Trip Generation Comparison

To understand the anticipated transportation impacts associated with Stage 1 of the 2010 Great Seneca Science Corridor Master Plan (2010 Plan), the approved and constructed land uses in Stage 1 are compared to the modeled land uses in Stage 1 (for simplicity, the approved and constructed land uses are referred to as "actual" land use, while the modeled land uses are referred to as "estimated" land use).

While the quantity of land use is the same in the actual and estimated scenarios, the types of land use differ. This is significant because the number of trips generated per square foot of development varies based on the type of land use. For example, office uses generate more trips per square foot than industrial uses, because activities are often more spread out in an industrial space.

As part of the 2010 Plan transportation analysis, Planning Department staff employed the Travel/4 model and the Local Area Model to understand transportation impacts. This model included vehicle trip generation estimates based on the quantity and type of land uses recommended in the master plan. The model includes four commercial land use types: office, retail, industrial, and other (which includes life sciences, health and institutional uses).

While the model estimated trip generation for the master plan overall, individual trip generation estimates were not developed based on the Plan staging. To estimate Stage 1 model growth, it is assumed that Stage 1 planned land uses in the Life Sciences Center (LSC) would be proportional to the overall land uses in the LSC. As Stage 1 land use is 37 percent of the total planned land use, it is assumed that each land use type will be built out 37 percent in Stage 1.

The trip generation rates applied in the 2010 Plan transportation analysis are then applied to the actual and estimated land uses. This analysis shows that the number of trips anticipated for the estimated land use exceeds trips generated by the actual land use by approximately 150 trips, meaning that the transportation impacts of what has been approved and constructed are lower than anticipated in the Plan analysis. Based on this analysis, an additional 100,000 square feet of life sciences development (included in the "other" uses) could be approved without exceeding the estimated transportation impacts in the 2010 Plan.

In addition, the 2010 Plan assumed limited telework – just 1 percent for office and "other" uses. While this was a reasonable assumption at the time, it does not align with current commuting practices to the LSC. A recent survey of travel patterns found that 7 percent of employees in the LSC work from home. When accounting for the difference in telework, the analysis finds that 250,000 square feet of "other" uses could be approved beyond the Stage 1 total without significantly exceeding the estimated transportation impacts in the 2010 Plan.

Scenario	Office	Retail	Indust	Other	Total
LSC Plan Growth (sq ft)	3,330,982	401,605	3,675,042	4,239,186	11,646,815
Stage 1 Estimated					
LSC Plan Growth (sq ft)	1,247,577	150,416	1,376,440	1,587,733	4,362,167
AM Peak Period Trips	2,655	180	2,109	2,338	7,282
Stage 1 Actual					
LSC Plan Growth (sq ft)	907,185	0	1,905,000	1,549,983	4,362,167
AM Peak Period Trips	1,930	0	2,918	2,283	7,132
Delta to Estimated	*-724*	*-180*	*810*	*-56*	*-151*
Stage 1 Actual + 100,000 sq ft "Other"					
LSC Plan Growth (sq ft)	907,185	0	1,905,000	1,649,983	4,462,167
AM Peak Period Trips	1,930	0	2,918	2,430	7,279
Delta to Estimated	*-724*	*-180*	*+810*	*+92*	*-3*
Stage 1 Actual + 7% Telework + 250,000 sq ft "Other"					
LSC Plan Growth (sq ft)	907,185	0	1,905,000	1,799,983	4,612,167
AM Peak Period Trips	1,869	0	2,831	2,586	7,286
Delta to Estimated	*-786*	*-180*	*722*	*247*	*3*
Stage 1 Actual + 7% Telework + 400,000 sq ft "Other"					
LSC Plan Growth (sqf)	907,185	0	1,905,000	1,949,983	4,762,168
AM Peak Period Trips	1,869	0	2,831	2,801	7,501
Delta to Estimated	*-786*	*-180*	*722*	*463*	*(219)*

Transportation Existing Conditions

Transit

Several local transit routes service the Life Science Center with Ride-On providing coverage for the majority of the area. Currently, Ride-On provides local and express service throughout the study area with 18 total routes. However, frequent service (routes which provide 10-15-minute headways during the day) only operates for routes 55 and 100, from the Germantown Transit Center to the Shady Grove and Rockville Metro Stations. Almost all households and employment centers are located within a ½ mile of local service transit, as shown in Figure 1.

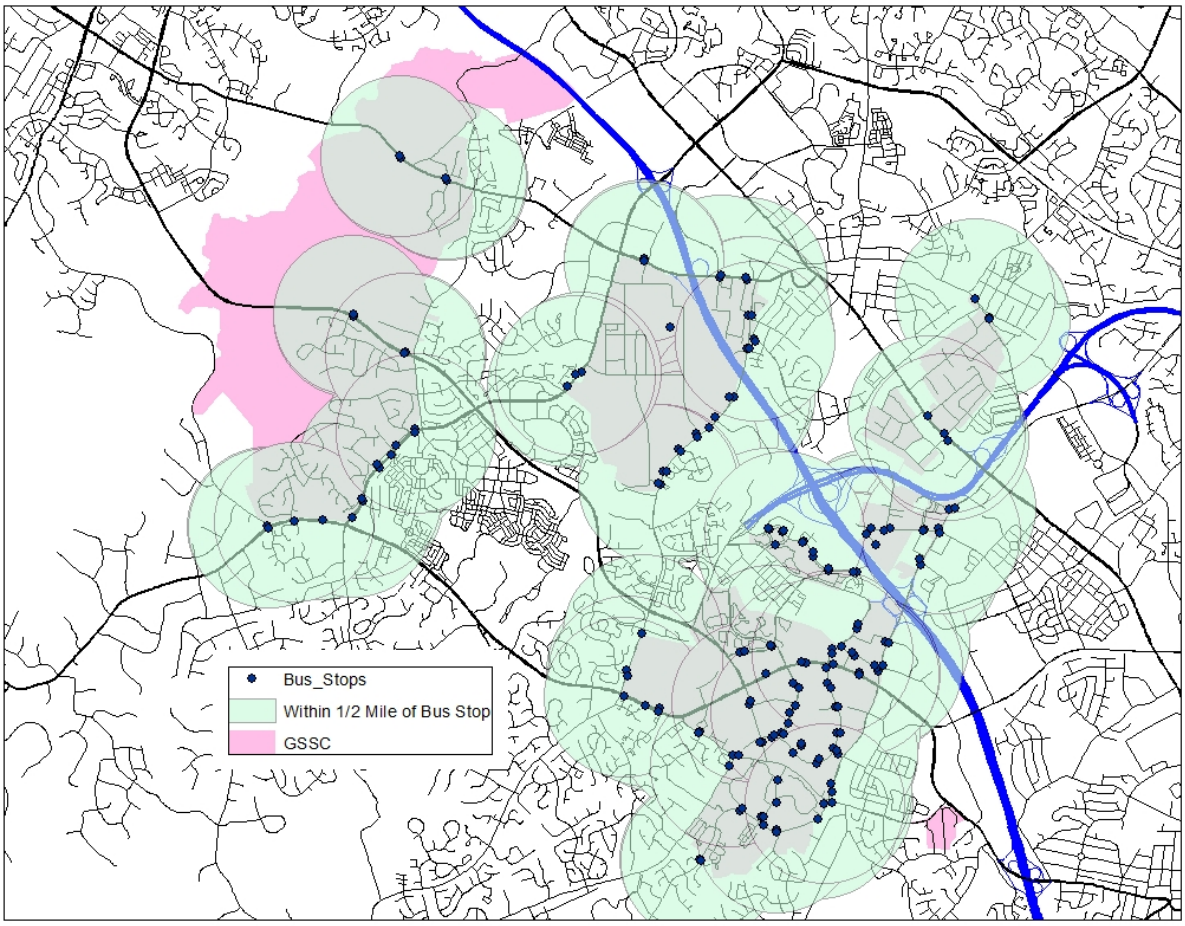


Figure 1: Households and Employment centers within ½ Mile of Bus Stops

In recent years, transit ridership has declined on almost every route, with the exception of routes 63, 66, 70, 74, 76, and 301 which have featured stagnant or increasing ridership over the course of the last five years. Route 63 has experienced the largest increase in average weekday ridership (increase of 194 average weekday trips between 2016 and 2020), and services both the Shady Grove and Rockville Metrorail Stations with stops at the activity center at the Shady Grove Road and Gaither Road intersection. Routes 66, 74, and 301, which have experienced stagnant and slight increases in ridership, provide service to the Life Sciences Center. The average top three highest ridership routes of Ride-On 55, 59, and 61 also featured three of the top five largest drops in ridership (losses of 2,703; 1,042; and 388 riders, respectively). The declining ridership of these three routes coincide with recent closures of flagship anchor stores at the Lakeforest Mall.

Routes Serving the 2010 Plan Area						
Route	Description	Ridership				
		2020	2019	2018	2017	2016
43	Traville TC-Shady Grove-Hospital-Shady Grove	592	690	626	801	799

45	Fallsgrove-Rockville Senior Center-Rockville-Twinbrook	842	800	917	989	969
54	Lakeforest-Washingtonian Blvd-Rockville	1,445	1,482	1,492	1,567	1,871
55	GTC-Milestone-MC, G-Lakeforest-Shady Grove-MC, R-Rockville	5,021	5,010	5,979	6,960	7,724
56	Lakeforest-Quince Orchard-Shady Grove Hospital-Rockville	1,543	1,582	1,661	1,783	2,140
59	Montgomery Village-Lakeforest-Shady Grove-Rockville	2,621	2,587	2,841	2,987	3,663
61	GTC-Lakeforest-Shady Grove	2,176	2,112	2,357	2,468	2,564
63	Shady Grove-Gaither Road-Piccard Dr.-Rockville	894	694	684	630	700
66	Shady Grove-Piccard Drive-Shady Grove Hospital-Traville TC	273	170	128	176	190
67	Traville TC-North Potomac-Shady Grove	103	82	113	114	118
70	Milestone-Medical Center-Bethesda Express	609	624	670	670	620
71	Kingsview-Dawson Farm-Shady Grove	318	314	358	335	359
74	GTC-Great Seneca Hwy.-Shady Grove	1,188	1,068	1,038	1,146	1,043
76	Poolesville-Kentlands-Shady Grove	776	692	776	766	752
78	Kingsview-Richter Farm-Shady Grove	217	262	307	349	221
79	Clarksburg-Skylark-Scenery-Shady Grove	297	287	328	374	409
100	GTC-Shady Grove Express	1,898	1,803	1,999	2,134	2,192
301	Rockville-Tobytown	98	72	63	42	-

Ridership is measured from March of each preceding year to February (i.e. year 2020 measured from March 2019-February 2020)

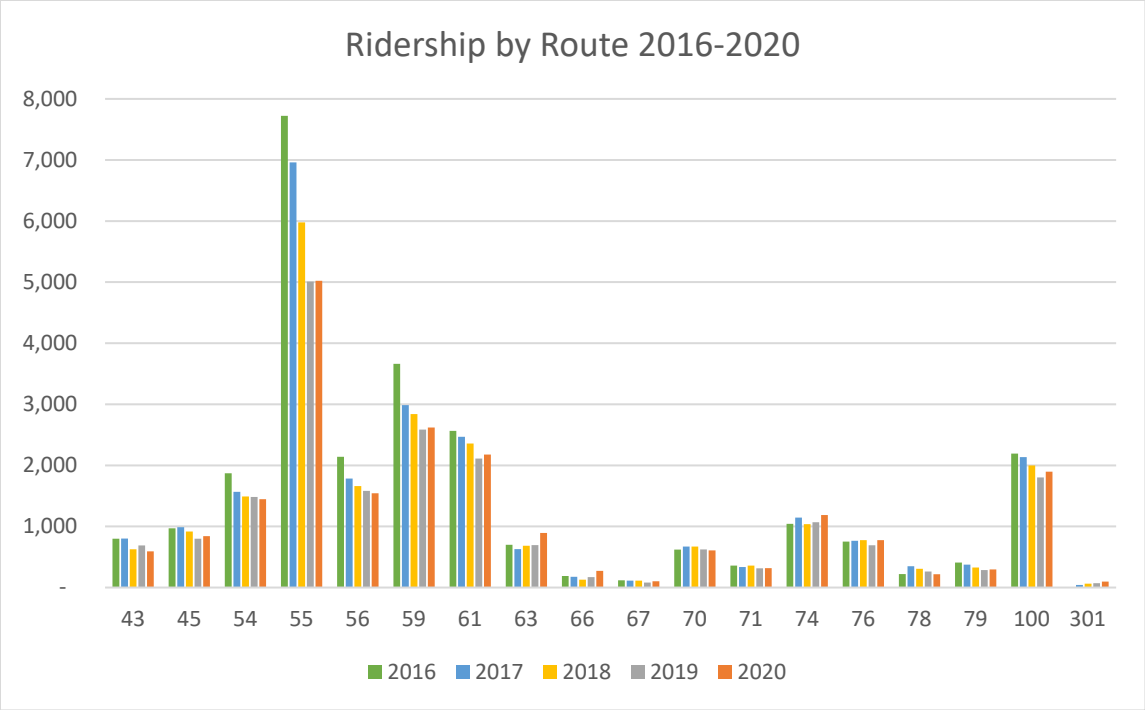


Figure 2: Ridership by Route 2016-2020

Washington Metropolitan Area Transit Authority does not provide service within the study area. The nearest routes connect to the Rockville Metrorail Station on the T2 local which runs along Falls Road, and the Q4/Q6 which runs along Veirs Mill Road.

Enhanced transit service with frequent routes and dedicated lanes are currently in design through the Life Science Center and along MD 355, through the Great Seneca Transit Network and the MD 355 Bus Rapid Transit route. Montgomery County Department of Transportation (MCDOT) received funding for planning and design of the Great Seneca Transit Network. MCDOT is also currently in phase II of the MD 355 BRT study which will provide service along MD 355/Frederick Avenue.

Micromobility

Capital Bikeshare currently operates eight docking stations within the Life Sciences Center at the following locations:

- Key West Ave & Siesta Key Way
- Key West Ave & Great Seneca Hwy
- Corporate Blvd & Omega Dr
- Key West Ave & Diamondback Dr
- Traville Gateway Dr & Gudelsky Dr
- Broschart & Blackwell Rd
- Medical Center Dr & Key West Ave
- Shady Grove Hospital

The Life Sciences Center falls within the range of both Lime and Bird dockless services.

Commuter Data

Over two thirds of commuters who live within the 2010 Plan area travel to work in private vehicles, which is greater than the percentage in the county overall. Residents in the area are also less likely to commute by public transit than in the county overall. A higher percentage of residents in the area commute within Montgomery County than travel elsewhere, compared to the county overall.

Commuting for Residents within the 2010 Plan Area

	2010 Plan Area		Montgomery County	
	commuters	distribution	commuters	distribution
Workers 16 years+ (a)	**20,588**	**100.0%**	**548,514**	**100.0%**
Commute to Work				
Drove Alone	14,532	70.6%	358,269	65.3%
Carpool	1,925	9.4%	53,681	9.8%
Public transportation	2,377	11.5%	82,610	15.1%
Walked, other means (b)	631*	3.1%	20,296	3.7%
Work at Home	1,123	5.5%	33,658	6.1%
Work Location				
In Montgomery County	14,599	70.9%	335,652	61.2%
Elsewhere in Maryland	1,591	7.7%	59,772	10.9%
Outside of Maryland	4,398	21.4%	153,090	27.9%
Average commuting time (minutes)	Not Available		34.6	

Notes:
U.S. Census block groups defining the areas approximating the master plan and study area. Master Plan includes block groups associated with GSSC area while Study Area includes GSSC with Gaithersburg block groups
(a) Includes all employed people over the age of 16 residing in the area.
(b) Other includes: bicycle, taxicab, motorcycle, ferryboat, streetcar, and "other means".
** The reliability of the data is listed as "fair". Data reliabilty was judged on a scale of good, fair, caution, or poor.*
Margin of error reported for estimates located in Appendix AQ.
Source: 2014-2018 American Community Survey, 5-year estimate, U.S. Census Bureau.

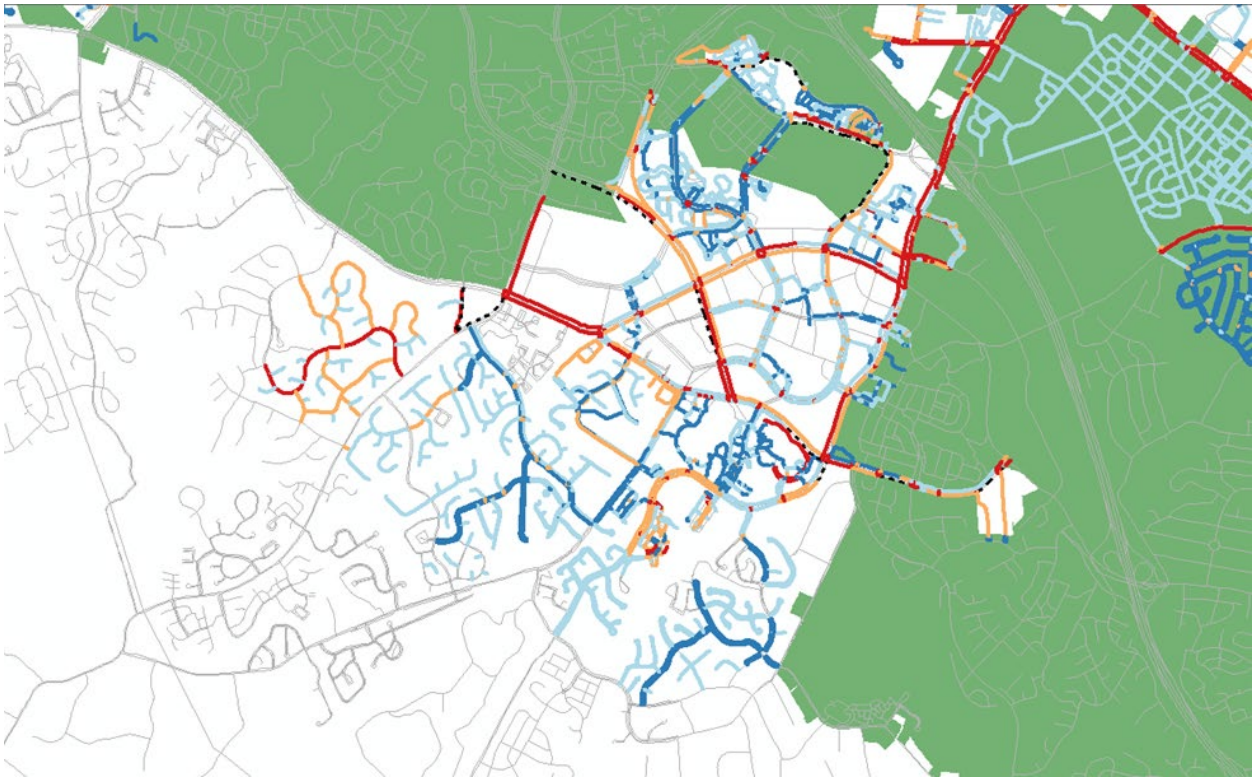
The Shady Grove Transportation Management District (TMD) tracks commuting patterns for people who work in the greater Shady Grove area, including the National Institute of Standards and Technology and Life Sciences Center. As part of its management of the Greater Shady Grove TMD, the MCDOT Commuter Services Division surveys employees who work within the Life Sciences Center to measure progress toward the Non-Auto Driver Mode Share (NADMS) staging requirement for each stage. The most recent survey year was in 2018, in which 19 percent of respondents indicated using bus, train,

carpooling, teleworking, bicycling or an alternative work schedule (Biennial Master Plan Monitoring Report, 2019).Based on 2019 Data 9.2 percent of commuters within the Life Sciences Center use transit, 3.1 percent walk/bike/taxi/motorcycle to work, and 7.2 percent telework

Pedestrian Level of Comfort Analysis

According to the Pedestrian Level of Comfort (PLOC) analysis (as of 12/17/2020) pedestrian comfort for the Plan area is higher in research and university campuses, multifamily residential neighborhoods to the north of the LSC, and single-family residential neighborhoods to the south of the Life Sciences Center.

Unsurprisingly, corridors identified as major highways in the Plan area have unacceptable PLOC scores (walking environment is uncomfortable, and most adults will only walk if they have no other option) despite the presence of sidewalks on both sides of each roadway.



Navy blue: Very Comfortable; light blue: Somewhat Comfortable; orange: Uncomfortable; red: Undesirable

Figure 3: Life Sciences Center - Pedestrian Level of Comfort

Bikeway Level of Stress Analysis / Implementation of Bikeways since 2010

Similar to findings from the PLOC analysis, residential local streets and internal campus connections have lower levels of stress for people bicycling. Several planned bikeways identified in the 2018 *Bicycle Master Plan* have been built in conjunction with private development since 2010, however those

constructed have occurred in segments. All Bicycle Master Plan bikeways have been built in the form of 10foot+ wide sidepaths, with the exception of a striped eastbound bikeway along Darnestown Rd from Muddy Branch Rd to Key West Ave. The Capital Improvement Program funded Life Sciences Center Loop Trail is the only bikeway currently in-progress in the area.

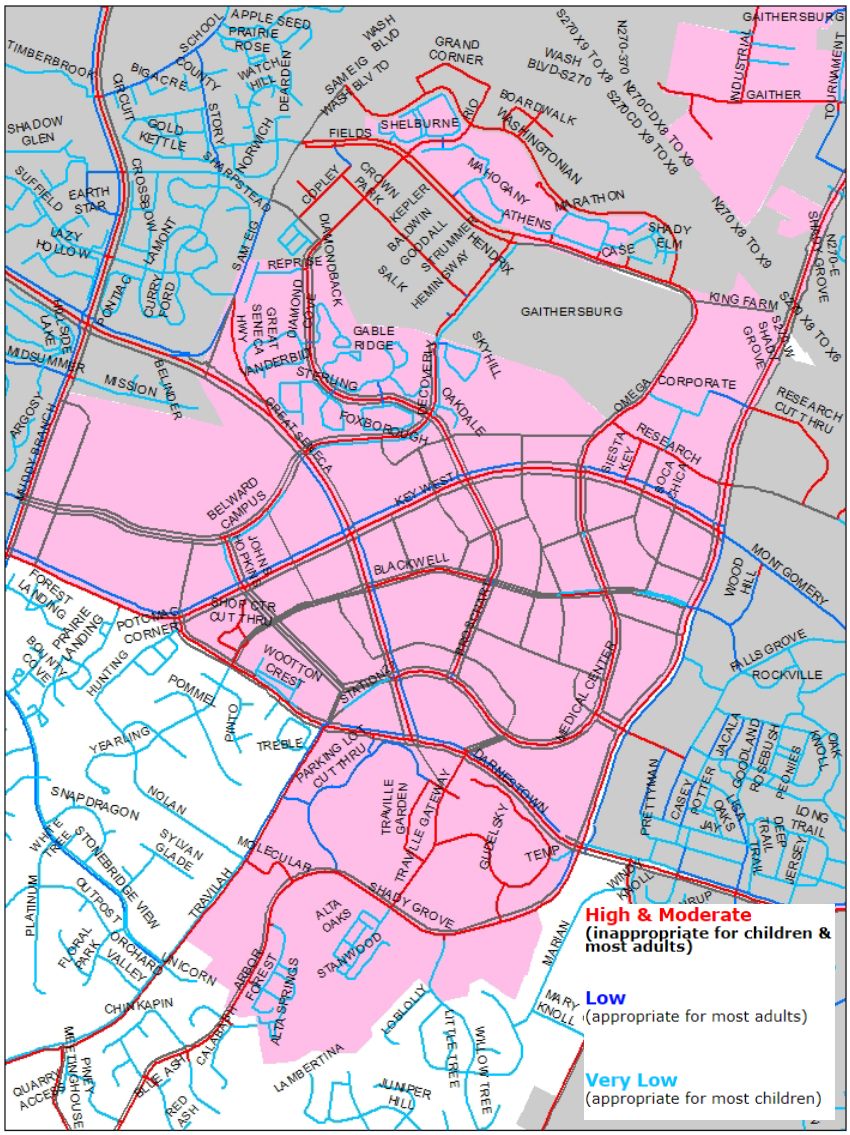


Figure 4: Bicycle Master Plan level of stress analysis

- Bicycle Master Plan bikeways built in the LSC pre-2010:
  - Shady Grove Rd (eastern frontage) from Montgomery Ave to Darnestown Rd
  - Key West Ave (northern frontage) from Shady Grove Rd to Darnestown Rd
  - Great Seneca Hwy (eastern frontage) from Darnestown Rd to Key West Ave
  - Great Seneca Hwy (northern frontage) from Muddy Branch Rd to Sam Eig Hwy
  - Darnestown Rd (northern frontage) from Muddy Branch Rd to Key West Ave
  - Decoverly Dr (eastern frontage) from Great Seneca Hwy to Skyhill Way
  - Bellward Campus Dr (eastern frontage) from Johns Hopkins Dr to dead end
  - Johns Hopkins Dr (western frontage) from Blackwell Rd to Key West Ave

        - Blackwell Rd (northern frontage) from Shady Grove Rd to dead end
        - Travilah Rd (western frontage) from Darnestown Rd to Stonebridge View Dr
        - Sam Eig Hwy (western frontage) from Diamondback Dr to Great Seneca Hwy
    - Bicycle Master Plan bikeways built in the LSC post 2010:
        - Decoverly Dr (eastern frontage) from Skyhill Way to Fields Rd
        - Blackwell Rd (northern frontage) from Medical Center Dr to dead end
        - Darnestown Rd (northern frontage) from Wooten Manor to Wooten Crossing Ct

High Injury Network Road segments

The majority of mileage for the roads identified in the High Injury Network (HIN) near the Plan area are located within municipal boundaries, outside of the Plan area. Several HIN road segments border or intersect with the Plan area although they are located in the Cities of Gaithersburg or Rockville. The plan boundaries are non-contiguous, and these road segments may be used to travel between the Plan area and to commute to it.

Each of the HIN roadway segments are classified as Major Highways in the Master Plan of Highways and Transitways (MPOHT), with the exception of Darnestown Road. Those HIN road segments with medium-high and high crash rates have posted speed limits of 40 miles per hour (MPH) or higher, with the exception of W. Diamond Avenue which has a posted speed limit of 35 MPH. HIN road segments in the area with low and low-medium crash rates have medians. Several HIN roadway segments are planned to be widened per the MPOHT to accommodate additional travel lanes or future dedicated transitways.

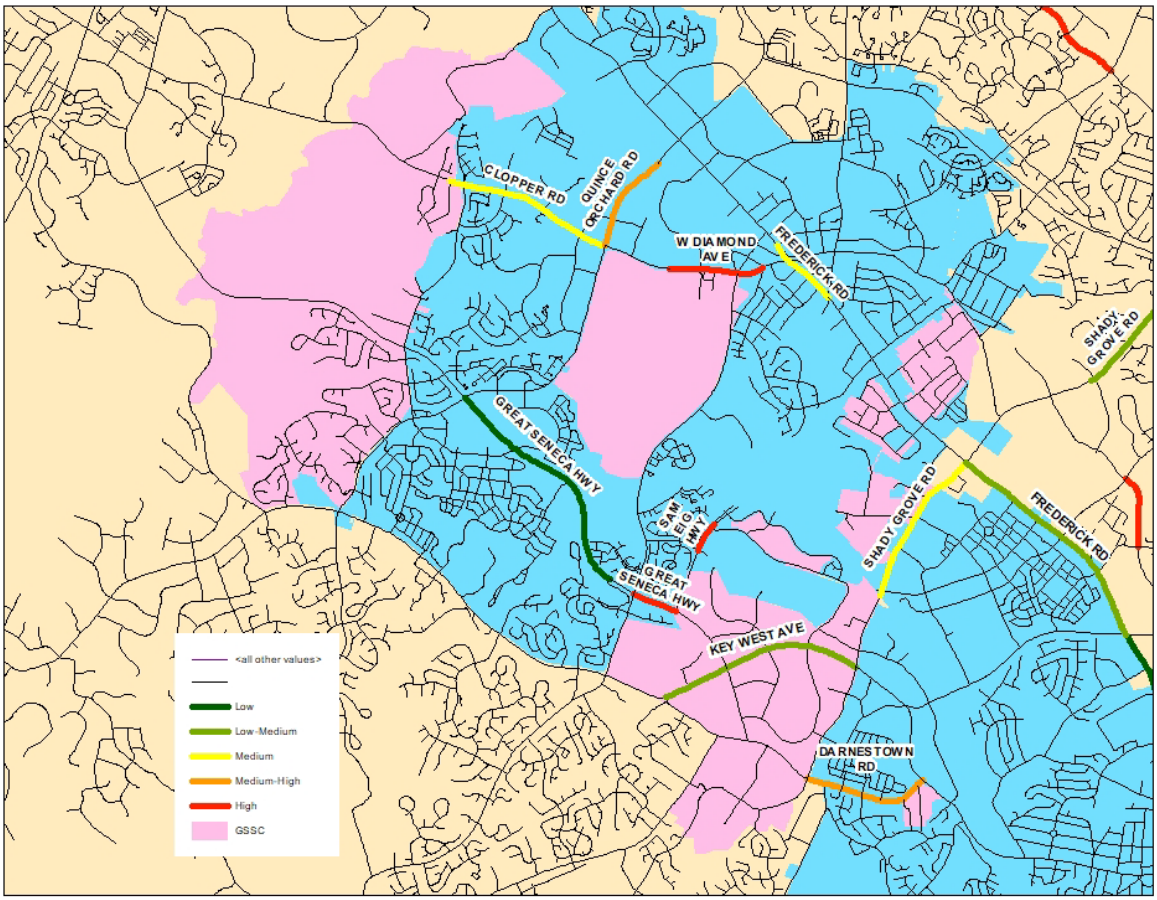


Figure 5: High Injury Network Segments and Crash Rates in the Plan Area

HIN Roadway segments within or adjacent to study area:

Road	From	To	Rate	Jurisdiction
Clopper Rd	Parkridge Dr	Quince Orchard Rd	Medium	MoCo; Gaithersburg
Darnestown Rd	Shady Grove Rd	Montgomery Ave	Medium-High	MoCo; Rockville
Diamond Ave	I-270	Meem Ave	High	MoCo; Gaithersburg
Great Seneca Hwy	Muddy Branch Rd	Sam Eig Hwy	High	MoCo; Gaithersburg
Key West Ave	Darnestown Rd	Shady Grove Rd	Low-Medium	MoCo
Shady Grove Rd	I-270	Frederick Rd	Medium-High	MoCo; Gaithersburg; Rockville

Crash rates classed as High: 24-52; Medium-High: 18-24; Medium: 14-18; Low-Medium: 11-14; Low: 5-11

HIN Segment Roadway Characteristics within or adjacent to study area:

Road	Functional Class	Posted Speed	Number of Lanes	Divided?
Clopper Rd	Major Highway (Arterial*)	35	4-6	N
Darnestown Rd	Arterial (Arterial*)	40	4	N
Diamond Ave	Major Highway (Arterial*)	35	4	Y
Great Seneca Hwy	Controlled Major Highway with planned BRT (Major Arterial*)	50	6	Y
Key West Ave	Controlled Major Highway	40	6	Y
Shady Grove Rd	Major Highway (Major Arterial*)	40	6	Y

*Per municipal road classifications

High Injury Network Roadway segments in surrounding area:

Road	From	To	Rate	Jurisdiction
Frederick Rd	Brookes Ave	Summit Ave	Medium	Gaithersburg
Frederick Rd	Shady Grove Rd	Gude Dr	Low-Medium	MoCo; Rockville
Great Seneca Hwy	Quince Orchard Rd	970’ west of Muddy Branch Rd	Low	Gaithersburg
Quince Orchard Rd	Clopper Rd	I-270	Medium-High	Gaithersburg
Sam Eig Hwy	Diamondback Dr	Fields Rd	High	Gaithersburg

Crash rates classed as High: 24-52; Medium-High: 18-24; Medium: 14-18; Low-Medium: 11-14; Low: 5-11

High Injury Network Roadway segments in surrounding area:

Road	Functional Class	Posted Speed	Number of Lanes	Divided?
Frederick Rd	Major Highway with planned BRT (Major Arterial*)	40	4	Y
Frederick Rd	Major Highway with planned BRT	40	6	Y
Great Seneca Hwy	Controlled Major Highway with planned BRT (Major Arterial*)	50	4	Y
Quince Orchard Rd	Major Highway (Arterial*)	40	4	N
Sam Eig Hwy	Controlled Major Highway with planned BRT (Major Arterial*)	50	6	N

*Per municipal road classifications

High Crash Intersections

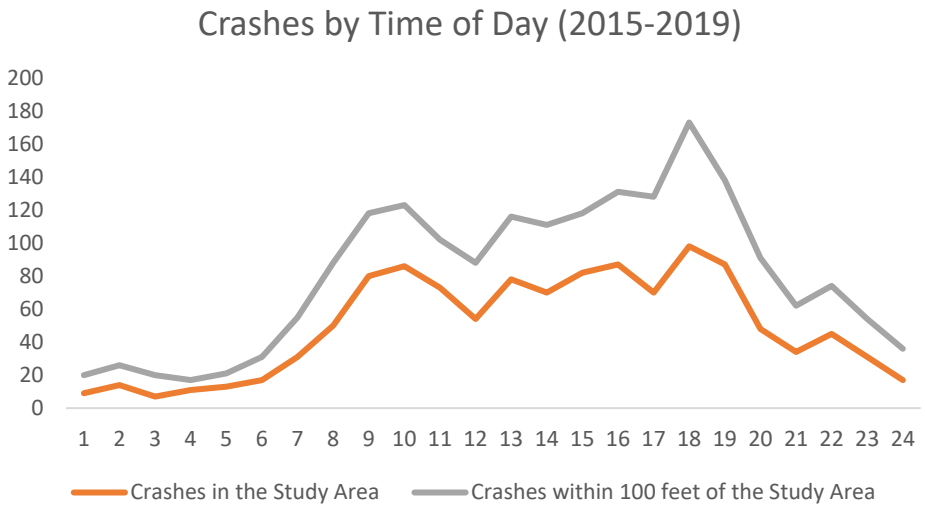
The total number of crash incidents are trending upwards over the five-year reporting period, peaking in 2019. However, the severity of crash incidents is trending downwards, peaking in 2016. The clear majority of crash incidents occur in daylight hours, at the evening traffic peak hour. Sixteen of the twenty-three severe incidents occurred in daylight hours. However, of the two fatal incidents which occurred during the five-year period, one occurred at dusk while the other occurred at night.

Top 15 Intersections:

Intersection	**Total Serious Injuries**	**Total Fatalities**	**Total Crashes to People Biking**	**Total Crashes to People Walking**
Quince Orchard & Clopper Road	2	0	1	0
MD-117 & Muddy Branch	1	0	0	0
MD-117 & Bureau	0	0	0	0
Shady Grove & Choke Cherry	1	0	0	2
Shady Grove & Gaither	0	0	1	6
Shady Grove & Research	1	0	0	0
Muddy Branch & Westside	1	0	0	1
Muddy Branch & King James	0	1	0	3
Shady Grove & Darnestown	1	0	1	0
Muddy Branch & Darnestown	1	0	2	0
Great Seneca & Sam Eig	0	0	1	0
Frederick & Westland	2	1	1	6
Quince Orchard & Bank/Northgate	2	0	1	0
Muddy Branch & Deer Park	1	0	0	0
Washington Grove & Diamond/Railroad	0	0	0	0

- Total Crashes within study area (2015-2019): 1,192 crashes
  - Serious Injury Incidents: 23
  - Fatal incidents: 2
  - Motorists: 1,139
  - Bicycle: 13
  - Pedestrian: 40

- Total Crashes within 100 feet of the study area (2015-2019): 1,941 crashes
  - Serious Injury Incidents: 40
  - Fatal incidents: 3
  - Motorists: 1,855
  - Bicycle: 25
  - Pedestrian: 61


Crashes by Time of Day (2015-2019)
200
180
160
140
120
100
80
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Crashes in the Study Area
Crashes within 100 feet of the Study Area