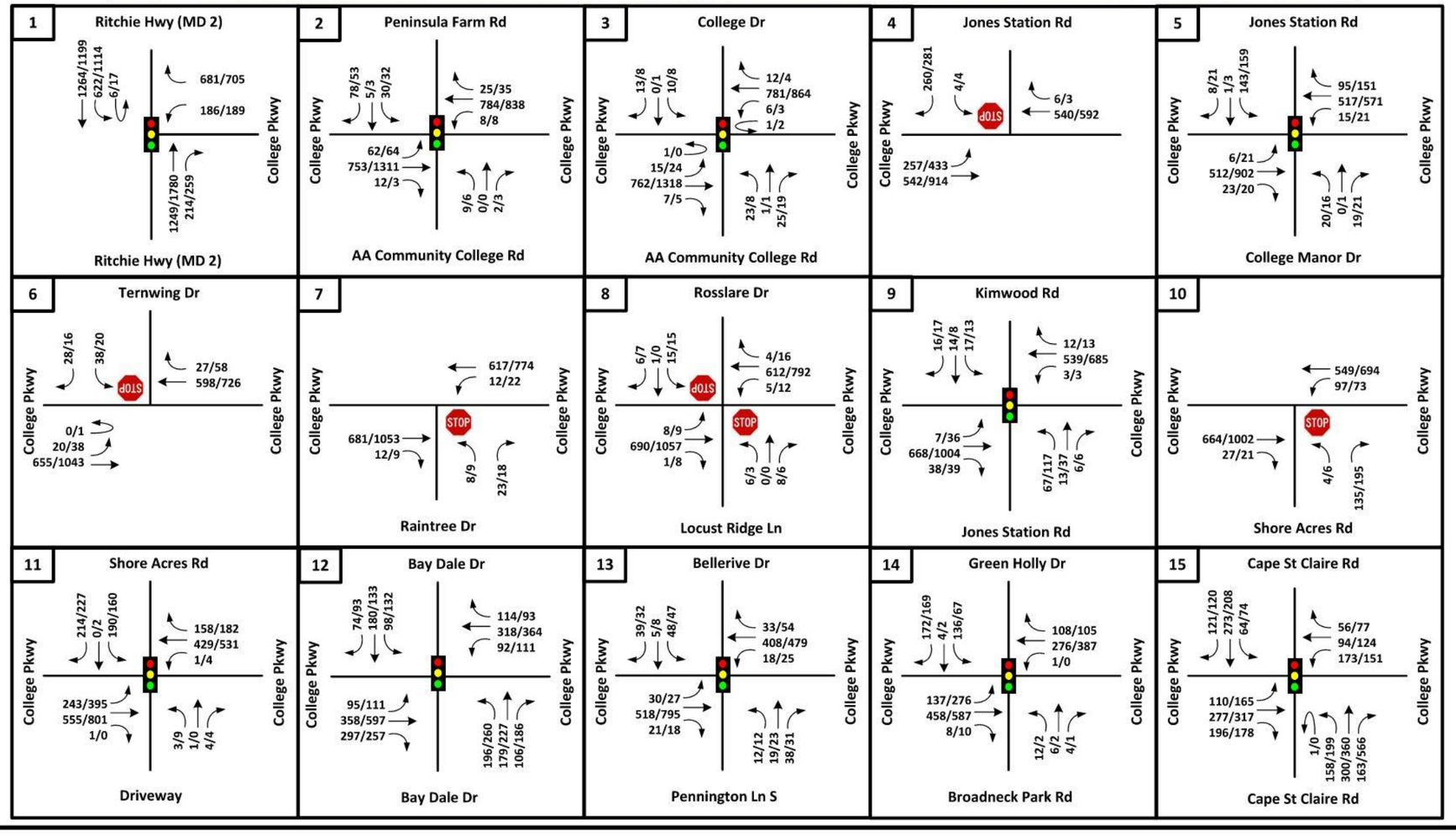
The 2032 Summer no-build peak hour forecasts are shown on ***Figure 16***.

The 2028 Fall no-build peak hour forecasts are shown on ***Figure 17***.

The 2032 Fall no-build peak hour forecasts are shown on ***Figure 18.***

The detailed traffic volume and forecasting calculations are included in ***Appendix C***.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Anne Arundel Community College
Chesapeake
Bay Hills Golf Club
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
College Pkwy


1 Ritchie Hwy (MD 2)
1264/1199
622/1114
6/17
681/705
186/189
1249/1780
214/259
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
78/53
5/3
30/32
25/35
784/838
8/8
62/64
753/1311
12/3
9/6
0/0
2/3
AA Community College Rd
3 College Dr
13/8
0/1
10/8
12/4
781/864
6/3
1/2
1/0
15/24
762/1318
7/5
23/8
1/1
25/19
AA Community College Rd
4 Jones Station Rd
260/281
4/4
STOP
6/3
540/592
257/433
542/914
5 Jones Station Rd
8/21
1/3
143/159
95/151
517/571
15/21
6/21
512/902
23/20
20/16
0/1
19/21
College Manor Dr
6 Ternwing Dr
28/16
38/20
27/58
598/726
0/1
20/38
655/1043
7
617/774
12/22
681/1053
12/9
8/9
23/18
Raintree Dr
8 Rosslare Dr
6/7
1/0
15/15
4/16
612/792
5/12
8/9
690/1057
1/8
6/3
0/0
8/6
Locust Ridge Ln
9 Kimwood Rd
16/17
14/8
17/13
12/13
539/685
3/3
7/36
668/1004
38/39
67/117
13/37
6/6
Jones Station Rd
10
549/694
97/73
664/1002
27/21
4/6
135/195
Shore Acres Rd
11 Shore Acres Rd
214/227
0/2
190/160
158/182
429/531
1/4
243/395
555/801
1/0
3/9
1/0
4/4
Driveway
12 Bay Dale Dr
74/93
180/133
98/132
114/93
318/364
92/111
95/111
358/597
297/257
196/260
179/227
106/186
Bay Dale Dr
13 Bellerive Dr
39/32
5/8
48/47
33/54
408/479
18/25
30/27
518/795
21/18
12/12
19/23
38/31
Pennington Ln S
14 Green Holly Dr
172/169
4/2
136/67
108/105
276/387
1/0
137/276
458/587
8/10
12/2
6/2
4/1
Broadneck Park Rd
15 Cape St Claire Rd
121/120
273/208
64/74
56/77
94/124
173/151
110/165
277/317
196/178
1/0
158/199
300/360
163/566
Cape St Claire Rd
College Parkway Operational and TSMO Study
2028 Future Summer AM/PM Peak Hour Volumes
July 2024
FIGURE 15
NOT TO SCALE
LEGEND
XX/XX AM/PM Peak Hour Traffic Volumes
Existing Traffic Control
Existing Roadway


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
1
2
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8
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10
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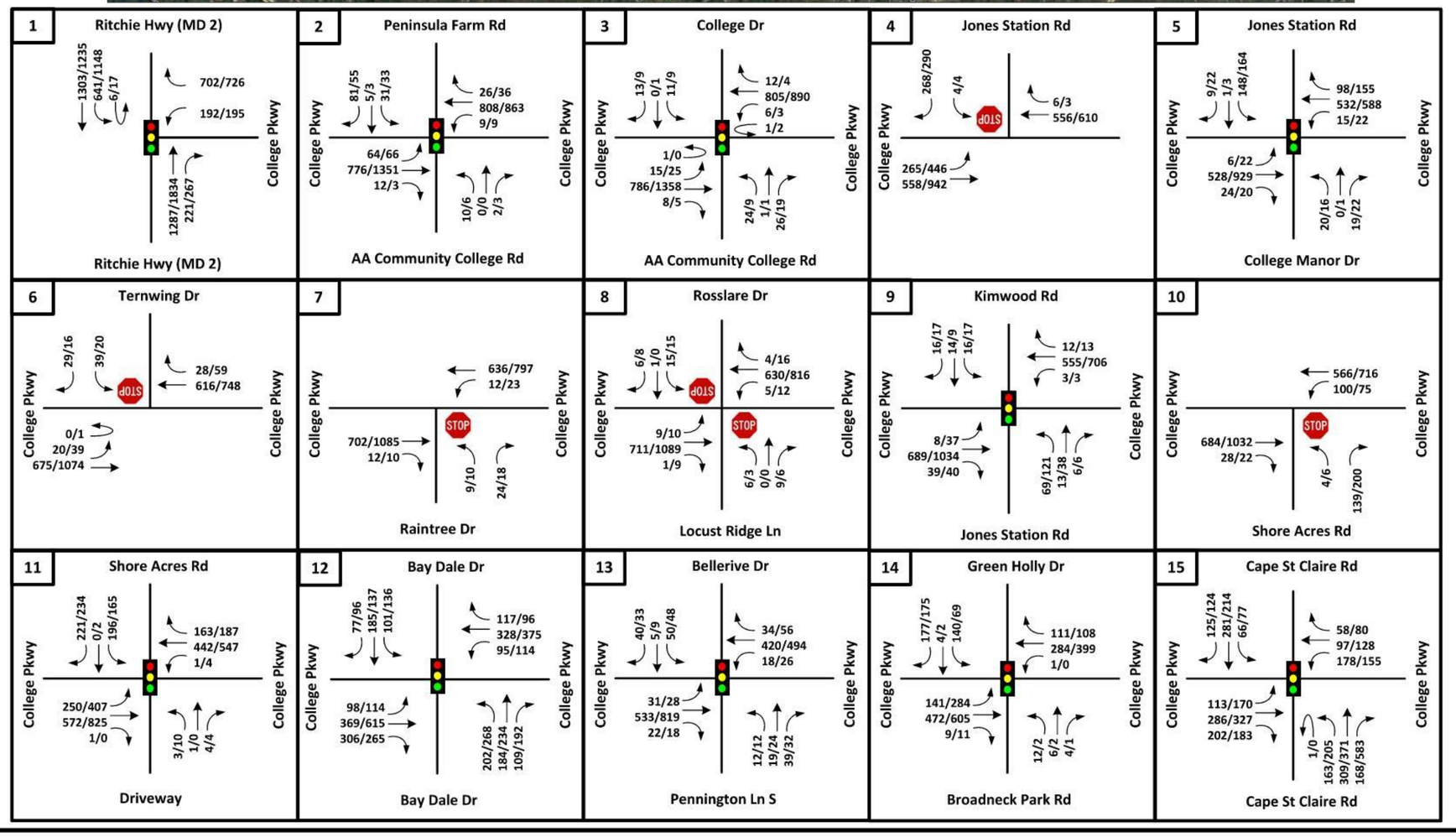
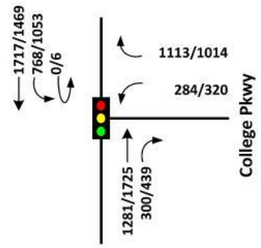
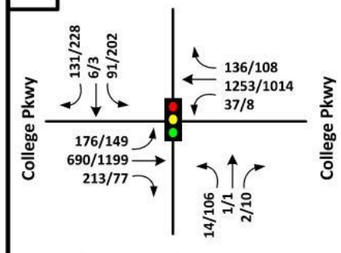
12
13
14
15


1 Ritchie Hwy (MD 2)
1303/1235
641/1148
6/17
702/726
192/195
1287/1834
221/267
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
81/55
5/3
31/33
26/36
808/863
9/9
64/66
776/1351
12/3
10/6
0/0
2/3
AA Community College Rd
3 College Dr
13/9
0/1
11/9
12/4
805/890
6/3
1/2
1/0
15/25
786/1358
8/5
24/9
1/1
26/19
AA Community College Rd
4 Jones Station Rd
268/290
4/4
STOP
6/3
556/610
265/446
558/942
5 Jones Station Rd
9/22
1/3
148/164
98/155
532/588
15/22
6/22
528/929
24/20
20/16
0/1
19/22
College Manor Dr
6 Ternwing Dr
29/16
39/20
28/59
616/748
0/1
20/39
675/1074
7 Raintree Dr
636/797
12/23
702/1085
12/10
9/10
24/18
8 Rosslare Dr
6/8
1/0
15/15
4/16
630/816
5/12
9/10
711/1089
1/9
6/3
0/0
9/6
Locust Ridge Ln
9 Kimwood Rd
16/17
14/9
16/17
12/13
555/706
3/3
8/37
689/1034
39/40
69/121
13/38
6/6
Jones Station Rd
10 Shore Acres Rd
566/716
100/75
684/1032
28/22
4/6
139/200
11 Shore Acres Rd
221/234
0/2
196/165
163/187
442/547
1/4
250/407
572/825
1/0
3/10
1/0
4/4
Driveway
12 Bay Dale Dr
77/96
185/137
101/136
117/96
328/375
95/114
98/114
369/615
306/265
202/268
184/234
109/192
Bay Dale Dr
13 Bellerive Dr
40/33
5/9
50/48
34/56
420/494
18/26
31/28
533/819
22/18
12/12
19/24
39/32
Pennington Ln S
14 Green Holly Dr
177/175
4/2
140/69
111/108
284/399
1/0
141/284
472/605
9/11
12/2
6/2
4/1
Broadneck Park Rd
15 Cape St Claire Rd
125/124
281/214
66/77
58/80
97/128
178/155
113/170
286/327
202/183
1/0
163/205
309/371
168/583
Cape St Claire Rd
College Parkway Operational and TSMO Study
2032 Future Summer AM/PM Peak Hour Volumes
July 2024
FIGURE 16
NOT TO SCALE
LEGEND
XX/XX AM/PM Peak Hour Traffic Volumes
Existing Traffic Control
Existing Roadway

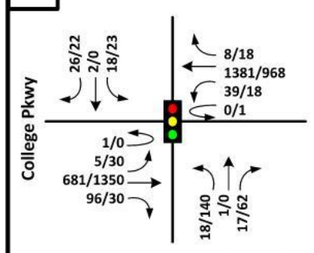
1 — Ritchie Hwy (MD 2)



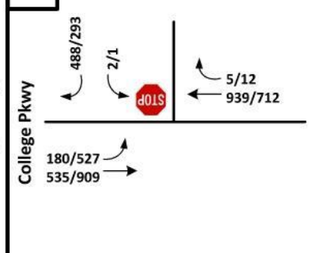
2 — Peninsula Farm Rd



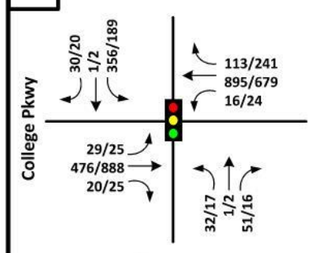
3 — College Dr



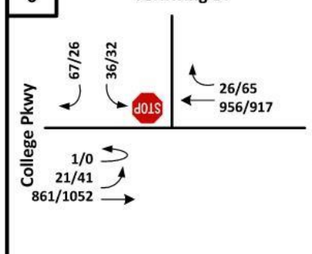
4 — Jones Station Rd



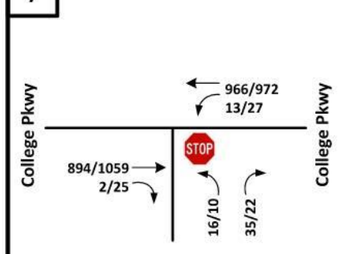
5 — Jones Station Rd



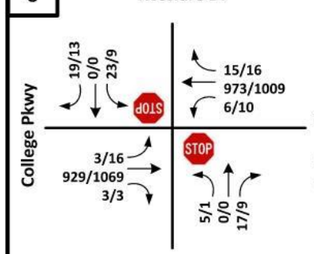
6 — Ternwing Dr



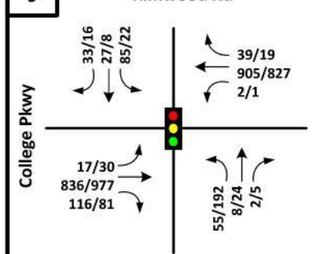
7



8 — Rosslare Dr



9 — Kimwood Rd



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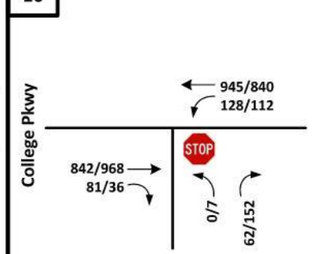
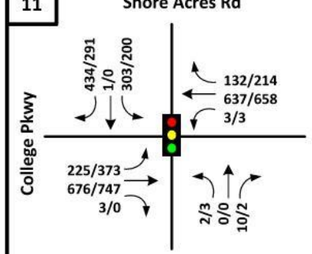
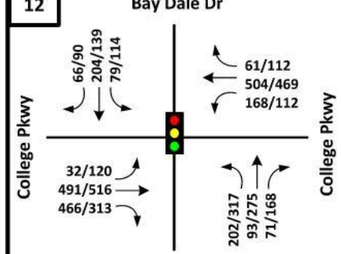


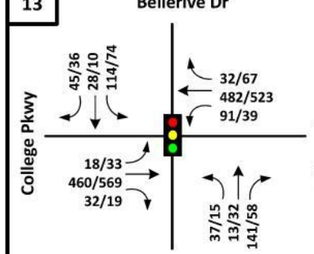
11 — Shore Acres Rd



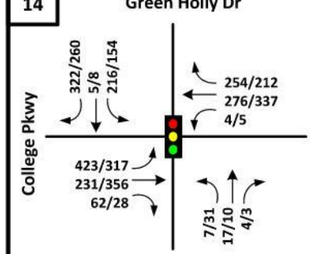
12 — Bay Dale Dr



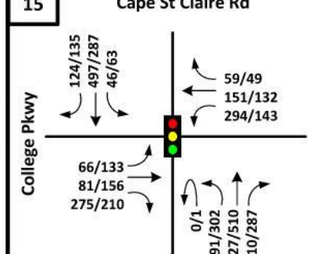
13 — Bellerive Dr



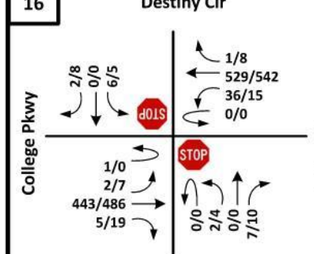
14 — Green Holly Dr



15 — Cape St Claire Rd



16 — Destiny Cir



College Parkway Operational and TSMO Study
2028 Future Fall AM/PM Peak Hour Volumes
July 2024
FIGURE 17

NOT TO SCALE

LEGEND
XX/XX AM/PM Peak Hour Traffic Volumes
Existing Traffic Control
Existing Roadway


1
2
3
4
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8
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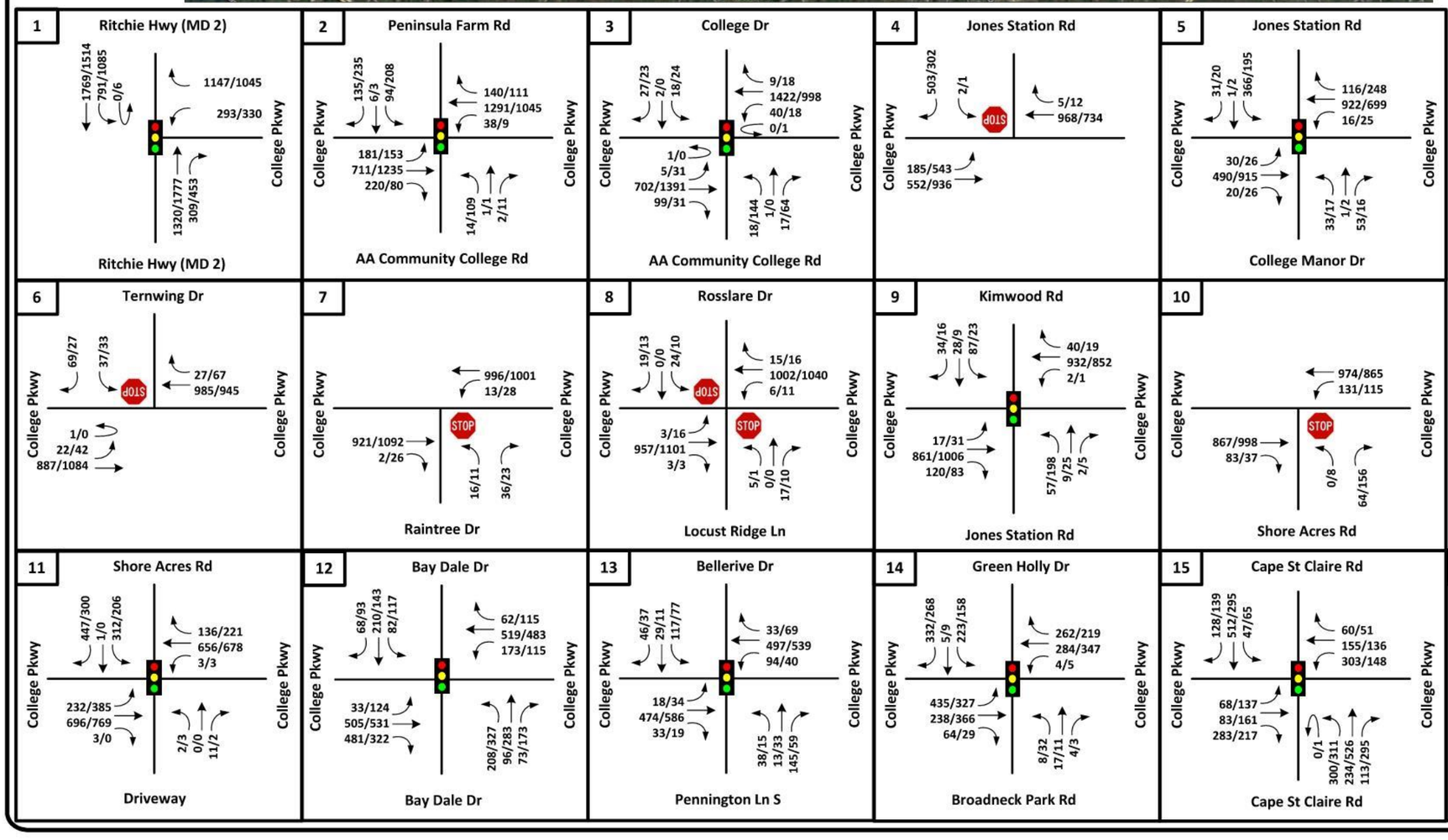
10
11
12
13
14
15
16
Anne Arundel Community College
Chesapeake
Bay Hills Golf Club
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa


1
Ritchie Hwy (MD 2)
1769/1514
791/1085
0/6
1147/1045
293/330
1320/1777
309/453
College Pkwy
Ritchie Hwy (MD 2)
2
Peninsula Farm Rd
135/235
6/3
94/208
140/111
1291/1045
38/9
181/153
711/1235
220/80
14/109
1/1
2/11
College Pkwy
AA Community College Rd
3
College Dr
27/23
2/0
18/24
9/18
1422/998
40/18
0/1
1/0
5/31
702/1391
99/31
18/144
1/0
17/64
College Pkwy
AA Community College Rd
4
Jones Station Rd
503/302
2/1
STOP
5/12
968/734
185/543
552/936
College Pkwy
5
Jones Station Rd
31/20
1/2
366/195
116/248
922/699
16/25
30/26
490/915
20/26
33/17
1/2
53/16
College Pkwy
College Manor Dr
6
Ternwing Dr
69/27
37/33
STOP
27/67
985/945
1/0
22/42
887/1084
College Pkwy
7
996/1001
13/28
921/1092
2/26
STOP
16/11
36/23
College Pkwy
Raintree Dr
8
Rosslare Dr
19/13
0/0
24/10
STOP
15/16
1002/1040
6/11
3/16
957/1101
3/3
STOP
5/1
0/0
17/10
College Pkwy
Locust Ridge Ln
9
Kimwood Rd
34/16
28/9
87/23
40/19
932/852
2/1
17/31
861/1006
120/83
57/198
9/25
2/5
College Pkwy
Jones Station Rd
10
974/865
131/115
867/998
83/37
STOP
0/8
64/156
College Pkwy
Shore Acres Rd
LEGEND
XX/XX AM/PM Peak Hour Traffic Volumes
Existing Traffic Control
Existing Roadway
11
Shore Acres Rd
447/300
1/0
312/206
136/221
656/678
3/3
232/385
696/769
3/0
2/3
0/0
11/2
College Pkwy
Driveway
12
Bay Dale Dr
68/93
210/143
82/117
62/115
519/483
173/115
33/124
505/531
481/322
208/327
96/283
73/173
College Pkwy
Bay Dale Dr
13
Bellerive Dr
46/37
29/11
117/77
33/69
497/539
94/40
18/34
474/586
33/19
38/15
13/33
145/59
College Pkwy
Pennington Ln S
14
Green Holly Dr
332/268
5/9
223/158
262/219
284/347
4/5
435/327
238/366
64/29
8/32
17/11
4/3
College Pkwy
Broadneck Park Rd
15
Cape St Claire Rd
128/139
512/295
47/65
60/51
155/136
303/148
68/137
83/161
283/217
0/1
300/311
234/526
113/295
College Pkwy
Cape St Claire Rd
16
Destiny Cir
2/9
0/0
6/5
STOP
1/9
545/558
37/15
0/0
STOP
1/0
2/8
457/501
5/19
0/0
2/4
0/0
8/11
College Pkwy
Broadneck Rd
College Parkway Operational and TSMO Study
2032 Future Fall AM/PM Peak Hour Volumes
July 2024
FIGURE 18
NOT TO SCALE
AMT

4.3. Operational Analyses

The Highway Capacity Manual (HCM; published by the *Transportation Research Board*) defines capacity as the maximum suitable flow rate at which vehicles reasonably can be expected to traverse a point during a specified time. Capacity uses the measure of efficiency, Level-of-Service (LOS), to describe the traffic performance at intersections. LOS is defined for the overall intersection delay for signalized intersections. As defined by the HCM and the *Anne Arundel County Design Manual* (Chapter III Roads and Streets; C. Traffic Studies; 2. Level of Service Study), an acceptable LOS for a signalized intersection is LOS D or better (i.e., A, B, C or D). At unsignalized intersections, the LOS is defined by the delay for the movements at the minor approaches that must yield right-of-way. It may be typical for stop-controlled minor streets to experience long delays during peak periods, while most of the traffic flows through the intersection on the major street travel unimpeded. The procedures outlined in the Highway Capacity Manual; 6th Edition were used as guidelines for the analysis of the study area intersections. This manual provides procedures for the analysis of both signalized and unsignalized intersections. LOS categories range from LOS "A" (best) to "F" (worst).

Level of Service	SIGNALIZED Intersection Delay (sec/veh)	UNSIGNALIZED Intersection Delay (sec/veh)	Intersection LOS Description
A	≤ 10.0	≤ 10.0	Free flow, insignificant delays.
B	10.1-20.0	10.1-15.0	Stable operation, minimal delays.
C	20.1-35.0	15.1-25.0	Stable operation, acceptable delays.
D	35.1-55.0	25.1-35.0	Restricted flow, common delays.
E	55.1-80.0	35.1-50.0	Maximum capacity, extended delays. Volumes at or near capacity. Long queues form upstream from intersection.
F	> 80.0	> 50.0	Forced flow, lengthy motorist delays. Represents jammed conditions. Intersection operates below capacity with low volumes. Queues may block upstream intersections.

Table 9: Level of Service Criteria

The LOS analysis for all traffic conditions was completed using Synchro/SimTraffic, version 11. The software package categorizes the LOS based on HCM methodology and criteria. According to industry standards, any approach of an unsignalized intersection is considered acceptable if the average delay is at LOS D or better with LOS A representing little or no delay. Any approach with a LOS of E or F is considered substandard and may need solutions to improve the operational performance. Any roundabout options were analyzed using Sidra Intersection 9. Measures of effectiveness include levels of service (LOS), delays, 95th percentile queues, and v/c (volume to capacity) ratios.

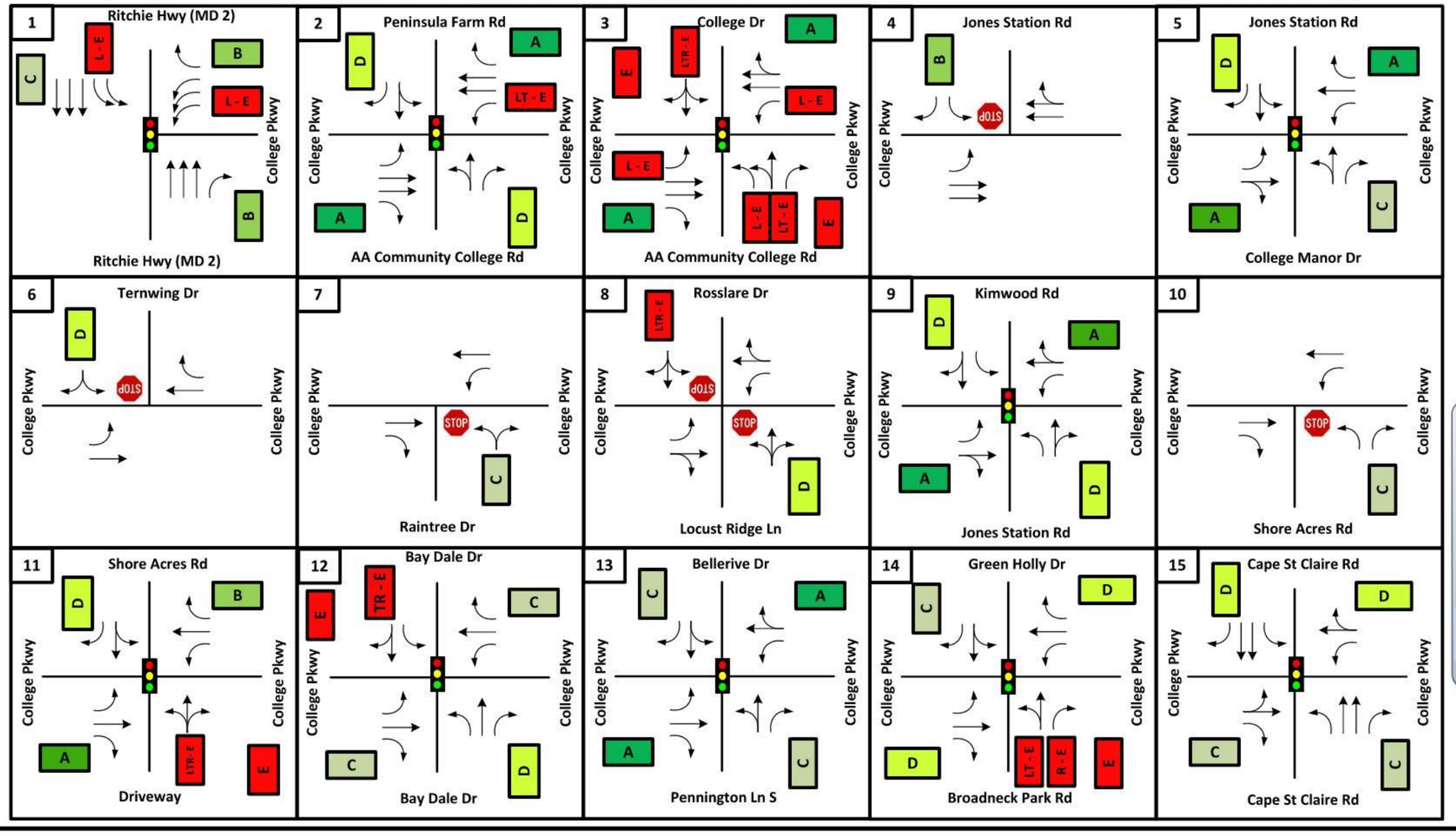
4.3.1 Existing (2022) Summer Conditions

The existing 2022 Summer peak hour conditions analyses are based on the existing roadway geometry and the 2022 AM and PM Summer peak hour volumes (shown on ***Figures 3 and 4a*** respectively). The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time is provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues for the SB lefts and WB lefts (AM peak) and the NB throughs and WB lefts (PM peak).
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time is provided to the WB lefts to access the AA Community College during both the AM and PM peak hours which results in unacceptable LOS "E" for the movement.
3. At College Drive / AA Community College (signal): More green time is provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for both College Drive and AA Community College access (AM and PM peaks), as well as the WB lefts (AM and PM peaks), and the EB lefts (AM peak only). The NB and SB movements operate under split phase, i.e., green phases are not concurrent for these movements. The NB approach has the green phase while the SB approach is stopped, followed by the SB approach having the green phase while the NB approach is stopped. This results in less green time provided for these approaches.
4. At Jones Station Road (stop): The SB approach out of Jones Station Road operates at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through approaches.
5. At Ternwing Drive (stop): The SB approach out of Ternwing Drive operates at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through approaches.
6. At Rosslare Drive / Locust Ridge Lane (stop): The SB approach out of Rosslare Drive operates at unacceptable LOS F during both the AM and PM peak hours, and the NB approach out of Locust Ridge Lane operates at unacceptable LOS F during the PM peak hour only due to insufficient gaps in the mainline College Parkway through approaches.
7. At Shore Acres Road (stop): The NB approach out of Shore Acres Road operates at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through approaches.
8. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive operates at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
9. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road operates at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
10. At Cape St Claire Road (MD 179) (signal): The EB shared through-left lane along College Parkway operates at unacceptable LOS E during the PM peak hour. In addition, the EB and WB College Parkway movements operate under spilt phasing, resulting in less green time for both movements compared to if the green times were concurrently phased.

The AM peak hour levels of service summary is shown on ***Figure 19a***; the PM peak hour levels of service summary is shown on ***Figure 19b***; the AM peak hour queue summary is shown on ***Figure 19c***; and the PM peak hour queue summary is shown on ***Figure 19d***.

The results of the operational analyses for existing (2022) Summer conditions are summarized in ***Table 10*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix D***.



College Parkway Operational and Safety Study

2022 Summer AM LOS Summary

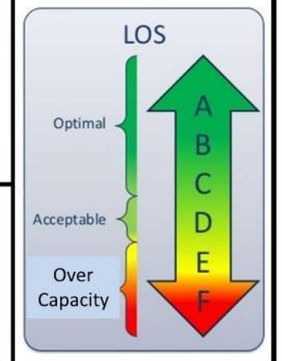
August 2024

FIGURE 19a

NOT TO SCALE

LEGEND

- Existing Traffic Control
- Existing Roadway
- Existing Laneage



AMT


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Waw
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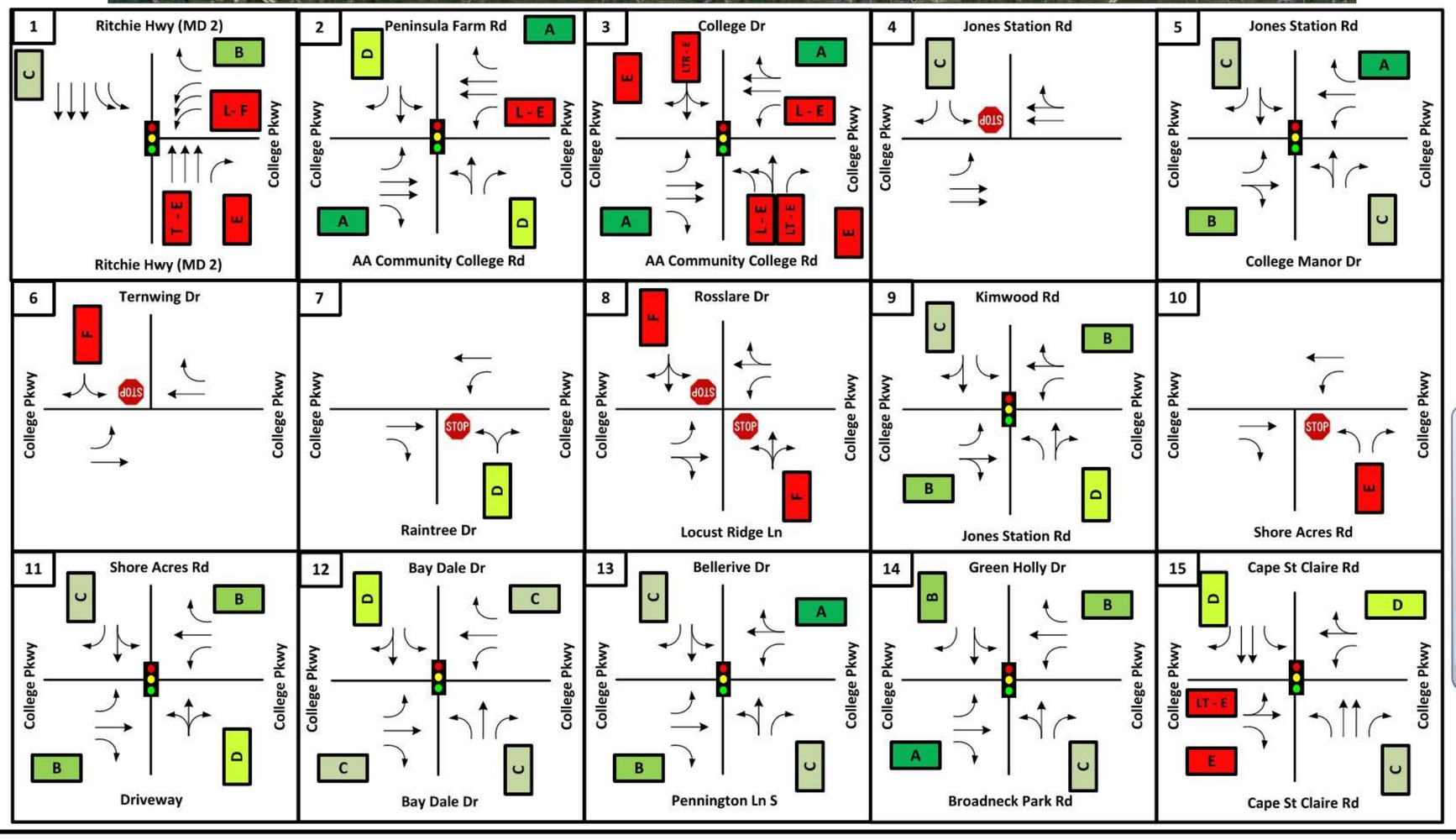
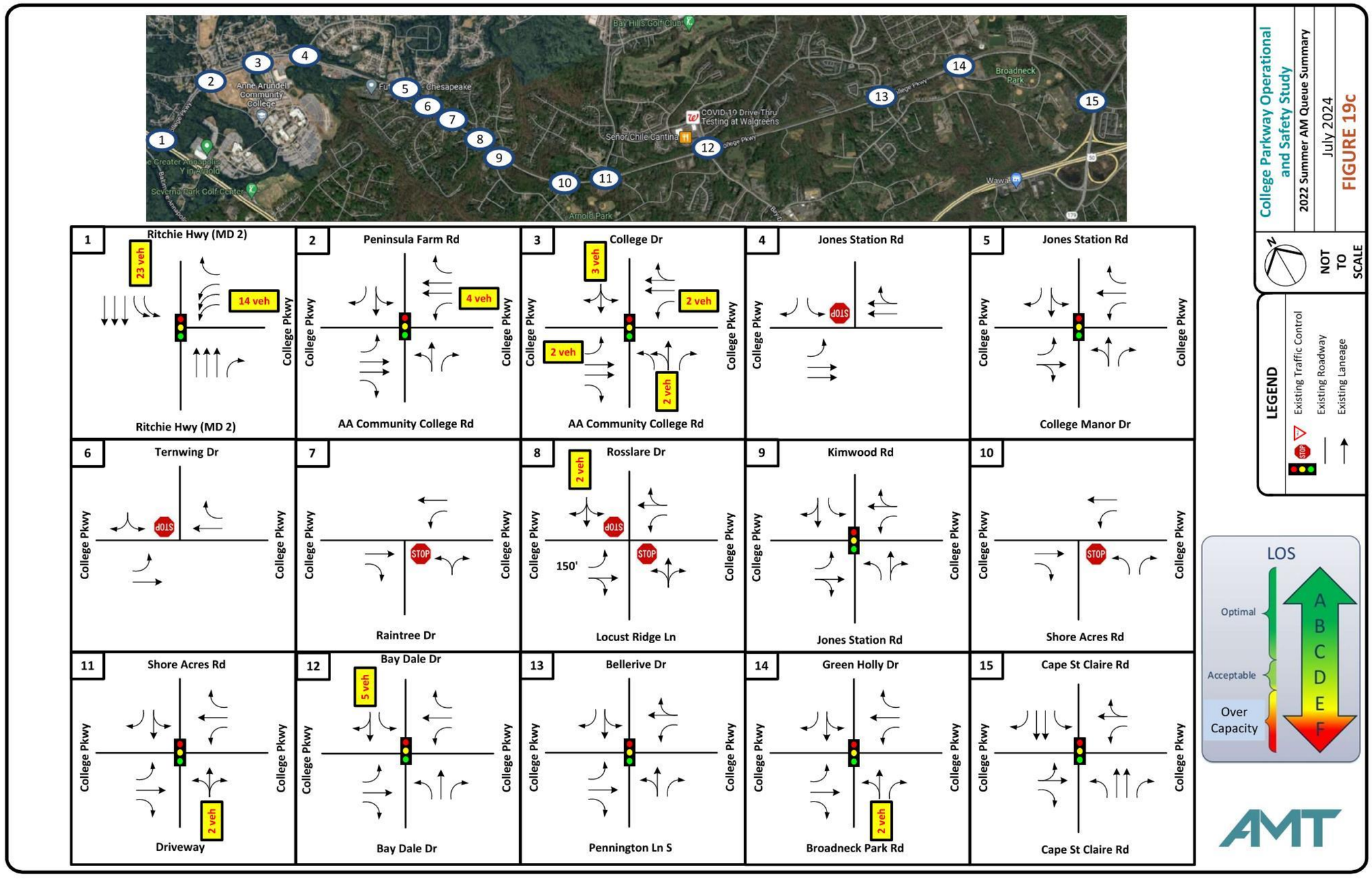
14
15


1 Ritchie Hwy (MD 2)
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
AA Community College Rd
3 College Dr
AA Community College Rd
4 Jones Station Rd
STOP
5 Jones Station Rd
College Manor Dr
6 Ternwing Dr
7
Raintree Dr
8 Rosslare Dr
Locust Ridge Ln
9 Kimwood Rd
Jones Station Rd
10
Shore Acres Rd
11 Shore Acres Rd
Driveway
12 Bay Dale Dr
Bay Dale Dr
13 Bellerive Dr
Pennington Ln S
14 Green Holly Dr
Broadneck Park Rd
15 Cape St Claire Rd
Cape St Claire Rd
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
NOT TO SCALE
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
College Parkway Operational and Safety Study
2022 Summer PM LOS Summary
August 2024
FIGURE 19b


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1 Ritchie Hwy (MD 2)
23 veh
14 veh
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
4 veh
AA Community College Rd
3 College Dr
3 veh
2 veh
2 veh
2 veh
AA Community College Rd
4 Jones Station Rd
STOP
5 Jones Station Rd
College Manor Dr
6 Ternwing Dr
STOP
7 Raintree Dr
STOP
8 Rosslare Dr
2 veh
STOP
150'
STOP
Locust Ridge Ln
9 Kimwood Rd
Jones Station Rd
10 Shore Acres Rd
STOP
Shore Acres Rd
11 Shore Acres Rd
2 veh
Driveway
12 Bay Dale Dr
5 veh
Bay Dale Dr
13 Bellerive Dr
Pennington Ln S
14 Green Holly Dr
2 veh
Broadneck Park Rd
15 Cape St Claire Rd
Cape St Claire Rd
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
NOT TO SCALE
LOS
Optimal
Acceptable
Over Capacity
A
B
C
D
E
F
College Parkway Operational and Safety Study
2022 Summer AM Queue Summary
July 2024
FIGURE 19c


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Waw
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2
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4
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6
7
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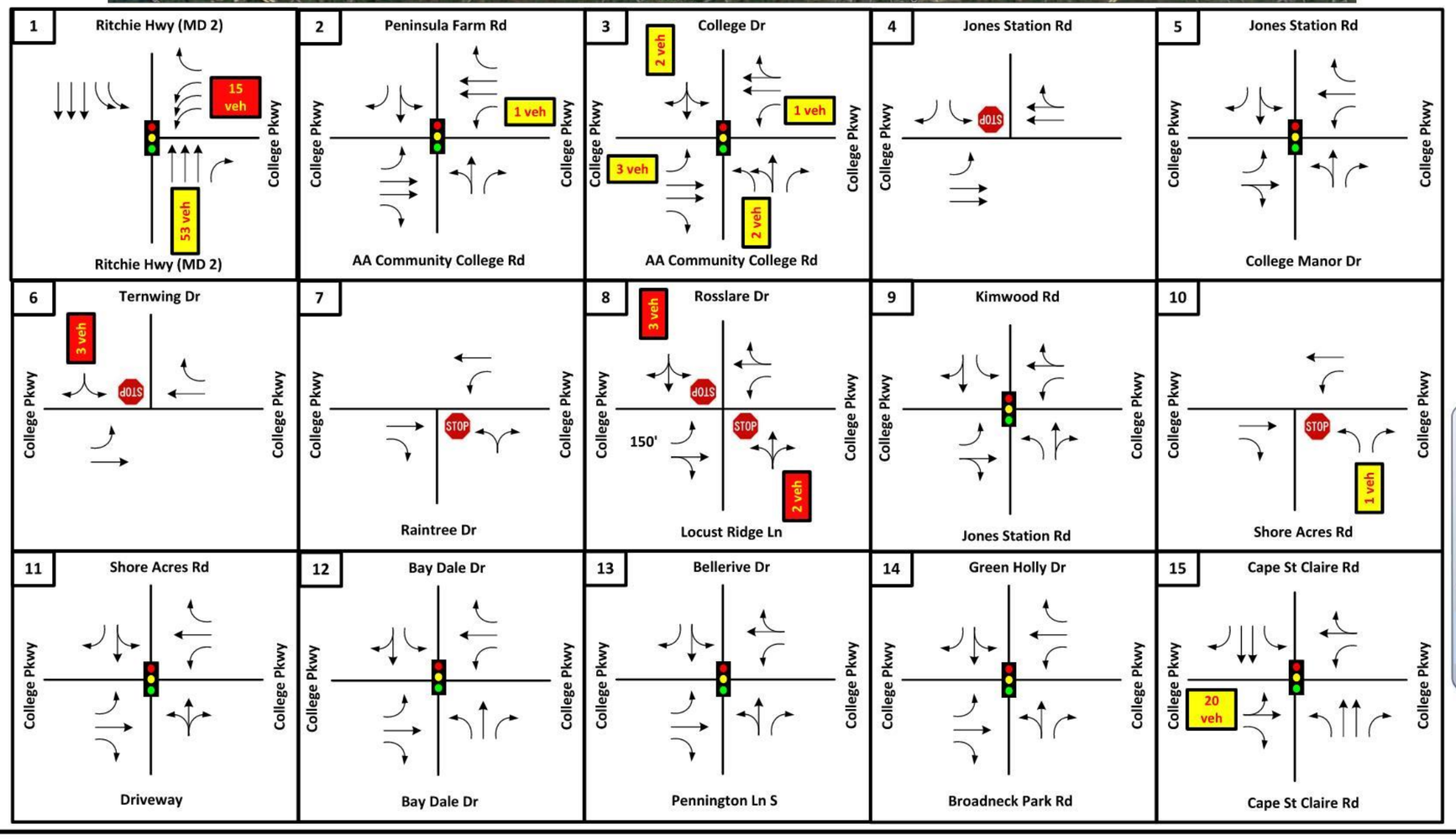
12
13
14
15


1 Ritchie Hwy (MD 2)
15 veh
53 veh
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
1 veh
AA Community College Rd
3 College Dr
2 veh
1 veh
3 veh
2 veh
4 Jones Station Rd
STOP
5 Jones Station Rd
College Manor Dr
6 Ternwing Dr
3 veh
7 Raintree Dr
8 Rosslare Dr
3 veh
150'
2 veh
Locust Ridge Ln
9 Kimwood Rd
Jones Station Rd
10 Shore Acres Rd
1 veh
11 Shore Acres Rd
Driveway
12 Bay Dale Dr
13 Bellerive Dr
Pennington Ln S
14 Green Holly Dr
Broadneck Park Rd
15 Cape St Claire Rd
20 veh
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
NOT TO SCALE
College Parkway Operational and Safety Study
2022 Summer PM Queue Summary
July 2024
FIGURE 19d
LOS
Optimal
Acceptable
Over Capacity
A
B
C
D
E
F

Intersection / Approach LOS (sec. delay/veh.)	Summer 2022	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**B (19.9)**	**D (37.1)**
Westbound Approach *(College Parkway)*	B (15.3)	B (18.4)
Northbound Approach *(Ritchie Hwy)*	B (19.4)	E (60.7)
Southbound Approach *(Ritchie Hwy)*	C (22.4)	C (23.7)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**A (9.4)**	**A (8.7)**
Eastbound Approach *(College Pkwy)*	A (6.9)	A (7.1)
Westbound Approach *(College Pkwy)*	A (5.9)	A (6.6)
Northbound Approach *(AACC Road)*	D (47.8)	D (48.6)
Southbound Approach *(Lake Wheeler Road)*	D (48.6)	D (50.1)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**A (8.6)**	**A (8.8)**
Eastbound Approach *(College Pkwy)*	A (5.8)	A (7.2)
Westbound Approach *(College Pkwy)*	A (7.0)	A (8.8)
Northbound Approach *(AACC Road)*	E (56.4)	E (56.0)
Southbound Approach *(College Dr)*	E (55.9)	E (60.0)
INTERSECTION 4 – College Pkwy & Jones Station Rd (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [9.7]	B [11.9]
Westbound Approach *(College Pkwy)*	-	-
Southbound Approach *(Jones Station Rd)*	B [13.2]	C [15.6]
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**B (12.0)**	**B (15.1)**
Eastbound Approach *(College Pkwy)*	A (7.4)	B (17.4)
Westbound Approach *(College Pkwy)*	A (6.8)	A (8.7)
Northbound Approach *(College Manor Dr)*	C (32.6)	C (22.7)
Southbound Approach *(Jones Station Rd)*	D (44.2)	C (27.9)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	A [8.8]	A [9.5]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	D [26.4]	F [160.4]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.0]	B [10.5]
Northbound Approach (Raintree Dr)	C [17.3]	D [33.2]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [8.9]	A [9.8]
Westbound Approach *(College Pkwy)*	A [9.1]	B [10.6]
Northbound Approach *(Locust Ridge Ln)*	D [25.7]	F [57.8]
Southbound Approach *(Rosslare Dr)*	E [35.5]	F [149.4]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**A (9.1)**	**B (16.8)**
Eastbound Approach *(College Pkwy)*	A (5.5)	B (17.1)
Westbound Approach *(College Pkwy)*	A (4.6)	B (10.7)
Northbound Approach *(Jones Station Rd)*	D (49.4)	D (38.0)
Southbound Approach *(Kimwood Rd)*	D (45.8)	C (29.8)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.4]	B [11.0]
Northbound Approach (Shore Acres Rd)	C [16.3]	E [42.6]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**B (17.9)**	**B (19.3)**
Eastbound Approach *(College Pkwy)*	A (8.9)	B (18.0)
Westbound Approach *(College Pkwy)*	B (12.0)	B (17.7)
Northbound Approach *(Driveway)*	E (59.2)	D (38.7)
Southbound Approach *(Shore Acres Rd)*	D (43.2)	C (26.0)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (36.9)**	**C (32.0)**
Eastbound Approach *(College Pkwy)*	C (23.1)	C (31.6)
Westbound Approach *(College Pkwy)*	C (22.5)	C (23.6)
Northbound Approach *(Bay Dale Dr)*	D (51.0)	C (34.4)
Southbound Approach *(Bay Dale Dr)*	E (68.4)	D (42.0)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**A (8.6)**	**B (10.7)**
Eastbound Approach *(College Pkwy)*	A (6.2)	B (10.5)
Westbound Approach *(College Pkwy)*	A (6.4)	A (7.0)
Northbound Approach *(Pennington Ln S)*	C (23.0)	C (25.3)
Southbound Approach *(Bellerive Dr)*	C (24.0)	C (26.1)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**D (37.3)**	**B (11.7)**
Eastbound Approach *(College Pkwy)*	D (39.9)	A (6.9)
Westbound Approach *(College Pkwy)*	D (45.0)	B (17.5)
Northbound Approach *(Broadneck Park Rd.)*	E (74.2)	C (29.1)
Southbound Approach *(Green Holly Dr.)*	C (20.3)	B (16.6)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**C (34.5)**	**D (43.1)**
Eastbound Approach *(College Pkwy)*	C (32.4)	E (60.6)
Westbound Approach *(College Pkwy)*	D (42.5)	D (44.8)
Northbound Approach *(Cape S. Clair Rd.)*	C (31.7)	C (33.5)
Southbound Approach *(Cape St. Claire Rd.)*	D (35.1)	D (39.4)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*		
Westbound Approach *(College Pkwy)*		
Northbound Approach *(Broadneck Rd)*		
Southbound Approach *(Destiny Cir)*		

Table 10: Intersection Level of Service Summary (Existing Summer Conditions)

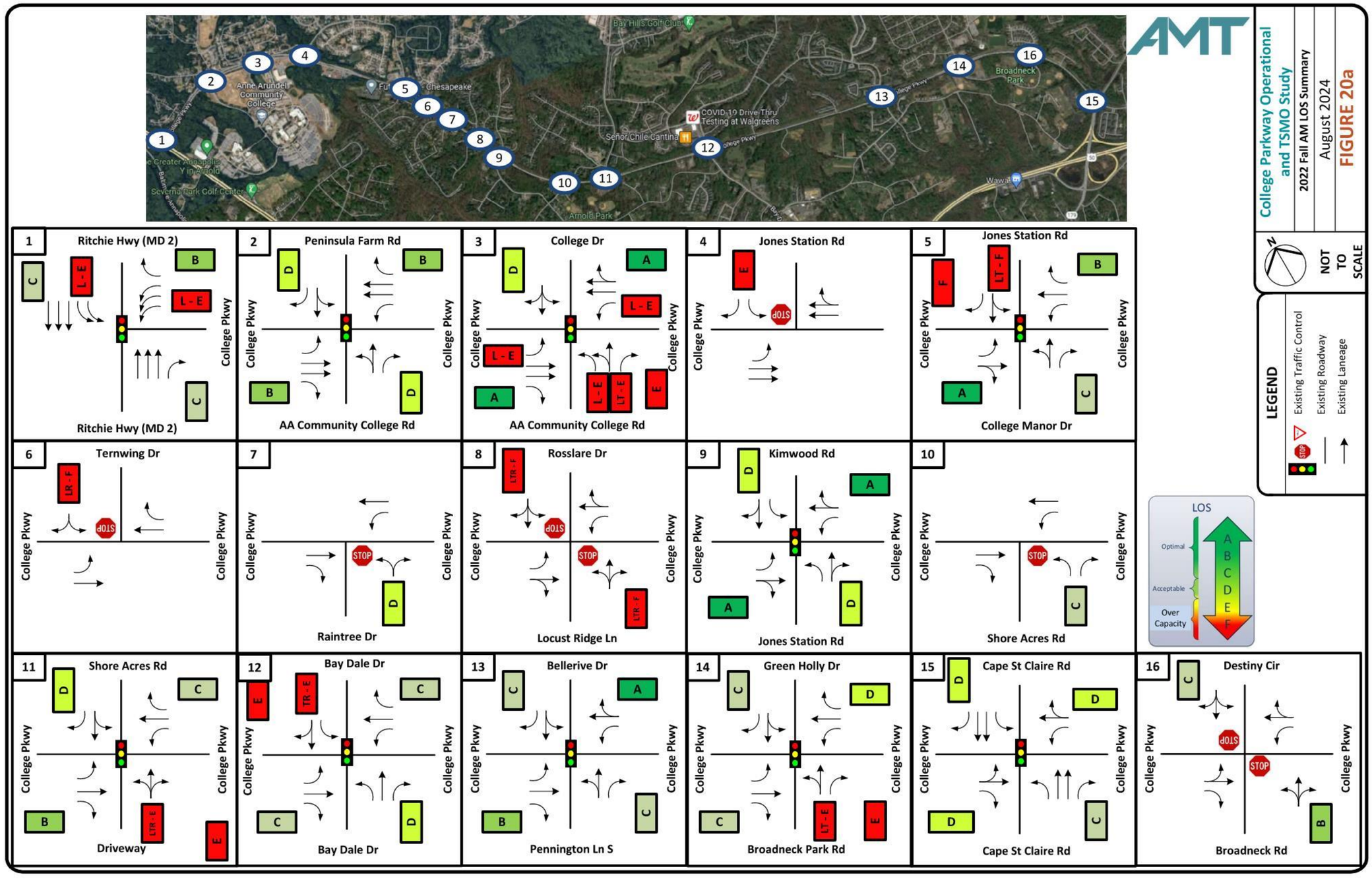
4.3.2 Existing (2022) Fall Conditions

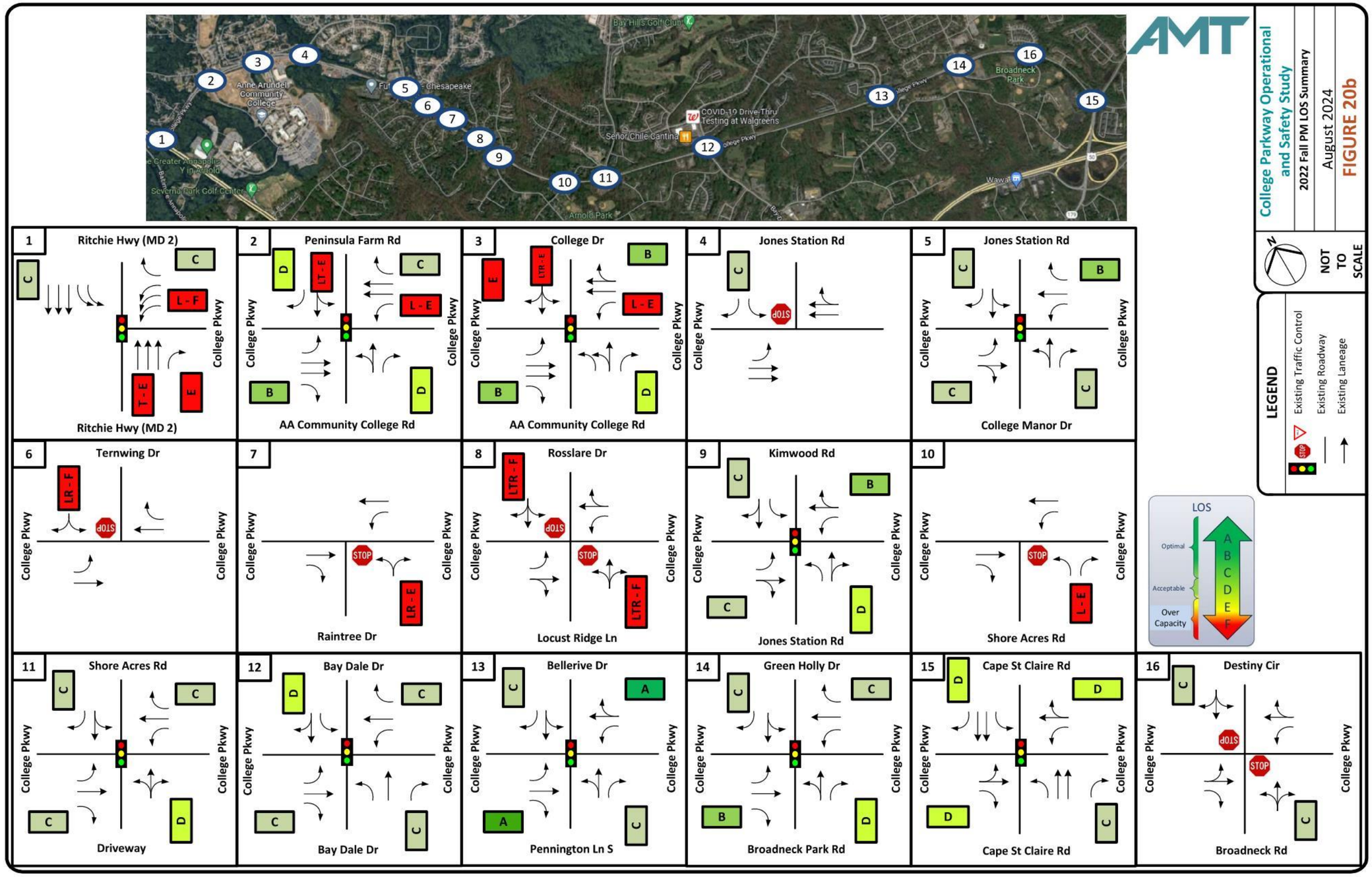
The existing 2022 Fall peak hour conditions analyses are based on the existing roadway geometry and the 2022 AM and PM Fall peak hour volumes (shown on ***Figures 3 and 4b*** respectively). The analyses indicate the following:

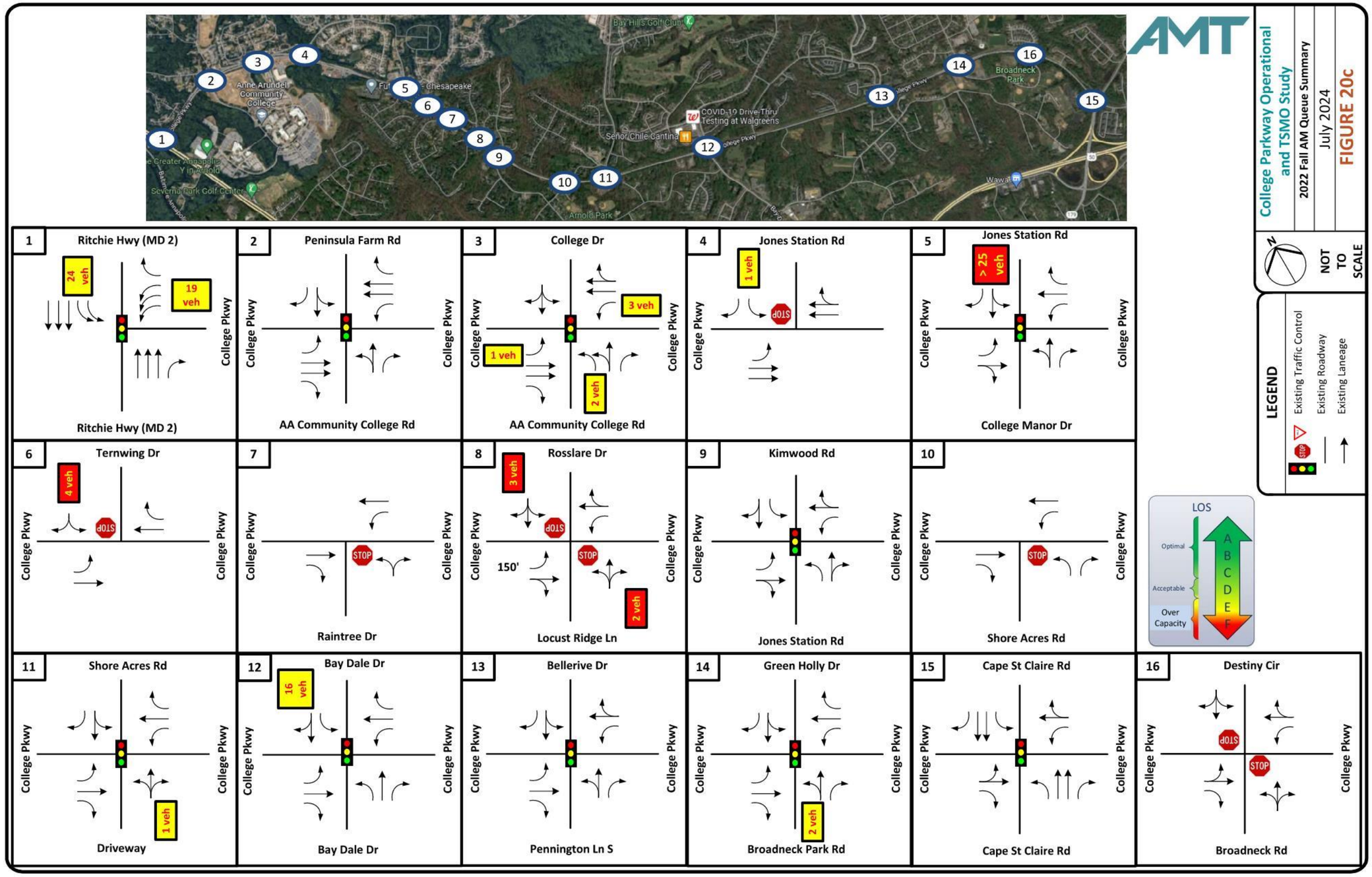
1. At MD 2 (Ritchie Highway) (signal): Insufficient green time is provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time is provided to the SB through/lefts and WB lefts to access the AA Community College during the PM peak hour, which results in unacceptable LOS "E" for both movements.
3. At College Drive / AA Community College (signal): The majority of the signal green time is provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for AA Community College access and the EB / WB lefts (AM peak), and for College Drive and the WB lefts (PM peak).
4. At Jones Station Road (stop): The SB approach out of Jones Station Road operates at unacceptable LOS E during the AM peak hour due to insufficient gaps in the mainline College Parkway through movements.
5. At Jones Station Road / College Manor Drive (signal): The SB movement out of Jones Station Road operates at unacceptable LOS F during the AM peak hour due to very high SB volumes operating with a permissive-only left turn phase.
6. At Ternwing Drive (stop): The SB approach out of Ternwing Drive operates at unacceptable LOS F during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
7. At Raintree Drive (stop): The NB approach out of Raintree Drive operates at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
8. At Rosslare Drive / Locust Ridge Lane (stop): The NB approach out of Locust Ridge Lane and the SB approach out of Rosslare Drive operate at unacceptable LOS F during both the AM and PM peak hours, due to insufficient gaps in the mainline College Parkway through movements.
9. At Shore Acres Road (stop): The NB approach out of Shore Acres Road operates at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
10. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive operates at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
11. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road operates at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.

The AM peak hour levels of service summary is shown on ***Figure 20a***; the PM peak hour levels of service summary is shown on ***Figure 20b***; the AM peak hour queue summary is shown on ***Figure 20c***; and the PM peak hour queue summary is shown on ***Figure 20d***.

The results of the operational analyses for existing (2022) Fall conditions are summarized in ***Table 11*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix D***.


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Waw
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
16 Destiny Cir
College Pkwy
Ritchie Hwy (MD 2)
AA Community College Rd
College Manor Dr
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
Driveway
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
Broadneck Rd
STOP
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
NOT TO SCALE
College Parkway Operational and TSMO Study
2022 Fall AM LOS Summary
August 2024
FIGURE 20a


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
16 Destiny Cir
College Pkwy
AA Community College Rd
Ritchie Hwy (MD 2)
College Manor Dr
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
Driveway
Bay Dale Dr
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
Broadneck Rd
STOP
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
NOT TO SCALE
College Parkway Operational and Safety Study
2022 Fall PM LOS Summary
August 2024
FIGURE 20b


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
College Pkwy
Broadneck Park
Severna Park Golf Center
Arnold Park
Waw
1 Ritchie Hwy (MD 2) — 24 veh — 19 veh — College Pkwy — Ritchie Hwy (MD 2)
2 Peninsula Farm Rd — College Pkwy — AA Community College Rd
3 College Dr — 3 veh — 1 veh — 2 veh — AA Community College Rd
4 Jones Station Rd — 1 veh — STOP
5 Jones Station Rd — > 25 veh — College Manor Dr
6 Ternwing Dr — 4 veh — STOP
7 — STOP — Raintree Dr
8 Rosslare Dr — 3 veh — STOP — 150' — 2 veh — Locust Ridge Ln
9 Kimwood Rd — Jones Station Rd
10 — STOP — Shore Acres Rd
11 Shore Acres Rd — 1 veh — Driveway
12 Bay Dale Dr — 16 veh — Bay Dale Dr
13 Bellerive Dr — Pennington Ln S
14 Green Holly Dr — 2 veh — Broadneck Park Rd
15 Cape St Claire Rd — Cape St Claire Rd
16 Destiny Cir — STOP — Broadneck Rd
LOS — Optimal — Acceptable — Over Capacity — A B C D E F
LEGEND — Existing Traffic Control — Existing Roadway — Existing Laneage
NOT TO SCALE
College Parkway Operational and TSMO Study
2022 Fall AM Queue Summary
July 2024
FIGURE 20c


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
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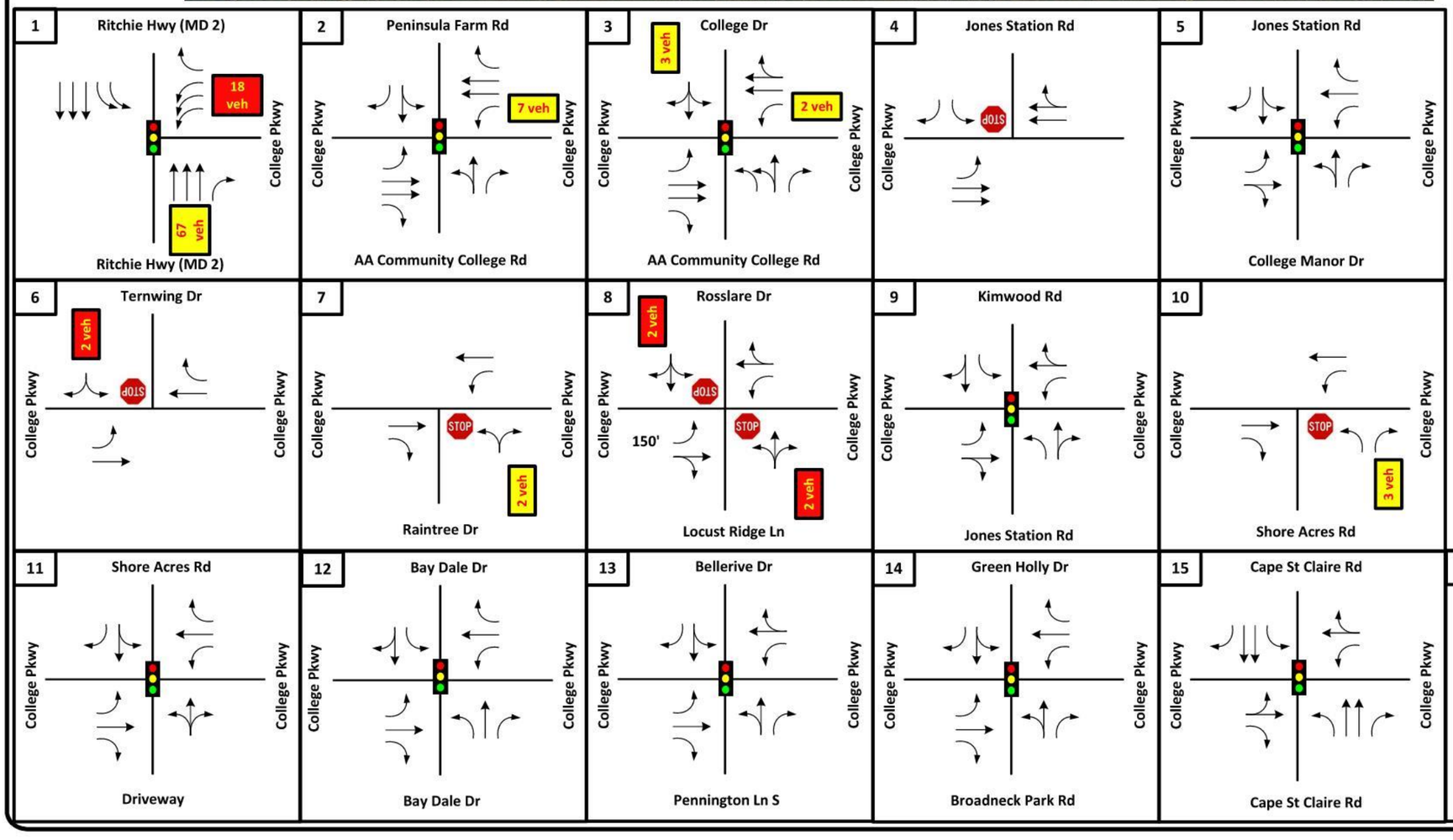
16


1 Ritchie Hwy (MD 2)
18 veh
67 veh
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
7 veh
AA Community College Rd
3 College Dr
3 veh
2 veh
4 Jones Station Rd
STOP
5 Jones Station Rd
College Manor Dr
6 Ternwing Dr
2 veh
7 Raintree Dr
8 Rosslare Dr
150'
Locust Ridge Ln
9 Kimwood Rd
Jones Station Rd
10 Shore Acres Rd
3 veh
11 Shore Acres Rd
Driveway
12 Bay Dale Dr
13 Bellerive Dr
Pennington Ln S
14 Green Holly Dr
Broadneck Park Rd
15 Cape St Claire Rd
16 Destiny Cir
Broadneck Rd
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
NOT TO SCALE
College Parkway Operational and Safety Study
2022 Fall PM Queue Summary
July 2024
FIGURE 20d

Intersection / Approach LOS (sec. delay/veh.)	Fall 2022	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (20.9)**	**C (34.9)**
Westbound Approach *(College Parkway)*	B (15.9)	C (21.5)
Northbound Approach *(Ritchie Hwy)*	C (25.4)	E (57.5)
Southbound Approach *(Ritchie Hwy)*	C (20.9)	C (22.7)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**B (17.1)**	**C (23.7)**
Eastbound Approach *(College Pkwy)*	B (13.4)	B (16.4)
Westbound Approach *(College Pkwy)*	B (15.1)	C (20.0)
Northbound Approach *(AACC Road)*	D (42.1)	D (48.9)
Southbound Approach *(Lake Wheeler Road)*	D (45.1)	D (50.2)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**B (10.3)**	**B (17.2)**
Eastbound Approach *(College Pkwy)*	A (7.0)	B (13.5)
Westbound Approach *(College Pkwy)*	A (9.5)	B (13.5)
Northbound Approach *(AACC Road)*	E (56.4)	D (52.7)
Southbound Approach *(College Dr)*	D (54.9)	E (55.9)
INTERSECTION 4 – College Pkwy & Jones Station Rd (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [11.7]	C [16.1]
Westbound Approach *(College Pkwy)*	-	-
Southbound Approach *(Jones Station Rd)*	E [49.1]	C [17.0]
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**E (66.3)**	**B (16.9)**
Eastbound Approach *(College Pkwy)*	A (8.4)	C (20.5)
Westbound Approach *(College Pkwy)*	B (14.5)	B (10.8)
Northbound Approach *(College Manor Dr)*	C (33.4)	C (20.9)
Southbound Approach *(Jones Station Rd)*	F (289.0)	C (27.4)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	B [10.2]	B [10.4]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	F [81.3]	F [726.7]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.8]	B [10.6]
Northbound Approach (Raintree Dr)	D [34.4]	E [41.7]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [11.4]	B [11.8]
Westbound Approach *(College Pkwy)*	B [10.1]	B [10.6]
Northbound Approach *(Locust Ridge Ln)*	F [76.2]	F [54.4]
Southbound Approach *(Rosslare Dr)*	F [370.2]	F [342.6]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**B (12.7)**	**C (23.4)**
Eastbound Approach *(College Pkwy)*	A (8.5)	C (24.1)
Westbound Approach *(College Pkwy)*	A (9.0)	B (16.5)
Northbound Approach *(Jones Station Rd)*	D (47.2)	D (44.9)
Southbound Approach *(Kimwood Rd)*	D (49.2)	C (29.3)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [10.8]	B [11.3]
Northbound Approach (Shore Acres Rd)	C [16.6]	E [36.3]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**C (24.8)**	**C (23.0)**
Eastbound Approach *(College Pkwy)*	B (15.7)	C (23.4)
Westbound Approach *(College Pkwy)*	C (20.1)	C (20.1)
Northbound Approach *(Driveway)*	E (57.1)	D (42.0)
Southbound Approach *(Shore Acres Rd)*	D (40.4)	C (27.1)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (37.7)**	**C (32.0)**
Eastbound Approach *(College Pkwy)*	C (31.5)	C (30.3)
Westbound Approach *(College Pkwy)*	C (25.8)	C (29.2)
Northbound Approach *(Bay Dale Dr)*	D (48.2)	C (32.2)
Southbound Approach *(Bay Dale Dr)*	E (69.3)	D (41.9)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**B (13.9)**	**B (11.0)**
Eastbound Approach *(College Pkwy)*	B (10.9)	A (8.8)
Westbound Approach *(College Pkwy)*	A (8.6)	A (9.1)
Northbound Approach *(Pennington Ln S)*	C (23.5)	C (21.7)
Southbound Approach *(Bellerive Dr)*	C (29.2)	C (22.9)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**C (31.7)**	**B (18.6)**
Eastbound Approach *(College Pkwy)*	C (22.7)	B (11.3)
Westbound Approach *(College Pkwy)*	D (45.0)	C (23.1)
Northbound Approach *(Broadneck Park Rd.)*	E (74.7)	D (39.9)
Southbound Approach *(Green Holly Dr.)*	C (28.2)	C (22.4)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (38.2)**	**D (36.6)**
Eastbound Approach *(College Pkwy)*	D (42.2)	D (40.4)
Westbound Approach *(College Pkwy)*	D (43.0)	D (45.6)
Northbound Approach *(Cape S. Clair Rd.)*	C (32.8)	C (30.9)
Southbound Approach *(Cape St. Claire Rd.)*	D (37.2)	D (39.4)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [0.1]	A [0.2]
Westbound Approach *(College Pkwy)*	A [0.9]	A [0.4]
Northbound Approach *(Broadneck Rd)*	B [13.9]	C [15.5]
Southbound Approach *(Destiny Cir)*	C [22.5]	C [17.3]

Table 11: Intersection Level of Service Summary (Existing Fall Conditions)

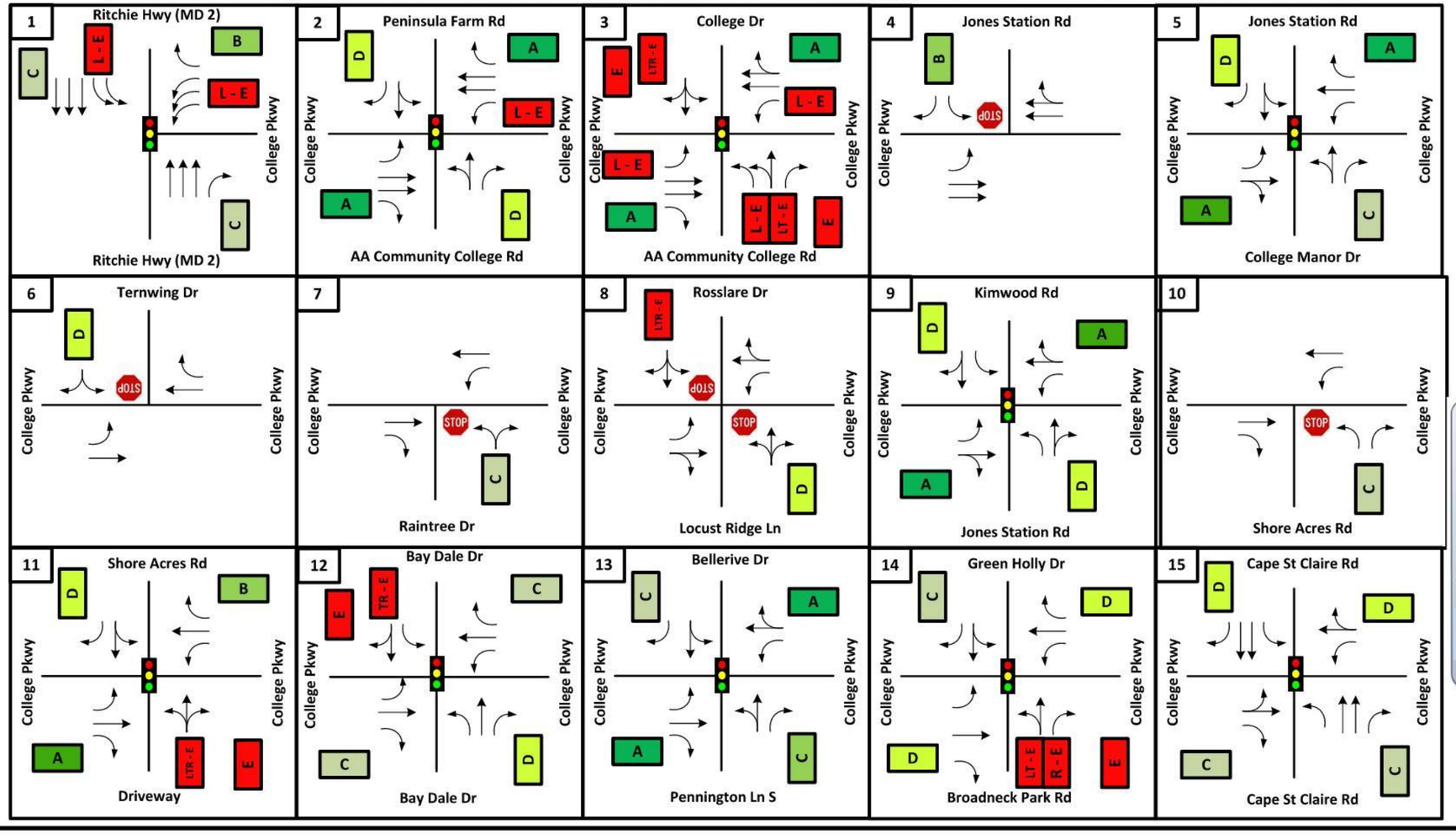
4.3.3 No-Build (2028) Summer Conditions

The no-build 2028 Summer peak hour conditions analyses are based on the existing roadway geometry (assuming no proposed improvements) and the 2028 AM and PM Summer peak hour volumes (shown on ***Figures 3 and 15*** respectively). The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time will continue to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time will continue to be provided to the WB lefts to access the AA Community College during both the AM and PM peak hours resulting in unacceptable LOS "E" for the movement.
3. At College Drive / AA Community College (signal): The majority of the signal green time will continue to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for both College Drive and AA Community College access (AM and PM peaks), as well as the WB lefts (AM and PM peaks), and the EB lefts (AM peak only).
4. At Ternwing Drive (stop): The SB approach out of Ternwing Drive will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
5. At Raintree Drive (stop): The NB movement out of Raintree Drive, which operated acceptably under existing summer conditions, will now operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
6. At Rosslare Drive / Locust Ridge Lane (stop): The SB approach out of Rosslare Drive will continue to operate at unacceptable LOS E and F during both the AM and PM peak hours, and the NB approach out of Locust Ridge Lane will continue to operate at unacceptable LOS F during the PM peak hour only due to insufficient gaps in the mainline College Parkway through movements.
7. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
8. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
9. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
10. At Cape St Claire Road (MD 179) (signal): The EB shared through-left lane along College Parkway will now operate at unacceptable LOS F (from a LOS E) during the PM peak hour. In addition, the EB and WB College Parkway movements operate under spilt phasing, resulting in less green time for both movements compared to if the green times were concurrently phased.

The AM peak hour levels of service summary is shown on ***Figure 21a*** and the PM peak hour levels of service summary is shown on ***Figure 21b***.

The results of the operational analyses for No-Build (2028) Summer conditions are summarized in ***Table 12*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix E***.



College Parkway Operational and Safety Study

2028 Summer No-Build AM LOS Summary

August 2024

FIGURE 21a

NOT TO SCALE

LEGEND

Existing Traffic Control

Existing Roadway

Existing Laneage

LOS

Optimal

Acceptable

Over Capacity

A B C D E F

AMT


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
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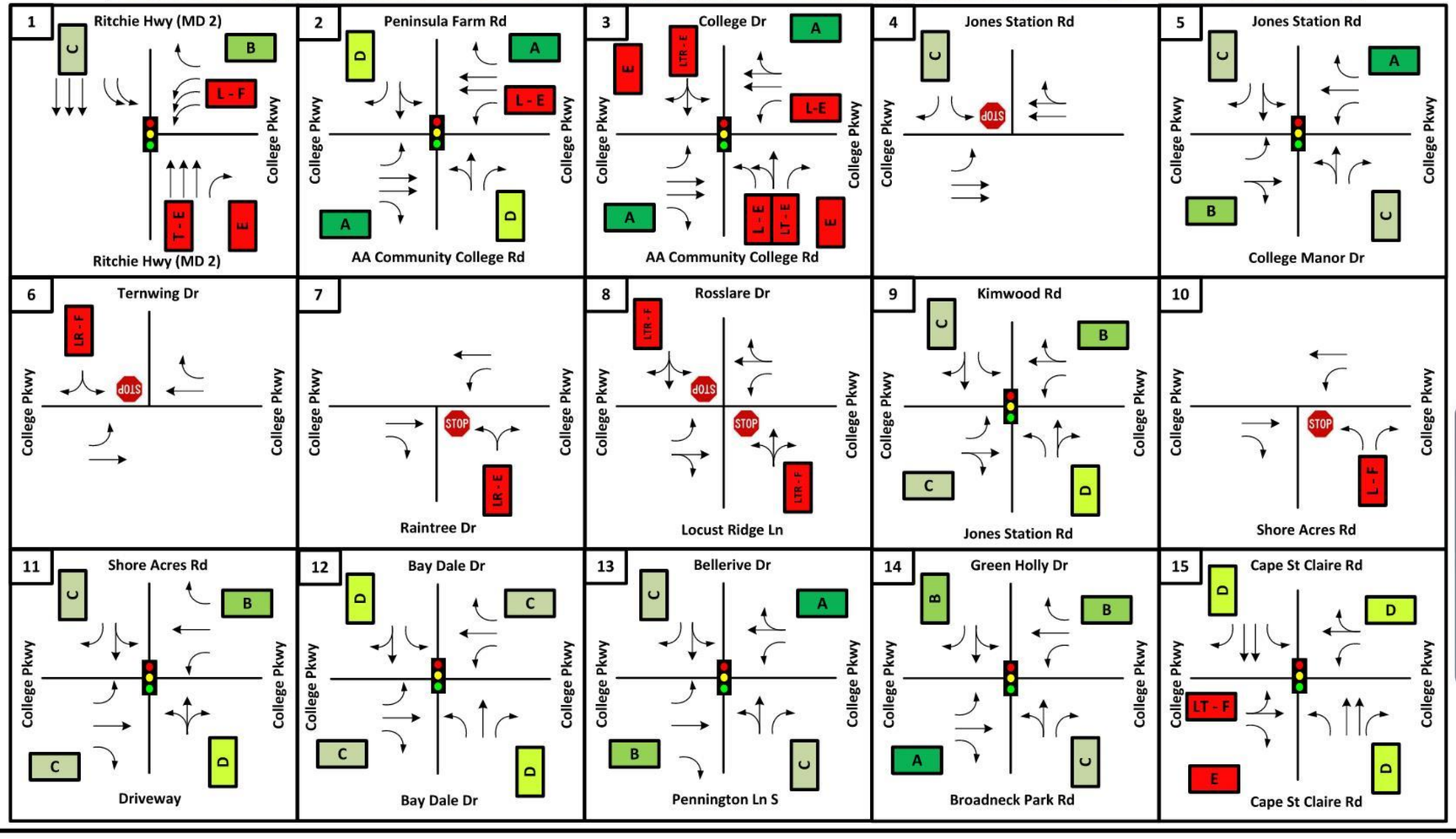
1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
College Pkwy
Ritchie Hwy (MD 2)
AA Community College Rd
College Manor Dr
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
Driveway
Bay Dale Dr
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
STOP
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
College Parkway Operational and Safety Study
2028 Summer No-Build PM LOS Summary
August 2024
FIGURE 21b
NOT TO SCALE

Intersection / Approach LOS (sec. delay/veh.)	Future No-Build Summer 2028	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (20.3)**	**D (39.9)**
Westbound Approach *(College Parkway)*	B (15.4)	B (18.4)
Northbound Approach *(Ritchie Hwy)*	C (20.7)	E (66.7)
Southbound Approach *(Ritchie Hwy)*	C (22.2)	C (24.7)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**A (9.4)**	**A (8.9)**
Eastbound Approach *(College Pkwy)*	A (6.9)	A (7.4)
Westbound Approach *(College Pkwy)*	A (6.1)	A (6.8)
Northbound Approach *(AACC Road)*	D (47.7)	D (48.5)
Southbound Approach *(Lake Wheeler Road)*	D (48.5)	D (50.0)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**A (8.7)**	**A (9.0)**
Eastbound Approach *(College Pkwy)*	A (5.9)	A (7.4)
Westbound Approach *(College Pkwy)*	A (7.1)	A (9.0)
Northbound Approach *(AACC Road)*	E (56.4)	E (56.0)
Southbound Approach *(College Dr)*	E (55.9)	E (60.0)
INTERSECTION 4 – College Pkwy & Jones Station Rd (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [10.0]	B [12.5]
Westbound Approach *(College Pkwy)*	-	
Southbound Approach *(Jones Station Rd)*	B [13.7]	C [16.7]
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**B (12.5)**	**B (16.4)**
Eastbound Approach *(College Pkwy)*	A (8.2)	B (19.4)
Westbound Approach *(College Pkwy)*	A (7.1)	A (8.9)
Northbound Approach *(College Manor Dr)*	C (32.6)	C (23.4)
Southbound Approach *(Jones Station Rd)*	D (45.5)	C (29.4)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	A [8.9]	A [9.6]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	D [30.1]	F [321.7]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.1]	B [10.8]
Northbound Approach (Raintree Dr)	C [18.1]	E [36.6]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [9.1]	B [10.1]
Westbound Approach *(College Pkwy)*	A [9.2]	B [10.8]
Northbound Approach *(Locust Ridge Ln)*	D [28.2]	F [73.4]
Southbound Approach *(Rosslare Dr)*	E [41.0]	F [235.7]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**A (9.4)**	**B (19.3)**
Eastbound Approach *(College Pkwy)*	A (5.8)	C (21.2)
Westbound Approach *(College Pkwy)*	A (4.8)	B (11.7)
Northbound Approach *(Jones Station Rd)*	D (49.6)	D (38.0)
Southbound Approach *(Kimwood Rd)*	D (45.7)	C (29.5)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.6]	B [11.3]
Northbound Approach (Shore Acres Rd)	C [17.2]	F [53.7]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**B (18.2)**	**C (21.5)**
Eastbound Approach *(College Pkwy)*	A (9.4)	C (21.8)
Westbound Approach *(College Pkwy)*	B (12.5)	B (18.4)
Northbound Approach *(Driveway)*	E (59.2)	D (39.4)
Southbound Approach *(Shore Acres Rd)*	D (43.0)	C (26.3)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (37.5)**	**C (34.0)**
Eastbound Approach *(College Pkwy)*	C (24.5)	C (33.7)
Westbound Approach *(College Pkwy)*	C (24.0)	C (24.7)
Northbound Approach *(Bay Dale Dr)*	D (50.2)	D (36.5)
Southbound Approach *(Bay Dale Dr)*	E (67.9)	D (45.2)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**A (9.5)**	**B (11.1)**
Eastbound Approach *(College Pkwy)*	A (7.4)	B (10.9)
Westbound Approach *(College Pkwy)*	A (7.5)	A (7.1)
Northbound Approach *(Pennington Ln S)*	C (22.1)	C (26.1)
Southbound Approach *(Bellerive Dr)*	C (22.8)	C (26.9)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**D (36.4)**	**B (11.9)**
Eastbound Approach *(College Pkwy)*	D (38.2)	A (7.0)
Westbound Approach *(College Pkwy)*	D (43.2)	B (17.7)
Northbound Approach *(Broadneck Park Rd.)*	E (74.2)	C (30.4)
Southbound Approach *(Green Holly Dr.)*	C (21.9)	B (17.4)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (35.3)**	**D (46.4)**
Eastbound Approach *(College Pkwy)*	C (34.1)	E (70.2)
Westbound Approach *(College Pkwy)*	D (42.9)	D (44.6)
Northbound Approach *(Cape S. Clair Rd.)*	C (32.1)	D (35.5)
Southbound Approach *(Cape St. Claire Rd.)*	D (35.8)	D (39.6)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*		
Westbound Approach *(College Pkwy)*		
Northbound Approach *(Broadneck Rd)*		
Southbound Approach *(Destiny Cir)*		

Table 12: Intersection Level of Service Summary (No-Build 2028 Summer Conditions)

4.3.4 No-Build (2028) Fall Conditions

The no-build 2028 Fall peak hour conditions analyses are based on the existing roadway geometry (assuming no proposed improvements) and the 2028 AM and PM Fall peak hour volumes (shown on ***Figures 3 and 17*** respectively). The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time continues to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time continues to be provided to the WB lefts to access the AA Community College during the PM peak hour. In addition, the SB shared through-left lane out of Peninsula Farm Road will now operate at LOS E during the PM peak hour, resulting in unacceptable LOS "E" for both movements.
3. At College Drive / AA Community College (signal): The majority of the signal green time continues to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for AA Community College access and the EB / WB lefts (AM peak), and for College Drive and the WB lefts (PM peak).
4. At Jones Station Road (stop): The SB approach out of Jones Station Road will now operate at unacceptable LOS F (from a LOS E) during the AM peak hour due to insufficient gaps in the mainline College Parkway through movements.
5. At Jones Station Road / College Manor Drive (signal): The SB movement out of Jones Station Road will continue to operate at unacceptable LOS F during the AM peak hour due to very high SB volumes operating with a permissive-only left turn phase.
6. At Ternwing Drive (stop): The SB approach out of Ternwing Drive will continue to operate at unacceptable LOS F during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
7. At Raintree Drive (stop): The NB movement out of Raintree Drive will now operate at unacceptable LOS E during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
8. At Rosslare Drive / Locust Ridge Lane (stop): The NB approach out of Locust Ridge Lane and the SB approach out of Rosslare Drive continue to operate at unacceptable LOS F during both the AM and PM peak hours, due to insufficient gaps in the mainline College Parkway through movements.
9. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will now operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
10. At Shore Acres Road / driveway (signal): The EB lefts into Shore Acres Road will now operate at unacceptable LOS E during the PM peak hour due to insufficient green time provided for that phase.
11. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
12. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.

The AM peak hour levels of service summary is shown on ***Figure 22a*** and the PM peak hour levels of service summary is shown on ***Figure 22b***.

The results of the operational analyses for No-Build (2028) Fall conditions are summarized in ***Table 13*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix E***.


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
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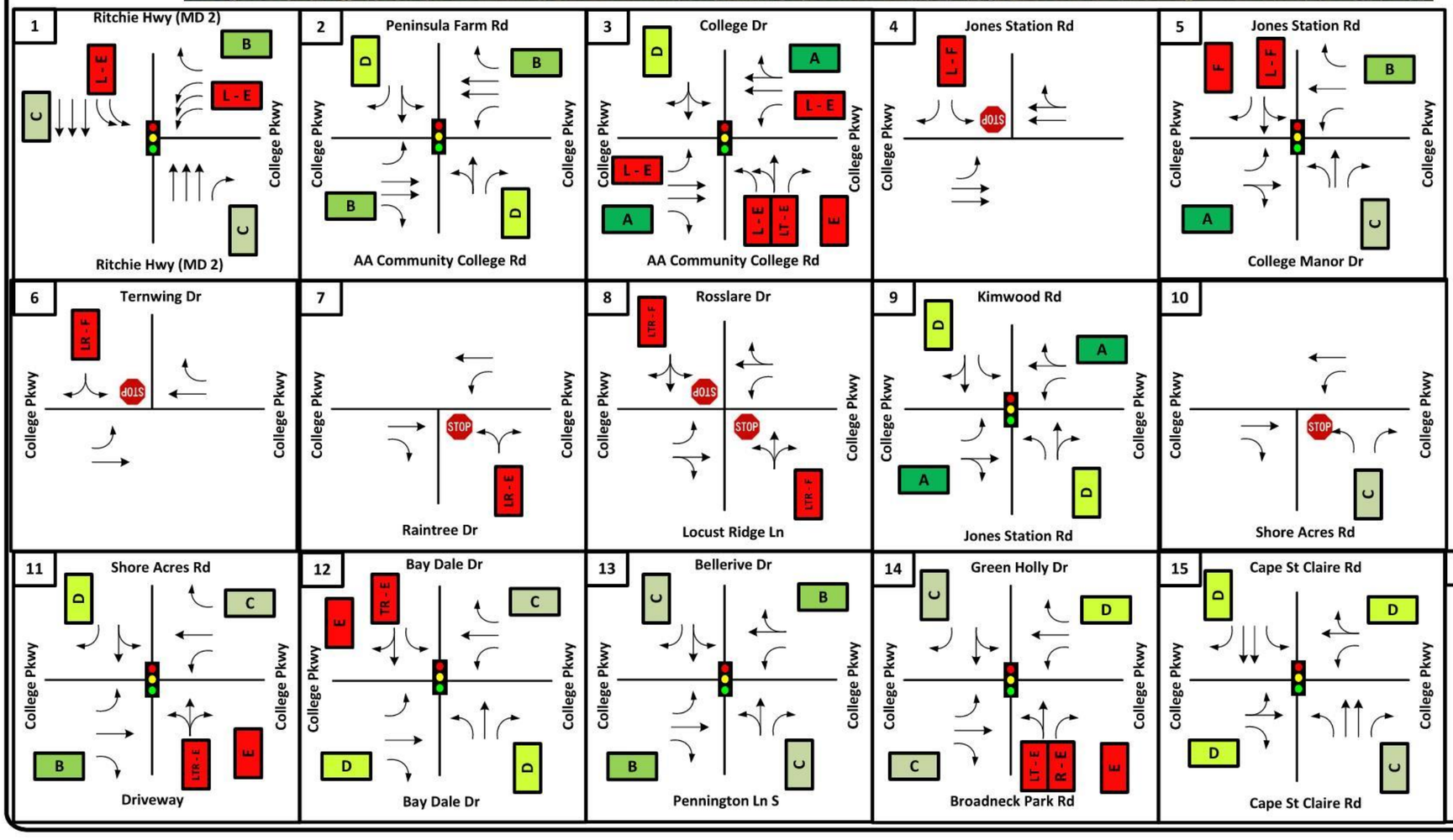
1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
16 Destiny Cir
College Pkwy
Ritchie Hwy (MD 2)
AA Community College Rd
College Manor Dr
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
Driveway
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
Broadneck Rd
STOP
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
College Parkway Operational and TSMO Study
2028 Fall No-Build AM LOS Summary
August 2024
FIGURE 22a
NOT TO SCALE
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage


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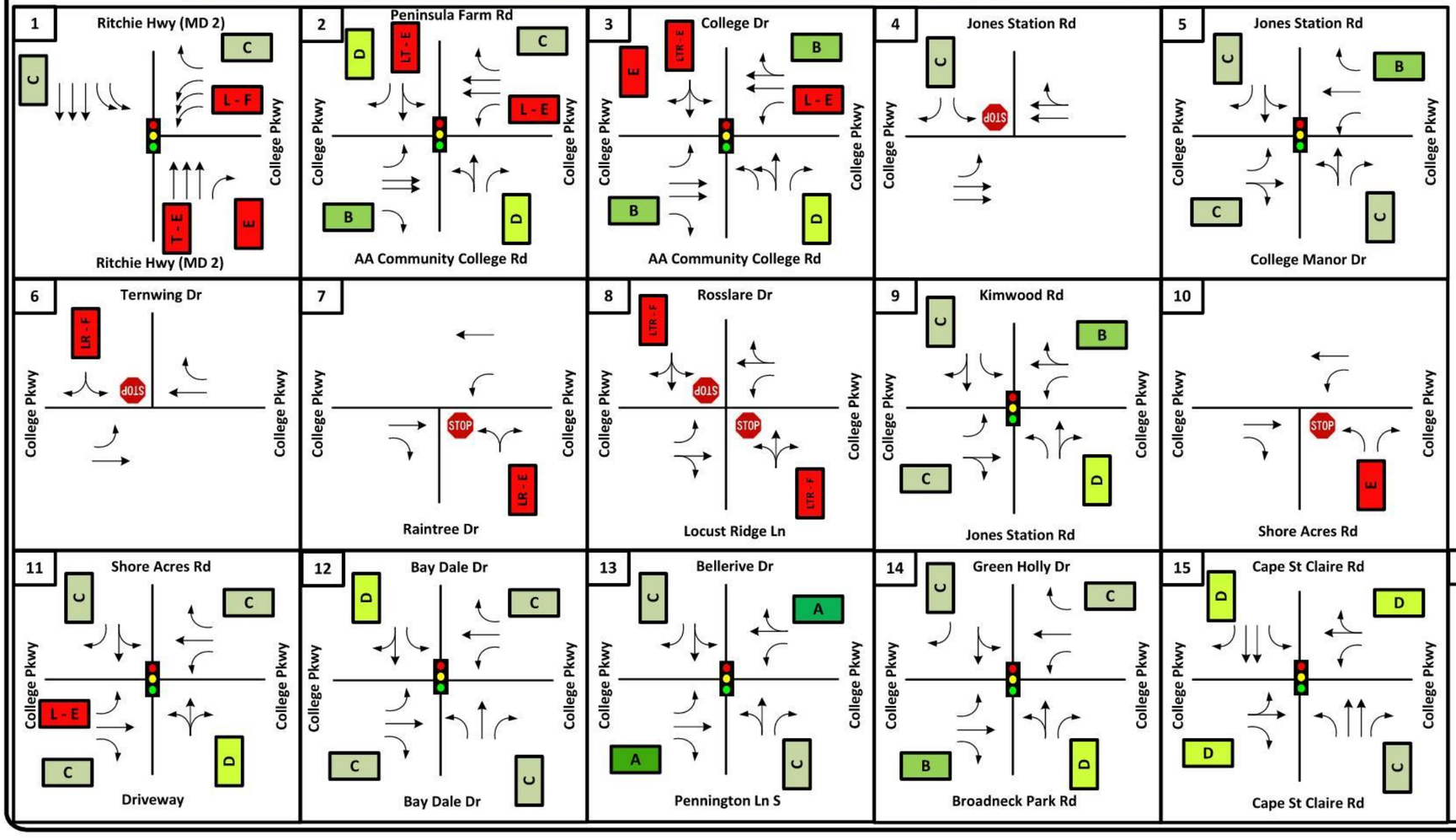
Anne Arundel Community College
Bay Hills Golf Club
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa


1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
College Pkwy
Ritchie Hwy (MD 2)
AA Community College Rd
College Manor Dr
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
16 Destiny Cir
Driveway
Bay Dale Dr
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
Broadneck Rd
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
NOT TO SCALE
College Parkway Operational and Safety Study
2028 Fall No-Build PM LOS Summary
August 2024
FIGURE 22b

Intersection / Approach LOS (sec. delay/veh.)	Future No-Build Fall 2028	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (21.5)**	**D (36.8)**
Westbound Approach *(College Parkway)*	B (16.2)	C (21.6)
Northbound Approach *(Ritchie Hwy)*	C (27.1)	E (61.5)
Southbound Approach *(Ritchie Hwy)*	C (20.9)	C (23.7)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**B (17.7)**	**C (24.8)**
Eastbound Approach *(College Pkwy)*	B (13.6)	B (17.2)
Westbound Approach *(College Pkwy)*	B (16.1)	C (21.5)
Northbound Approach *(AACC Road)*	D (41.8)	D (50.7)
Southbound Approach *(Lake Wheeler Road)*	D (44.8)	D (51.5)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**B (10.7)**	**B (17.7)**
Eastbound Approach *(College Pkwy)*	A (7.6)	B (14.1)
Westbound Approach *(College Pkwy)*	A (9.8)	B (14.0)
Northbound Approach *(AACC Road)*	E (56.4)	D (52.6)
Southbound Approach *(College Dr)*	D (54.9)	E (55.9)
INTERSECTION 4 – College Pkwy & Jones Station Rd (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [12.2]	C [18.0]
Westbound Approach *(College Pkwy)*		-
Southbound Approach *(Jones Station Rd)*	F [65.6]	C [18.4]
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**E (72.7)**	**B (18.0)**
Eastbound Approach *(College Pkwy)*	A (8.7)	C (22.0)
Westbound Approach *(College Pkwy)*	B (15.7)	B (11.0)
Northbound Approach *(College Manor Dr)*	C (33.5)	C (22.0)
Southbound Approach *(Jones Station Rd)*	F (318.6)	C (30.3)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	B [10.4]	B [10.6]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	F [120.6]	F [Err]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [10.0]	B [10.8]
Northbound Approach (Raintree Dr)	E [40.0]	E [47.2]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [11.9]	B [12.4]
Westbound Approach *(College Pkwy)*	B [10.3]	B [10.9]
Northbound Approach *(Locust Ridge Ln)*	F [114.2]	F [80.0]
Southbound Approach *(Rosslare Dr)*	F [676.3]	F [609.9]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**B (13.5)**	**C (26.8)**
Eastbound Approach *(College Pkwy)*	A (9.3)	C (29.5)
Westbound Approach *(College Pkwy)*	A (9.9)	B (17.8)
Northbound Approach *(Jones Station Rd)*	D (47.1)	D (47.5)
Southbound Approach *(Kimwood Rd)*	D (49.2)	C (29.9)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [11.1]	B [11.7]
Northbound Approach (Shore Acres Rd)	C [17.5]	E [43.7]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**C (25.9)**	**C (27.9)**
Eastbound Approach *(College Pkwy)*	B (17.3)	C (33.2)
Westbound Approach *(College Pkwy)*	C (21.8)	C (20.9)
Northbound Approach *(Driveway)*	E (57.1)	D (43.0)
Southbound Approach *(Shore Acres Rd)*	D (40.3)	C (27.9)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (39.7)**	**C (33.8)**
Eastbound Approach *(College Pkwy)*	D (35.1)	C (32.0)
Westbound Approach *(College Pkwy)*	C (27.9)	C (30.5)
Northbound Approach *(Bay Dale Dr)*	D (47.8)	C (34.3)
Southbound Approach *(Bay Dale Dr)*	E (68.8)	D (44.4)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**B (15.0)**	**B (11.5)**
Eastbound Approach *(College Pkwy)*	B (13.6)	A (9.5)
Westbound Approach *(College Pkwy)*	B (10.9)	A (8.9)
Northbound Approach *(Pennington Ln S)*	C (22.2)	C (23.3)
Southbound Approach *(Bellerive Dr)*	C (25.0)	C (24.8)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**C (31.3)**	**B (20.0)**
Eastbound Approach *(College Pkwy)*	C (21.2)	B (12.6)
Westbound Approach *(College Pkwy)*	D (43.6)	C (24.8)
Northbound Approach *(Broadneck Park Rd.)*	E (74.7)	D (39.9)
Southbound Approach *(Green Holly Dr.)*	C (30.4)	C (23.9)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (39.9)**	**D (38.1)**
Eastbound Approach *(College Pkwy)*	D (43.9)	D (41.8)
Westbound Approach *(College Pkwy)*	D (45.4)	D (47.5)
Northbound Approach *(Cape S. Clair Rd.)*	C (34.1)	C (32.1)
Southbound Approach *(Cape St. Claire Rd.)*	D (38.8)	D (41.6)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [0.1]	A [0.2]
Westbound Approach *(College Pkwy)*	A [1.0]	A [0.4]
Northbound Approach *(Broadneck Rd)*	B [14.4]	C [16.2]
Southbound Approach *(Destiny Cir)*	C [24.0]	C [18.2]

Table 13: Intersection Level of Service Summary (No-Build 2028 Fall Conditions)

4.3.5 No-Build (2032) Summer Conditions

The no-build 2032 Summer peak hour conditions analyses are based on the existing roadway geometry (assuming no proposed improvements) and the 2032 AM and PM Summer peak hour volumes (shown on ***Figures 3 and 16*** respectively). The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time will continue to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time will continue to be provided to the WB lefts to access the AA Community College during both the AM and PM peak hours, resulting in unacceptable LOS "E" for both movements.
3. At College Drive / AA Community College (signal): The majority of the signal green time will continue to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for both College Drive and AA Community College access (AM and PM peaks.
4. At Ternwing Drive (stop): The SB approach out of Ternwing Drive will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
5. At Raintree Drive (stop): The NB movement out of Raintree Drive, which operated acceptably under existing summer conditions, will now operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
6. At Rosslare Drive / Locust Ridge Lane (stop): The SB approach out of Rosslare Drive will continue to operate at unacceptable LOS E and F during both the AM and PM peak hours, and the NB approach out of Locust Ridge Lane will continue to operate at unacceptable LOS F during the PM peak hour only due to insufficient gaps in the mainline College Parkway through movements.
7. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
8. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will now operate at unacceptable LOS E during both the AM and PM peak hours due to insufficient green time provided for the minor roadway.
9. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
10. At Cape St Claire Road (MD 179) (signal): The EB shared through-left lane along College Parkway will now operate at unacceptable LOS F (from a LOS E) during the PM peak hour. In addition, the EB and WB College Parkway movements operate under spilt phasing, resulting in less green time for both movements compared to if the green times were concurrently phased.

The AM peak hour levels of service summary is shown on ***Figure 23a*** and the PM peak hour levels of service summary is shown on ***Figure 23b***.

The results of the operational analyses for No-Build (2032) Summer conditions are summarized in ***Table 14*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix E***.


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
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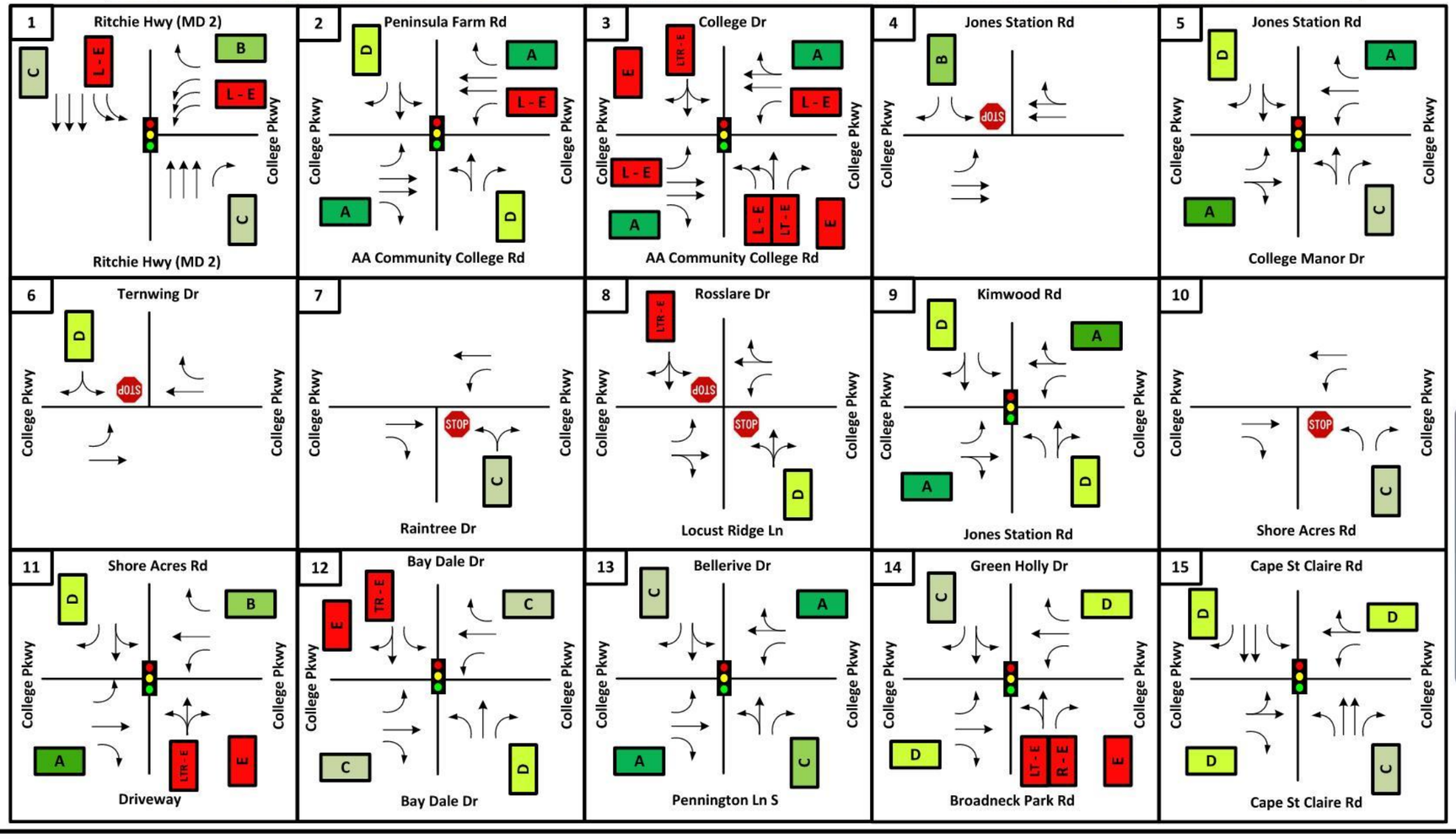
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2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
College Pkwy
Ritchie Hwy (MD 2)
AA Community College Rd
College Manor Dr
6 Ternwing Dr
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8 Rosslare Dr
9 Kimwood Rd
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Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
Driveway
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Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
STOP
L - E
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LT - E
R - E
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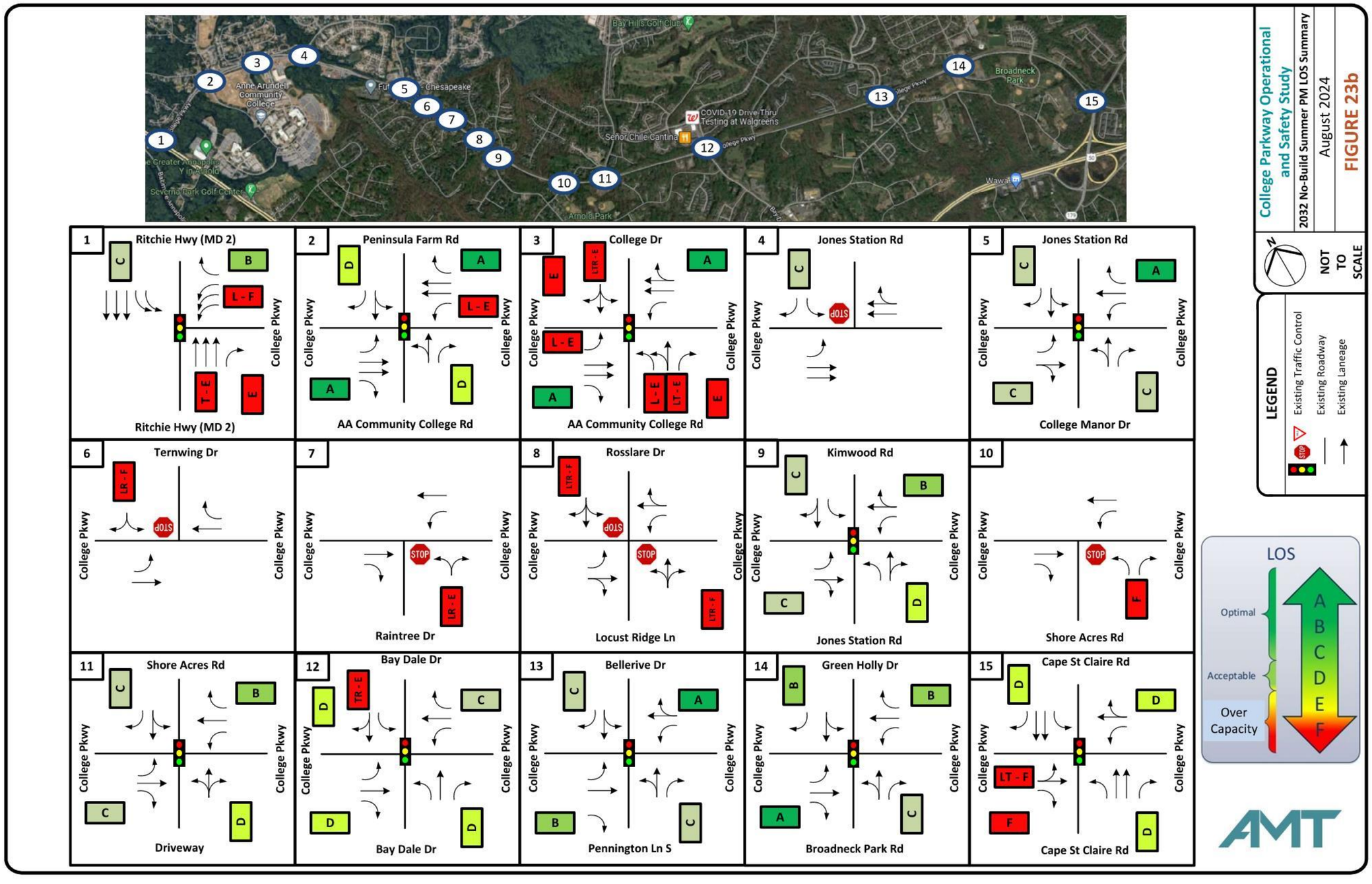
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
NOT TO SCALE
College Parkway Operational and Safety Study
2032 No-Build Summer AM LOS Summary
August 2024
FIGURE 23a


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
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1 Ritchie Hwy (MD 2)
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3 College Dr
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College Pkwy
AA Community College Rd
4 Jones Station Rd
C
STOP
College Pkwy
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College Manor Dr
6 Ternwing Dr
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College Pkwy
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College Pkwy
Raintree Dr
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Locust Ridge Ln
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College Pkwy
Jones Station Rd
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College Pkwy
Shore Acres Rd
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Driveway
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College Pkwy
Bay Dale Dr
13 Bellerive Dr
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A
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College Pkwy
Pennington Ln S
14 Green Holly Dr
B
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A
C
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
D
D
LT - F
F
D
College Pkwy
Cape St Claire Rd
College Parkway Operational and Safety Study
2032 No-Build Summer PM LOS Summary
August 2024
FIGURE 23b
NOT TO SCALE
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
STOP
LOS
Optimal
Acceptable
Over Capacity
A
B
C
D
E
F
AMT

Intersection / Approach LOS (sec. delay/veh.)	Future No-Build Summer 2032	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (20.6)**	**D (42.6)**
Westbound Approach *(College Parkway)*	B (15.4)	B (18.5)
Northbound Approach *(Ritchie Hwy)*	C (21.6)	E (72.8)
Southbound Approach *(Ritchie Hwy)*	C (22.1)	C (25.5)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**A (9.6)**	**A (9.1)**
Eastbound Approach *(College Pkwy)*	A (7.0)	A (7.6)
Westbound Approach *(College Pkwy)*	A (6.3)	A (7.1)
Northbound Approach *(AACC Road)*	D (47.7)	D (48.4)
Southbound Approach *(Lake Wheeler Road)*	D (48.5)	D (49.9)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**A (8.8)**	**A (9.2)**
Eastbound Approach *(College Pkwy)*	A (6.0)	A (7.6)
Westbound Approach *(College Pkwy)*	A (7.2)	A (9.2)
Northbound Approach *(AACC Road)*	E (56.4)	E (56.1)
Southbound Approach *(College Dr)*	E (55.9)	E (60.1)
INTERSECTION 4 – College Pkwy & Jones Station Rd (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [10.1]	B [13.0]
Westbound Approach *(College Pkwy)*	-	-
Southbound Approach *(Jones Station Rd)*	B [14.0]	C [17.5]
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**B (12.9)**	**B (17.4)**
Eastbound Approach *(College Pkwy)*	A (8.4)	C (21.2)
Westbound Approach *(College Pkwy)*	A (7.2)	A (9.1)
Northbound Approach *(College Manor Dr)*	C (32.5)	C (23.7)
Southbound Approach *(Jones Station Rd)*	D (46.9)	C (30.3)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	A [9.0]	A [9.7]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	D [32.9]	F [551.0]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.2]	B [10.9]
Northbound Approach (Raintree Dr)	C [19.2]	E [41.2]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [9.2]	B [10.3]
Westbound Approach *(College Pkwy)*	A [9.3]	B [11.0]
Northbound Approach *(Locust Ridge Ln)*	D [29.4]	F [89.1]
Southbound Approach *(Rosslare Dr)*	E [45.4]	F [309.3]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**A (9.5)**	**C (21.8)**
Eastbound Approach *(College Pkwy)*	A (6.0)	C (25.2)
Westbound Approach *(College Pkwy)*	A (4.9)	B (12.3)
Northbound Approach *(Jones Station Rd)*	D (50.0)	D (38.0)
Southbound Approach *(Kimwood Rd)*	D (45.6)	C (29.2)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.7]	B [11.5]
Northbound Approach (Shore Acres Rd)	C [17.9]	F [62.9]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**B (18.5)**	**C (24.0)**
Eastbound Approach *(College Pkwy)*	A (9.8)	C (26.1)
Westbound Approach *(College Pkwy)*	B (12.9)	B (18.9)
Northbound Approach *(Driveway)*	E (59.2)	D (40.0)
Southbound Approach *(Shore Acres Rd)*	D (42.9)	C (26.7)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (38.1)**	**D (35.6)**
Eastbound Approach *(College Pkwy)*	C (25.6)	D (35.0)
Westbound Approach *(College Pkwy)*	C (24.9)	C (25.4)
Northbound Approach *(Bay Dale Dr)*	D (50.1)	D (38.3)
Southbound Approach *(Bay Dale Dr)*	E (67.7)	D (48.0)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**A (10.0)**	**B (11.0)**
Eastbound Approach *(College Pkwy)*	A (8.3)	B (10.5)
Westbound Approach *(College Pkwy)*	A (7.6)	A (6.8)
Northbound Approach *(Pennington Ln S)*	C (22.4)	C (28.3)
Southbound Approach *(Bellerive Dr)*	C (23.2)	C (29.4)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**D (35.9)**	**B (12.1)**
Eastbound Approach *(College Pkwy)*	D (37.3)	A (7.0)
Westbound Approach *(College Pkwy)*	D (42.2)	B (18.0)
Northbound Approach *(Broadneck Park Rd.)*	E (74.2)	C (31.5)
Southbound Approach *(Green Holly Dr.)*	C (22.8)	B (18.0)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (36.0)**	**D (49.6)**
Eastbound Approach *(College Pkwy)*	D (35.6)	F (80.4)
Westbound Approach *(College Pkwy)*	D (43.4)	D (45.0)
Northbound Approach *(Cape S. Clair Rd.)*	C (32.3)	D (36.3)
Southbound Approach *(Cape St. Claire Rd.)*	D (36.3)	D (40.3)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*		
Westbound Approach *(College Pkwy)*		
Northbound Approach *(Broadneck Rd)*		
Southbound Approach *(Destiny Cir)*		

Table 14: Intersection Level of Service Summary (No-Build 2032 Summer Conditions)

4.3.6 No-Build (2032) Fall Conditions

The no-build 2032 Fall peak hour conditions analyses are based on the existing roadway geometry (assuming no proposed improvements) and the 2032 AM and PM Fall peak hour volumes (shown on ***Figures 3 and 18*** respectively). The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time continues to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time continues to be provided to the WB lefts to access the AA Community College during the PM peak hour. In addition, the SB shared through-left lane out of Peninsula Farm Road will now operate at LOS E during the PM peak hour, resulting in unacceptable LOS "E" for both movements.
3. At College Drive / AA Community College (signal): The majority of the signal green time continues to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for AA Community College access and the EB / WB lefts (AM peak), and for College Drive and the WB lefts (PM peak).
4. At Jones Station Road (stop): The SB approach out of Jones Station Road will continue to operate at unacceptable LOS F during the AM peak hour due to insufficient gaps in the mainline College Parkway through movements.
5. At Jones Station Road / College Manor Drive (signal): The SB movement out of Jones Station Road will continue to operate at unacceptable LOS F during the AM peak hour due to very high SB volumes operating with a permissive-only left turn phase.
6. At Ternwing Drive (stop): The SB appraoch out of Ternwing Drive will continue to operate at unacceptable LOS F during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
7. At Raintree Drive (stop): The NB movement out of Raintree Drive will continue to operate at unacceptable LOS E during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
8. At Rosslare Drive / Locust Ridge Lane (stop): The NB approach out of Locust Ridge Lane and the SB approach out of Rosslare Drive continue to operate at unacceptable LOS F during both the AM and PM peak hours, due to insufficient gaps in the mainline College Parkway through movements.
9. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will continue to operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
10. At Shore Acres Road / driveway (signal): The EB lefts into Shore Acres Road will continue to operate at unacceptable LOS E during the PM peak hour due to insufficient green time provided for that phase.
11. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
12. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.

The AM peak hour levels of service summary is shown on ***Figure 24a*** and the PM peak hour levels of service summary is shown on ***Figure 24b***.

The results of the operational analyses for No-Build (2032) Fall conditions are summarized in ***Table 15*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix E***.


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
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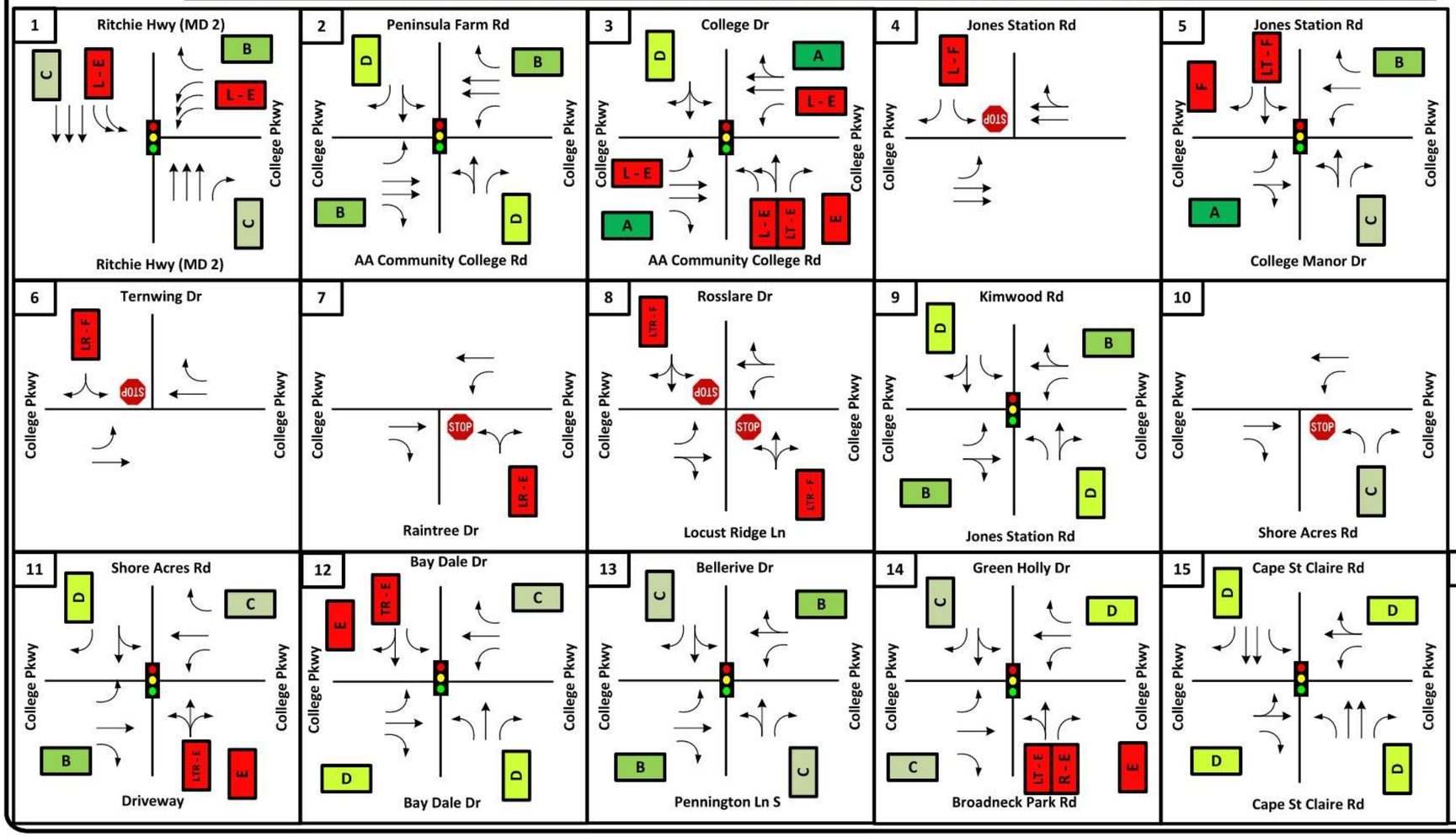
1 Ritchie Hwy (MD 2)
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
AA Community College Rd
3 College Dr
AA Community College Rd
4 Jones Station Rd
STOP
5 Jones Station Rd
College Manor Dr
6 Ternwing Dr
Raintree Dr
7
8 Rosslare Dr
Locust Ridge Ln
9 Kimwood Rd
Jones Station Rd
10
Shore Acres Rd
11 Shore Acres Rd
Driveway
12 Bay Dale Dr
Bay Dale Dr
13 Bellerive Dr
Pennington Ln S
14 Green Holly Dr
Broadneck Park Rd
15 Cape St Claire Rd
Cape St Claire Rd
16 Destiny Cir
Broadneck Rd
College Pkwy
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
NOT TO SCALE
College Parkway Operational and TSMO Study
2032 No-Build Fall AM LOS Summary
August 2024
FIGURE 24a


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive-Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
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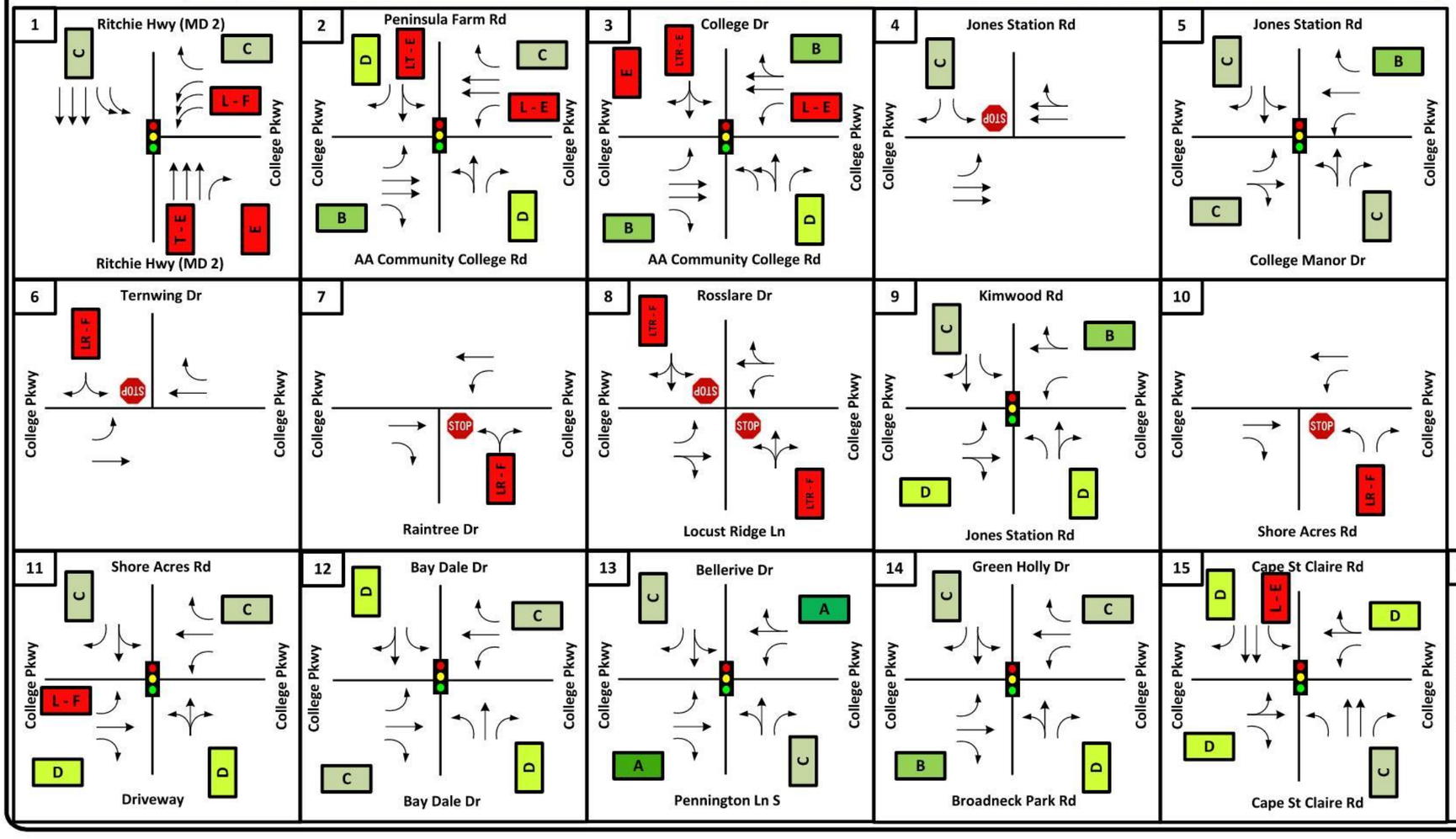

1 Ritchie Hwy (MD 2)
Ritchie Hwy (MD 2)
College Pkwy
2 Peninsula Farm Rd
AA Community College Rd
3 College Dr
AA Community College Rd
4 Jones Station Rd
STOP
5 Jones Station Rd
College Manor Dr
6 Ternwing Dr
7
Raintree Dr
8 Rosslare Dr
Locust Ridge Ln
9 Kimwood Rd
Jones Station Rd
10
Shore Acres Rd
11 Shore Acres Rd
Driveway
12 Bay Dale Dr
Bay Dale Dr
13 Bellerive Dr
Pennington Ln S
14 Green Holly Dr
Broadneck Park Rd
15 Cape St Claire Rd
Cape St Claire Rd
16 Destiny Cir
Broadneck Rd
LEGEND
Existing Traffic Control
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
NOT TO SCALE
College Parkway Operational and Safety Study
2032 No-Build Fall PM LOS Summary
August 2024
FIGURE 24b

Intersection / Approach LOS (sec. delay/veh.)	Future No-Build Fall 2032	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (22.0)**	**D (38.7)**
Westbound Approach *(College Parkway)*	B (16.5)	C (21.8)
Northbound Approach *(Ritchie Hwy)*	C (28.4)	E (65.5)
Southbound Approach *(Ritchie Hwy)*	C (21.0)	C (24.6)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**B (18.1)**	**C (25.7)**
Eastbound Approach *(College Pkwy)*	B (13.8)	B (17.7)
Westbound Approach *(College Pkwy)*	B (16.8)	C (22.7)
Northbound Approach *(AACC Road)*	D (41.6)	D (52.3)
Southbound Approach *(Lake Wheeler Road)*	D (44.8)	D (52.8)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**B (10.8)**	**B (18.1)**
Eastbound Approach *(College Pkwy)*	A (7.7)	B (14.7)
Westbound Approach *(College Pkwy)*	A (10.0)	B (14.4)
Northbound Approach *(AACC Road)*	E (56.4)	D (52.2)
Southbound Approach *(College Dr)*	D (54.9)	E (55.9)
INTERSECTION 4 – College Pkwy & Jones Station Rd (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [12.5]	C [19.6]
Westbound Approach *(College Pkwy)*	-	-
Southbound Approach *(Jones Station Rd)*	F [80.6]	C [19.7]
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**E (77.0)**	**B (19.3)**
Eastbound Approach *(College Pkwy)*	A (8.9)	C (24.4)
Westbound Approach *(College Pkwy)*	B (16.8)	B (11.3)
Northbound Approach *(College Manor Dr)*	C (33.6)	C (22.4)
Southbound Approach *(Jones Station Rd)*	F (338.8)	C (31.7)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	B [10.6]	B [10.8]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	F [157.9]	F [Err]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [10.1]	B [11.0]
Northbound Approach (Raintree Dr)	E [43.6]	F [54.7]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [12.5]	B [13.0]
Westbound Approach *(College Pkwy)*	B [10.5]	B [11.0]
Northbound Approach *(Locust Ridge Ln)*	F [187.0]	F [108.5]
Southbound Approach *(Rosslare Dr)*	F [1156.7]	F [1134.3]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**B (14.8)**	**C (30.7)**
Eastbound Approach *(College Pkwy)*	B (11.1)	D (35.8)
Westbound Approach *(College Pkwy)*	B (11.6)	B (19.6)
Northbound Approach *(Jones Station Rd)*	D (45.2)	D (48.3)
Southbound Approach *(Kimwood Rd)*	D (46.2)	C (29.8)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [11.3]	B [11.9]
Northbound Approach (Shore Acres Rd)	C [18.1]	F [53.0]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**C (26.8)**	**C (31.6)**
Eastbound Approach *(College Pkwy)*	B (18.4)	D (40.8)
Westbound Approach *(College Pkwy)*	C (23.0)	C (21.2)
Northbound Approach *(Driveway)*	E (57.1)	D (44.1)
Southbound Approach *(Shore Acres Rd)*	D (40.4)	C (29.1)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (41.3)**	**D (35.2)**
Eastbound Approach *(College Pkwy)*	D (38.1)	C (33.4)
Westbound Approach *(College Pkwy)*	C (29.5)	C (32.0)
Northbound Approach *(Bay Dale Dr)*	D (47.8)	D (35.4)
Southbound Approach *(Bay Dale Dr)*	E (68.4)	D (46.1)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**B (15.4)**	**B (11.8)**
Eastbound Approach *(College Pkwy)*	B (13.8)	A (9.8)
Westbound Approach *(College Pkwy)*	B (11.2)	A (9.2)
Northbound Approach *(Pennington Ln S)*	C (22.7)	C (23.6)
Southbound Approach *(Bellerive Dr)*	C (25.9)	C (25.3)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**C (31.3)**	**C (20.5)**
Eastbound Approach *(College Pkwy)*	C (20.5)	B (13.0)
Westbound Approach *(College Pkwy)*	D (43.1)	C (25.4)
Northbound Approach *(Broadneck Park Rd.)*	E (74.7)	D (41.1)
Southbound Approach *(Green Holly Dr.)*	C (31.7)	C (24.5)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (41.2)**	**D (39.0)**
Eastbound Approach *(College Pkwy)*	D (45.2)	D (42.8)
Westbound Approach *(College Pkwy)*	D (46.6)	D (48.6)
Northbound Approach *(Cape S. Clair Rd.)*	D (35.5)	C (32.8)
Southbound Approach *(Cape St. Claire Rd.)*	D (39.9)	D (42.7)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [0.1]	A [0.3]
Westbound Approach *(College Pkwy)*	A [1.0]	A [0.4]
Northbound Approach *(Broadneck Rd)*	B [14.4]	C [16.5]
Southbound Approach *(Destiny Cir)*	D [25.2]	C [18.5]

Table 15: Intersection Level of Service Summary (No-Build 2032 Fall Conditions)

5. POTENTIAL IMPROVEMENTS (BUILD ASSESSEMENT)

5.1. Operational and Safety Improvements and Assessment

Based on the existing and no-build traffic assessment, as well as the historical crash rates at each study intersection, potential improvements and/or strategies were modeled to see how they could mitigate the operational concerns and improve safety conditions for all roadway users. Some of the potential improvements presented below including, but not limited to, backplates, pedestrian signals, crosswalks, and span wire to mast arm conversions were deemed safety features that offered increased visibility and protection for motorists, pedestrians, and bicyclists. The duration of improvements listed below are defined as: Short-Term (0-2 years), Mid-Term (3-5 years) and Long-Term (6-10 years).

5.1.1 College Parkway at MD 2 [SIGNAL]

OPERATIONS

The westbound left turn movement from College Parkway onto southbound MD 2 consists of very high volumes and consistently operates at unacceptable LOS during the peak hours. An additional 20 seconds of signal green time was modeled for this movement to attempt to improve the LOS and queues, but this was found to make a negligible difference in the traffic operations. MDOT SHA currently has long-term plans to widen MD 2 which has the potential to improve traffic flow along MD 2. This widening, however, will not include the College Parkway intersection.

Cut-through traffic has been realized as an operational problem for neighborhood residents along the College Parkway corridor. Particularly during the summer months as many motorists utilize MD 2 and US 50 east to head to the eastern shore, residents have raised issues about their increased delays to access either direction of College Parkway and starts with the MD 2 at College Parkway intersection. Measures such as installing static signs and programming Variable Message Signs (VMS) that read “Stay on MD 2 for Bay Bridge Access” are deemed passive and unlikely to be respected by motorists and enforced by police officers. Therefore, remedying cut-traffic requires a more hands-on approach with more invasive means to quell the issue. The main goal is to make it uncomfortable and a less attractive option for cut-through motorists to want to traverse the corridor. Speed humps and tables are widely utilized as vertical deflections, however, the posted speed limit (40 MPH) and vehicle speeds along College Parkway prevent those from being used. Horizontal deflections such as chicanes (zigzag pattern with alternating curves), mini roundabouts, and lane narrowing through adding bike lanes, landscaping, and raised center and shoulder medians are beneficial causing to slow down which would help neighboring residents to find safer gaps in traffic along the 2-lane section of College Parkway. The 4-lane section of College Parkway could be implemented with lane narrowing through bike lanes, landscaping, and raised shoulder medians. Public outreach is important to inform residents of other travel options including accessing intersections with traffic signals from their neighborhood and making a left turn by first making a right turn then a U-turn at the next intersection.

SAFETY

Some of the operational issues with cut-through traffic permeate into the safety issues and the goal is to find recommendations that address both. Based on the existing traffic data collected, speeding was found to be a concern along the 4-lane section of College Parkway during the summer. As with VMS and static signs, the installation of speed trailers to deter speeding, particularly during the summer months, is a passive measure as they are unlikely to be respected by motorists. However, the horizontal deflections mentioned above in the Operations Section could be implemented to slow down motorists and maintain safety. Police enforcement is very important in establishing the speed limit of the roadway. Periodic placement of police in various locations and times of the day will keep motorists honest with their vehicle speeds. MDOT SHA and the County has various roadway safety programs addressing speeding "Be Street Wise, Drive Safe" and "Vision Zero" that the community, agencies, and law enforcement can partner together.

College Parkway is classified as a minor arterial that carries between 22,500-30,000 vehicles per day during summer and fall months. Based upon the type of roadway, traffic volumes, and vehicle speeds, the optimal and safest mitigation measure will need to be selected as it will need to be properly integrated into the roadway corridor.

COLLEGE PARKWAY AT MD 2:

SHORT-/MID-/LONG-TERM IMPROVEMENTS: NONE.

5.1.2 College Parkway at Peninsula Farm Road / AA Community College Road [SIGNAL]

OPERATIONS

The eastbound and westbound left turns along College Parkway into both Peninsula Farm Road and AA Community College operate under unacceptable LOS with high delays and peak hour queues. Additional green signal time was modeled for both left turn movements from College Parkway to Peninsula Farm Road and AA Community College Road (without impacting mainline traffic along College Parkway). This resulted in negligible improvements for either left turn movement. Therefore, this study acknowledges that while there are operational concerns (long delays) for traffic attempting to access Peninsula Farm Road and AA Community College from mainline College Parkway, no geometric improvement is recommended at this time due to potential detrimental impacts to mainline College Parkway during the peak hours.

In addition, it was noted that occasionally, it is necessary to flush Peninsula Farm Road, so traffic along College Parkway needs to be held, which results in spillbacks to the MD 2 intersection. This does not occur often, therefore, no improvements/recommendations are necessary.

SAFETY

It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

COLLEGE PARKWAY AT PENINSULA FARM ROAD / AA COMMUNITY COLLEGE ROAD:

SHORT-TERM IMPROVEMENT: INSTALL BACK PLATES ON THE SIGNAL HEADS.

MID-/LONG-TERM IMPROVEMENTS: NONE.

5.1.3 College Parkway at College Drive / AA Community College Road [SIGNAL]

OPERATIONS

The College Parkway eastbound left turn into College Drive is a lagging left turn movement. There is no indication with traffic volumes or in the field that a lagging left turn is required or needed. The eastbound left turn was converted to a leading left turn movement, which improves the overall intersection LOS and delays.

To mitigate the unacceptable eastbound and westbound left turn peak hour LOS, additional green signal time was modeled for both left turn movements from College Parkway to College Drive and AA Community College Road (without impacting mainline traffic along College Parkway). This resulted in negligible improvements for either left turn movement due to the very low volumes.

To improve the minor road operations, the northbound approach from AA Community College was restriped from a left and shared-through-left lanes to a separate left and separate through lane. This allows the minor roadway signal operations to be converted from split-phasing to concurrent left phasing and provides additional green time for both minor approaches. The overall signal cycle length was not modified. The timings along eastbound and westbound College Parkway were not modified either. This potential improvement results in an overall intersection LOS of A during the AM Peak hour (from a LOS B). The overall intersection LOS during the PM peak hour remains at a B, but the NB approach delay is reduced by approximately 10 seconds.

SAFETY

It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

COLLEGE PARKWAY AT COLLEGE DRIVE / AA COMMUNITY COLLEGE ROAD:

SHORT-TERM IMPROVEMENTS:

- INSTALL BACK PLATES ON THE SIGNAL HEADS.
- RESTRIPE NORTHBOUND APPROACH TO SEPARATE LEFT AND SEPARATE THROUGH LANES.
- CONVERT NORTHBOUND AND SOUTHBOUND SIGNAL APPROACHES FROM SPLIT-PHASE TO CONCURRENT LEFT PHASES.

MID-/LONG-TERM IMPROVEMENTS: NONE.

5.1.4 College Parkway at Jones Station Road [STOP-CONTROLLED / SIGNAL]

OPERATIONS

A new signal is proposed at this intersection as part of the Broadneck Trail Phase III project. The signal was incorporated into the peak hour build condition models with a cycle length of 110 seconds to match the remaining signal system. Approximately 40 seconds of green time was provided for the southbound Jones Station Road approach, keeping in mind the Trail pedestrian crosswalk located across the east leg of College Parkway. This results in an overall LOS B for the peak hours under Build conditions.

SAFETY

None.

COLLEGE PARKWAY AT JONES STATION ROAD:

SHORT-TERM IMPROVEMENT: NEW TRAFFIC SIGNAL (PROPOSED AS PART OF THE BROADNECK TRAIL PHASE III PROJECT).

MID-/LONG-TERM IMPROVEMENTS: NONE.

5.1.5 College Parkway at Jones Station Road / College Manor Drive [SIGNAL]

OPERATIONS

The southbound left turn movement out of Jones Station Road operates at unacceptable LOS F during the AM peak hour due to very high SB volumes operating with a permissive-only left turn phase. A potential short-term recommendation is to increase the northbound and southbound green times by 10 seconds during the AM peak hour. This improves the overall intersection LOS from a E to a D and improves the southbound LOS from an F with 340 seconds of delay to a LOS F with 83 seconds of delay. Taking 10 seconds of green time away from College Parkway does impact the westbound mainline College Parkway movement, where the LOS worsens from a B to a D (still considered acceptable though).

Three (3) potential recommendations could include the following:

- Restriping the northbound and southbound approaches from a shared left-through lane and separate right turn lane to a separate left turn lane and a shared through-right lane. This results in an overall intersection LOS of D during the AM peak hour and improves the southbound LOS from an F with 340 seconds of delay to a LOS E with 74 seconds of delay. The westbound approach of College Parkway will continue to operate at LOS D. This improvement has negligible impacts on the northbound and eastbound approaches of the intersection during the AM peak hour, as well as on the intersection overall during the PM peak hour.
- Restriping only the southbound approaches from a shared left-through lane and separate right turn lane to a separate left turn lane and a shared through-right lane. This continues to result in an overall intersection LOS of D during the AM peak hour and improves the southbound LOS from an F with 340 seconds of delay to a LOS E with 69 seconds of delay. The westbound approach of College Parkway will continue to operate at LOS D. This improvement has negligible impacts on the northbound and eastbound approaches of the intersection during the AM peak hour, as well as on the intersection overall during the PM peak hour. This recommendation was deemed not as safe for motorists as the first option.
- Restriping the northbound and southbound approaches from a shared left-through lane and separate right turn lane to a separate left turn lane and a shared through-right lane AND modifying the signal phasing to allow the northbound left turns to operate as a permitted phase only, while the southbound left turns would operate as a protected-permitted phase. This results in an overall intersection LOS of D during the AM peak hour and improves the southbound LOS from an F with 340 seconds of delay to a LOS E with 55.4 seconds of delay (just at the cusp of a LOS D). The westbound approach of College Parkway will continue to operate at LOS D. This improvement has negligible impacts on the northbound and eastbound approaches of the intersection during the AM peak hour, as well as on the intersection overall during the PM peak hour.

SAFETY

To better complement the Broadneck Trail Phase III once it is completed, it is recommended that a new crosswalk be provided across the southern leg of the intersection to provide sidewalk connectivity, a new crosswalk should be provided across the eastern leg to provide safe trail crossings, and pedestrian countdown signals should be provided for each crosswalk at the intersection.

To improve safety conditions, it is recommended that the existing span wire traffic signals be replaced with mast arm signal poles. While span wire traffic signals offer flexibility in where the signal poles are placed, mast arm signal poles offer the following safety benefits:

- They increase the visibility of traffic signal heads while decreasing angle collisions. Traffic signal heads will not move around vertically or horizontally from windy conditions as is the potential case with traffic signal heads on span wires.
- The sagging of the traffic signal heads and overhead signs on a span wire over time is more likely than on a sturdy designed mast arm. The potential vertical deflection of a traffic signal head on a span wire can pose a safety issue during windy conditions with heavy trucks.
- Mast arm signal poles require less maintenance than signal poles with span wires. Safety issues are minimal due to their longer durability.

COLLEGE PARKWAY AT JONES STATION ROAD / COLLEGE MANOR DRIVE:

SHORT-TERM IMPROVEMENTS:

- PROVIDE AN ADDITIONAL 10 SECS OF SIGNAL GREEN TIME FOR THE NORTHBOUND AND SOUTHBOUND MINOR APPROACHES.
- RESTRIPE THE NORTHBOUND AND SOUTHBOUND APPROACHES TO PROVIDE SEPARATE LEFT AND SEPARATE SHARED THROUGH/RIGHT TURN LANES.
- MODIFY THE SIGNAL PHASING TO ALLOW THE NORTHBOUND LEFT TURNS TO OPERATE AS A PERMITTED PHASE ONLY, WHILE THE SOUTHBOUND LEFT TURNS WOULD OPERATE AS A PROTECTED-PERMITTED PHASE.

MID-TERM IMPROVEMENT: PROVIDE NEW CROSSWALKS FOR THE EASTERN AND SOUTHERN LEGS OF THE INTERSECTION, WITH PEDESTRIAN COUNTDOWN SIGNALS FOR ALL CROSSWALKS.

LONG-TERM IMPROVEMENTS: REMOVE ALL SPAN WIRES AND INSTALL MAST ARMS FOR SIGNAL HEADS.

5.1.6 College Parkway at Ternwing Drive [STOP CONTROLLED]

OPERATIONS

The southbound movement out of Ternwing Drive has difficulty turning onto mainline College Parkway due to insufficient traffic gaps. Based on the peak hour traffic volumes, it is recommended that the southbound approach be restriped from single shared left-right lane to two (2) lanes: a separate left turn lane and a separate right turn lane. While this improvement does not result in acceptable LOS for the southbound movement, it does provide some relief for motorists since additional capacity is provided in the form of an extra lane.

Additional operational improvements could include:

- Community outreach to encourage residents to access College Parkway from other nearby signalized intersections (such as Jones Station Road/College Manor Drive).
- The restriction of the southbound left turns out of Ternwing Drive – this would require additional operational studies and community outreach.

Due to the low traffic volumes from Ternwing Drive, a traffic signal would not be warranted.

SAFETY

Based on the existing pedestrian volumes collected, it is also recommended that a crosswalk be provided across the northern leg of the intersection. Note that this new crosswalk is included as part of the Broadneck Trail Phase III project. Field conditions also revealed that the southern sidewalk along College Parkway is not wide enough to be considered ADA compliant and should be upgraded.

COLLEGE PARKWAY AT TERNWING DRIVE:

SHORT-TERM IMPROVEMENTS:

- RESTRIPE THE SOUTHBOUND APPROACH TO PROVIDE SEPARATE LEFT AND RIGHT TURN LANES (WITH A STORAGE LENGTH OF APPROXIMATELY 150 FEET EACH).
- COMMUNITY OUTREACH TO ENCOURAGE RESIDENTS TO ACCESS OTHER SIGNALIZED INTERSECTIONS ONTO COLLEGE PARKWAY.
- PROVIDE A NEW CROSSWALK ACROSS THE NORTHERN LEG OF THE INTERSECTION (ALREADY INCLUDED AS PART OF THE BROADNECK TRAIL PHASE III PROJECT).
- UPGRADE THE SOUTHERN SIDEWALK TO MEET ADA-COMPLIANT GUIDELINES/STANDARDS.

MID-/LONG-TERM IMPROVEMENTS: NONE.

5.1.7 College Parkway at Raintree Drive [STOP CONTROLLED]

OPERATIONS

While the northbound movement out of Raintree Drive operates at unacceptable LOS E during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements, it is assumed that improvements at the intersection of Rosslare Drive /Locust Ridge Lane will provide additional gaps in mainline traffic at this location to allow residents to exit the minor road.

Additional operational improvements could include community outreach to encourage residents to access College Parkway from other nearby intersections and encouraging residents to turn right out of Raintree Drive to avoid long delays while waiting to turn left onto College Parkway.

SAFETY

None.

COLLEGE PARKWAY AT RAINTREE DRIVE:

SHORT-/MID-/LONG-TERM IMPROVEMENTS: NONE.

5.1.8 College Parkway at Rosslare Drive / Locust Ridge Lane [STOP CONTROLLED]

OPERATIONS

The northbound and southbound movements out of Rosslare Drive and Locust Ridge Lane have difficulty turning onto mainline College Parkway due to insufficient traffic gaps. It is recommended that the northbound and southbound approaches be restriped from single shared left-through-right lane to two (2) lanes: a separate left turn lane and a separate shared through-right turn lane with 100 feet of storage for the left turn lane.

A roundabout was also considered as a potential improvement for this intersection. A memo detailing the traffic analysis for the roundabout was submitted dated April 2024. It is included in ***Appendix H***. The memorandum recommends that a roundabout NOT be installed at this intersection due to 95th percentile queues of 800+ feet expected along College Parkway. A roundabout works best if the traffic is balanced along all approaches. The minor streets have very low volume compared to the traffic on College Parkway.

SAFETY

The Broadneck Trail aligns with the northern leg of this intersection; therefore, providing a new crosswalk across the northern leg will ensure connectivity for all peds and bicycles. Note that this new crosswalk is included as part of the Broadneck Trail Phase III project.

COLLEGE PARKWAY AT ROSSLARE DRIVE / LOCUST RIDGE LANE:

SHORT-TERM IMPROVEMENTS:

- RESTRIPE THE NORTHBOUND AND SOUTHBOUND APPROACHES TO PROVIDE SEPARATE LEFT (WITH A STORAGE LENGTH OF APPROXIMATELY 100 FEET) AND SEPARATE THROUGH-RIGHT TURN LANES.
- PROVIDE A NEW CROSSWALK ACROSS THE NORTHERN LEG OF THE INTERSECTION (ALREADY INCLUDED AS PART OF THE BROADNECK TRAIL PHASE III PROJECT).

MID-TERM IMPROVEMENTS: NONE.

LONG-TERM IMPROVEMENT: NONE.

5.1.9 College Parkway at Kimwood Road / Jones Station Road [SIGNAL]

OPERATIONS

To better contain the eastbound left turn queues during the peak hours, it is recommended that the eastbound left turn storage length be increased from 190 feet to 300 feet.

SAFETY

The Broadneck Trail aligns with the northern leg of this intersection; therefore, providing a new crosswalk across the northern leg will ensure connectivity for all peds and bicycles, and a new pedestrian signal will improve safety for all users along the trail. Note that this new crosswalk is included as part of the Broadneck Trail Phase III project.

To improve safety conditions, it is recommended that the existing span wire traffic signals be replaced with mast arm signal poles. While span wire traffic signals offer flexibility in where the signal poles are placed, mast arm signal poles offer the following safety benefits:

- They increase the visibility of traffic signal heads while decreasing angle collisions. Traffic signal heads will not move around vertically or horizontally from windy conditions as is the potential case with traffic signal heads on span wires.
- The sagging of the traffic signal heads and overhead signs on a span wire over time is more likely than on a sturdy designed mast arm. The potential vertical deflection of a traffic signal head on a span wire can pose a safety issue during windy conditions with heavy trucks.
- Mast arm signal poles require less maintenance than signal poles with span wires. Safety issues are minimal due to their longer durability.

COLLEGE PARKWAY AT KIMWOOD ROAD / JONES STATION ROAD:

SHORT-TERM IMPROVEMENT: INSTALL BACKPLATES ON THE SIGNAL HEADS.

MID-TERM IMPROVEMENTS:

- EXTEND THE EASTBOUND LEFT TURN STORAGE LENGTH FROM 190 FEET TO 300 FEET.
- PROVIDE A NEW CROSSWALK AND PEDESTRIAN SIGNAL ACROSS THE NORTHERN LEG OF THE INTERSECTION (ALREADY INCLUDED AS PART OF THE BROADNECK TRAIL PHASE III PROJECT).

LONG-TERM IMPROVEMENT: REMOVE ALL SPAN WIRES AND INSTALL MAST ARMS FOR SIGNAL HEADS.

5.1.10 College Parkway at Shore Acres Road [STOP CONTROLLED]

OPERATIONS

The northbound right turn volumes exiting Shore Acres Road onto eastbound College Parkway are significantly high during the PM peak hour, resulting in delays and queues. A potential improvement would be to convert the existing northbound single shared left-right lane to provide a separate channelized right turn lane with an adequate acceleration lane.

Based on the existing and future traffic volumes at this intersection, a traffic signal would not be warranted.

SAFETY

It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

A pedestrian refuge area consisting of a 4-foot minimum wide concrete median is recommended along College Parkway to facilitate pedestrians crossing College Parkway in a two-step process if there are insufficient gaps along both directions of the roadway. Depending on the location of the median, pedestrians would potentially be crossing three or four lanes of traffic. While there is a traffic signal at the intersection of College Parkway/Shore Acres Road (North), approximately 1,055 feet to the east, that could assist with providing gaps in traffic in the westbound direction, the intersection of College Parkway/Jones Station Road/Kimwood Road may not since it is approximately 1,750 feet to the west. Also, stopping sight distance to the west may not be sufficient to the slight horizontal curve which would compromise the safety of crossing pedestrians. The future Broadneck Peninsula Trail on the northside of College Parkway would be destination for residents on the southside of College Parkway and thus the volume of pedestrians may increase over the years who are looking to access the trail. A pedestrian refuge area would be a traffic calming device as it would narrow the roadway to help control any excessive vehicle speeds along the corridor.

COLLEGE PARKWAY AT SHORE ACRES ROAD (STOP):

SHORT-TERM IMPROVEMENTS: NONE.

MID-TERM IMPROVEMENTS:

- RESTRIPE THE NORTHBOUND APPROACH TO PROVIDE A SEPARATE LEFT TURN AND A SEPARATE CHANNELIZED RIGHT TURN LANE (WITH AN ADEQUATE ACCELERATION LANE ALONG EASTBOUND COLLEGE PARKWAY).
- POTENTIALLY ADDING A CONCRETE MEDIAN ALONG COLLEGE PARKWAY TO PROVIDE A PEDESTRIAN REFUGE AREA.

LONG-TERM IMPROVEMENTS: NONE.

5.1.11 College Parkway at Shore Acres Road [SIGNAL]

OPERATIONS

The northbound approach out of the private driveway experiences delays and queues due to the current signal split-phasing for the minor roads. A potential improvement is to convert the minor roadway signal operations from split-phasing to concurrent left phasing, which provides additional green time for both minor approaches. The overall intersection LOS improves from a LOS D to a LOS B, with the NB approach alone improving from a LOS E with a delay of 59 seconds to a LOS D with a delay of 39 seconds. The southbound right turn movement out of Shore Acres Road onto Westbound College Parkway would continue to operate as an overlap with the eastbound left turn movement.

To better contain the eastbound left turn queues during the peak hours, it is recommended that the eastbound left turn storage length be increased from 185 feet to 250 feet.

SAFETY

Based on the existing pedestrian volumes collected, it is also recommended that a crosswalk and pedestrian signals be provided across the northern leg of the intersection to improve pedestrian safety and operations.

It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

To improve safety conditions, it is recommended that the existing span wire traffic signals be replaced with mast arm signal poles. While span wire traffic signals offer flexibility in where the signal poles are placed, mast arm signal poles offer the following safety benefits:

- They increase the visibility of traffic signal heads while decreasing angle collisions. Traffic signal heads will not move around vertically or horizontally from windy conditions as is the potential case with traffic signal heads on span wires.
- The sagging of the traffic signal heads and overhead signs on a span wire over time is more likely than on a sturdy designed mast arm. The potential vertical deflection of a traffic signal head on a span wire can pose a safety issue during windy conditions with heavy trucks.
- Mast arm signal poles require less maintenance than signal poles with span wires. Safety issues are minimal due to their longer durability.

COLLEGE PARKWAY AT SHORE ACRES ROAD (SIGNAL):

SHORT-TERM IMPROVEMENTS:

- CONVERT NORTHBOUND AND SOUTHBOUND APPROACHES FROM SPLIT-PHASING TO CONCURRENT LEFT-PHASING.
- INSTALL BACK PLATES ON THE SIGNAL HEADS.

MID-TERM IMPROVEMENTS:

- EXTEND THE EASTBOUND LEFT TURN STORAGE LENGTH FROM 185 FEET TO 250 FEET.
- PROVIDE A NEW CROSSWALK AND PEDESTRIAN SIGNAL ACROSS THE NORTHERN LEG OF THE INTERSECTION.

LONG-TERM IMPROVEMENT: REMOVE ALL SPAN WIRES AND INSTALL MAST ARMS FOR SIGNAL HEADS.

5.1.12 College Parkway at Bay Dale Drive [SIGNAL]

OPERATIONS

This intersection operates acceptably overall during both the AM and PM peak hours; however, the southbound approach experiences high delays and a significant number of left turn crashes occur at this location.

Potential operational recommendations could include the following:

- Modify the westbound left turn phase to protected only to reduce the risk of left turn crashes. This option would degrade the westbound left turn LOS from a C to an E since less signal time would be provided for the left turns. The overall westbound approach LOS would degrade from a C to a D. With a protected left turn phase, the storage length would need to be extended from 180 feet to 300 feet.
- To mitigate the southbound delays and queues, additional green time was provided in the form of 10 seconds and 20 seconds. This had minimal benefits on the southbound LOS and is therefore not recommended.
- Modify the southbound approach from a separate left turn lane and a shared through-right lane to a separate left, separate through, and separate right turn lane. A storage length of 75 feet would be required for the separate right turn lane. While the LOS for the southbound approach would remain an E with this option with a delay of 1 second, the overall southbound queue would be reduced from 400 feet to 325 feet. Right-of-way is a concern for this option since a sidewalk exists where the right turn lane would need to be constructed.

SAFETY

To improve safety at this intersection, potential safety recommendations could include the following:

- Provide an additional Flashing Red Arrow for the westbound protected-permitted left turn phase. While this would reduce the risk of left turn crashes, it has no benefit from an operational standpoint.
- Based on the existing operations of the intersection, providing Leading Pedestrian Intervals (LPI) is recommended at this intersection. The overall intersection still operates at LOS D with an increase in delay of 1 second, with the southbound movement operating at a LOS E (similar to existing conditions), but this is offset with the safety benefits.
- It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

To improve safety conditions, it is recommended that the existing span wire traffic signals be replaced with mast arm signal poles. While span wire traffic signals offer flexibility in where the signal poles are placed, mast arm signal poles offer the following safety benefits:

- They increase the visibility of traffic signal heads while decreasing angle collisions. Traffic signal heads will not move around vertically or horizontally from windy conditions as is the potential case with traffic signal heads on span wires.

- The sagging of the traffic signal heads and overhead signs on a span wire over time is more likely than on a sturdy designed mast arm. The potential vertical deflection of a traffic signal head on a span wire can pose a safety issue during windy conditions with heavy trucks.
- Mast arm signal poles require less maintenance than signal poles with span wires. Safety issues are minimal due to their longer durability.

COLLEGE PARKWAY AT BAY DALE DRIVE:

SHORT-TERM IMPROVEMENTS:

- MODIFY THE WESTBOUND LEFT TURN SIGNAL PHASE TO A FLASHING RED ARROW AS PROTECTED-PERMITTED PHASE.

OR

- MODIFY THE WESTBOUND LEFT TURN PHASE TO A PROTECTED-ONLY PHASE.
- INSTALL BACK PLATES ON THE SIGNAL HEADS.

MID-TERM IMPROVEMENTS:

- EXTEND THE WESTBOUND LEFT TURN STORAGE LENGTH FROM 190 FEET TO 300 FEET.
- PROVIDE LEADING PEDESTRIAN INTERVALS (LIP) FOR ALL FOUR LEGS OF THE INTERSECTION.

LONG-TERM IMPROVEMENT: REMOVE ALL SPAN WIRES AND INSTALL MAST ARMS FOR SIGNAL HEADS.

5.1.13 College Parkway at Bellerive Drive / Pennington Lane South [SIGNAL]

OPERATIONS

Overall, this intersection operates acceptably during the peak hours

SAFETY

The southbound approach (Bellerive Drive) does not have sufficient green time allocated to safely allow pedestrians to cross the west leg of College Parkway. It is recommended that the green time and flashing do not walk time (FDW) for the southbound approach be increased by 5 seconds, which results in negligible impacts on the LOS and queues at the intersection.

It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

To improve safety conditions, it is recommended that the existing span wire traffic signals be replaced with mast arm signal poles. While span wire traffic signals offer flexibility in where the signal poles are placed, mast arm signal poles offer the following safety benefits:

- They increase the visibility of traffic signal heads while decreasing angle collisions. Traffic signal heads will not move around vertically or horizontally from windy conditions as is the potential case with traffic signal heads on span wires.
- The sagging of the traffic signal heads and overhead signs on a span wire over time is more likely than on a sturdy designed mast arm. The potential vertical deflection of a traffic signal head on a span wire can pose a safety issue during windy conditions with heavy trucks.
- Mast arm signal poles require less maintenance than signal poles with span wires. Safety issues are minimal due to their longer durability.

COLLEGE PARKWAY AT BELLERIVE DRIVE / PENNINGTON LANE SOUTH:

SHORT-TERM IMPROVEMENTS:

- PROVIDE AN ADDITIONAL FIVE (5) SECONDS OF GREEN TIME TO THE SOUTHBOUND APPROACH (BELLERIVE DRIVE) TO FACILITATE PEDESTRIAN CROSSINGS FOR THE WEST LEG OF THE INTERSECTION.
- INSTALL BACK PLATES ON THE SIGNAL HEADS.

MID-TERM IMPROVEMENTS: NONE

LONG-TERM IMPROVEMENT: REMOVE ALL SPAN WIRES AND INSTALL MAST ARMS FOR SIGNAL HEADS.

5.1.14 College Parkway at Green Holly Drive / Broadneck Park Road [SIGNAL]

OPERATIONS

None.

SAFETY

The northbound approach of the intersection does not have sufficient green time allocated to safely allow pedestrians to cross the east leg of College Parkway. Heavy pedestrian volumes were recorded across the east leg due to its proximity to Broadneck High School, as well as the location of the parking lot in the park south of the intersection, where students can park and then walk to the High School. It is recommended that the green time and flashing do not walk time (FDW) for the northbound approach be increased by 5 seconds, which results in negligible impacts on the LOS and queues at the intersection.

To improve pedestrian safety, it is recommended that a "Turning Traffic Yield to Peds" sign be installed for the westbound right turn traffic. Providing a crossing guard to assist with pedestrian crossings during school arrival and dismissal hours would also provide a safety benefit.

Lastly, providing Leading Pedestrian Intervals (LPI) of seven (7) seconds before the northbound phase (Phase 3) is recommended at this intersection to improve safety for pedestrians. This results in a degrade in the overall intersection LOS from a C to a D, with the northbound movement operating at a LOS E, but this is offset with the safety benefits.

It is recommended that backplates be installed on the existing signal heads. Retroreflective traffic signal backplates have been found to improve the visibility of a traffic signal head by providing a contrasting background along with a yellow retroreflective border. Studies from the Federal Highway Administration (FHWA) have shown that the retroreflective backplates help to reduce crashes because motorists are able to clearly identify the traffic signal head whether day or night and rain or snow. During nighttime driving or bad weather conditions (i.e., heavy rain, snow), headlights from vehicles can pick up the retroreflective border and have it reflected back towards the motorist. The retroreflective border is a fluorescent tape that can be added for an additional cost of approximately $35 or replacing the entire backplate with the retroreflective border included for an approximate cost of $100. The retroreflective traffic signal backplates have been seen to reduce crashes by up to 30%.

To improve safety conditions, it is recommended that the existing span wire traffic signals be replaced with mast arm signal poles. While span wire traffic signals offer flexibility in where the signal poles are placed, mast arm signal poles offer the following safety benefits:

- They increase the visibility of traffic signal heads while decreasing angle collisions. Traffic signal heads will not move around vertically or horizontally from windy conditions as is the potential case with traffic signal heads on span wires.
- The sagging of the traffic signal heads and overhead signs on a span wire over time is more likely than on a sturdy designed mast arm. The potential vertical deflection of a traffic signal head on a span wire can pose a safety issue during windy conditions with heavy trucks.
- Mast arm signal poles require less maintenance than signal poles with span wires. Safety issues are minimal due to their longer durability.

COLLEGE PARKWAY AT GREEN HOLLY DRIVE / BROADNECK PARK ROAD:

SHORT-TERM IMPROVEMENTS:

- PROVIDE AN ADDITIONAL FIVE (5) SECONDS OF GREEN TIME TO THE NORTHERN APPROACH (GREEN HOLLY DRIVE) TO FACILITATE PEDESTRIAN CROSSINGS FOR THE EAST LEG OF THE INTERSECTION.
- PROVIDE A "TURNING TRAFFIC YIELD TO PEDS" SIGN FOR THE WESTBOUND RIGHT TURNS, WITH A POTENTIAL CROSSING GUARD DURING THE SCHOOL ARRIVAL AND DISMISSAL TIMES.
- PROVIDE SEVEN (7) SECS OF LPI FOR THE NORTHBOUND APPROACH (PHASE 3).
- INSTALL BACK PLATES ON THE SIGNAL HEADS.

MID-TERM IMPROVEMENTS: NONE

LONG-TERM IMPROVEMENT: REMOVE ALL SPAN WIRES AND INSTALL MAST ARMS FOR SIGNAL HEADS.

5.1.15 College Parkway at Cape St. Claire Road (MD 179) [SIGNAL]

OPERATIONS

Operational concerns exist during the summertime peak periods due to the seasonal traffic diverting off MD 2 and US 50 and cutting through College Parkway to access the Bay Bridge. Based on the results of the Summer 2023 US 50 pilot project, a reduction of approximately 2,000 vehicles per day traveling along eastbound College Parkway at Cape St Claire Road to access the College Parkway service road was observed. It is assumed that when MDOT SHA permanently addresses the cut-through and diverting concerns along MD 2 and US 50, the operational concerns at this intersection will be mitigated as well.

SAFETY

None.

COLLEGE PARKWAY AT CAPE ST. CLAIRE ROAD:

SHORT-/MID-/LONG-TERM IMPROVEMENTS: NONE – SUMMER CAPACITY ISSUES ARE BEING RESOLVED THROUGH THE MDOT SHA BAY BRIDGE PILOT PROJECTS.

5.1.16 College Parkway at Destiny Circle / Broadneck Road [STOP CONTROLLED]

OPERATIONS

There is an ongoing multi-year geometric project at this location that will add new right and left turn lanes along College Parkway, as well as an overhanging pedestrian signal. The signal will flash yellow during all times of the day until activated by a pedestrian to cross College Parkway, where it will turn red. Side traffic from Destiny Circle is expected to yield to the pedestrian crossing movement as needed.

Table 16 includes the detailed analyses of the intersection as stop-controlled for existing, 2028 and 2032 conditions. The intersection is expected to continue to operate at acceptable conditions (LOS D or better at all approaches).

Intersection / Approach LOS (sec. delay/veh.)	Summer 2022		Fall 2022		Future Build Summer 2028		Future Build Fall 2028		Future Build Summer 2032		Future Build Fall 2032	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)												
Eastbound Approach *(College Pkwy)*			A [0.1]	A [0.2]			A (0.1)	A (0.2)			A (0.1)	A (0.3)
Westbound Approach *(College Pkwy)*			A [0.9]	A [0.4]			A (1.0)	A (0.4)			A (1.0)	A (0.4)
Northbound Approach *(Broadneck Rd)*			B [13.9]	C [15.5]			B (14.4)	C (16.2)			B (14.4)	C (16.5)
Southbound Approach *(Destiny Cir)*			C [22.5]	C [17.3]			C (24.0)	C (18.2)			D (25.2)	C (18.5)

Table 16: College Parkway at Destiny Circle Stop-Controlled Analysis

While a traffic signal was previously recommended at this intersection to facilitate pedestrian crossings, a single lane roundabout was also further studied as part of this project.

Table 17 shows the detailed analyses of the intersection as a single lane roundabout for the 2028 and 2032 conditions. This intersection is expected to operate at acceptable conditions for both the 2028 and 2032 conditions. ***Appendix H*** includes the detailed SIDRA analyses indicating that a single lane roundabout would operate at acceptable LOS A during both the AM and PM peak hours under existing, 2028 and 2032 future conditions. A roundabout will increase queues along mainline College Parkway. However, queues are not expected to be more than 100 feet.

Intersection / Approach	2028 Fall AM			2028 Fall PM		
	LOS (Delay) (sec/veh)	Volume to Capacity (v/c) ratio	95th Percentile Queue (feet)	LOS (Delay) (sec/veh)	Volume to Capacity (v/c) ratio	95th Percentile Queue (feet)
INTERSECTION 16 – College Parkway & Destiny Cir/Broadneck Rd (ROUNDABOUT)						
Eastbound Approach *(College Pkwy)*	A (6.4)	0.38	62	A (6.8)	0.421	74
Westbound Approach *(College Pkwy)*	A (7.2)	0.458	87	A (7.3)	0.460	87
Northbound Approach *(Locust Ridge Ln)*	A (4.6)	0.013	2	A (4.9)	0.021	3
Southbound Approach *(Rosslare Dr)*	A (5.2)	0.014	2	A (5.2)	0.021	3

Intersection / Approach	2032 Fall AM			2032 Fall PM		
	LOS (Delay) (sec/veh)	Volume to Capacity (v/c) ratio	95th Percentile Queue (feet)	LOS (Delay) (sec/veh)	Volume to Capacity (v/c) ratio	95th Percentile Queue (feet)
INTERSECTION 16 – College Parkway & Destiny Cir/Broadneck Rd (ROUNDABOUT)						
Eastbound Approach *(College Pkwy)*	A (6.2)	0.363	57	A (7.0)	0.434	78
Westbound Approach *(College Pkwy)*	A (6.9)	0.437	80	A (7.5)	0.475	92
Northbound Approach *(Locust Ridge Ln)*	A (4.5)	0.013	2	A (5.3)	0.023	3
Southbound Approach *(Rosslare Dr)*	A (5.0)	0.013	2	A (5.3)	0.023	3

Table 17: College Parkway at Destiny Circle SIDRA Roundabout Analysis

SAFETY

New Rectangular Rapid Flashing Beacons (RRFB) and crosswalks were recently installed at this intersection along College Parkway to facilitate pedestrian crossings. This works as a pedestrian signal as push buttons activate the signal warning drivers along College Parkway about pedestrians.

The potential roundabout design option would continue to provide full access to all movements at the intersection, but also reduce pedestrian crash risk and act as a traffic calming device by requiring mainline motorists to reduce speeds to navigate the intersection.

COLLEGE PARKWAY AT DESTINY CIRCLE / BROADNECK ROAD:

SHORT-/MID-TERM IMPROVEMENTS: NONE

LONG-TERM IMPROVEMENT: INSTALLATION OF A POTENTIAL ROUNDABOUT.

5.1.17 College Parkway Eastbound Lane Reduction between the Jones Station Road and the Jones Station Road/College Manor Drive Intersections

AMT evaluated the eastbound College Parkway left lane reduction from two (2) lanes to one (1) lane between Jones Station Road to Jones Station Road / College Manor Drive. While no operational issues were identified with respect to traffic queues from bottlenecking, there were safety concerns identified during the feedback from the community public meeting. Multiple site visits concluded that the existing pavement markings were in compliance with the latest Maryland MUTCD standards (Section 3B.09). The existing signage types and location are shown on ***Figure 25a***. However, some of the existing signage did not conform to latest standards in terms of size, spacing, and placement within the signage sequence.

Left lane reductions are not as common as right lane reductions along most roadways, thus the driver expectation of this movement is slightly compromised. Also, the left lane of a multi-lane approach is typically the "fast lane" or where the higher speed vehicles travel. Vehicles in this left lane are taking advantage of this and possibly cutting off vehicles traveling in the right lane while merging to the right.

AMT has recommended removing the existing signage assembly and installing new signage per Section 3B.09. This would entail utilizing the correct sign sizes and spacing and the double posting of all the signs except for the Lane Ends (W9-2(2)) / Merge Right (W9-2(3)) sign which is the last sign of the sequence. The additional signage should assist in emphasizing the left lane reduction and corresponding safe right merge along this stretch of roadway. The proposed signage types and locations are shown on ***Figure 25b***.

Appendix G contains the preliminary construction cost estimates for each intersection and short-term, mid-term, and long-term improvements.

FIGURE 25a - EXISTING CONDITIONS - EB LANE REDUCTION

Anne Arundel County DPW&YOU *Making a difference, together*

PARTNER MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION

CONSULTANT A. MORTON THOMAS AND ASSOCIATES, INC.

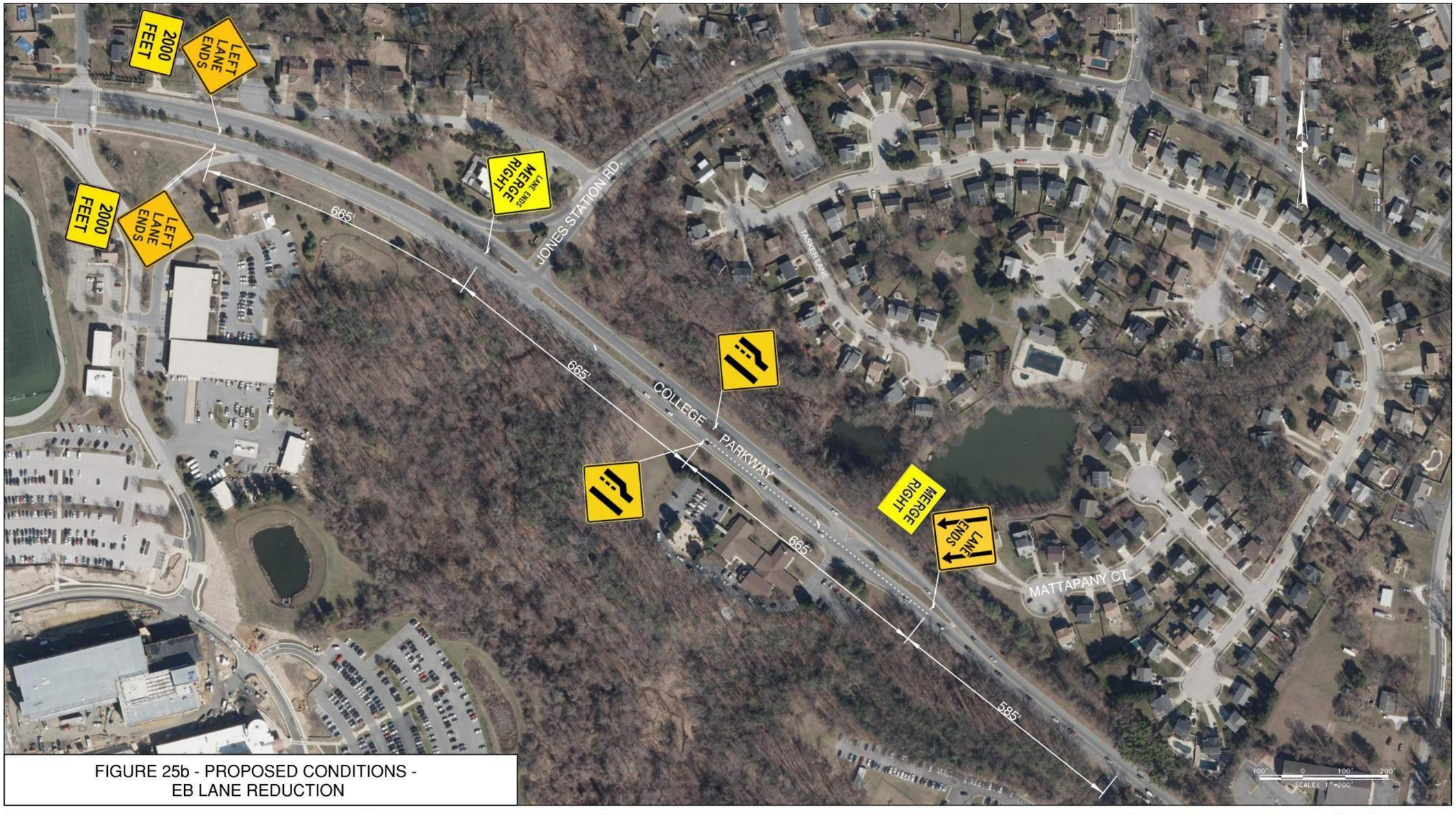


FIGURE 25b - PROPOSED CONDITIONS -
EB LANE REDUCTION

5.1.18 Other Potential Operational and Safety Improvements

Additional potential corridor-wide improvements could be implemented to improve both the operational and safety conditions along the College Parkway corridor during future conditions, which include Transportation System Management and Operations (TSMO) strategies:

Development of a "Flush" Traffic Signal Pattern

A "flush" signal timing pattern could be implemented along the signalized corridor intersections to clear out unusual traffic patterns/volumes due to an incident, special event, increased travel demand triggered by seasonal motorists heading to the Eastern Shore, etc. A "flushing" system would provide additional green time to a particular movement along College Parkway, essentially "flushing" the preferred movement through faster than using the regular signal timings.

Implement Adaptive Signal Timing Technology

Adaptive signal timing technology allows the signals to measure/monitor live traffic conditions (vehicles, pedestrians, bicyclists, etc.) and uses software to adapt the signal timings accordingly in response to the real-time traffic conditions. The modified timings are calculated based on the traffic demand and the timings can be adjusted accordingly for each signal cycle. The signal system where the adaptive technology is installed adjust the timings along the corridor without the need for human interaction. The adaptive technology results in fewer motorist stops at the signalized intersections and the amount of time each motorist must wait at a red light. Further operational studies would be required along the College Parkway corridor to determine if implementing an adaptive signal system for this project would not further degrade operations at the unsignalized intersections where insufficient gaps exist today.

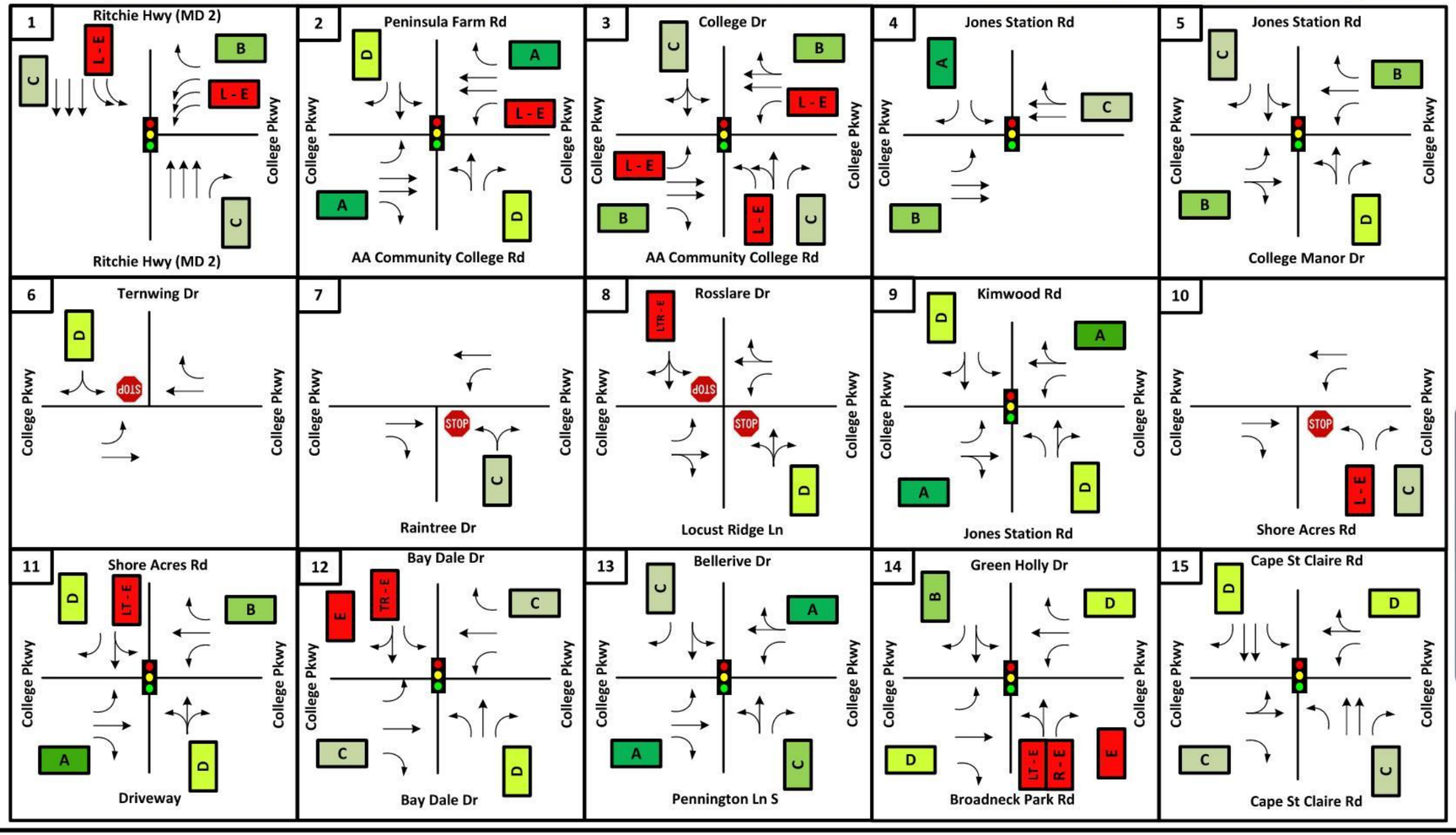
5.1.19 Build (2028) Summer Conditions

The Build 2028 Summer peak hour conditions analyses are based on the 2028 AM and PM Summer peak hour volumes and assuming the proposed improvements as documented. The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time will continue to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time will continue to be provided to the WB lefts to access the AA Community College during the AM and PM peak hour.
3. At College Drive / AA Community College (signal): Additional green time will continue to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for both College Drive and AA Community College access (PM peak only), as well as the WB lefts (AM and PM peaks), and the EB lefts (AM and PM peak only).
4. At Jones Station Rd (signal): Intersection is proposed to be signalized and movements are expected to operate at acceptable conditions during the AM and PM peak hours.
5. At Ternwing Drive (stop): All approaches are now expected to operate acceptably during the AM and PM peak hours.
6. At Raintree Drive (stop): All approaches are now expected to operate acceptably during the AM and PM peak hours.
7. At Rosslare Drive / Locust Ridge Lane (stop): The SB left turn approach out of Rosslare Drive will continue to operate at unacceptable LOS E and LOS F during the AM and PM peak hours, and the NB approach out of Locust Ridge Lane will continue to operate at unacceptable LOS E and LOS F during the AM and PM peak hour due to insufficient gaps in the mainline College Parkway through movements. A roundabout is proposed at this intersection for future conditions
8. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
9. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
10. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E and LOS F during the AM and PM peak hours due to insufficient green time provided for the minor roadway.
11. At Cape St Claire Road (MD 179) (signal): The EB shared through-left lane along College Parkway will now operate at unacceptable LOS F (from a LOS E during existing conditions) during the PM peak hour due to very high traffic volumes traveling along College Parkway. This analysis assumes that no improvements are in place to mitigate the MD 2 and US 50 congestion during the summertime (worst-case scenario).

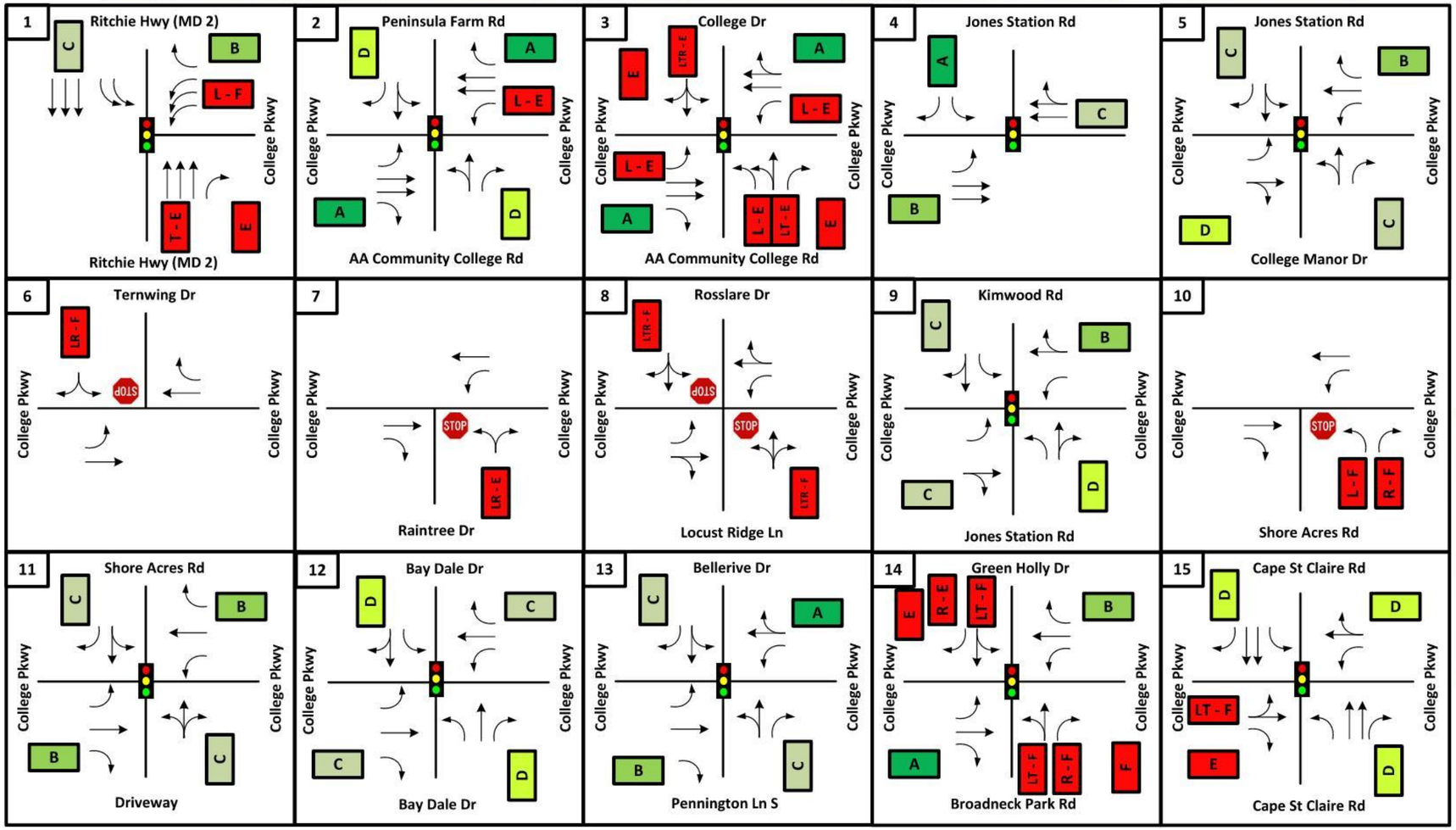
The AM peak hour levels of service summary is shown on ***Figure 26a*** and the PM peak hour levels of service summary is shown on ***Figure 26b***.

The results of the operational analyses for Build (2028) Summer conditions are summarized in ***Table 18*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix F***.



College Parkway Operational and Safety Study
2028 Build Summer AM LOS Summary
August 2024
FIGURE 26a


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Anne Arundel Community College
Bay Hills Golf Club
COVID-19 Drive-Thru Testing at Walgreens
Senor Chile Cantina
Broadneck Park
Wawa
Severna Park Golf Center
Arnold Park


1 Ritchie Hwy (MD 2)
C
B
L - F
T - E
E
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
D
A
L - E
A
D
College Pkwy
AA Community College Rd
3 College Dr
E
LTR - E
A
L - E
L - E
A
L - E
LT - E
E
College Pkwy
AA Community College Rd
4 Jones Station Rd
A
C
B
College Pkwy
5 Jones Station Rd
C
B
D
C
College Pkwy
College Manor Dr
6 Ternwing Dr
LR - F
STOP
College Pkwy
7
STOP
LR - E
College Pkwy
Raintree Dr
8 Rosslare Dr
LTR - F
STOP
STOP
LTR - F
College Pkwy
Locust Ridge Ln
9 Kimwood Rd
C
B
C
D
College Pkwy
Jones Station Rd
10
STOP
L - F
R - F
College Pkwy
Shore Acres Rd
11 Shore Acres Rd
C
B
B
C
College Pkwy
Driveway
12 Bay Dale Dr
D
C
C
D
College Pkwy
Bay Dale Dr
13 Bellerive Dr
C
A
B
C
College Pkwy
Pennington Ln S
14 Green Holly Dr
E
R - E
LT - F
B
A
LT - F
R - F
F
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
D
D
LT - F
E
D
College Pkwy
Cape St Claire Rd
College Parkway Operational and Safety Study
2028 Build Summer PM LOS Summary
August 2024
FIGURE 26b
N
NOT TO SCALE
LEGEND
Traffic Control
Roadway
Laneage
LOS
Optimal
Acceptable
Over Capacity
A
B
C
D
E
F
AMT

Intersection / Approach LOS (sec. delay/veh.)	Future Build Summer 2028	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (20.3)**	**D (39.9)**
Westbound Approach *(College Parkway)*	B (15.4)	B (18.4)
Northbound Approach *(Ritchi Hwy)*	C (20.7)	E (66.7)
Southbound Approach *(Ritchi Hwy)*	C (22.2)	C (24.7)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**A (9.4)**	**A (8.9)**
Eastbound Approach *(College Pkwy)*	A (6.9)	A (7.4)
Westbound Approach *(College Pkwy)*	A (6.1)	A (6.8)
Northbound Approach *(AACC Road)*	D (47.7)	D (48.5)
Southbound Approach *(Lake Wheeler Road)*	D (48.5)	D (50.0)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**B (16.1)**	**A (5.4)**
Eastbound Approach *(College Pkwy)*	B (15.1)	A (4.6)
Westbound Approach *(College Pkwy)*	B (15.8)	A (4.0)
Northbound Approach *(AACC Road)*	C (30.5)	E (55.9)
Southbound Approach *(College Dr)*	C (29.6)	E (57.1)
INTERSECTION 4 – College Pkwy & Jones Station Rd (SIGNALIZED)		
Overall	**B (13.7)**	**B (19.9)**
Eastbound Approach *(College Pkwy)*	B (11.9)	B (18.3)
Westbound Approach *(College Pkwy)*	C (22.8)	C (32.6)
Southbound Approach *(Jones Station Rd)*	A (0.6)	A (0.6)
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**B (14.5)**	**C (27.9)**
Eastbound Approach *(College Pkwy)*	B (12.7)	D (40.5)
Westbound Approach *(College Pkwy)*	B (11.0)	B (13.1)
Northbound Approach *(College Manor Dr)*	D (40.6)	C (34.9)
Southbound Approach *(Jones Station Rd)*	C (28.9)	C (21.7)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	A [8.9]	A [9.6]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	D [29.3]	F [386.0]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.1]	B [10.3]
Northbound Approach (Raintree Dr)	C (18.1)	E [36.6]
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [9.1]	B [10.1]
Westbound Approach *(College Pkwy)*	A [9.2]	B [10.8]
Northbound Approach *(Locust Ridge Ln)*	D [27.5]	F [70.4]
Southbound Approach *(Rosslare Dr)*	E [39.5]	F [215.8]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**A (9.4)**	**B (19.3)**
Eastbound Approach *(College Pkwy)*	A (5.8)	C (21.2)
Westbound Approach *(College Pkwy)*	A (4.8)	B (11.7)
Northbound Approach *(Jones Station Rd)*	D (49.6)	D (38.0)
Southbound Approach *(Kimwood Rd)*	D (45.7)	C (29.5)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.6]	B 11.3]
Northbound Approach (Shore Acres Rd)	C [17.2]	F [53.7]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**B (17.3)**	**B (16.8)**
Eastbound Approach *(College Pkwy)*	A (8.2)	B (12.8)
Westbound Approach *(College Pkwy)*	B (11.4)	B (19.2)
Northbound Approach *(Driveway)*	D (39.7)	C (27.0)
Southbound Approach *(Shore Acres Rd)*	D (43.6)	C (24.2)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (37.5)**	**C (34.0)**
Eastbound Approach *(College Pkwy)*	C (24.5)	C (33.7)
Westbound Approach *(College Pkwy)*	C (24.0)	C (24.7)
Northbound Approach *(Bay Dale Dr)*	D (50.2)	D (36.5)
Southbound Approach *(Bay Dale Dr)*	E (67.9)	D (45.2)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**A (9.8)**	**B (10.6)**
Eastbound Approach *(College Pkwy)*	A (8.1)	B (10.1)
Westbound Approach *(College Pkwy)*	A (7.4)	A (6.7)
Northbound Approach *(Pennington Ln S)*	C (22.2)	C (27.4)
Southbound Approach *(Bellerive Dr)*	C (22.9)	C (28.4)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**D (42.2)**	**B (16.1)**
Eastbound Approach *(College Pkwy)*	D (47.3)	A (3.7)
Westbound Approach *(College Pkwy)*	D (52.3)	B (10.5)
Northbound Approach *(Broadneck Park Rd.)*	E (74.2)	F (96.0)
Southbound Approach *(Green Holly Dr.)*	B (17.5)	E (71.3)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (35.3)**	**D (46.4)**
Eastbound Approach *(College Pkwy)*	C (34.1)	E (70.2)
Westbound Approach *(College Pkwy)*	D (42.9)	D (44.6)
Northbound Approach *(Cape S. Clair Rd.)*	C (32.1)	D (35.5)
Southbound Approach *(Cape St. Claire Rd.)*	D (35.8)	D (39.6)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*		
Westbound Approach *(College Pkwy)*		
Northbound Approach *(Broadneck Rd)*		
Southbound Approach *(Destiny Cir)*		

Table 18: Intersection Level of Service Summary (Build 2028 Summer Conditions)

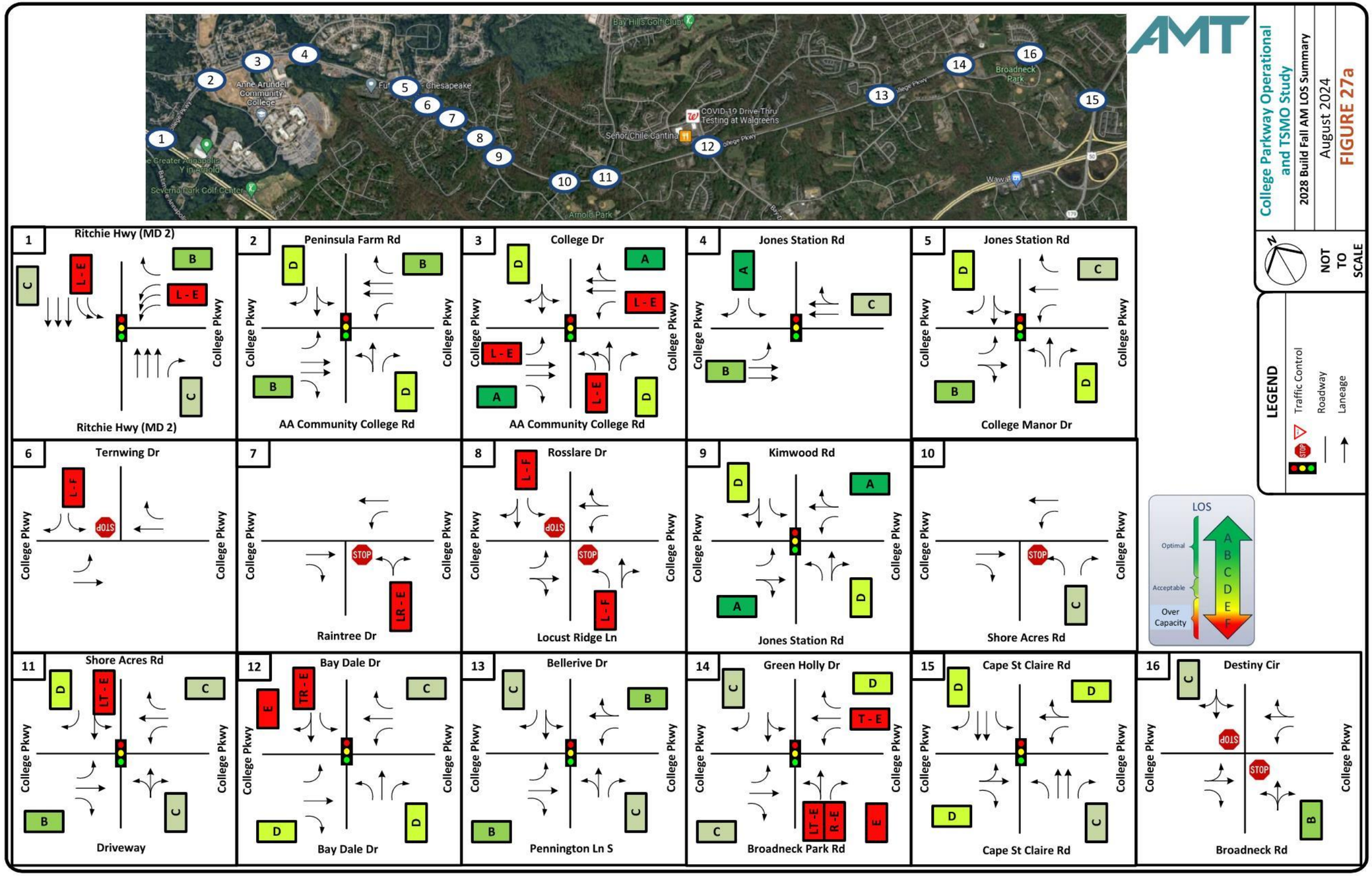
5.1.20 Build (2028) Fall Conditions

The Build 2028 Fall peak hour conditions analyses are based on the 2028 AM and PM Fall peak hour volumes and assuming the proposed improvements as documented. The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time continues to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time continues to be provided to the WB lefts to access the AA Community College during the PM peak hour. In addition, the SB shared through-left lane out of Peninsula Farm Road will now operate at LOS E during the PM peak hour.
3. At College Drive / AA Community College (signal): The majority of the signal green time continues to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for AA Community College access and the EB /WB lefts (AM peak), and for College Drive and the WB lefts (PM peak).
4. At Jones Station Road (signal): This intersection is proposed to be signalized and all movements are expected to operate at acceptable conditions during both the AM and PM peak hours.
5. At Jones Station Road / College Manor Drive (signal): All movements are expected to operate at acceptable conditions during both the AM and PM peak hours.
6. At Ternwing Drive (stop): The SB approach out of Ternwing Drive will continue to operate at unacceptable LOS F during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
7. At Raintree Drive (stop): The NB approach out of Raintree Drive will now operate at unacceptable LOS E during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
8. At Rosslare Drive / Locust Ridge Lane (stop): The NB approach out of Locust Ridge Lane and the SB approach out of Rosslare Drive continue to operate at unacceptable LOS F during both the AM and PM peak hours, due to insufficient gaps in the mainline College Parkway through movements.
9. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will now operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
10. At Shore Acres Road / driveway (signal): The SB shared left-through will now operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for that phase.
11. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
12. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM and PM peak hours due to insufficient green time provided for the minor roadway.

The AM peak hour levels of service summary is shown on ***Figure 27a*** and the PM peak hour levels of service summary is shown on ***Figure 27b***.

The results of the operational analyses for Build (2028) Fall conditions are summarized in ***Table 19*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix F***.


AMT
College Parkway Operational and TSMO Study
2028 Build Fall AM LOS Summary
August 2024
FIGURE 27a
NOT TO SCALE
Bay Hills Golf Club
Anne Arundel Community College
Severna Park Golf Center
Arnold Park
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Wawa
1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
16 Destiny Cir
College Pkwy
AA Community College Rd
College Manor Dr
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
Driveway
Bay Dale Dr
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
Broadneck Rd
LEGEND
Traffic Control
Roadway
Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
1
2
3
4
5
6
7
8
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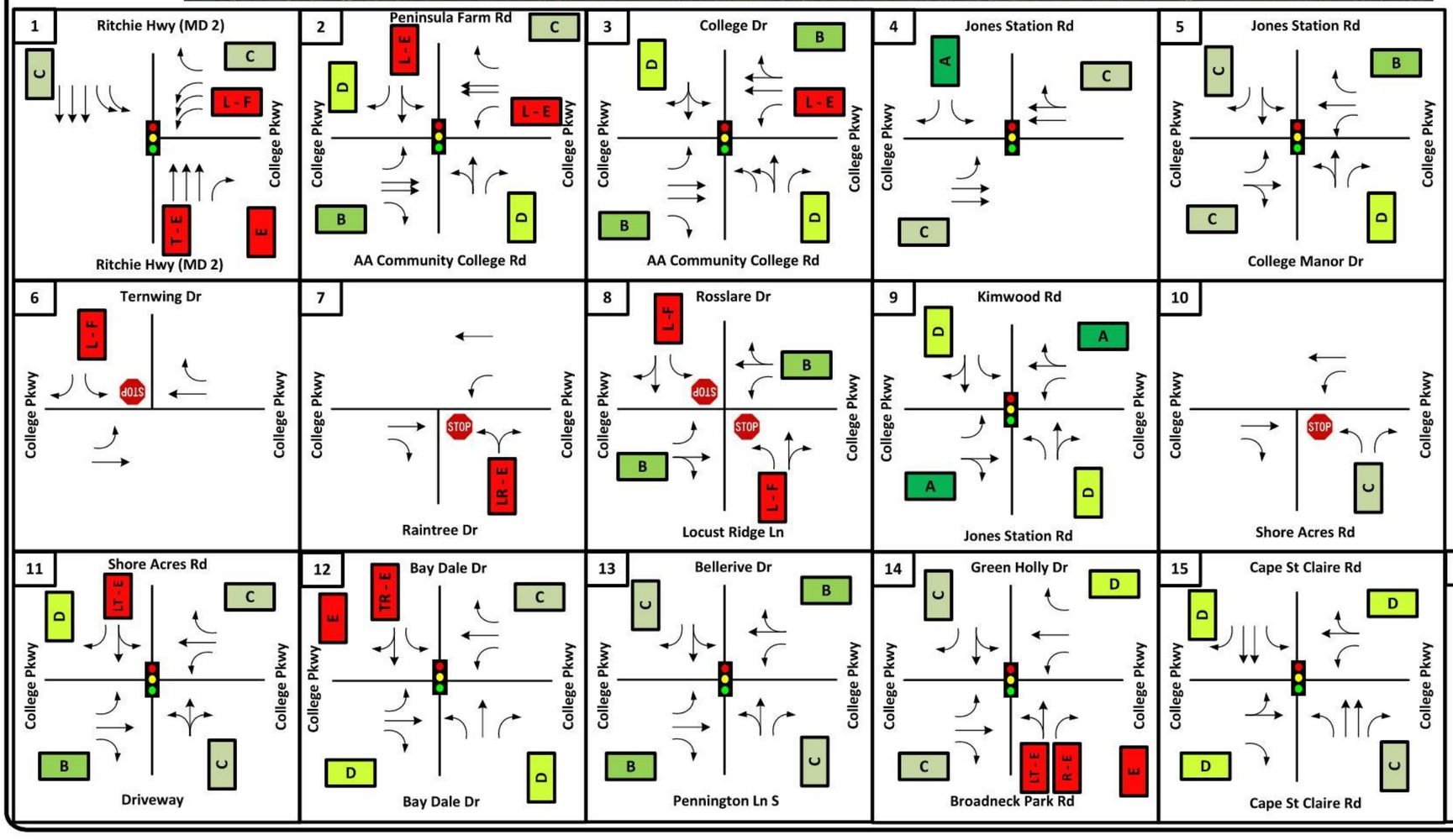
15
16


1 Ritchie Hwy (MD 2)
C
C
L - F
T - E
E
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
C
L - E
D
L - E
B
D
College Pkwy
AA Community College Rd
3 College Dr
D
B
L - E
B
D
College Pkwy
AA Community College Rd
4 Jones Station Rd
A
C
C
College Pkwy
5 Jones Station Rd
C
B
C
D
College Pkwy
College Manor Dr
6 Ternwing Dr
L - F
STOP
College Pkwy
7
STOP
LR - E
College Pkwy
Raintree Dr
8 Rosslare Dr
L - F
STOP
B
B
STOP
L - F
College Pkwy
Locust Ridge Ln
9 Kimwood Rd
D
A
A
D
College Pkwy
Jones Station Rd
10
STOP
C
College Pkwy
Shore Acres Rd
11 Shore Acres Rd
D
LT - E
C
B
C
College Pkwy
Driveway
12 Bay Dale Dr
E
TR - E
C
D
D
College Pkwy
Bay Dale Dr
13 Bellerive Dr
C
B
B
C
College Pkwy
Pennington Ln S
14 Green Holly Dr
C
D
C
LT - E
R - E
E
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
D
D
D
C
College Pkwy
Cape St Claire Rd
16 Destiny Cir
C
STOP
STOP
B
College Pkwy
Broadneck Rd
LOS
Optimal
Acceptable
Over Capacity
A
B
C
D
E
F
LEGEND
Traffic Control
Roadway
Laneage
NOT TO SCALE
College Parkway Operational and Safety Study
2028 Build Fall PM LOS Summary
August 2024
FIGURE 27b

Intersection / Approach LOS (sec. delay/veh.)	Future Build Fall 2028	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (21.5)**	**D (36.8)**
Westbound Approach *(College Parkway)*	B (16.2)	C (21.6)
Northbound Approach *(Ritchi Hwy)*	C (27.1)	E (61.5)
Southbound Approach *(Ritchi Hwy)*	C (20.9)	C (23.7)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**B (17.7)**	**C (24.8)**
Eastbound Approach *(College Pkwy)*	B (13.6)	B (17.2)
Westbound Approach *(College Pkwy)*	B (16.1)	C (21.5)
Northbound Approach *(AACC Road)*	D (41.8)	D (50.7)
Southbound Approach *(Lake Wheeler Road)*	D (44.8)	D (51.5)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**A (7.0)**	**B (14.7)**
Eastbound Approach *(College Pkwy)*	A (4.7)	B (12.1)
Westbound Approach *(College Pkwy)*	A (5.6)	B (10.0)
Northbound Approach *(AACC Road)*	D (54.6)	D (49.8)
Southbound Approach *(College Dr)*	D (54.3)	D (42.6)
INTERSECTION 4 – College Pkwy & Jones Station Rd (SIGNALIZED)		
Overall	**B (14.7)**	**C (21.6)**
Eastbound Approach *(College Pkwy)*	B (11.7)	C (20.5)
Westbound Approach *(College Pkwy)*	C (24.4)	C (32.5)
Southbound Approach *(Jones Station Rd)*	A (0.7)	A (0.4)
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**C (31.8)**	**C (24.6)**
Eastbound Approach *(College Pkwy)*	B (14.5)	C (34.0)
Westbound Approach *(College Pkwy)*	C (32.7)	B (14.9)
Northbound Approach *(College Manor Dr)*	D (42.0)	D (36.1)
Southbound Approach *(Jones Station Rd)*	D (50.8)	C (23.8)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	B [10.4]	B [10.6]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	F [149.2]	F (5507.3)
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [10.0]	B [10.8]
Northbound Approach (Raintree Dr)	E [40.0]	E (47.2)
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [11.9]	B [12.4]
Westbound Approach *(College Pkwy)*	B [10.3]	B [10.9]
Northbound Approach *(Locust Ridge Ln)*	F [97.1]	F [74.6]
Southbound Approach *(Rosslare Dr)*	F [474.8]	F [426.9]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**B (13.5)**	**C (26.8)**
Eastbound Approach *(College Pkwy)*	A (9.3)	C (29.5)
Westbound Approach *(College Pkwy)*	A (9.9)	B (17.8)
Northbound Approach *(Jones Station Rd)*	D (47.1)	D (47.5)
Southbound Approach *(Kimwood Rd)*	D (49.2)	C (29.9)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [11.1]	B [11.7]
Northbound Approach (Shore Acres Rd)	C [17.5]	E (44.2)
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**C (26.2)**	**C (22.5)**
Eastbound Approach *(College Pkwy)*	B (15.9)	B (16.7)
Westbound Approach *(College Pkwy)*	C (21.6)	C (25.5)
Northbound Approach *(Driveway)*	C (32.4)	C (31.5)
Southbound Approach *(Shore Acres Rd)*	D (43.6)	C (30.5)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (39.7)**	**C (33.9)**
Eastbound Approach *(College Pkwy)*	D (35.1)	C (32.0)
Westbound Approach *(College Pkwy)*	C (27.9)	C (30.6)
Northbound Approach *(Bay Dale Dr)*	D (47.8)	C (34.3)
Southbound Approach *(Bay Dale Dr)*	E (68.8)	D (44.6)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**B (15.1)**	**B (11.5)**
Eastbound Approach *(College Pkwy)*	B (13.8)	A (9.6)
Westbound Approach *(College Pkwy)*	B (11.0)	A (8.9)
Northbound Approach *(Pennington Ln S)*	C (22.2)	C (23.3)
Southbound Approach *(Bellerive Dr)*	C (25.0)	C (24.8)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**C (34.7)**	**C (25.2)**
Eastbound Approach *(College Pkwy)*	C (27.2)	A (9.4)
Westbound Approach *(College Pkwy)*	D (52.7)	C (20.1)
Northbound Approach *(Broadneck Park Rd.)*	E (74.7)	E (72.8)
Southbound Approach *(Green Holly Dr.)*	C (24.9)	D (53.0)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (39.9)**	**D (38.1)**
Eastbound Approach *(College Pkwy)*	D (43.9)	D (41.8)
Westbound Approach *(College Pkwy)*	D (45.4)	D (47.5)
Northbound Approach *(Cape S. Clair Rd.)*	C (34.1)	C (32.1)
Southbound Approach *(Cape St. Claire Rd.)*	D (38.8)	D (41.6)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [0.1]	A [0.2]
Westbound Approach *(College Pkwy)*	A [1.0]	A [0.4]
Northbound Approach *(Broadneck Rd)*	B [14.4]	C [16.2]
Southbound Approach *(Destiny Cir)*	C [24.0]	C [18.2]

Table 19: Intersection Level of Service Summary (Build 2028 Fall Conditions)

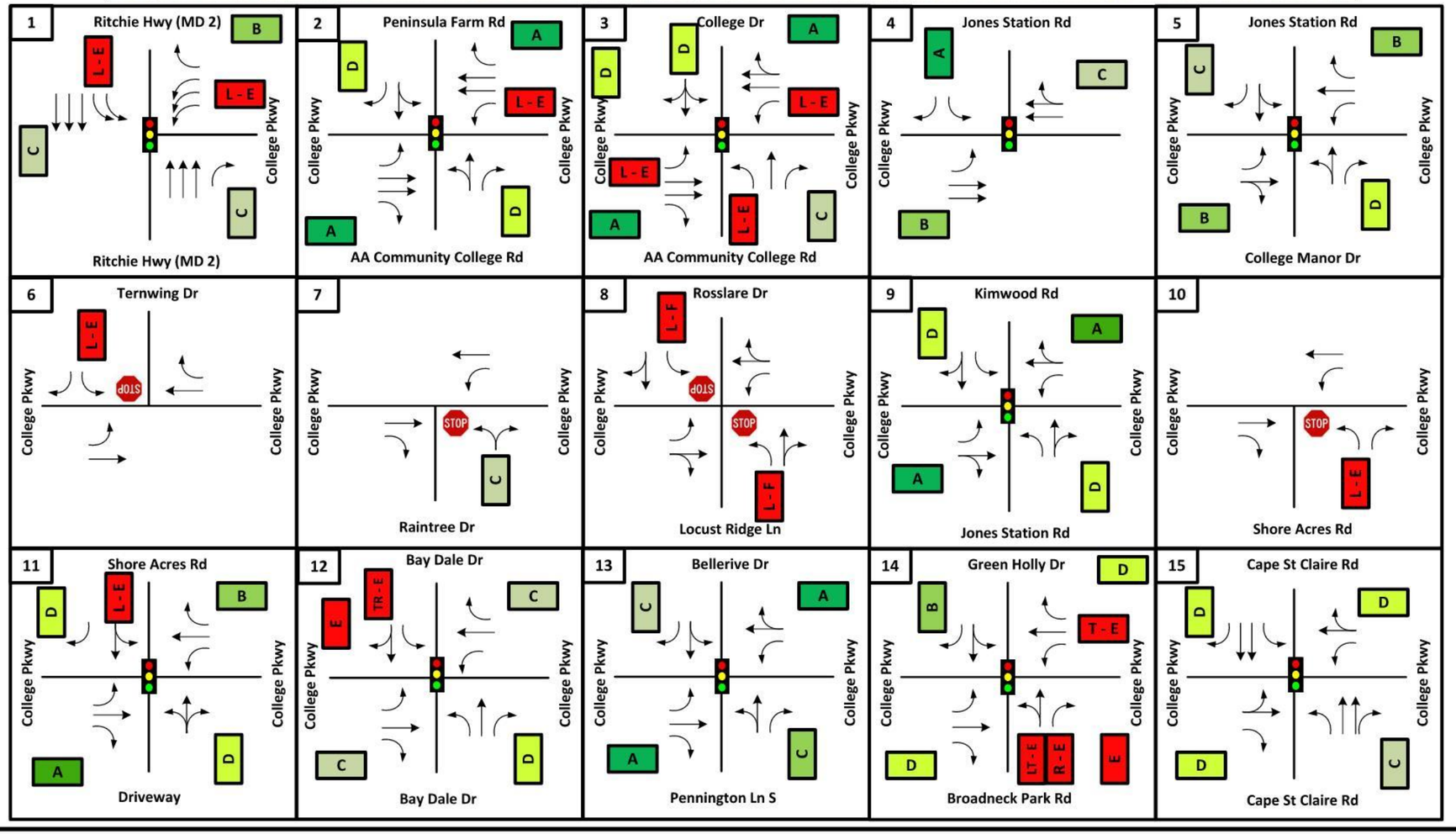
5.1.21 Build (2032) Summer Conditions

The Build 2032 Summer peak hour conditions analyses are based on the 2032 AM and PM Summer peak hour volumes and the proposed improvements as documented. The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time will continue to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time will continue to be provided to the WB lefts to access the AA Community College during both the AM and PM peak hours.
3. At College Drive / AA Community College (signal): The majority of the signal green time will continue to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for both College Drive and AA Community College access (PM peak hour).
4. At Ternwing Drive (stop): The SB approach out of Ternwing Drive will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
5. At Raintree Drive (stop): The NB approach out of Raintree Drive, which operated acceptably under existing summer conditions, will now operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
6. At Rosslare Drive / Locust Ridge Lane (stop): The SB approach out of Rosslare Drive will continue to operate at unacceptable LOS E and F during both the AM and PM peak hours, and the NB approach out of Locust Ridge Lane will continue to operate at unacceptable LOS F during the PM peak hour only due to insufficient gaps in the mainline College Parkway through movements.
7. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will continue to operate at unacceptable LOS F during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
8. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will now operate at unacceptable LOS E during both the AM and PM peak hours due to insufficient green time provided for the minor roadway.
9. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
12. At Cape St Claire Road (MD 179) (signal): The EB shared through-left lane along College Parkway will now operate at unacceptable LOS F (from a LOS E during existing conditions) during the PM peak hour due to very high traffic volumes traveling along College Parkway. This analysis assumes that no improvements are in place to mitigate the MD 2 and US 50 congestion during the summertime (worst-case scenario).

The AM peak hour levels of service summary is shown on ***Figure 28a*** and the PM peak hour levels of service summary is shown on ***Figure 28b***.

The results of the operational analyses for Build (2032) Summer conditions are summarized in ***Table 20*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix F***.



College Parkway Operational and Safety Study

2032 Build Summer AM LOS Summary

August 2024

FIGURE 28a

NOT TO SCALE

LEGEND

Traffic Control

Roadway

Laneage

LOS

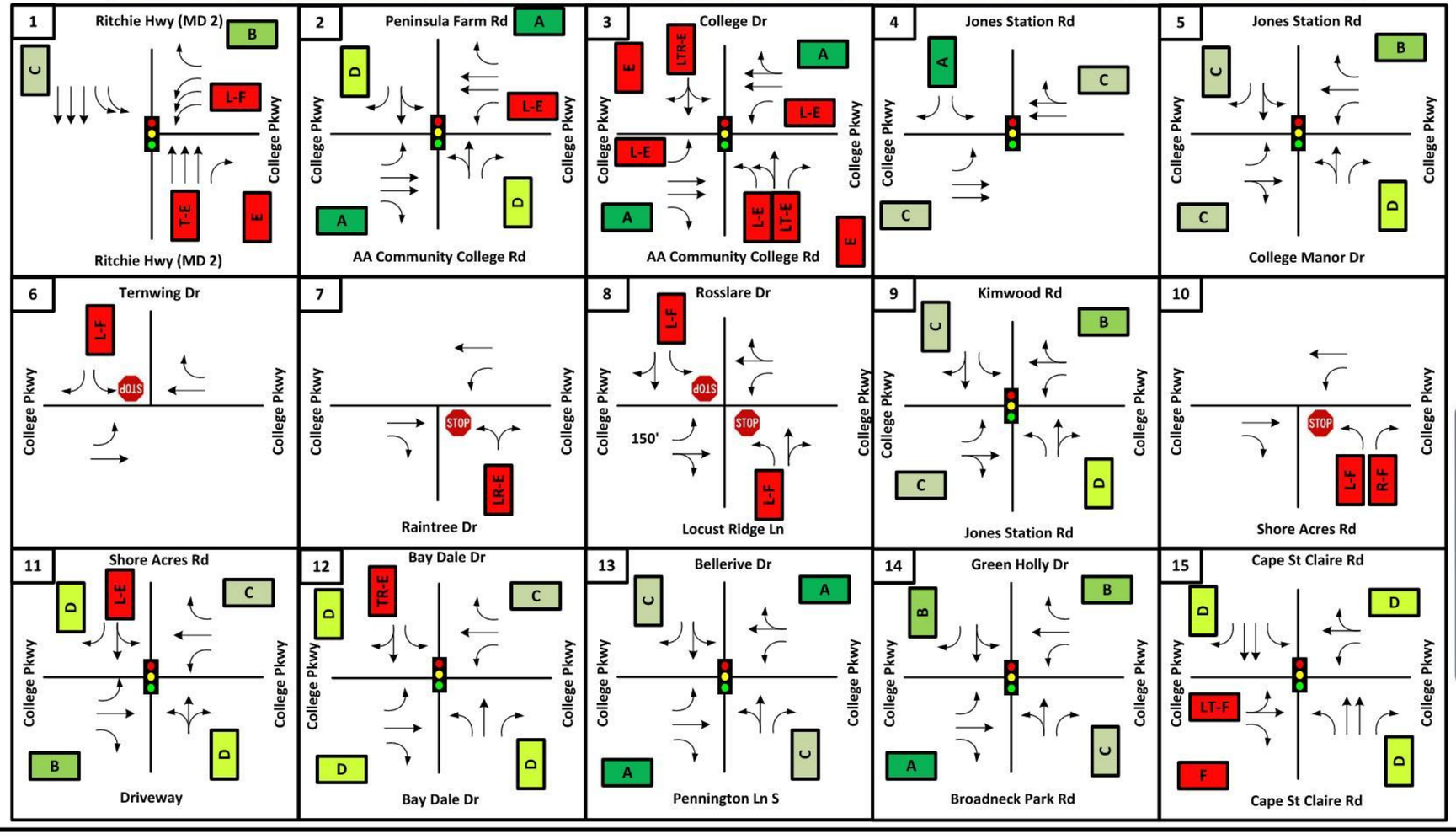
Optimal

Acceptable

Over Capacity

A B C D E F


Bay Hills Golf Club
Anne Arundel Community College
Chesapeake
COVID-19 Drive Thru Testing at Walgreens
Señor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15


1 Ritchie Hwy (MD 2)
B
C
L-F
T-E
E
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
A
D
L-E
D
A
College Pkwy
AA Community College Rd
3 College Dr
E
LTR-E
A
L-E
L-E
A
L-E
LT-E
E
College Pkwy
AA Community College Rd
4 Jones Station Rd
A
C
C
College Pkwy
5 Jones Station Rd
B
C
C
D
College Pkwy
College Manor Dr
6 Ternwing Dr
L-F
STOP
College Pkwy
7 Raintree Dr
STOP
LR-E
College Pkwy
8 Rosslare Dr
L-F
STOP
150'
STOP
L-F
College Pkwy
Locust Ridge Ln
9 Kimwood Rd
C
B
C
D
College Pkwy
Jones Station Rd
10 Shore Acres Rd
STOP
L-F
R-F
College Pkwy
11 Shore Acres Rd
D
L-E
C
B
D
College Pkwy
Driveway
12 Bay Dale Dr
TR-E
D
C
D
D
College Pkwy
Bay Dale Dr
13 Bellerive Dr
C
A
A
C
College Pkwy
Pennington Ln S
14 Green Holly Dr
B
B
A
C
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
D
D
LT-F
F
D
College Pkwy
Cape St Claire Rd
College Parkway Operational and Safety Study
2032 Build Summer PM LOS Summary
August 2024
FIGURE 28b
NOT TO SCALE
LEGEND
Traffic Control
Roadway
Laneage
STOP
LOS
Optimal
Acceptable
Over Capacity
A
B
C
D
E
F
AMT

Intersection / Approach LOS (sec. delay/veh.)	Future Build Summer 2032	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (20.6)**	**D (42.6)**
Westbound Approach *(College Parkway)*	B (15.4)	B (18.5)
Northbound Approach *(Ritchi Hwy)*	C (21.6)	E (72.8)
Southbound Approach *(Ritchi Hwy)*	C (22.1)	C (25.5)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**A (9.6)**	**A (9.1)**
Eastbound Approach *(College Pkwy)*	A (7.0)	A (7.6)
Westbound Approach *(College Pkwy)*	A (6.3)	A (7.1)
Northbound Approach *(AACC Road)*	D (47.7)	D (48.4)
Southbound Approach *(Lake Wheeler Road)*	D (48.5)	D (49.9)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**A (5.2)**	**A (5.6)**
Eastbound Approach *(College Pkwy)*	A (3.8)	A (4.8)
Westbound Approach *(College Pkwy)*	A (3.7)	A (4.0)
Northbound Approach *(AACC Road)*	C (29.1)	E (56.0)
Southbound Approach *(College Dr)*	D (53.3)	E (57.5)
INTERSECTION 4 – College Pkwy & Jones Station Rd (SIGNALIZED)		
Overall	**B (14.0)**	**C (21.1)**
Eastbound Approach *(College Pkwy)*	B (12.1)	C (20.8)
Westbound Approach *(College Pkwy)*	C (23.2)	C (31.4)
Southbound Approach *(Jones Station Rd)*	A (0.6)	A (0.6)
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**B (14.7)**	**C (21.7)**
Eastbound Approach *(College Pkwy)*	B (13.0)	C (28.0)
Westbound Approach *(College Pkwy)*	B (11.2)	B (11.6)
Northbound Approach *(College Manor Dr)*	D (40.6)	D (39.2)
Southbound Approach *(Jones Station Rd)*	C (29.0)	C (26.7)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	A [9.0]	A [9.7]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	D [32.2]	F [722.6]
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.2]	B [10.9]
Northbound Approach (Raintree Dr)	C [19.2]	E (41.2)
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [9.2]	B [10.3]
Westbound Approach *(College Pkwy)*	A [9.3]	B [11.0]
Northbound Approach *(Locust Ridge Ln)*	D [28.6]	F [84.9]
Southbound Approach *(Rosslare Dr)*	E [43.6]	F [273.6]
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**A (9.5)**	**C (21.8)**
Eastbound Approach *(College Pkwy)*	A (6.0)	C (25.2)
Westbound Approach *(College Pkwy)*	A (4.9)	B (12.3)
Northbound Approach *(Jones Station Rd)*	D (50.0)	D (38.0)
Southbound Approach *(Kimwood Rd)*	D (45.6)	C (29.2)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	A [9.7]	B [11.5]
Northbound Approach (Shore Acres Rd)	C [17.9]	F [62.9]
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**B (17.5)**	**C (20.9)**
Eastbound Approach *(College Pkwy)*	A (8.7)	B (12.7)
Westbound Approach *(College Pkwy)*	B (12.0)	C (26.2)
Northbound Approach *(Driveway)*	D (39.2)	D (40.1)
Southbound Approach *(Shore Acres Rd)*	D (42.7)	D (35.6)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (38.1)**	**D (35.6)**
Eastbound Approach *(College Pkwy)*	C (25.6)	D (35.1)
Westbound Approach *(College Pkwy)*	C (24.9)	C (25.5)
Northbound Approach *(Bay Dale Dr)*	D (50.1)	D (38.2)
Southbound Approach *(Bay Dale Dr)*	E (67.7)	D (48.1)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**A (9.9)**	**B (10.7)**
Eastbound Approach *(College Pkwy)*	A (8.3)	A (9.9)
Westbound Approach *(College Pkwy)*	A (7.6)	A (6.5)
Northbound Approach *(Pennington Ln S)*	C (22.4)	C (30.0)
Southbound Approach *(Bellerive Dr)*	C (23.2)	C (31.2)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**D (42.2)**	**B (12.0)**
Eastbound Approach *(College Pkwy)*	D (47.3)	A (7.0)
Westbound Approach *(College Pkwy)*	D (52.2)	B (17.8)
Northbound Approach *(Broadneck Park Rd.)*	E (74.2)	C (30.9)
Southbound Approach *(Green Holly Dr.)*	B (17.8)	B (17.9)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (36.0)**	**D (49.6)**
Eastbound Approach *(College Pkwy)*	D (35.6)	F (80.4)
Westbound Approach *(College Pkwy)*	D (43.4)	D (45.0)
Northbound Approach *(Cape S. Clair Rd.)*	C (32.3)	D (36.3)
Southbound Approach *(Cape St. Claire Rd.)*	D (36.3)	D (40.3)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*		
Westbound Approach *(College Pkwy)*		
Northbound Approach *(Broadneck Rd)*		
Southbound Approach *(Destiny Cir)*		

Table 20: Intersection Level of Service Summary (Build 2032 Summer Conditions)

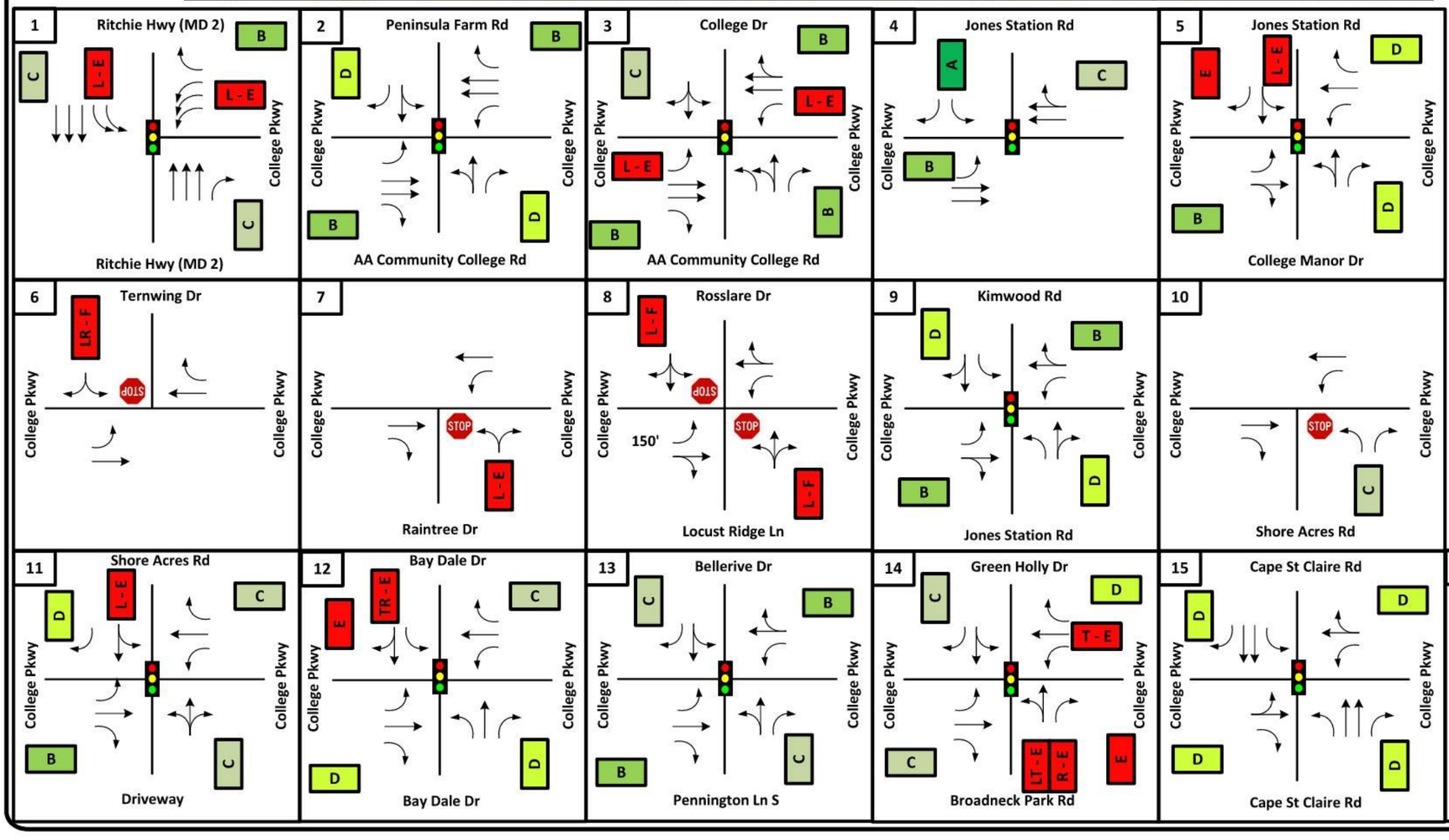
5.1.22 Build (2032) Fall Conditions

The Build 2032 Fall peak hour conditions analyses are based on the 2032 AM and PM Fall peak hour volumes and the proposed improvements as documented. The analyses indicate the following:

1. At MD 2 (Ritchie Highway) (signal): Insufficient green time continues to be provided for the SB lefts and WB lefts (AM peak) and NB throughs and WB lefts (PM peak) resulting in unacceptable LOS E and F, and long vehicle queues.
2. At Peninsula Farm Road / AA Community College (signal): Insufficient green time continues to be provided to the WB lefts to access the AA Community College during the PM peak hour. In addition, the SB shared through-left lane out of Peninsula Farm Road will now operate at LOS E during the PM peak hour.
3. At College Drive / AA Community College (signal): The majority of the signal green time continues to be provided to mainline EB and WB through College Parkway traffic, resulting in unacceptable LOS for AA Community College access and the EB / WB lefts (AM peak), and for College Drive and the WB lefts (PM peak).
4. At Jones Station Road (signal): This intersection is proposed to be signalized and all approaches are expected to operate at acceptable conditions during both the AM and PM peak hours.
5. At Jones Station Road / College Manor Drive (signal): The SB approach out of Jones Station Road will continue to operate at unacceptable LOS E during the AM peak hour due to very high SB volumes operating with a permissive-only left turn phase.
6. At Ternwing Drive (stop): The SB approach out of Ternwing Drive will continue to operate at unacceptable LOS F during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
7. At Raintree Drive (stop): The NB approach out of Raintree Drive will continue to operate at unacceptable LOS E during both the AM and PM peak hours due to insufficient gaps in the mainline College Parkway through movements.
8. At Rosslare Drive / Locust Ridge Lane (stop): The NB approach out of Locust Ridge Lane and the SB approach out of Rosslare Drive continue to operate at unacceptable LOS F during both the AM and PM peak hours, due to insufficient gaps in the mainline College Parkway through movements.
9. At Shore Acres Road (stop): The NB approach out of Shore Acres Road will continue to operate at unacceptable LOS E during the PM peak hour due to insufficient gaps in the mainline College Parkway through movements.
10. At Shore Acres Road / driveway (signal): The EB lefts into Shore Acres Road will continue to operate at unacceptable LOS E during the PM peak hour due to insufficient green time provided for that phase.
11. At Bay Dale Drive (signal): The SB shared through-right lane out of Bay Dale Drive will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.
12. At Green Holly Drive / Broadneck Park Road (signal): The NB shared through-left lane out of Broadneck Park Road will continue to operate at unacceptable LOS E during the AM peak hour due to insufficient green time provided for the minor roadway.

The AM peak hour levels of service summary is shown on ***Figure 29a*** and the PM peak hour levels of service summary is shown on ***Figure 29b***.

The results of the operational analyses for Build (2032) Fall conditions are summarized in ***Table 21*** (Intersection Level of Service Summary). The detailed Synchro/SimTraffic result output sheets are provided in ***Appendix F***.



College Parkway Operational and Safety Study

2032 Build Fall AM LOS Summary

August 2024

FIGURE 29a

NOT TO SCALE

LEGEND

Traffic Control

Roundabout

Existing Roadway

Existing Laneage

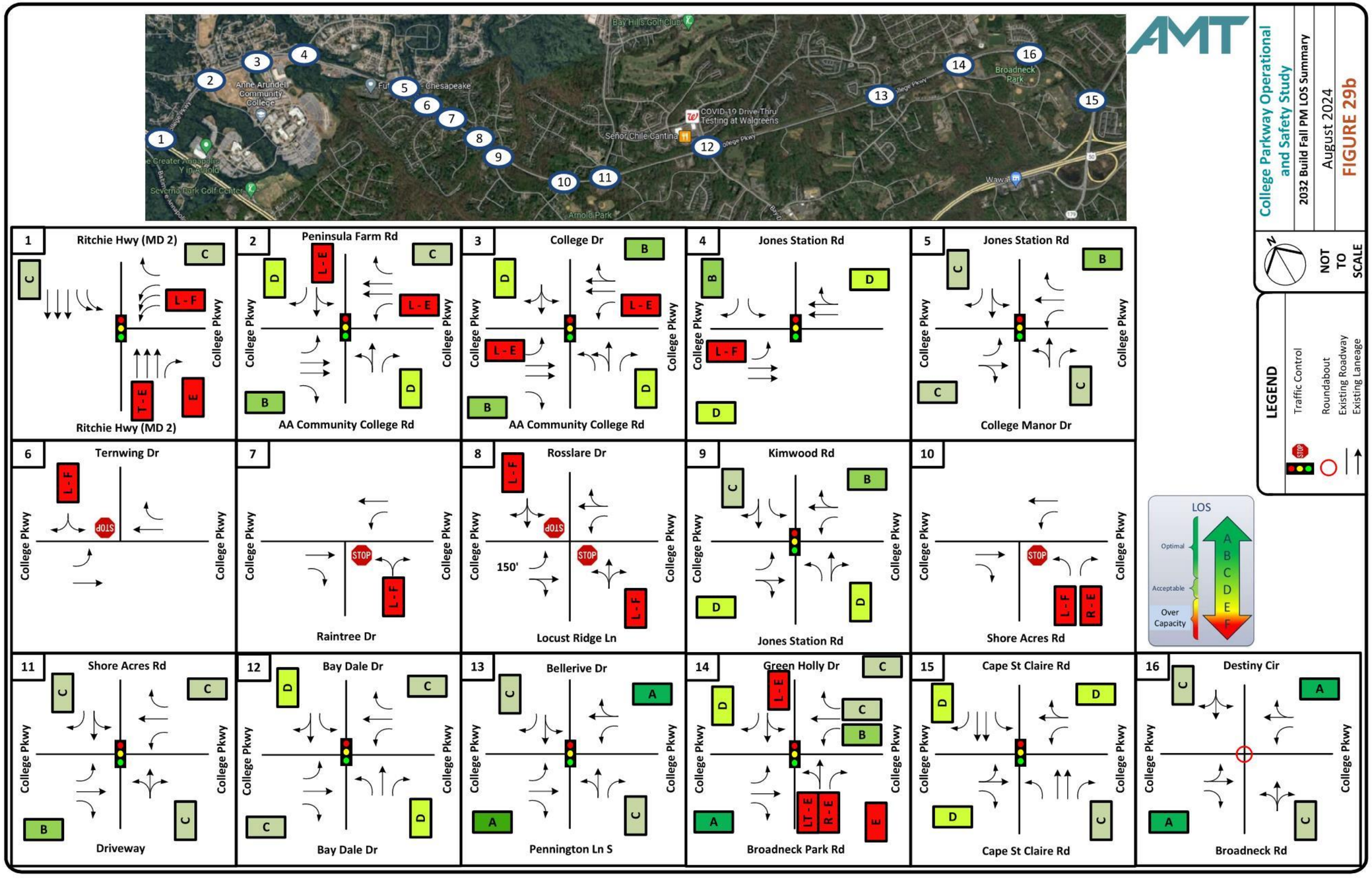
LOS

Optimal

Acceptable

Over Capacity

A B C D E F


AMT
College Parkway Operational and Safety Study
2032 Build Fall PM LOS Summary
August 2024
FIGURE 29b
NOT TO SCALE
LEGEND
Traffic Control
Roundabout
Existing Roadway
Existing Laneage
LOS
Optimal
Acceptable
Over Capacity
A B C D E F
1 Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
3 College Dr
4 Jones Station Rd
5 Jones Station Rd
College Pkwy
AA Community College Rd
College Manor Dr
6 Ternwing Dr
7
8 Rosslare Dr
9 Kimwood Rd
10
STOP
150'
Raintree Dr
Locust Ridge Ln
Jones Station Rd
Shore Acres Rd
11 Shore Acres Rd
12 Bay Dale Dr
13 Bellerive Dr
14 Green Holly Dr
15 Cape St Claire Rd
16 Destiny Cir
Driveway
Bay Dale Dr
Pennington Ln S
Broadneck Park Rd
Cape St Claire Rd
Broadneck Rd

Intersection / Approach LOS (sec. delay/veh.)	Future Build Fall 2032	
	AM	PM
INTERSECTION 1 – College Parkway & Ritchi Hwy (SIGNALIZED)		
Overall	**C (22.0)**	**D (38.7)**
Westbound Approach *(College Parkway)*	B (16.5)	C (21.8)
Northbound Approach *(Ritchi Hwy)*	C (28.4)	E (65.5)
Southbound Approach *(Ritchi Hwy)*	D (21.0)	C (24.6)
INTERSECTION 2 – College Pwy & AACC Rd/Peninsula Farm Rd (SIGNALIZED)		
Overall	**B (18.1)**	**C (25.7)**
Eastbound Approach *(College Pkwy)*	B (13.8)	B (17.7)
Westbound Approach *(College Pkwy)*	B (16.8)	C (22.7)
Northbound Approach *(AACC Road)*	D (41.6)	D (52.3)
Southbound Approach *(Lake Wheeler Road)*	D (44.8)	D (52.8)
INTERSECTION 3 – College Pwy & AACC Rd/College Dr (SIGNALIZED)		
Overall	**B (16.7)**	**B (15.8)**
Eastbound Approach *(College Pkwy)*	B (14.2)	B (13.3)
Westbound Approach *(College Pkwy)*	B (17.5)	B (12.0)
Northbound Approach *(AACC Road)*	B (18.0)	D (46.5)
Southbound Approach *(College Dr)*	C (33.9)	D (40.8)
INTERSECTION 4 – College Pkwy & Jones Station Rd (SIGNALIZED)		
Overall	**B (16.5)**	**D (38.8)**
Eastbound Approach *(College Pkwy)*	B (13.2)	D (40.8)
Westbound Approach *(College Pkwy)*	C (27.2)	D (46.0)
Southbound Approach *(Jones Station Rd)*	A (0.7)	B (11.0)
INTERSECTION 5 – College Pkwy & College Manor Dr/Jones Station Rd (SIGNALIZED)		
Overall	**D (35.2)**	**C (20.8)**
Eastbound Approach *(College Pkwy)*	B (14.8)	C (27.8)
Westbound Approach *(College Pkwy)*	D (37.4)	B (12.3)
Northbound Approach *(College Manor Dr)*	D (42.1)	C (33.9)
Southbound Approach *(Jones Station Rd)*	E (55.4)	C (26.0)
INTERSECTION 6 – College Parkway & Ternwing Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	B [10.6]	B [10.8]
Westbound Approach (College Pkwy)	-	-
Southbound Approach (Ternwing Dr)	F (200.9)	F (5491.4)
INTERSECTION 7 – College Parkway & Raintree Dr (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [10.1]	B [11.0]
Northbound Approach (Raintree Dr)	E (43.6)	F (54.7)
INTERSECTION 8 – College Parkway & Locust Ridge Ln/Rosslare Dr (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	B [12.5]	B [13.0]
Westbound Approach *(College Pkwy)*	B [10.5]	B [11.0]
Northbound Approach *(Locust Ridge Ln)*	F (146.2)	F (97.4)
Southbound Approach *(Rosslare Dr)*	F (794.5)	F (753.3)
INTERSECTION 9 – College Pwy & Jones Station Rd/Kimwood Rd (SIGNALIZED)		
Overall	**B (14.8)**	**C (30.7)**
Eastbound Approach *(College Pkwy)*	B (11.1)	D (35.8)
Westbound Approach *(College Pkwy)*	B (11.6)	B (19.6)
Northbound Approach *(Jones Station Rd)*	D (45.2)	D (48.3)
Southbound Approach *(Kimwood Rd)*	D (46.2)	C (29.8)
INTERSECTION 10 – College Parkway & Shore Acres Rd (UNSIGNALIZED)		
Eastbound Approach (College Pkwy)	-	-
Westbound Approach (College Pkwy)	B [11.3]	B [11.9]
Northbound Approach (Shore Acres Rd)	C [18.1]	F (54.5)
INTERSECTION 11 – College Pwy & Shore Acres Rd/Driveway (SIGNALIZED)		
Overall	**C (26.4)**	**C (24.6)**
Eastbound Approach *(College Pkwy)*	B (18.3)	B (19.1)
Westbound Approach *(College Pkwy)*	C (23.4)	C (27.5)
Northbound Approach *(Driveway)*	C (30.3)	C (32.7)
Southbound Approach *(Shore Acres Rd)*	D (39.5)	C (31.8)
INTERSECTION 12 – College Pwy & Bay Dale Dr. (SIGNALIZED)		
Overall	**D (41.3)**	**D (35.3)**
Eastbound Approach *(College Pkwy)*	D (38.1)	C (33.5)
Westbound Approach *(College Pkwy)*	C (29.5)	C (32.1)
Northbound Approach *(Bay Dale Dr)*	D (47.8)	D (35.5)
Southbound Approach *(Bay Dale Dr)*	E (68.4)	D (46.5)
INTERSECTION 13 – College Pwy & Pennington Ln S./Bellerive Dr. (SIGNALIZED)		
Overall	**B (15.5)**	**B (11.8)**
Eastbound Approach *(College Pkwy)*	B (14.1)	A (9.9)
Westbound Approach *(College Pkwy)*	B (11.3)	A (9.3)
Northbound Approach *(Pennington Ln S)*	C (22.6)	C (23.6)
Southbound Approach *(Bellerive Dr)*	C (25.6)	C (25.2)
INTERSECTION 14 – College Pwy & Broadneck Park Rd./Green Holly Dr.. (SIGNALIZED)		
Overall	**C (34.1)**	**C (26.0)**
Eastbound Approach *(College Pkwy)*	C (25.2)	A (9.9)
Westbound Approach *(College Pkwy)*	D (51.5)	C (23.8)
Northbound Approach *(Broadneck Park Rd.)*	E (74.7)	E (73.0)
Southbound Approach *(Green Holly Dr.)*	C (26.7)	D (50.6)
INTERSECTION 15 – College Pwy & Cape St. Claire Rd. (SIGNALIZED)		
Overall	**D (41.2)**	**D (39.0)**
Eastbound Approach *(College Pkwy)*	D (45.2)	D (42.8)
Westbound Approach *(College Pkwy)*	D (46.6)	D (48.6)
Northbound Approach *(Cape S. Clair Rd.)*	D (35.5)	C (32.8)
Southbound Approach *(Cape St. Claire Rd.)*	D (39.9)	D (42.7)
INTERSECTION 16 – College Parkway & Broadneck Rd/Destiny Cir (UNSIGNALIZED)		
Eastbound Approach *(College Pkwy)*	A [0.1]	A [0.3]
Westbound Approach *(College Pkwy)*	A [1.0]	A [0.4]
Northbound Approach *(Broadneck Rd)*	B [14.4]	C [16.5]
Southbound Approach *(Destiny Cir)*	D [25.2]	C [18.5]

Table 21: Intersection Level of Service Summary (Build 2032 Fall Conditions)

5.2. Preliminary Crash Modification Factors Assessment

For purposes of comparing benefit versus cost for potential intersection improvement alternatives, a preliminary evaluation of safety performance resulting from motor vehicle crashes at the intersection was performed utilizing accepted FHWA safety analysis procedures and the *Highway Safety Manual* (HSM; published by the American Association of State Highway and Transportation Officials AASHTO) guidelines. FHWA Crash Modification Factors (CMF's), identified in the "FHWA CMF Clearinghouse", are planning-stage tools used to make preliminary safety decisions based on proposed improvement alternatives. The CMF are applied to the existing crash totals to compute the "predicted" number of crashes after a countermeasure aimed at reducing crash frequencies has been implemented. The application of CMF's is an estimating guide or tool only. It is a minor portion of a much larger highway safety predictive assessment, which takes many other factors into account (traffic volumes, travel speeds, etc.), and will include a benefit/costs analysis to compare the benefit of each countermeasure against the cost of implementing it.

The two potential safety improvements selected are:

Improvement 1: Modifying the signalized College Parkway left-turn phases from protected-permitted to protected only.

Improvement 2: Change existing phasing to flashing red-arrow protective permissive.

These potential improvements were applied to the intersections along College Parkway with the highest crash rates: 1) Bay Dale Drive (1.05 CPMEV); 2) Green Holly Drive / Broadneck Park Road (0.57 CPMEV); 3) Shores Acres Road (signalized – 0.43 CPMEV); and 4) Bellerive Drive / Pennington Lane South (0.43 CPMEV).

CMF's depicting the potential improvements were selected from the Crash Modification Factors Clearinghouse (ID 339: Change from permitted-protected to protected on major approaches, and ID 10028: Modifying to Flashing Red Arrow). A summary of the CMF's utilized is shown on Table 22.

Countermeasure	Crash Type	Area Type	Fatal Crash CMF	Disabled / Incapacitated CMF	Injured/Not Incapacitated; Possible Injury CMF	Property Damage Only CMF	Service Life *
Convert permitted-protected to protected	Angle / Left Turn	Urban	0.01	0.01	0.01	0.01	20 years
Change existing phasing to flashing red-arrow protective permissive	Left Turn	N/A	0.53	0.53	0.53	0.53	N/A **

** Per the HSM, service life is defined as "the number of years in which the countermeasure is expected to have a noticeable and quantifiable effect on the crash occurrence at the site."*
*** Service life unavailable in the CMF Clearinghouse*

Table 22: Crash Modification Factors per Selected Countermeasures

According to crash study reports via the CMF Clearinghouse, Improvements 1 and 2 will reduce the of crashes by a certain estimated percentage. Improvement 1 has a CMF of 0.01, which indicates this alternative essentially reduces future left turn crashes with opposing vehicles by approximately 99%, while Improvement 2 has a CMF of 0.53, which implies this improvement essentially reduces the future left turn crashes with opposing vehicles by half.

The selected CMF's were utilized to forecast the safety performance of both improvement alternative to estimate the anticipated benefit in terms of reduction of injury crashes. The CMF's were applied to recent crash data at each intersection to predict the expected crash reduction from each improvement alternative by severity. Safety performance is a key factor of this study.

Table 23 summarizes the annualized crash performance of each intersection based upon recent data and application of the CMF's. Each value reflects the number of crashes expected following construction of each improvement alternative.

Crash Severity Summary - College Parkway at Bay Dale Drive

Crash Type	Actual Number of Crashes (2012-2020)	Actual Percent of Total	Number of Left Turn Crashes, Different Roadways	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Total	59	100.00%	17	42.17	51.01
Fatal	0	0.00%	0	0	0
Disabled	2	3.39%	1	1.01	1.53
Injured	9	15.25%	5	4.05	6.65
Possible Injury	12	20.34%	5	7.05	9.65
Property Damage Only	36	61.02%	6	30.06	33.18

Crash Severity Summary - College Parkway at Green Holly Drive / Broadneck Park Road

Crash Type	Actual Number of Crashes (2012-2020)	Actual Percent of Total	Number of Left Turn Crashes, Different Roadways	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Total	32	100.00%	6	26.06	29.18
Fatal	0	0.00%	0	0	0
Disabled	1	3.13%	0	1	1
Injured	5	15.63%	1	4.01	4.53
Possible Injury	6	18.75%	3	3.03	4.59
Property Damage Only	20	62.50%	2	18.02	19.06

Crash Severity Summary - College Parkway at Shore Acres Road (signal)

Crash Type	Actual Number of Crashes (2012-2020)	Actual Percent of Total	Number of Left Turn Crashes, Different Roadways	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Total	19	100.00%	3	16.03	17.59
Fatal	0	0.00%	0	0	0
Disabled	1	5.26%	0	1	1
Injured	3	15.79%	0	3	3
Possible Injury	3	15.79%	2	1.02	2.06
Property Damage Only	12	63.16%	1	11.01	11.53

Crash Severity Summary - College Parkway at Bellerive Drive / Pennington Lane South

Crash Type	Actual Number of Crashes (2012-2020)	Actual Percent of Total	Number of Left Turn Crashes, Different Roadways	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Total	21	100.00%	0	21	21
Fatal	0	0.00%	0	0	0
Disabled	0	0.00%	0	0	0
Injured	4	19.05%	0	4	4
Possible Injury	4	19.05%	0	4	4
Property Damage Only	13	61.90%	0	13	13

Table 23: Application of CMF's to Existing Crash Severity

Looking at the specific injury types or severity in *Table 23*, Improvement 1 would offer more safety benefits for the left-turn crash types compared to Improvement 2 (except at Bellerive Drive / Pennington Lane South):

- College Parkway at Bay Dale Drive: With each CMF applied to the left-turn crashes, the disabled crashes would be reduced from 2 (total existing crashes) to 1 for Improvement 1 and to 1.53 for Improvement 2. The injury/possible injury crashes would be reduced from 21 (total existing crashes) down to 11 for Improvement 1 and down to 17 crashes for Improvement 2.

- College Parkway at Green Holly Drive/Broadneck Park Road: With each CMF applied to the left-turn crashes, the disabled crashes would remain identical as existing conditions. The injury/possible injury crashes would be reduced from 11 (total existing crashes) down to 7 for Improvement 1 and down to 9 crashes for Improvement 2.
- College Parkway at Shore Acres Road (signal): With each CMF applied to the left-turn crashes, the disabled and injury crashes would not be reduced with either CMF since none of these crashes are left turn collisions. The possible injury crashes would be reduced from 3 (total existing crashes) down to 1 for Improvement 1 and down to 2 crashes for Improvement 2.
- College Parkway at Bellerive Drive / Pennington Lane South: There are no left turn crashes along Bellerive Drive or Pennington Lane South reported at this intersection in the study period, so neither CMF applies.

Crash Type Summary - College Parkway at Bay Dale Drive

Accident Type	Actual Number of Crashes (2012-2020)	Actual Percent of Total	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Left Turn, Different Roadways	17	28.81%	0.17	9.01

Crash Type Summary - College Parkway at Green Holly Drive / Broadneck Park Road

Accident Type	Number of Crashes (2012-2020)	Actual Percent of Total	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Left Turn, Different Roadways	11	34.38%	5.06	8.18

Crash Type Summary - College Parkway at Shore Acres Road (signal)

Accident Type	Number of Crashes (2012-2020)	Actual Percent of Total	Predicted Number of Crashes (Improvement 1 - CMF = 0.01)	Predicted Number of Crashes (Improvement 2 - CMF = 0.53)
Left Turn, Different Roadways	3	15.79%	0.03	1.59

*** Note that of the eleven (11) Left-Turn, Different Roadways crashes, six (6) occurred on the side streets, while five (5) occurred along College Parkway.*

Table 24: Application of CMF's to Existing Crash Types

The application of Improvements 1 and 2 are expected to reduce the number of left turn crashes for vehicles traveling along different roadways only (i.e.: collision of vehicles on one roadway colliding with a vehicle on the intersecting roadway. As shown in ***Table 24***:

- College Parkway at Bay Dale Drive: This would result in a reduction from 17 crashes (existing) down to nearly no crashes for Improvement 1, and down to 9 crashes for Improvement 2.
- College Parkway at Green Holly Drive/Broadneck Park Road: This would result in a reduction from 11 crashes (existing) down to 5 crashes for Improvement 1, and down to 8 crashes for Improvement 2.
- College Parkway at Shore Acres Road (signal): This would result in a reduction from 3 crashes (existing) down to nearly no crashes for Improvement 1, and down to 2 crashes for Improvement 2.

- College Parkway at Bellerive Drive / Pennington Lane South: There are no left turn crashes at this intersection along College Parkway, so neither CMF applies (the left turn crash occurred along the minor roadway).

The safety assessment went further to specifically study each left turn movement along College Parkway at the two intersections with the highest crash rate along College Parkway: Bay Dale Drive and Green Holly Drive/Broadneck Park Road. ***Table 25*** shows the annualized crash performance of the individual left turns and for the intersection overall based upon recent data and application of the CMF's. Each value reflects the number of crashes expected annually following construction of each improvement alternative.

Accident Type	Number of Crashes (2012-2020)	Estimated Annual Crashes (Base Condition)	Estimated Annual Crashes with CMF from Improvement 1 (CMF = 0.01)	Estimated Annual Crashes with CMF from Improvement 2 (CMF = 0.53)
College Parkway with Bay Dale Drive				
Left Turn, from College Parkway (EB)	7	0.88	0.01	0.46
Left Turn, from College Parkway (WB)	10	1.25	0.01	0.66
Left Turn, from College Parkway (Total)	17	2.13	0.02	1.13
College Parkway with Green Holly Drive				
Left Turn, from College Parkway (EB)	6	0.75	0.01	0.40
Left Turn, from College Parkway (WB)	0	0.00	0.00	0.00
Left Turn, from College Parkway (Total)	6	0.75	0.01	0.40

Table 25: Application of CMF's to Specific Left Turn Movements along College Parkway

In summary:

- Safety Improvement 1 (Modifying the signalized College Parkway left-turn phases from protected-permitted to protected only) is the best safety alternative to reduce the estimated annual crashes of this crash type; however, protected only left-turn phasing can be a capacity constraint.

- Safety Improvement 2 (Change existing phasing to flashing red-arrow protective permissive) is an acceptable second option as a safety improvement, while still maintaining capacity of the left-turn movements.

The proposed 2028 and 2032 Build lane use and traffic control for each of the key intersections is shown on ***Figure 30a and 30b***, respectively.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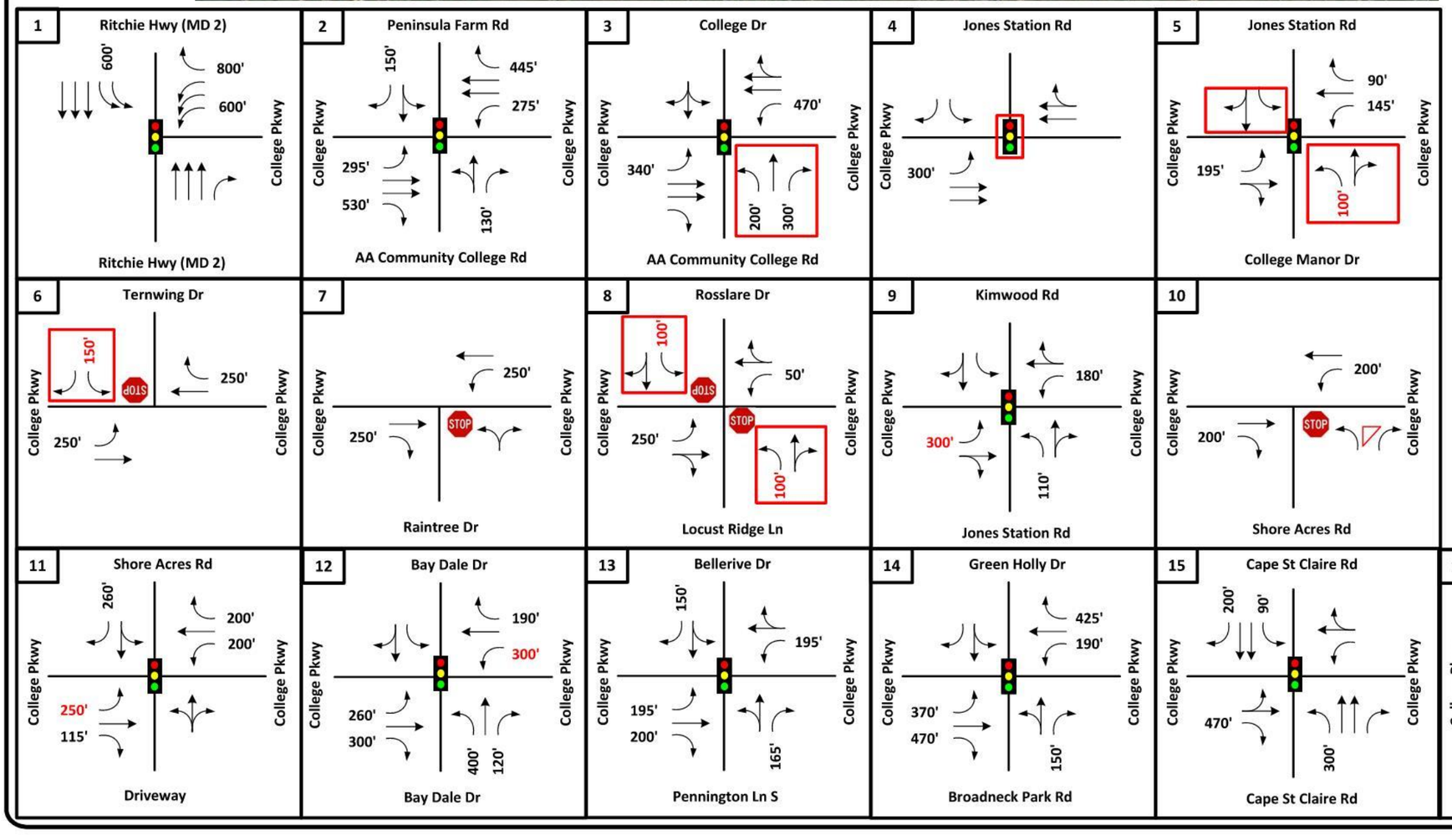
Anne Arundel Community College
Bay Hills Golf Club
COVID-19 Drive Thru Testing at Walgreens
Senior Chile Cantina
Broadneck Park
Wawa
Severna Park Golf Center
Arnold Park


1 Ritchie Hwy (MD 2)
600'
800'
600'
College Pkwy
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
150'
445'
275'
295'
530'
130'
College Pkwy
College Pkwy
AA Community College Rd
3 College Dr
470'
340'
200'
300'
College Pkwy
College Pkwy
AA Community College Rd
4 Jones Station Rd
College Pkwy
300'
5 Jones Station Rd
90'
145'
195'
100'
College Pkwy
College Pkwy
College Manor Dr
6 Ternwing Dr
150'
STOP
250'
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College Pkwy
7
250'
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STOP
College Pkwy
College Pkwy
Raintree Dr
8 Rosslare Dr
100'
STOP
50'
STOP
250'
100'
College Pkwy
College Pkwy
Locust Ridge Ln
9 Kimwood Rd
180'
300'
110'
College Pkwy
College Pkwy
Jones Station Rd
10
200'
200'
STOP
College Pkwy
College Pkwy
Shore Acres Rd
11 Shore Acres Rd
260'
200'
200'
250'
115'
College Pkwy
College Pkwy
Driveway
12 Bay Dale Dr
190'
300'
260'
300'
400'
120'
College Pkwy
College Pkwy
Bay Dale Dr
13 Bellerive Dr
150'
195'
195'
200'
165'
College Pkwy
College Pkwy
Pennington Ln S
14 Green Holly Dr
425'
190'
370'
470'
150'
College Pkwy
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
200'
90'
470'
300'
College Pkwy
College Pkwy
Cape St Claire Rd
16 Destiny Cir
125'
STOP
STOP
125'
College Pkwy
College Pkwy
Broadneck Rd
LEGEND
XXX' Storage Bay Length
XXX' Proposed Storage Bay Length
Proposed Improvement
Traffic Control
Roadway
Laneage
STOP
College Parkway Operational and TSMO Study
Future 2028 Proposed Improvements
August 2024
FIGURE 30a
NOT TO SCALE


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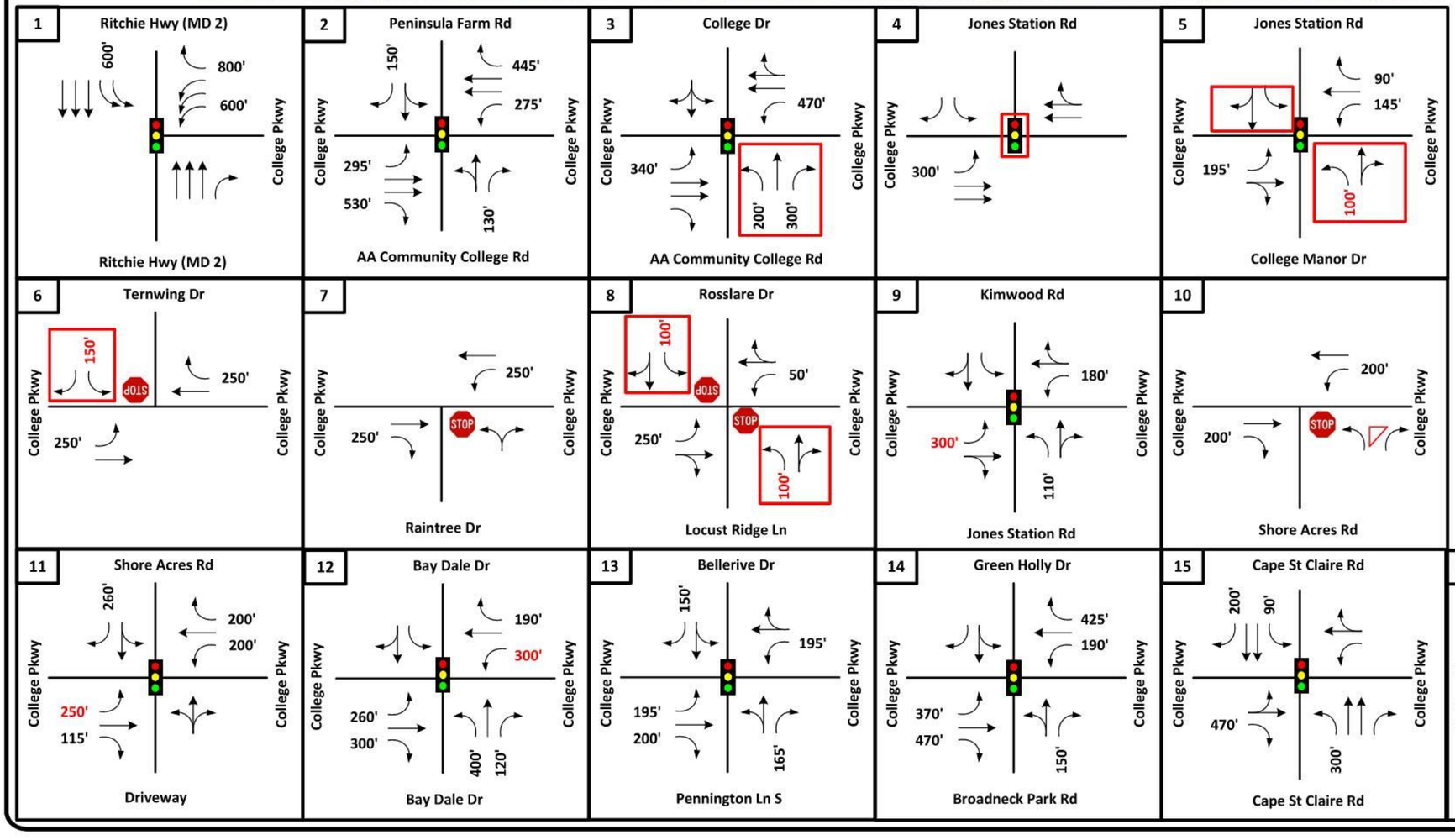
Anne Arundel Community College
Bay Hills Golf Club
COVID-19 Drive-Thru Testing at Walgreens
Senor Chile Cantina
Broadneck Park
Severna Park Golf Center
Arnold Park
Wawa


1 Ritchie Hwy (MD 2)
600'
800'
600'
College Pkwy
Ritchie Hwy (MD 2)
2 Peninsula Farm Rd
150'
445'
275'
295'
530'
130'
College Pkwy
AA Community College Rd
3 College Dr
470'
340'
200'
300'
College Pkwy
AA Community College Rd
4 Jones Station Rd
300'
College Pkwy
5 Jones Station Rd
90'
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195'
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College Pkwy
College Manor Dr
6 Ternwing Dr
150'
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College Pkwy
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College Pkwy
Raintree Dr
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College Pkwy
Locust Ridge Ln
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College Pkwy
Jones Station Rd
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STOP
College Pkwy
Shore Acres Rd
11 Shore Acres Rd
260'
200'
200'
250'
115'
College Pkwy
Driveway
12 Bay Dale Dr
190'
300'
260'
300'
400'
120'
College Pkwy
Bay Dale Dr
13 Bellerive Dr
150'
195'
195'
200'
165'
College Pkwy
Pennington Ln S
14 Green Holly Dr
425'
190'
370'
470'
150'
College Pkwy
Broadneck Park Rd
15 Cape St Claire Rd
200'
90'
470'
300'
College Pkwy
Cape St Claire Rd
16 Destiny Cir
125'
125'
College Pkwy
Broadneck Rd
LEGEND
XXX' Storage Bay Length
XXX' Proposed Storage Bay Length
Proposed Improvement
Traffic Control
Roundabout
Roadway Laneage
STOP
N
NOT TO SCALE
College Parkway Operational and TSMO Study
Future 2032 Proposed Improvements
August 2024
FIGURE 30b