

Introduction:

Virginia State Route 7 is a primary highway traveling approximately 73-miles between Winchester and Alexandria, serving the northern part of the state. The highway has a functional classification designation of Principal Arterial, serving regional travel needs of connecting the northern Shenandoah Valley to Northern Virginia as a critical commuter corridor. The transitional section of Route 7 between these two regions falls on the boundary of Clarke County and Loudoun County, as the highway travels over the easternmost ridge of the Blue Ridge Mountains at Snickers Gap. This 4-mile segment of Route 7 climbs over 600' as it crosses the Shenandoah River in Clarke County to the west, reaching the summit at the unsignalized intersection with Route 601 (Blue Ridge Mountain Road), before descending into Loudoun County to the east. Route 601 is a 2-lane, Minor Collector roadway that travels north and south. North of Route 7, Route 601 is a dead end roadway that crosses into neighboring West Virginia. To the south of Route 7, Route 601 travels the mountain ridgeline for approximately 11-miles, generally following the county boundary, before connecting to Route 50/17. The Route 7 and 601 intersection serves as the primary access for residential communities along the mountain ridgeline, a brewery, winery, and the Mount Weather Emergency Operations Center federal facility. The intersection also provides recreational access to the Appalachian Trail, which crosses Route 7 immediately to the west. The combination of these land uses, the mountainous terrain, and the characteristics of higher speeds and heavy commuting volumes along Route 7 result in a challenging intersection for driver navigation during the morning and afternoon peak periods and during inclement weather. These issues were compounded during the summer of 2020 at the height of the Covid-19 pandemic lockdown. The Appalachian Trail and the outdoor venues at the winery and brewery became popular destinations during this time, resulting in an overuse of the existing parking facilities at the intersection, creating unsafe conditions with individuals parking along the public right-of-way of both Route 7 and 601. Given both the underlying and elevated 2020 concerns at Route 7 and 601, a multi-jurisdictional team consisting of VDOT Staunton District, VDOT NoVA District, Clarke County, and Loudoun County staff, and representatives from the National Park Service and Appalachian Trail organizations, began an intersection study in May 2021 to evaluate operational and safety conditions and develop alternatives to address the identified needs. The outcome of the study is a preferred improvement alternative to be considered by the localities for advancement for transportation funding consideration.

Study Location and Data Collection:

The locations identified for traffic data collection to support the study consisted of the intersection of Route 7 and 601, the right-in/right-out entrance to the informal park and ride located 900' to the west of the primary intersection, and the entrance to Bear Chase Brewery on Route 601 located 1,600' to the south of the primary intersection. The data collection locations are identified in **Figure 1**. Based on the VDOT annual count program, Route 7 has a daily volume of 27,000 AADT (Annual Average Daily Traffic) with a peak one-way directional volume of over 2,100 vehicles observed in June 2021. The southern leg of Route 601 has a daily volume of 1,900 AADT, with the volume being predominantly generated by the brewery and the Mount Weather facility, both located to the south of the study intersection. In addition to the 2021 traffic data collection, the study team also had access to pre-pandemic peak period weekday turning movement volumes collected at the primary intersection in September 2019 to support an initial evaluation of intersection improvements by VDOT Staunton District Traffic Engineering. The 2019 counts were compared to the current data collection to determine appropriate traffic volumes to utilize for the analysis of existing conditions and as a baseline for forecasting future conditions.

To support the current effort, 12-hour Friday through Sunday turning movement counts were collected for three consecutive weekends beginning June 11, 2021. These count periods were selected to understand the impacts of weekend visitors to the brewery and the Appalachian Trail. The 12-hour counts were conducted at the three intersections identified in **Figure 1** and included classification and pedestrian counts. Additionally, pedestrian counts of Appalachian Trail users were collected along the southern shoulder of Route 7 and the spur trail leading from the informal park and ride lot during the traffic count period. Hourly park and ride vehicle volumes were also collected over the initial count weekend.

Following an evaluation of the count data, the afternoon peak period on the 2021 Father’s Day Sunday represented the highest volumes for the weekend counts; however, overall, the weekend volumes did not equate to significant operational concerns at the study intersection as anticipated. This observation was further supported based on comments from the brewery that they have not experienced similar crowds that occurred in 2020 during the pandemic lockdowns. The park and ride vehicle counts also supports that Appalachian Trail usage has decreased from the 2020 highs. A potential explanation for this drop in traffic volumes between 2020 and 2021 is the overall easing of COVID-19 restrictions with more dining and recreational opportunities becoming available to the public.

The 2021 Friday counts also saw a significant drop in both Route 7 and 601 peak hour volumes when compared to the 2019 counts, indicating the continual impact of COVID-19 on traffic volumes. While traffic monitoring across the state has shown that volumes in the VDOT Staunton District are close to returning to pre-pandemic levels, the VDOT Northern Virginia District was still experiencing up to a 10% suppression of volumes from 2019 highs during the data collect period. As a result of the evaluation of the June 2021 traffic data, the study team determined that the AM and PM weekday counts from 2019 and the Father’s Day PM counts from 2021 would be appropriate for analysis of intersection improvements

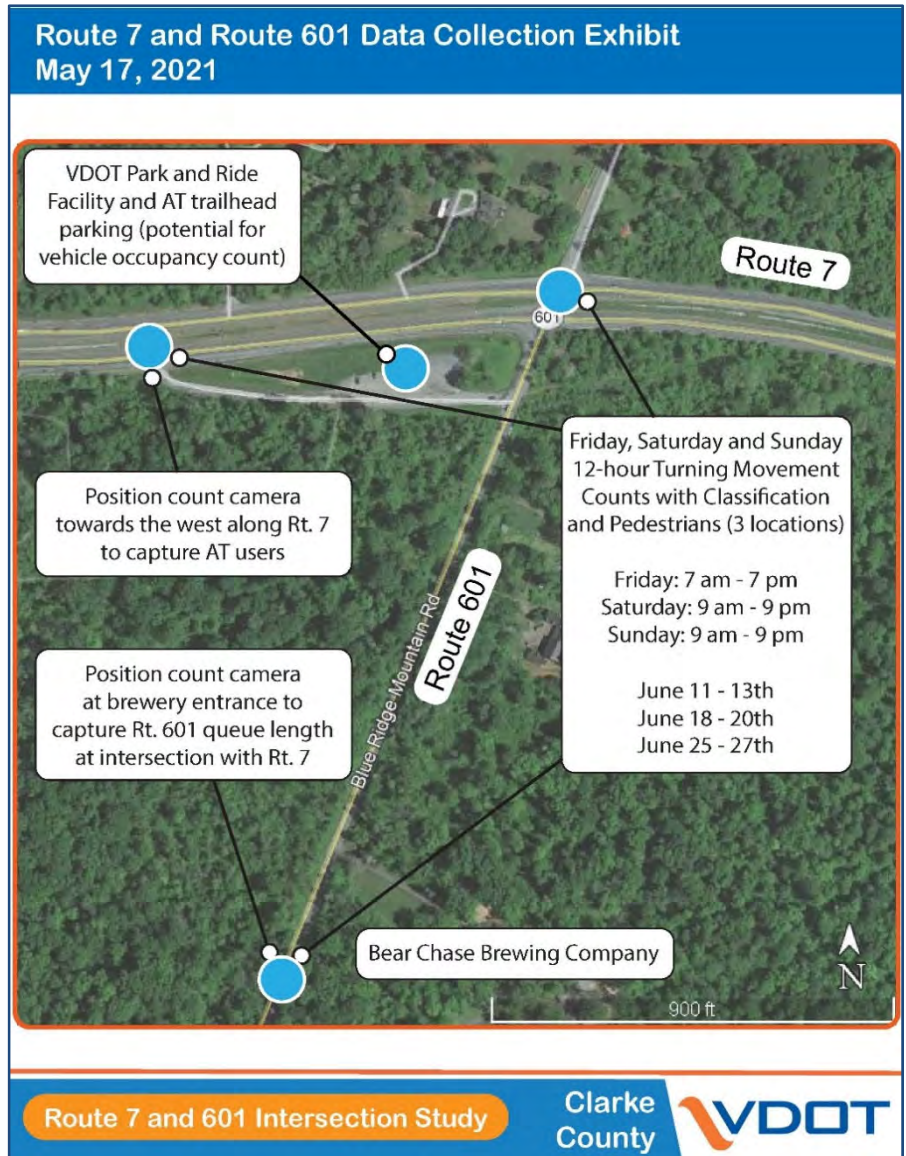


Figure 1: Study Location and Data Collection Exhibit

moving forward. The difference in peak hour traffic volumes when comparing in the 2019 and 2021 counts at the primary intersection is illustrated in **Figure 2**.

Existing Conditions:

Route 7 is a 4-lane, divided roadway posted at 55 mph. Observations during site field visits confirm that the actual travel speeds on Route 7 are significantly higher than the posted limits, ranging from 65 to 70 mph and greater. Route 601 is a 2-lane, Minor Collector posted at 40 mph. The existing intersection is unsignalized with stop sign control on both approaches of Route 601. There are existing left and right turn lanes serving both approaches on Route 7. However, given the design speeds of the roadway, all of the existing turn lanes are substandard in terms of minimum deceleration lengths. Over the summer of 2021, VDOT Northern Virginia District completed an extension of the existing Route 7 westbound left turn lane to southbound Route 601 to expand turn lane storage and improve deceleration length. Both of the Route 601 approaches are single lane and have a significant downgrade to Route 7. The intersection is located just to the east of the vertical crest

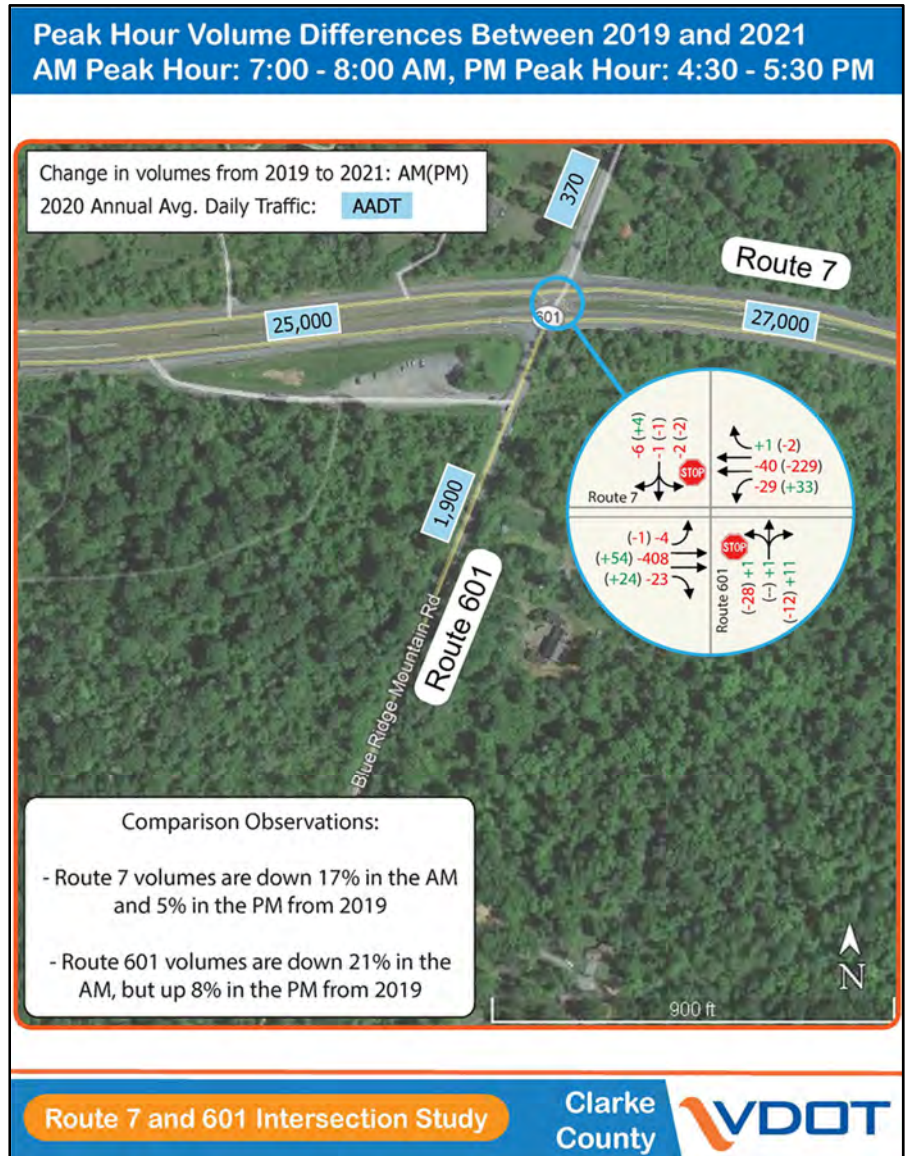


Figure 2: Comparison of 2019 and 2021 peak hour traffic volumes

of Route 7. As a result, intersection sight distance, while challenging for all movements, is particularly concerning on the Route 7 eastbound approach for northbound Route 601 vehicles. The median along Route 7 is generally 30' in width. This allows for passenger vehicles to make a 2-stage left turn movement onto Route 7 from Route 601. However, the median width makes a 2-stage crossing for heavy vehicles difficult without obstructing the through lanes on Route 7. Given the mainline volumes and sight distance challenges, performing a 2-stage left turn is essential during peak periods.

The informal park and ride facility located in the southwest quadrant of the study intersection is connected to Route 7 and 601 by a driveway. Both the informal park and ride lot and associated driveway are located on state property, but are not regularly maintained by VDOT. While this location is not an official VDOT park and ride, the remnant of old Route 7 right-of-way is used by both commuters and for recreational access to the Appalachian Trail. It should be noted that during initial study team meetings and in prior settings, the need for improvements to the Appalachian Trail crossing of

Route 7 immediately west of the study intersection has been discussed. However, the study team determined that such an improvement has independent utility, addressing a separate purpose and need outside of the scope of this study. The collected traffic data confirms that pedestrian crossings are generally not occurring at the study intersection and the majority of users accessing the Appalachian Trail from the park and ride are using the existing spur trail as opposed to the shoulder on Route 7. Therefore, while this study may consider possible impacts to the intersection where the trail crossing is located, pedestrian crossing improvements along Route 7 will be not included in the scope of this study. Improvements to the park and ride may be considered based on both the types of improvement alternatives advanced for analysis and the potential to generate project benefit through a potential Smart Scale application. At the request of Clarke County, a separate study started in 2022 to evaluate short-term recommendations to the existing at-grade Appalachian Trail crossing and evaluate the feasibility of a grade-separate pedestrian bridge over Route 7. This study is anticipated to be completed in February 2023.

SAFETY EVALUATION

To assess the safety needs of the study intersection, crash data for a 5-year period from the beginning of 2016 through February 2021 was reviewed to determine crash trends. Over this time period, there were 22 total crashes identified within the functional area of the primary study intersection. Of the total crashes, 5 crashes resulted in minor injuries (Type C) and 17 crashes were property damage only (PDO). Given the high speeds associated with Route 7, the low percentage of injury crashes and lack of severe injuries were surprising. The following trends were identified from the crash assessment:

- 77% of reported crashes are angle crashes.
- 64% of reported crashes are a result of movements coming off of Route 601
- 80% of reported injury crashes are a result of movements coming off of Route 601
- 23% of reported crashes occurred during wet or fog conditions
- 32% of reported crashes occurred during non-daylight hours

A crash diagram summarizing the 5-years of crash data is presented in **Figure 3**. The predominance of angle crashes involving a high percentage of movements from the side street supports the consideration of intersection types that reduce vehicular conflict points. Conflict points represent locations within an intersections where crashes may occur. They consist of merge, diverge and crossing conflicts, where crossing conflicts represent a higher risk of injury crashes. The current Route 7 and 601 intersection contains 24 crossing conflicts due to the 2-lane approaches of Route 7 and 16 merge/diverge conflicts, for a total of 40 conflict points. Intersection types that remove/relocate certain movements reduce vehicular conflict points, resulting in an anticipated reduction of crashes. This anticipated reduction of crashes associated with an improvement is referred to as a Crash Modification Factor (CMF). VDOT has adopted improvement specific CMFs based on national standard and best practices.

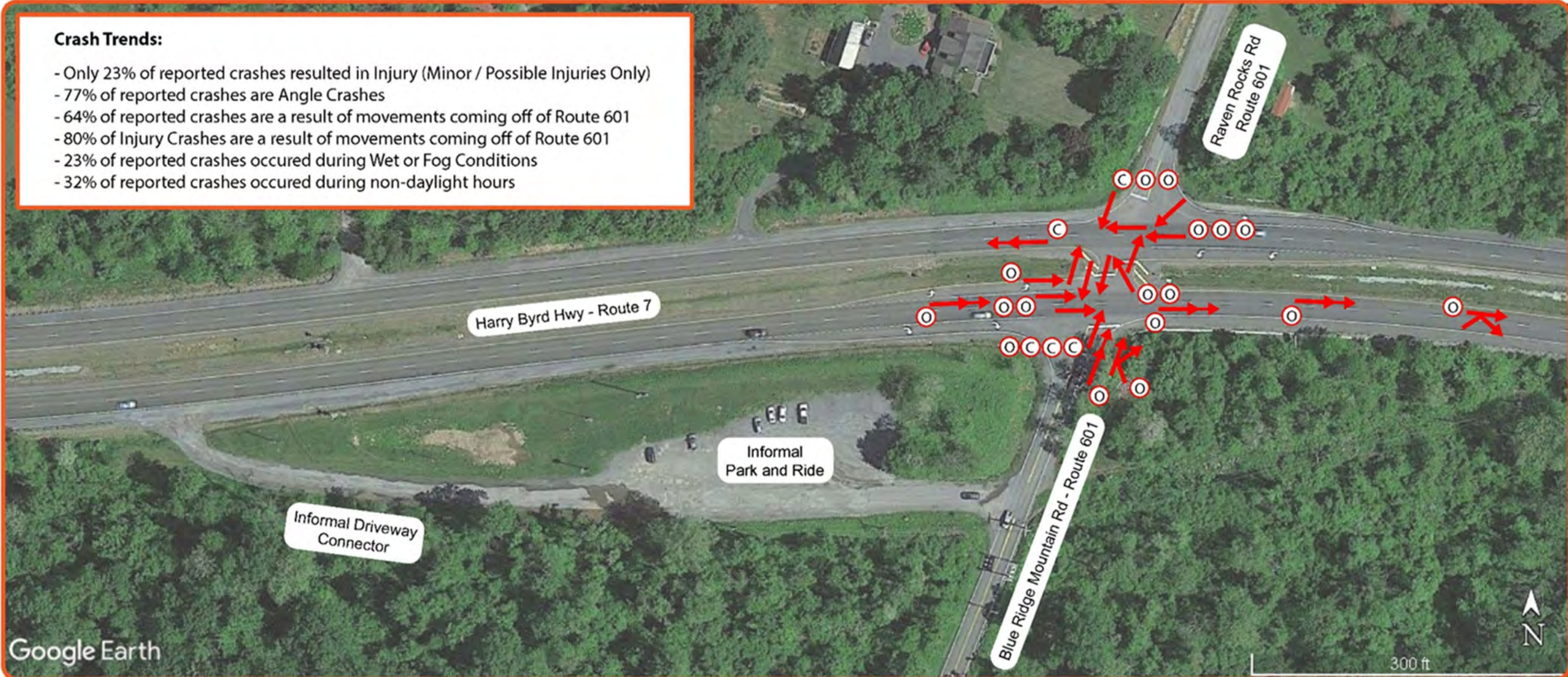
VDOT utilizes Potential of Safety Improvement (PSI) rankings as a tool for the initial screening of roadway segments and intersection where there may be safety concerns. PSI rankings utilize 5-years of crash data to compare actual crashes to anticipated crashes based on roadway characteristics. The current VDOT PSI rankings are based on 2016 – 2020 crash data. The primary intersection is not designated as a PSI location with the current data set. This can be attributed to the high volumes associated with mainline Route 7 that result in an increased level of anticipated crashes.

Route 7 and 601 Crash Assessment Exhibit

DRAFT

Crash Trends:

- Only 23% of reported crashes resulted in Injury (Minor / Possible Injuries Only)
- 77% of reported crashes are Angle Crashes
- 64% of reported crashes are a result of movements coming off of Route 601
- 80% of Injury Crashes are a result of movements coming off of Route 601
- 23% of reported crashes occurred during Wet or Fog Conditions
- 32% of reported crashes occurred during non-daylight hours



CRASH TYPE:

- REAR END
- ↘ ANGLE
- ↔ SIDE SWIPE

CRASH SEVERITY:

- (K) FATAL
- (A) SEVERE INJURY
- (B) VISIBLE INJURY
- (C) MINOR INJURY
- (O) PROPERTY DAMAGE ONLY

YEAR	TIME OF DAY			CONDITION				CRASH TYPE			CRASH SEVERITY					TOTAL
	DAY	DAWN/DUSK	DARK	DRY	WET	FOG	SNOW/ICE	REAR END	ANGLE	SIDE SWIPE	K	A	B	C	O	
2016	2		2	3	1	1			4					1	3	4
2017	1			1					1					1		1
2018	2		2	3	1			1	3						4	4
2019	4	1	1	5	1	2		2	3	1				1	5	6
2020	5			5				2	2	1				2	3	5
2021	1		1	1	1	1			2						2	2
TOTAL	15	1	6	18	4	4		5	15	2				5	17	22

Planning-Level Crash Diagram

Clarke and Loudoun County



Figure 3: Crash Diagram

EXISTING OPERATIONAL ANALYSIS

Utilizing the 2019 weekday AM and PM peak hour volumes and the 2021 weekend peak hour volumes, the primary intersection was initially modeled in Synchro traffic software. However, given the limitations of Synchro in modeling the unsignalized improvement alternatives considered, the intersection was also modeled in Vissim simulation software. Following calibration of the Vissim model, the reported Measures of Effectiveness (MOE) from Vissim for delay per vehicle and maximum queue length more accurately reflected existing conditions as observed during site field visits. All analysis supporting the study was conducted in compliance with VDOT’s Traffic Operations and Safety Analysis Manual (TOSAM Version 2.0). A comparison of reported MOEs from both analysis software for the critical intersection left turn movements from the existing conditions analysis can be found in **Table 1** and **Table 2**.

Scenario	Rt. 601 NB Left	Rt. 601 SB Left	Rt. 7 EB Left	Rt. 7 WB Left
AM (Synchro)	94.8s (F)	42.4s (E)	8.4s (A)	24.1s (C)
AM (Vissim)	53.2s	58.6s	10.7s	50.11s
PM (Synchro)	60.8s (F)	167.5s (F)	22.3s (C)	9.0s (A)
PM (Vissim)	57.2s	52.7s	42.7s	12.3s
Weekend PM (Synchro)	27.4s (D)	20.9s (C)	9.5s (A)	10.5s (B)
Weekend PM (Vissim)	42.7s	27.6s	14.9s	19.7s

Table 1: Existing Year Delay per Vehicle in Seconds Comparison

Scenario	Rt. 601 NB Left	Rt. 601 SB Left	Rt. 7 EB Left	Rt. 7 WB Left
AM (Synchro)	88'	25'	0'	25'
AM (Vissim)	95'	37'	6'	67'
PM (Synchro)	113'	53'	25'	25'
PM (Vissim)	161'	42'	41'	133'
Weekend PM (Synchro)	100'	25'	0'	25'
Weekend PM (Vissim)	209'	34'	24'	100'

Table 2: Existing Year Queue Length in Feet Comparison

The study team determined that Vissim was the more appropriate tool for analysis to support the study moving forward. The existing conditions analysis identified peak hour operations that are not considered unacceptable. While delay per vehicle approaches what would be considered a failing level of service (greater than 50 seconds) for the side street left turns, this is not uncommon for unsignalized intersection. As a result of the existing conditions analysis and observations from field visits, it was assumed that the reported intersection operational concerns from summer 2020 were no longer occurring. While navigation of the intersection is challenging related to mainline speeds, volumes and roadway geometrics, the existing conditions safety and operations analysis did not reveal any critical intersection issues or needs.

Forecasted Conditions:

The study team selected a design year of 2032 to forecast future traffic conditions for the evaluation of intersection improvement alternatives. This design year would account for 10-years of assumed traffic growth and represent an estimated year of construction completion should a project be approved for funding in the FY2024 VDOT Six Year Improvement Program (SYIP). In order to determine an appropriate growth rate to apply to the existing year traffic volumes, historical traffic volumes along Route 7 and 601 from the VDOT annual count program were reviewed to determine growth trends. The study team also reviewed potential future land uses within proximity to the study area, including a planned expansion of the Mount Weather facility. Based on the review of this data, the study team ultimately selected the following annual growth rates to develop the forecasted design year 2032 traffic volumes.

Route 7 to the west of the intersection with Route 601:	1.50%
Route 7 to the east of the intersection with Route 601:	2.00%
Route 601 to the south of the intersection with Route 7:	1.50%
Route 601 to the north of the intersection with Route 7:	1.00%

FORECASTED 2032 NO BUILD OPERATIONAL ANALYSIS

Using the 2032 traffic volumes in the developed Vissim model, reported MOEs for the critical intersection left turn movements can be found in **Table 3** and **Table 4**.

Scenario	Rt. 601 NB Left	Rt. 601 SB Left	Rt. 7 EB Left	Rt. 7 WB Left
AM (Vissim)	129.8s	123.2s	18.5s	133.6s
PM (Vissim)	317.2s	93.8s	81.2s	14.5s
Weekend PM (Vissim)	133.0s	36.1s	20.6s	28.1s

Table 3: Design Year 2032 Delay per Vehicle in Seconds

Scenario	Rt. 601 NB Left	Rt. 601 SB Left	Rt. 7 EB Left	Rt. 7 WB Left
AM (Vissim)	188'	54'	93'	140'
PM (Vissim)	509'	49'	85'	179'
Weekend PM (Vissim)	487'	34'	27'	180'

Table 4: Design Year 2032 Queue Length in Feet

The results of the design year 2032 no build analysis show that the Route 7 and 601 intersection is at risk of experiencing deteriorating operational conditions over the next decade if traffic growth on Route 7 continues at the expected rate. Delay per vehicle increases for all left turn movements, with the Route 601 northbound left turn experiencing significant increases to over 2 minutes of delay in all scenarios and maximum queue length increasing to approximately 500' in the weekday and weekend PM peak periods. Delays of this magnitude are likely to result in drivers accepting smaller “gaps”

in conflicting traffic to make the desired movement. This more aggressive driving behavior, when coupled with the challenging sight distance and mainline speeds of Route 7, could lead to an increase in crashes at the study intersection.

While the Route 7 left turn queue lengths experience an increase over existing conditions, they are accommodated by the existing storage lengths (with the recently completed improvements to the Route 7 westbound left turn lane). While storage lengths are adequate for the reported queues based on the operational analysis, with the exception of the Route 7 westbound left turn lane, the turn lanes at the intersection do not meet VDOT minimum storage and taper lengths based on the design speed of Route 7.

Evaluation of Improvement Alternatives:

The VDOT Junction Screening Tool (VJuST) was used to conduct an initial screening of intersection types for analysis consideration based on intersection volumes and reduction of conflict points. The previously developed 2020 VDOT Staunton District Traffic Engineering report was also considered in the advancement of alternatives. The preliminary screening of intersection improvement alternatives utilized both the existing year traffic volumes and design year 2032 forecasted traffic volumes. The peak hour volumes were entered into VJuST for an initial planning-level assessment of alternatives based on existing and assumed future roadway geometry. The VJuST outputs were then compared to the results presented in the 2020 VDOT Staunton District Traffic Engineering report to assist with determining the appropriate improvement concepts to advance for more detailed consideration in Vissim. Given the scale of the identified intersection needs and the reality of transportation dollars relying on competitive funding grants, only at-grade intersections improvements were considered in the VJuST screening, as all grade-separated concepts were determined to be cost-prohibitive by the study team.

VJuST SCREENING RESULTS

The VJuST tool is based on the Federal Highway Administration (FHWA) CAP-X capacity tool that considers critical intersection volumes to determine a planning-level maximum Volume to Capacity (V/C) ratio per intersection type. In addition to capacity, the VJuST tool also considers pedestrian crossing improvements (compared to a conventional intersection) and safety improvements with the total number of conflict points per intersection type. **Table 5** below presents the V/C outputs and conflict points associated with each intersection type for the existing and design year time periods. Since pedestrian crossing improvements are not being considered as part of the study scope per the framework document, these VJuST outputs are not included.

Intersection Type	Existing Weekday AM	Existing Weekday PM	Existing Weekend PM	Design Year Weekday AM	Design Year Weekday PM	Design Year Weekend PM	Conflict Points
Conventional	0.76	0.82	0.51	0.89	0.99	0.60	48
Bowtie	0.75	0.83	0.45	0.87	1.01	0.53	24
Continuous Green-T	0.77	0.72	0.51	0.89	0.88	0.60	12
Median U-Turn	0.72	0.82	0.46	0.84	1.00	0.55	20
Partial Median U-Turn	0.60	0.65	0.27	0.70	0.79	0.32	28
Quadrant Roadway	0.73	0.81	0.44	0.84	0.98	0.53	40
Restricted Crossing U-Turn	0.60	0.65	0.39	0.70	0.79	0.50	20
Split Intersection	0.72	0.75	0.34	0.83	0.92	0.40	36
Roundabout	0.86	0.93	0.41	1.01	1.14	0.50	8
Two-Way Stop Control	0.68	0.67	0.61	N/A	1.28	0.84	48

Table 5: VJuST V/C and Conflict Point Summary

The VJuST capacity results identify the Partial Median U-turn (PMUT) and Restricted Crossing U-turn (RCUT) intersections as offering the lowest maximum V/C in all scenarios. Both of these intersection options would relocate movements to and from Route 601 from the primary intersection to downstream U-turn locations. The relocation of these movement would also reduce conflict points, potential enhancing intersection safety and navigability.

2020 TRAFFIC ENGINEERING REPORT SUMMARY

VDOT Staunton District Traffic Engineering previously evaluated intersection improvements from an operational standpoint using the collected 2019 weekday peak hour volumes. The 2020 report is included as **Appendix C** in this document for reference. The evaluation considered a conventional signalized intersection, an unsignalized RCUT intersection, an unsignalized double Continuous Green-T intersection that provides a southbound Route 601 connection at the primary intersection and a northbound Route 601 connection at the service drive / informal park and ride driveway to the west through the creation of a new median break on Route 7, and a hybrid concept that includes components of both an unsignalized RCUT and an unsignalized Continuous Green-T using the service drive to accommodate the northbound Route 601 left turns onto westbound Route 7.

The report found that warrants were not met to support a signal based on the 2019 traffic counts. The operational analysis also showed unacceptable left turn delay and directional peak hour 95th percentile queue lengths of approximately 1,000' on Route 7. From a safety standpoint, the prevailing speeds of Route 7 may result in an increase of rear end crashes with the installation of a traffic signal. Furthermore, Route 7 is part of the VDOT Arterial Preservation Network. This designation is intended to ensure the preservation of roadway capacity for critical statewide and regional travel corridors. Based on the roadway characteristics of Route 7 and the operational concerns associated with the signal analysis, a conventional traffic signal to stop through traffic on Route 7 is not supported.

Given the unconventional characteristics of the evaluated alternatives, the memo indicates the problematic results from attempting the supporting analysis in Synchro and Highway Capacity Software. Ultimately, the technical memo

recommended the hybrid RCUT / Continuous Green-T alternative based on delay measure of effectiveness reported from SimTraffic microsimulation.

CONCEPT ALTERNATIVES FOR CONSIDERATION

Both the VJuST analysis and previous Traffic Engineering evaluation support the consideration of an RCUT intersection to relocate the left and through movements from Route 601 to downstream U-Turns on Route 7. Additionally, the VJuST analysis indicates the relocation of the Route 7 left turns onto Route 601 to downstream U-Turns should also be considered. Both of these alternatives would address needs identified from the crash analysis and site visit in terms of reducing conflict points and simplifying driver navigation of the intersection. The presence of the service drive/informal park and ride access and associated available right-of-way in the southwest corner of the intersection provides an opportunity to accommodate the relocation of turning movements from the primary intersection with the creation of a new median break to the west on Route 7. Sight distance will need to be evaluated from this location to determine if a new median break can be considered. While the VJuST analysis shows a higher maximum V/C for a Continuous Green-T and/or Split Intersection concept when compared to the PMUT and RCUT, these alternatives both operate under capacity in the design year. Additionally, given the previous Traffic Engineering evaluation and intersection characteristics to potentially use the service drive to “split” the Route 601 approach volumes, it was determined that these concepts also warrant additional analysis in Vissim. A description of each intersection alternative advancing from the planning-level screening evaluation follows. Based on the characteristics of the intersection, the following assumptions are applied to all of the concepts under consideration.

- To accommodate U-Turn movements on Route 7, additional analysis of extra travel times, sight distance measurements, and engineering judgement will be used to determine if the existing downstream crossovers can be utilized or new median breaks are warranted. If the use of the existing crossovers is recommended (2,050' to the west and 2,720' to the east), both will require turn lane extensions to provide for safe deceleration out of the mainline. U-Turn movements may also require loons or bulb-outs to accommodate heavy vehicle turning movements.
- Concepts that utilize the service drive that accesses the informal park and ride will need to assume a full reconstruction of the roadway to current geometric and pavement standards. Sight distance at the service drive intersection with Route 601 will also need to be evaluated and potentially addressed.

Figure 4a illustrates an unsignalized RCUT concept. The concept would relocate the conventional turning movements of 2.3% of the weekday PM peak hour intersection volume and reduce intersection conflict points by 58%. The RCUT would utilize the recently completed Route 7 westbound left turn lane extension to Route 601 and the magnitude of cost is anticipated to be low with improvements contained within the Route 7 right-of-way, with the exception of potential truck loons.

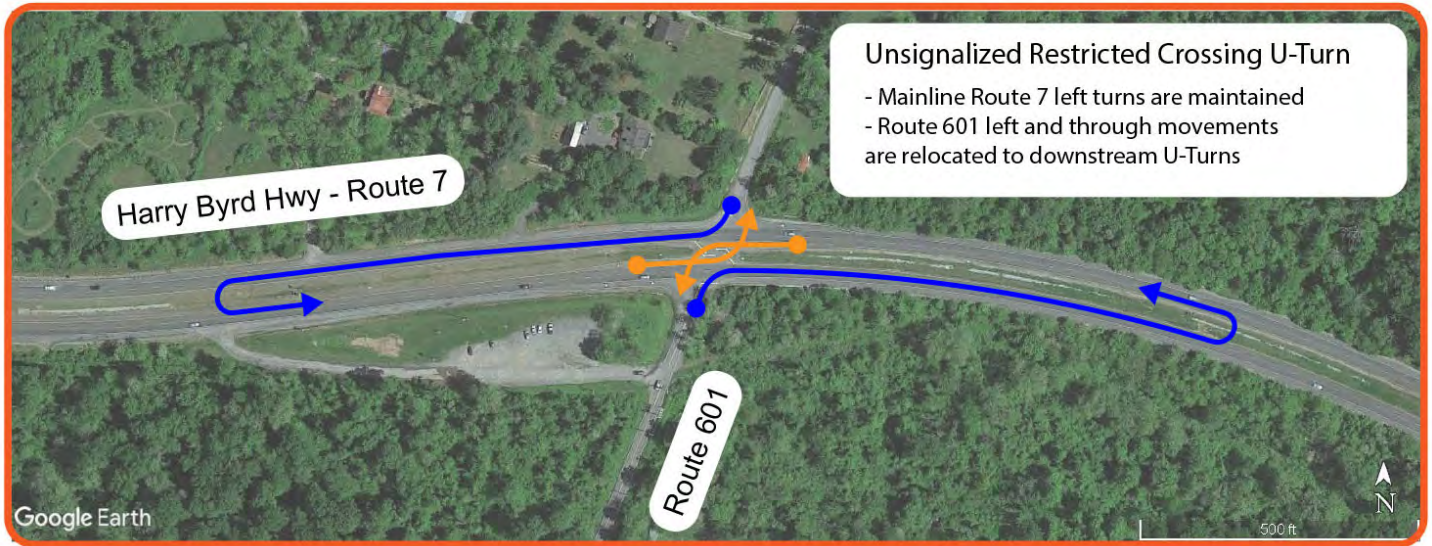


Figure 4a: Unsignalized Restricted Crossing U-Turn (RCUT) Intersection

Figure 4b illustrates an unsignalized PMUT concept. This concept would relocate the conventional turning movements of 2.9% of the weekday PM peak hour intersection volume and reduce intersection conflict points by 42%. This alternative would require the removal of the recently completed Route 7 westbound left turn lane extension to Route 601. However, the magnitude of cost is anticipated to be low with improvements contained within the Route 7 right-of-way, with the exception of potential truck loons. Note that the VJuST tool only considers a signalized primary intersection with this concept. Based on the design year conflicting Route 7 through volumes, the left turns from Route 601 may be over capacity. The delay of these movements will be evaluated in Vissim.

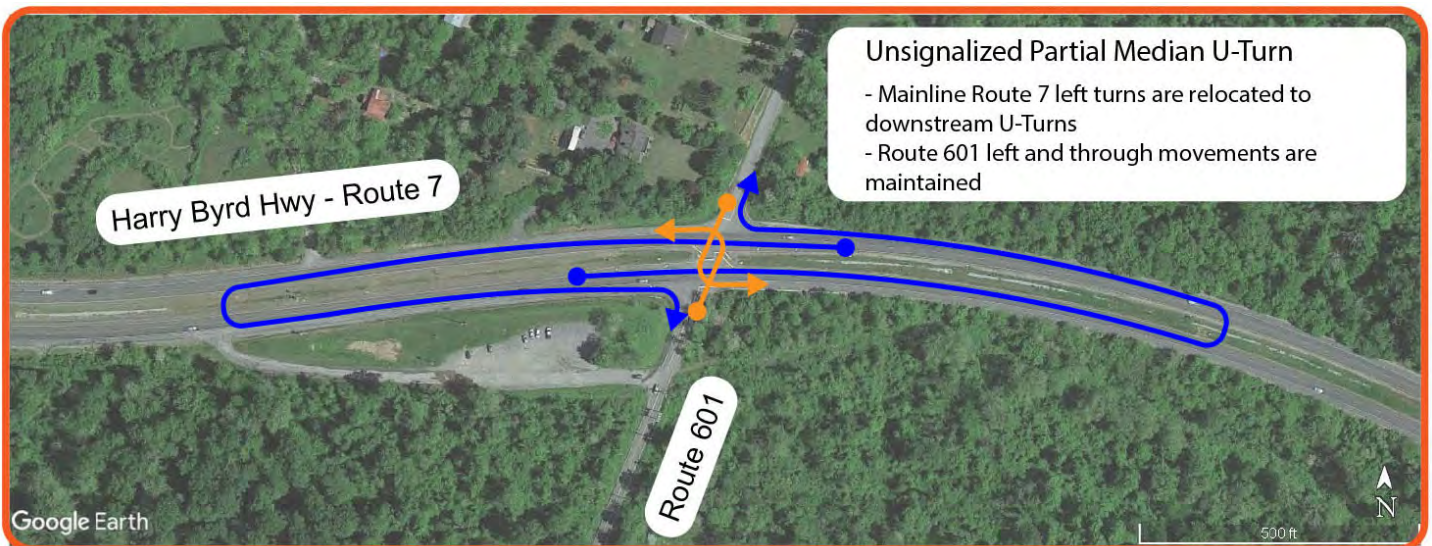


Figure 4b: Unsignalized Partial Median U-Turn (PMUT) Intersection

Figure 4c illustrates an unsignalized, single Continuous Green-T intersection to serve the southern leg of Route 601. The concept would relocate the conventional turning movements of 1.0% of the weekday PM peak hour intersection volume

by requiring the northern leg of the intersection to be right-in / right-out. Conflict points at the primary intersection would be reduced by 66%. The Continuous Green-T would utilize the recently completed Route 7 westbound left turn lane extension to Route 601 and the magnitude of cost is anticipated to be the lowest of the five concepts presented in this memo. Note that the VJuST tool only considers a signalized primary intersection with this concept. Based on the design year conflicting Route 7 through volumes, the left turns from northbound Route 601 may be over capacity. The delay of these movements will be evaluated in Vissim. A new acceleration lane to accommodate the northbound left turn merge onto Route 7 could be considered with this concept.

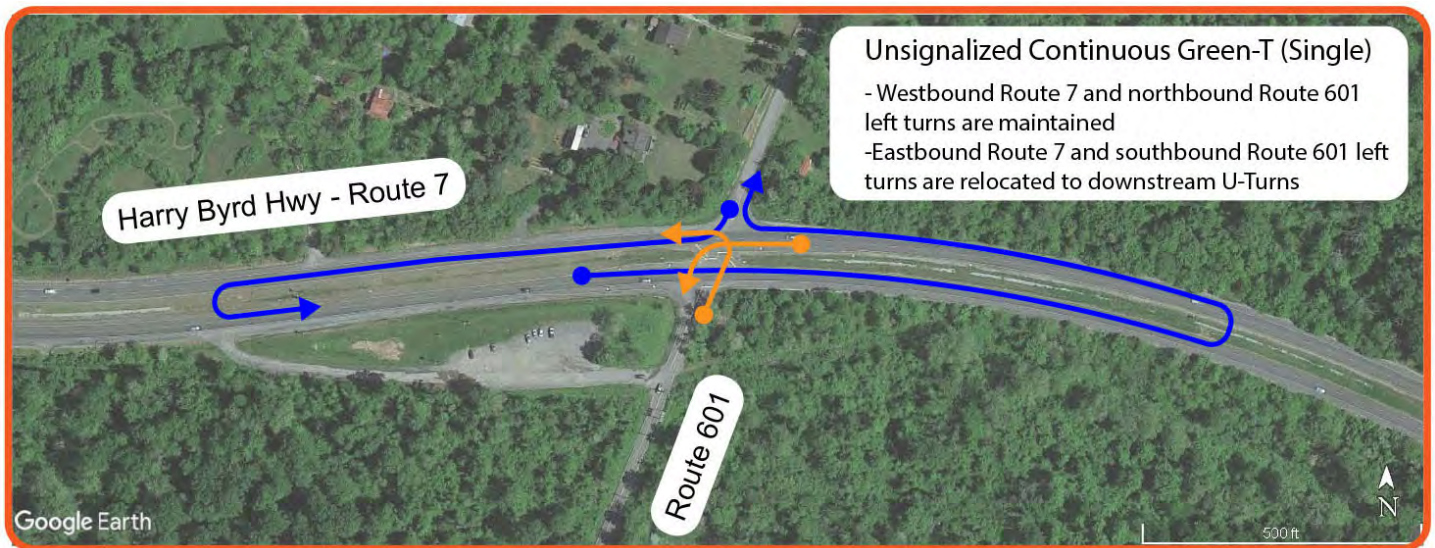


Figure 4c: Unsignalized Continuous Green-T Intersection

Figure 4d illustrates an unsignalized, double Continuous Green-T or “split” intersection concept. The concept would relocate the conventional turning movements of 4.6% of the weekday PM peak hour intersection volume, but would result in the lowest extra travel time for any movement of the five concepts presented in this memo. By splitting the intersection volumes into two locations, overall conflict points would be reduced by 25%. This alternative would require the removal of the recently completed Route 7 westbound left turn lane extension to Route 601 and is anticipated to have a higher magnitude of cost due to the need to reconstruct the service drive accessing the informal park and ride. Note that the VJuST tool only considers a signalized primary intersection with this concept. Based on the design year conflicting Route 7 through volumes, the left turns from Route 601 may be over capacity. The delay of these movements will be evaluated in Vissim. A new acceleration lane to accommodate the southbound left turn merge onto Route 7 could be considered. However, an acceleration lane for the northbound left turns into Route 7 may be problematic given the proximity of the downstream pedestrian crossing serving the Appalachian Trail.

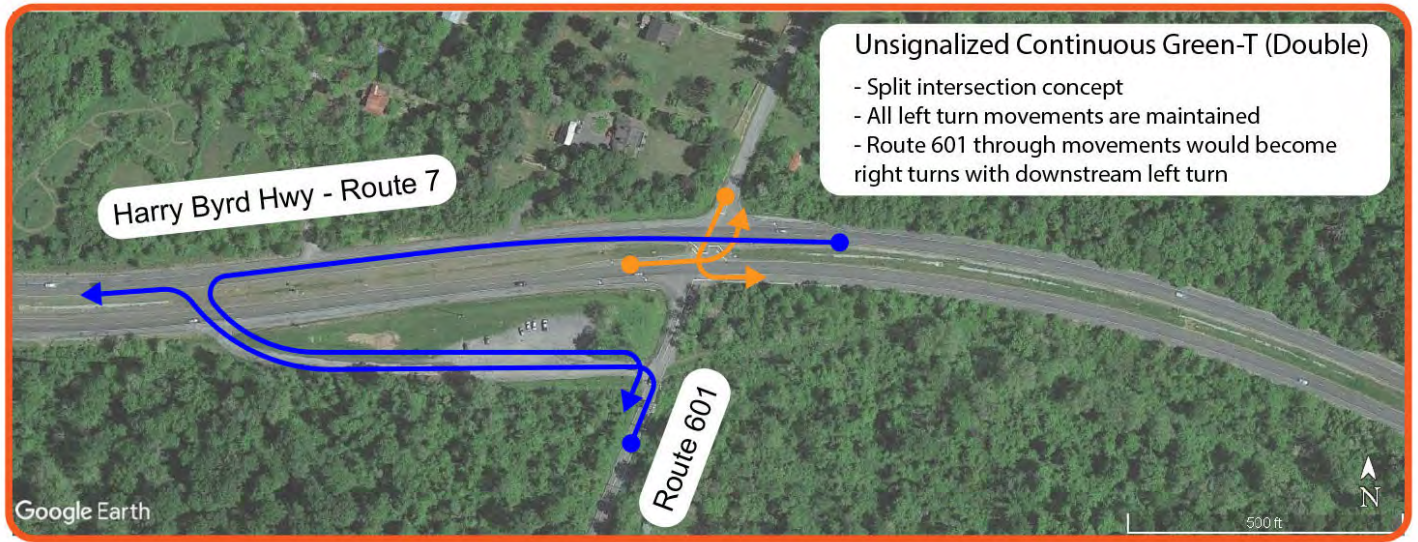


Figure 4d: Unsignalized Double Continuous Green-T “Split” Intersection

Figure 4e illustrates an unsignalized RCUT and Continuous Green-T hybrid concept. The concept would relocate the conventional turning movements of 2.3% of the weekday PM peak hour intersection volume and reduce intersection conflict points by 58%. The hybrid concept would utilize the recently completed Route 7 westbound left turn lane extension to Route 601. However, it is anticipated to have a higher magnitude of cost due to the need to reconstruct the service drive accessing the informal park and ride. Note that the VJuST tool only considers a signalized primary intersection with the Continuous Green-T portion of the concept. Based on the design year conflicting Route 7 through volumes, the left turns from northbound Route 601 may be over capacity. The delay of these movements will be evaluated in Vissim. Note that an acceleration lane for the northbound left turns into Route 7 may be problematic given the proximity of the downstream pedestrian crossing serving the Appalachian Trail.

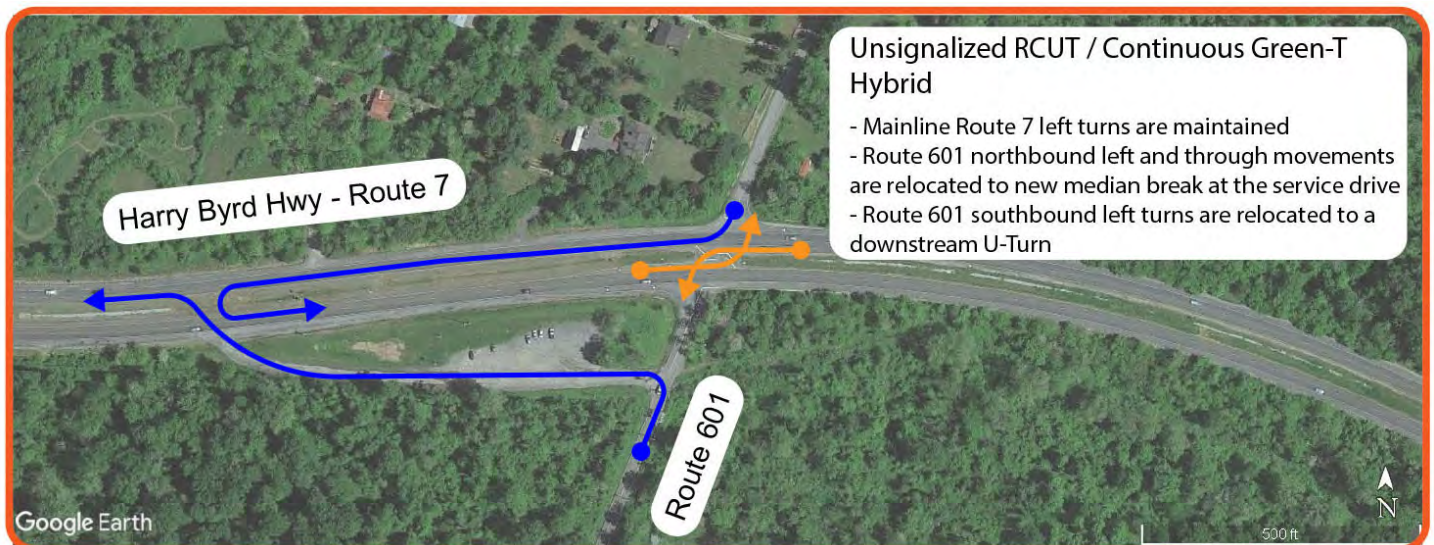


Figure 4e: Unsignalized Restricted Crossing U-Turn (RCUT) and Continuous Green-T Hybrid Intersection

IMPROVEMENT ALTERNATIVES IDENTIFIED FOR EVALUATION

Based on a review of the benefits and potential issues associated with the preliminary alternative screening, the study team decided to drop the concepts that would relocate the heavier volumes of the Route 7 westbound left turns onto southbound Route 601. This decision would minimize interruptions to existing turning movements and maintain traditional access to the Mount Weather facility. As a result, the RCUT, the Continuous Green-T, and the Hybrid alternatives were advanced for further evaluation in Vissim (**Figures 4a, 4c, and 4e**). All three of the advancing alternatives provide similar reductions in vehicular conflict points for potential improvements to intersection safety. The alternatives provide an approximately 40% reduction of overall conflict points and reduce the more critical crossing conflicts by more than 50%. The following alternative summaries provide a general description of benefit and concerns associated with the three concepts following the additional Vissim analysis and engineering judgement. In order to provide full analysis to properly compare these alternatives, the Vissim models were expanded to capture the downstream intersections at Route 734 to the east and Route 679 to the west. This allowed the evaluation of the necessary U-turn movements at these intersections and the extra travel time associated with these relocated movements. A comparison of MOEs for the critical left turn movements for the 2032 no-build and three alternative scenarios are shown in **Table 6** and **Table 7**. The full report outs of delay per vehicle and max queue length can be found in **Appendix D**.

IMPROVEMENT ALTERNATIVE I – UNSIGNALIZED RCUT

The unsignalized RCUT intersection reduced overall vehicular delay at the primary intersection by 23% in the weekday AM peak, 56% in the weekday PM peak, and 45% in the weekend PM peak. The alternative was also successful in reducing the northbound Route 601 queues (81% reduction in the weekday PM peak). While this alternative provided significant operational improvements at the primary intersection, this concept relocated the most movements of the three alternatives and resulted in the highest extra travel time due to the utilization of the downstream intersections to make the necessary U-turns. The analysis also identified delay and queue lengths associated with the U-turns at the downstream intersection with Route 734 that approached unacceptable conditions in the weekday PM peak due to the high westbound Route 7 conflicting movements. This alternative was initially viewed as the lowest cost option due to the improvements being fully within existing right-of-way. A planning-level estimate range for Alternative I was \$1.6-1.9 million. However, following review by the study team, given the operational issues associated with the U-turn movement, the conflicting peak hour mainline volumes, and the grades associated with Route 7, the study team determined that if this concept advanced as the preferred alternative, it will include loons and receiving climbing lanes to accommodate the U-turns in both directs. As a result, these additional improvement elements would significantly increase the cost of Alternative I. A concept exhibit for Alternative I is provided in **Figure 5**.

IMPROVEMENT ALTERNATIVE II – UNSIGNALIZED CONTINUOUS GREEN-T

Following the initial analysis of Alternative II in Vissim, it was determined that the unsignalized Continuous Green-T intersection would require a receiving westbound Route 7 acceleration lane to be a viable option due to unacceptable delays for the northbound Route 601 left turn in the weekday PM peak hour. While this additional component would increase the cost of Alternative II, the acceleration lane would create a single stage left turn for this movement by allowing

the left turning vehicles to accelerate once inside the median and merge downstream with westbound Route 7 traffic. With this addition to the improvement, Alternative II was the best performing option from an operational standpoint, reducing overall vehicular delay at the primary intersection by 29% in the weekday AM peak, 77% in the weekday PM peak, and 59% in the weekend PM peak. The alternative was also successful in reducing the northbound Route 601 queues by 80% in the weekday PM peak hour. In addition to the operational improvements, this concept relocated the least number of movements of the three alternatives. A planning-level estimate range for Alternative II was \$2.5-2.8 million. While Alternative II presented multiple benefits, there were concerns by the study team of the weave movement being created by this concepts at the downstream intersection of Route 7 and Route 679 to the west. For this improvement option, southbound Route 601 left turns and through movements are required to turn right and make a downstream U-turn at Route 679. While these movements are low in volume, these vehicles will be creating an undesirable weave and speed differential with the northbound Route 601 left turns using the acceleration lane to enter mainline Route 7. These concerns are elevated based on the fact that the Route 679 intersection also serves as the Route 7 crossing location for the Appalachian Trail. The weave, operating speeds and the potential presence of pedestrians creates a scenario that may result in a future safety concern. A concept exhibit for Alternative II is provided in **Figure 6**.

IMPROVEMENT ALTERNATIVE III – UNSIGNALIZED HYBRID INTERSECTION

The unsignalized hybrid intersection alternative reduced overall vehicular delay at the primary intersection by 43% in the weekday AM peak, 76% in the weekday PM peak, and 73% in the weekend PM peak. The alternative was also successful in reducing the northbound Route 601 queues (86% reduction in the weekday PM peak). In addition to the significant operational improvements at the primary intersection, this concept relocates less movements than Alternative I and has the lowest overall extra travel time due to the proposed median crossover to accommodate the concept. However, following a field review of sight distance at the new crossover, it was determined that the location would fall below minimum intersection sight distances due to the operating speeds and vertical curvature of Route 7. A planning-level estimate range for Alternative III is \$3.6-3.9 million. The higher cost estimate associated with this concept is related to the necessary reconstruction of the informal park and ride service drive to accommodate the relocation of movements to the new crossover to the west of the primary intersection. With the need to improve this roadway, this alternative and estimate also includes an improved 100 space park and ride facility. A concept exhibit for Alternative III is provided in **Figure 7**.

Scenario	Rt. 601 NB Left	Rt. 601 SB Left	Rt. 7 EB Left	Rt. 7 WB Left
No-Build	317.2s	93.8s	81.2s	14.5s
Alternative I	148.5s *	100.6s *	50.8s	14.7s
Alternative II	14.3s	109.1s *	115.2s *	13.5s
Alternative III	50.4s *	69.2s *	50.9s	14.6s

Table 6: Design Year 2032 Delay per Vehicle in Seconds

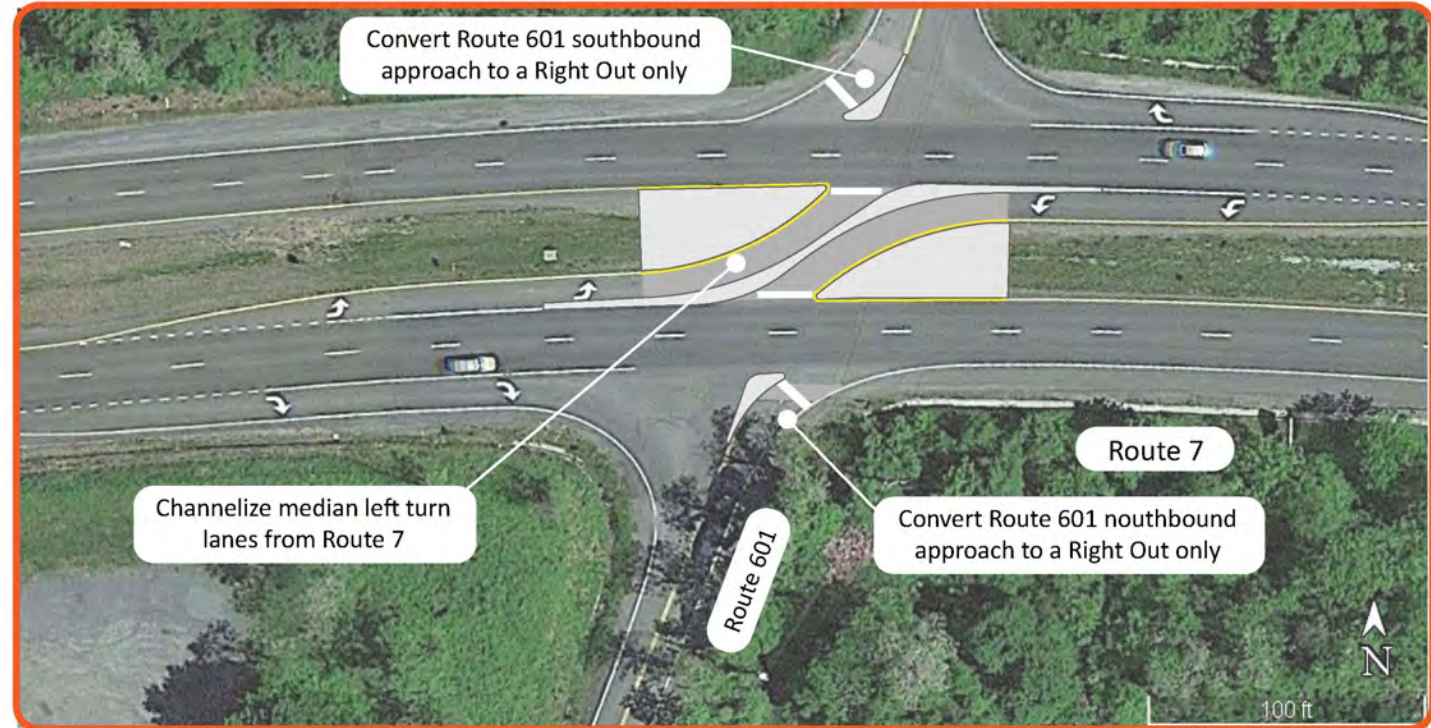
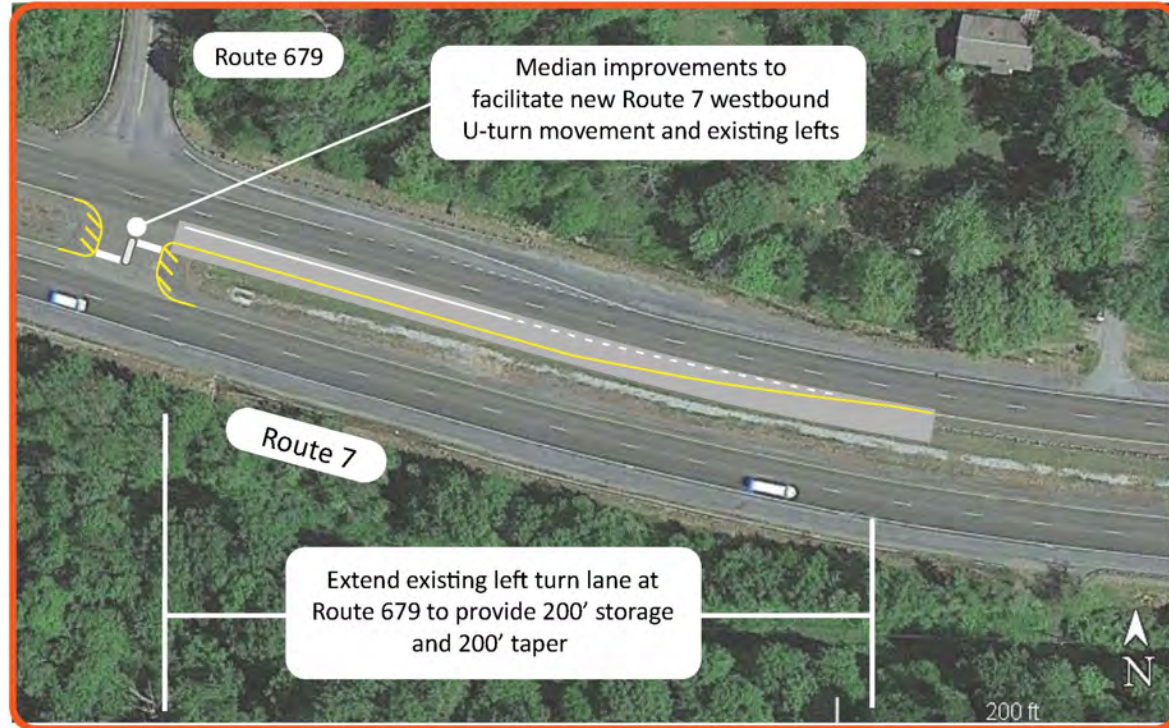
Scenario	Rt. 601 NB Left	Rt. 601 SB Left	Rt. 7 EB Left	Rt. 7 WB Left
No-Build	509'	49'	85'	179'
Alternative I	131' *	38' *	72'	136'
Alternative II	101'	35' *	65' *	162'
Alternative III	68' *	66' *	71'	155'

Table 7: Design Year 2032 Queue Length in Feet

* These MOEs reported in Tables 6 and 7 represent delay and queue lengths at the location of relocated movements

Route 7 and 601 Intersection Study

DRAFT



Alternative I Concept Sketch

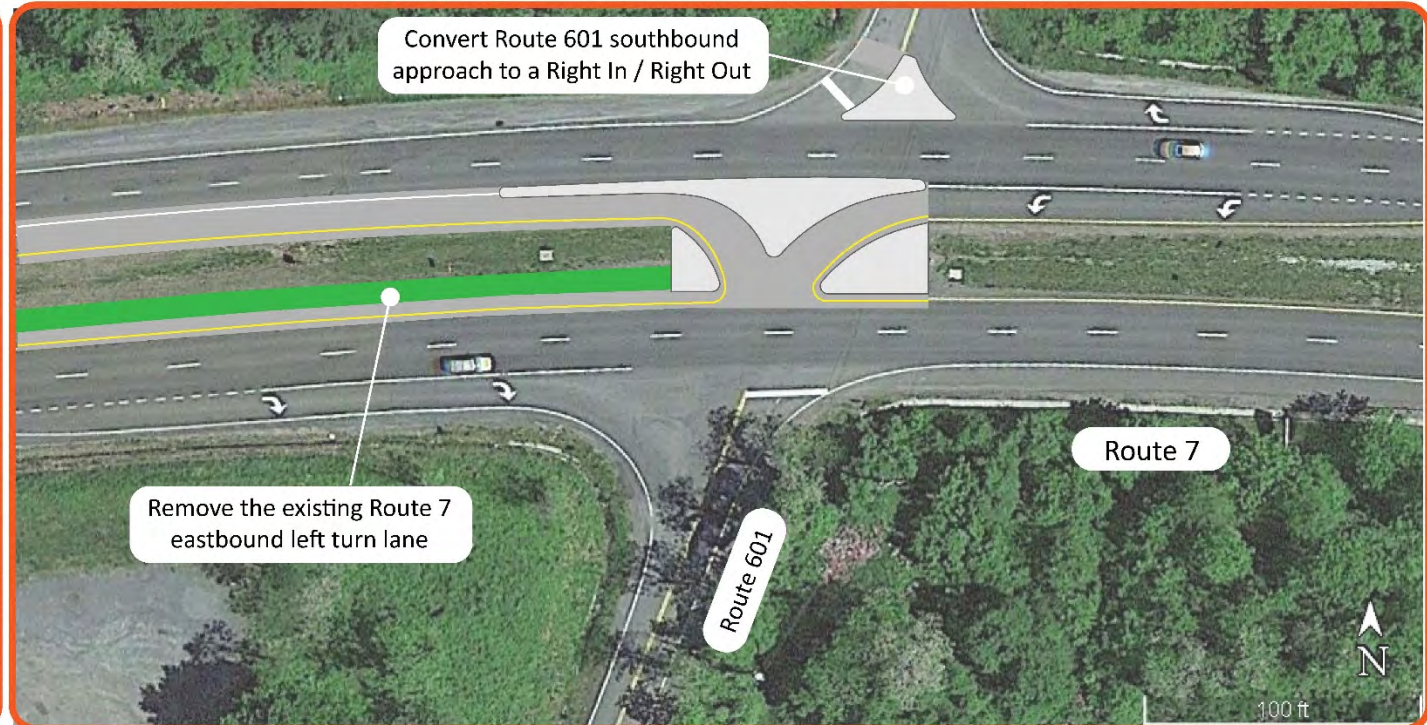
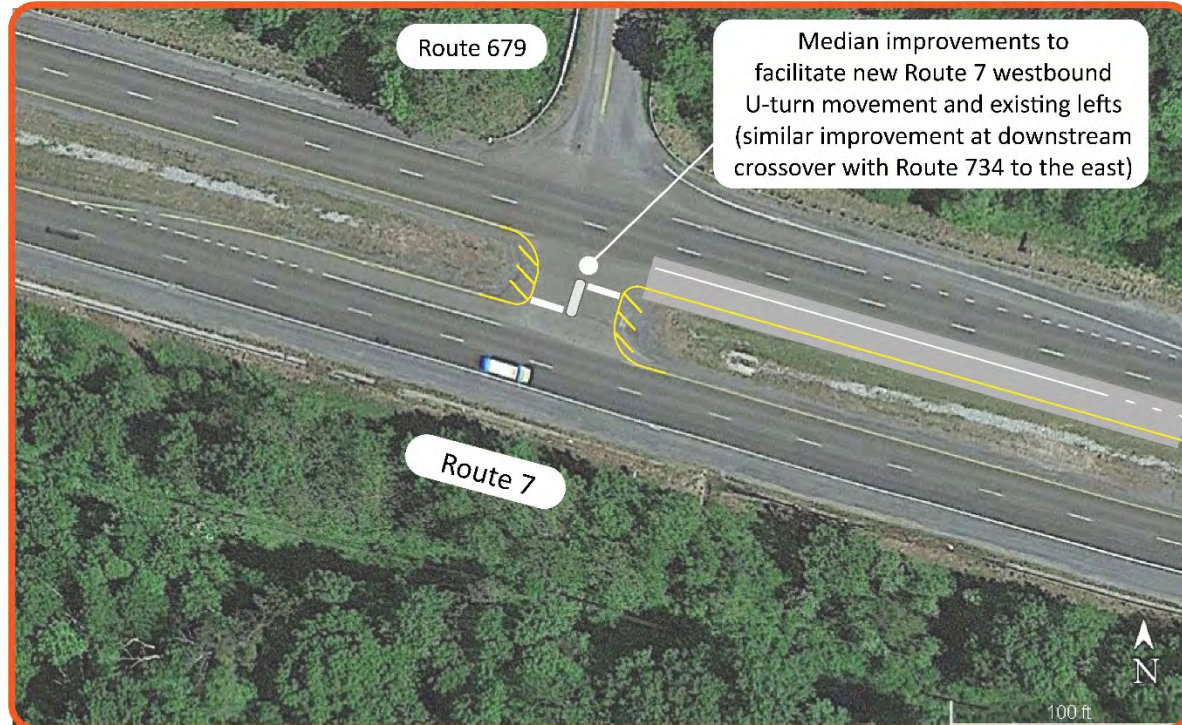
Clarke and Loudoun County



Figure 5: Alternative I – RCUT Intersection

Route 7 and 601 Intersection Study

DRAFT



Alternative II Concept Sketch

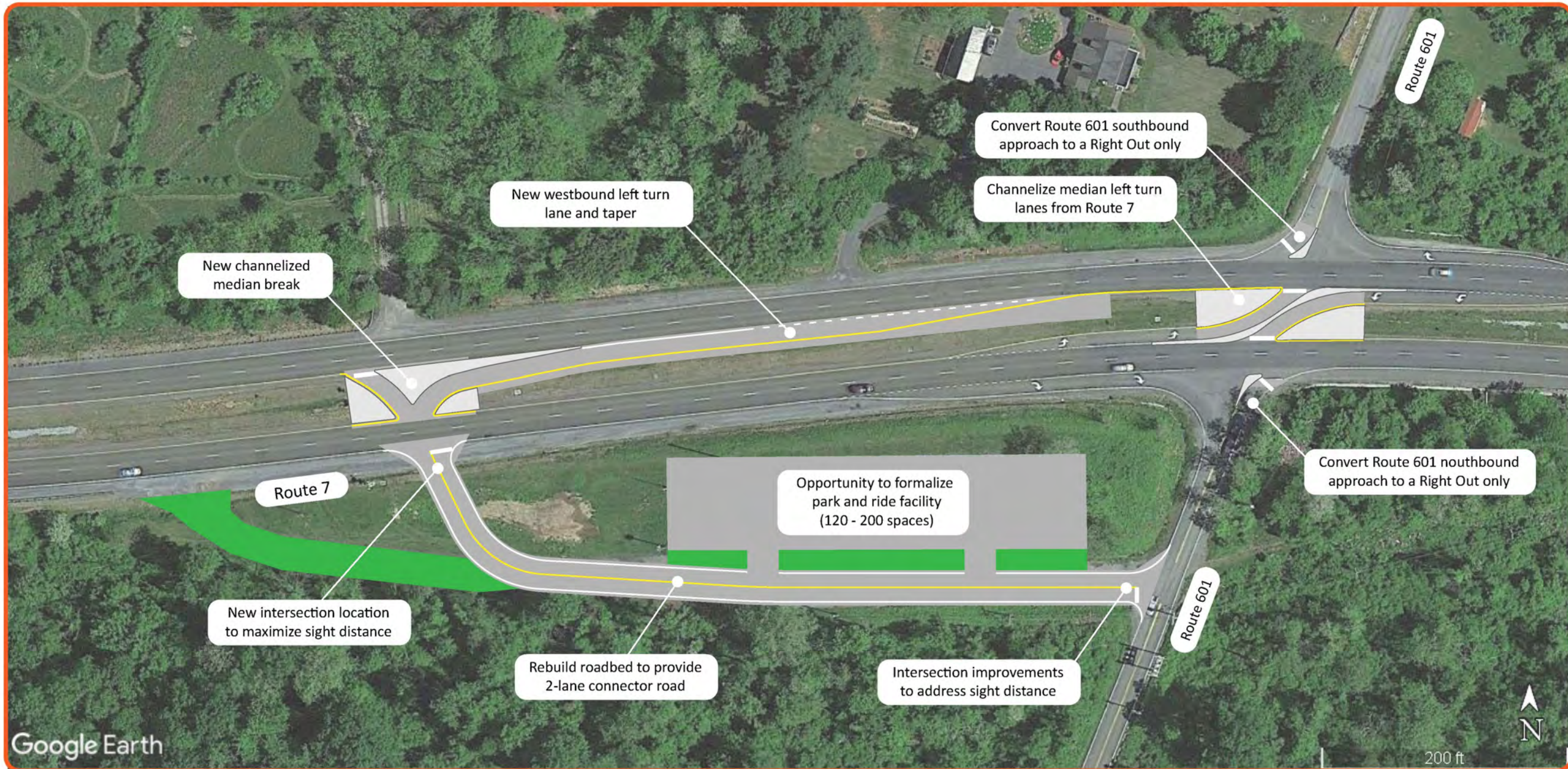
Clarke and Loudoun County



Figure 6: Alternative II – Continuous Green T

Route 7 and 601 Intersection Study

DRAFT



Alternative III Concept Sketch

Clarke and Loudoun County



Figure 7: Alternative III – Hybrid Intersection

Public Outreach:

The study team generally met in a virtual format once a month from May 2021 to February 2022 to review study progress and make decisions to advance the effort. By February 2022, the three improvement alternatives advanced for technical analysis had been evaluated and presented to the study team to identify the benefits and issues associated with each alternative. At this time, the study team determined that presentations to the Clarke County Board of Supervisors and the Loudoun County Transportation Committee were appropriate. Following these presentation, the Clarke County Board of Supervisors expressed their appreciation of the study work to date and understood the benefits of the developed improvement alternatives in reducing intersection conflict points to improve roadway safety. However, they expressed concerns related to the need to relocate specific intersection improvements, both from a standpoint of public acceptance and challenges of safely providing for the U-turn movements related to the speeds and roadway grades along Route 7. Following the meeting, they asked for VDOT to coordinate a meeting with the Blue Ridge Mountain Community Association (BRMCA) to present the alternatives for public review and feedback. The Loudoun County Transportation Committee supported this next step for public outreach as well. Following a review of the improvement alternatives and the supporting operational analysis, Loudoun County indicated that their preferred alternative was the RCUT intersection with the inclusion of loons and receiving acceleration lanes to accommodate the downstream U-turns in both directions.

A Public Information Meeting for the BRMCA was held at Blue Ridge Volunteer Fire Department on the evening of May 10, 2022. The public meeting consisted of a formal presentation of the study work to date and the three alternatives developed to address the needs of the intersection. Following the presentation, there was a question and answer session with the attendees. The meeting was well attended and generated a positive discussion of roadway concerns along this section of Route 7, opinions on the improvement alternatives, and other ideas for potential consideration. The key take-a-ways from the public meeting included:

- Speeds along Route 7 are the primary issue and there is a need to expand the study scope to evaluate the larger Route 7 corridor.
- The increase in traffic related to the newer land uses (brewery/winery) significantly compounded the intersection issues.
- Heavy vehicle access and the U-turn movements associated with the improvement alternatives are a significant concern due to the grades associated with Route 7.
- Several meeting attendees indicated they already use downstream U-turns during congested times.

Following the BRMCA Public Information Meeting, the meeting presentation and additional study information was posted to a VDOT study website and a public comment period was opened for two weeks, through the end of May. During this period, 16 public comments were received sharing similar observations and concerns as summarized above. Of the comments that indicated a preference for the improvement alternatives, these were evenly split between the RCUT concept (Alternative I) and Hybrid intersection concept (Alternative III). A full set of the public comments received can be found in **Appendix E**. A summary of public outreach/events to support the study is shown in **Table 8**.

Public Events	Date
Presentation to the Clarke County Board of Supervisors (Improvement Alternatives)	March 7, 2022
Development of VDOT Study Public Website	May 2022
Presentation to the Blue Ridge Mountain Community Association	May 10, 2022
Public Comment Period	Through the end of May 2022
Presentation to the Clarke County Board of Supervisors (Preferred Alternative)	June 13, 2022
Clarke County Board of Supervisors Approve Smart Scale Resolution of Support	July 19, 2022
Loudoun County Board of Supervisors Approve Smart Scale Resolution of Support	July 19, 2022
National Capital Region Transportation Planning Board Approve Smart Scale Resolution of Support	September 9, 2022

Table 8: Summary of Public Outreach

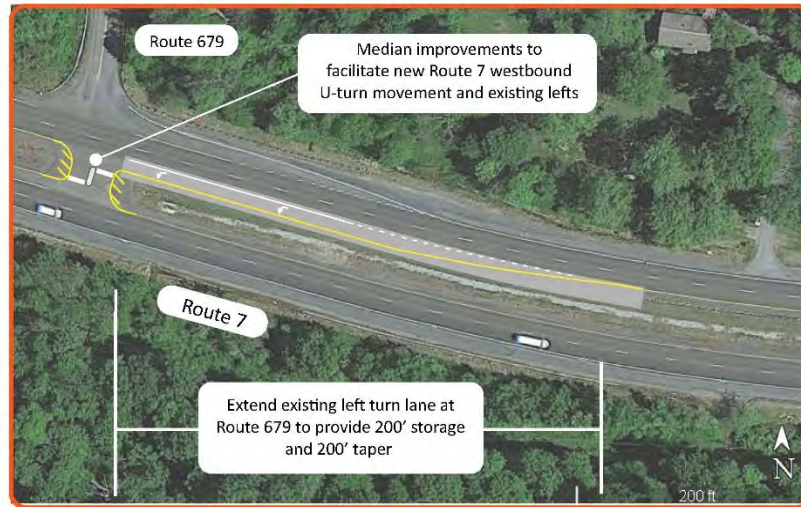
Preferred Alternative:

Following a review of the public comments, the study team considered concerns expressed by the public and the Clarke County Board of Supervisors related to the relocation of turning movements at the primary intersection. Given the indication from multiple members of the public that voluntary U-turns are already being performed to navigate the intersection during congested periods, the study team considered a lower cost improvement to make voluntary U-turns safer and more attractive to drivers. This included the addition of a second Route 601 northbound approach lane to provide a designated right turn lane onto eastbound Route 7 and an extension of three existing left turn lanes in the Route 7 median to increase storage and deceleration length (the eastbound left turn lane at the primary intersection, the eastbound left turn lane at the intersection with Route 734, and the westbound left turn lane at the intersection with Route 679). The concept can be viewed as an initial phase to set up a future full RCUT intersection (Alternative I, Phase 1). Drivers comfortable with making the downstream U-turn would be able to perform the movement safer, while also avoiding the left turn queue created by drivers that would prefer to make the traditional movement. Over time, the number of voluntary U-turns may increase as delay increases for the traditional left turn, while public support for the full RCUT concept may also increase. A concept exhibit for the Preferred Alternative is provided in **Figure 8**.

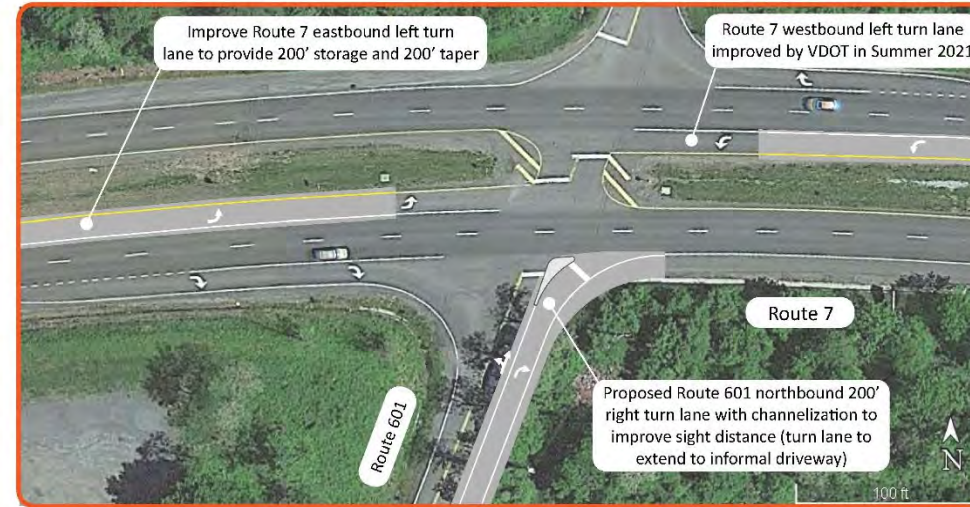
The new concept was presented to Loudoun and Clarke County, receiving support from both staff and elected officials as a balanced compromise of the previous alternatives. Analysis of Alternative I, Phase 1 identified that operational and safety improvements would be minimal without voluntary diversion to make the downstream U-turn. However, in an analysis scenario that assumed 25% of the northbound Route 601 left turns would divert to the U-turn, the new concept was successful in reducing delay for the critical northbound Route 601 left turn movement by 51% in the weekday AM peak, 60% in the weekday PM peak, and 75% in the weekend PM peak. The alternative was also successful in reducing the northbound Route 601 queues (74% reduction in the weekday PM peak).

Route 7 and 601 Intersection Study - Interim Improvement to set up a future Reduced Conflict Intersection (RCI)

DRAFT



Downstream crossover to the west (Route 679): Improve the westbound left turn lane to provide 200' storage and 200' taper and provide crossover pavement marking to make U-turn movements safer and more attractive.



Primary Intersection: Improve Route 7 westbound left turn lane and add a right turn lane to the Route 601 northbound approach to extend back to the informal driveway access to the south (approx. 200'). Add channelization to improve sight distance.



Downstream crossover to the east (Route 734): Improve the eastbound left turn lane to provide 200' storage and 200' taper and provide crossover pavement marking to make U-turn movements safer and more attractive.

Alternative I - Phase I Concept Sketch

Clarke and Loudoun County **VDOT**

Figure 8: Alternative I, Phase 1 – Preferred Alternative

Smart Scale Application:

Smart Scale is the state’s primary transportation funding program for capacity and safety improvements. The Smart Scale application process opens every two years for localities and regional planning bodies to submit selected transportation project that address identified needs. Applications compete at a statewide and VDOT construction district level in various factors that include congestion mitigation and safety. Based on the scoring methodology, project benefit points are calculated and then a final project score is determined by dividing the project benefit by the amount of funding requested. The project scores are then utilized by VDOT and the Commonwealth Transportation Board (CTB) to determine which projects will receive funding and incorporated in the state’s Six Year Improvement Program (SYIP).

Clarke County submitted a Smart Scale pre-application as a placeholder for an intersection improvement to address the location’s safety need when the FY24 Smart Scale application window opened in March 2022. With the preferred alternative now identified by the study team, Clarke County refined the Smart Scale application during the summer to incorporate the project elements and estimate of the Alternative I, Phase 1 concept, making application submission by the August 1, 2022 deadline. As part of the application, Clarke County, Loudoun County and the National Capital Region Transportation Planning Board all approved Resolutions of Support for the project. As part of Loudoun County’s Resolution of Support, the application was also able to apply \$500,000 designated in their Capital Improvement Program to be applied to improvements at the subject intersection. With these leveraged funds, the total Smart Scale request after inflation was \$2.7 million.

The FY24 Smart Scale scores and the staff recommended funding scenario were presented at the January 2023 CTB meeting. Unfortunately, the Clarke County Route 7 and 601 application did not score well enough to be recommended for funding. The application’s final Smart Scale score was 0.3, well below the VDOT Staunton District final Smart Scale score funding threshold of 5.53. As anticipated, project benefit points were difficult to obtain as the five minor injury crashes at the study intersection during the scoring period only translated to a 1.5 safety score. Furthermore, the decision of the Smart Scale scoring team to evaluate the application as a Loudoun County (Smart Scale Area Type A) project, placing more emphasis on congestion mitigation than safety, limited the project benefit. VDOT district staff had assumed that as a Clarke County application (Smart Scale Area Type D), the scoring would have focused on safety, but because more of the project elements were in Loudoun County, it was scored with Area Type A criteria. VDOT district staff confirmed that even if the application had been scored under the Area Type D criteria, it would have still been below the funding threshold, with the final Smart Scale score increasing from 0.3 to 1.64.

With the project being considered as falling primarily within Loudoun County for purposes of Smart Scale scoring, it will be difficult to improve the project score/application competitiveness in future rounds of Smart Scale, even if injury crashes increase at the intersection, due to the low scoring percentage applied to safety in Area Type A. With the \$500,000 available for the intersection from the Loudoun County Capital Improvement Plan, the VDOT Revenue Sharing program may be a more appropriate path forward to secure funding for the recommended project.

Appendix:

- Appendix A – Approved Framework Document
- Appendix B – Traffic Growth Rate Memo and Turning Movement Volumes
- Appendix C – 2020 VDOT Staunton District Traffic Engineering Report
- Appendix D – MOE Summary
- Appendix E – Summary of Public Comments
- Appendix F – Smart Scale Application and Scorecard

Appendix A: Approved Framework Document

PURPOSE AND NEED:

Given the high Route 7 mainline traffic volumes and vehicular speeds, and steep horizontal and vertical roadway curvature, the unsignalized intersection with Route 601 creates unacceptable side street delays for left turn movements onto Route 7 during peak travel periods. While the intersection is not currently identified on VDOT’s Potential for Safety Improvement (PSI) screening list, the side street delay, along with high mainline speeds creates a safety issue with drivers potentially accepting insufficient gaps to make left turns onto Route 7. The issue can be amplified by the popularity of the informal park and ride in the southwest quadrant of the intersection. While this location is not an official, state maintained park and ride, the remnant of old Route 7 right-of-way is used by both commuters and for recreational access to the Appalachian Trail. This study will evaluate existing and future vehicular operation and safety conditions in the consideration of intersection improvements to address the identified needs. The study team is comprised of representatives from VDOT Staunton District, VDOT Northern Virginia District, Loudoun County, Clarke County, the National Park Service, and Appalachian Trail organizations. VDOT Staunton District Planning and Traffic Engineering will lead the study effort with support from Loudoun County, Clarke County and VDOT NOVA District staff as necessary.

STUDY LOCATION:

The intersection of Route 7, Harry Byrd Highway and Route 601, Blue Ridge Mountain Road is located along the Clarke and Loudoun County boundary, at the top of the initial ridgeline of the Blue Ridge Mountains when traveling from east to west. Route 7 is a 4-lane, divided roadway with a functional classification of Principal Arterial and posted at 55 mph. Route 601 is a 2-lane, Minor Collector posted at 40 mph. The existing intersection is unsignalized with stop sign control on the Route 601 approaches. There are existing turn lanes serving both approaches on Route 7. Over the summer of 2021, VDOT NOVA District completed an extension of the existing Route 7 westbound left turn lane to southbound Route 601. The Route 601 approaches are single lane. The informal park and ride facility located at the study intersection is connected to Route 7 and 601 by a driveway in the southwest quadrant. Both the informal park and ride lot and associated driveway are located on state property, but are not regularly maintained by VDOT. The study location is identified in **Figure 1**. Route 7 serves as a critical commuter corridor for residents of the Winchester / Frederick County region to employment locations in Northern Virginia. Given the commuting pattern and characteristics of the roadway, Route 7 experiences significantly higher travel

**Route 7 and Route 601 Data Collection Exhibit
May 17, 2021**

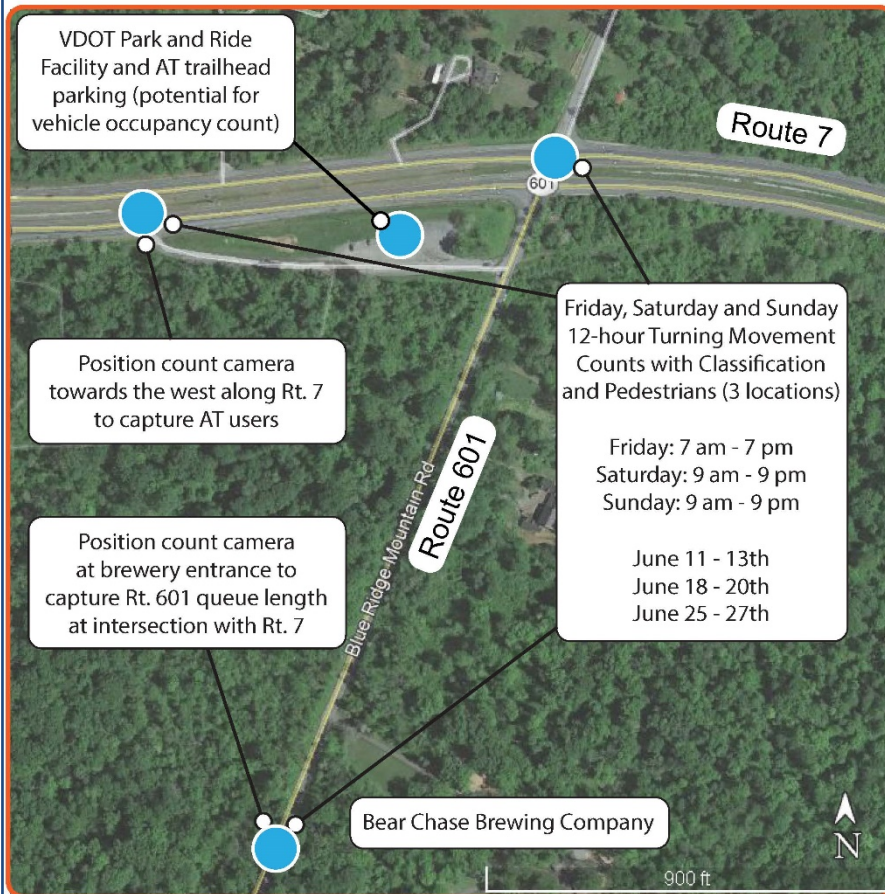


Figure 1: Study Location and Data Collection Exhibit

speeds than the posted limit. Route 7 has a daily volume of 27,000 AADT with a peak one-way directional volume of over 2,100 vehicles observed in June 2021. The southern leg of Route 601 has a daily volume of 1,900 AADT, with the volume being predominantly generated by a popular brewery and the federal government installation of the Mount Weather Emergency Operations Center, both located to the south of the study intersection.

STUDY APPROACH:

The study will consist of an analysis based approach to evaluate and determine existing and design year no-build intersection operation and safety needs. The study team will develop improvement alternatives to address the identified needs at the primary study intersection, in addition to downstream intersections or crossovers, as necessary based on the alternatives to be considered.

- **Data Collection and Evaluation:** Peak period weekday turning movement volumes were collected at the primary intersection in September 2019, pre-pandemic, for an initial evaluation of intersection improvements by VDOT Staunton District Traffic Engineering. To support the current effort, 12-hour Friday through Sunday turning movement counts were collected for three consecutive weekends beginning June 11, 2021. These count periods were selected to understand the impacts of weekend visitors to the brewery located on Route 601 just south of the study intersection. The popularity of the brewery outdoor space and the Appalachian Trail during the COVID-19 pandemic resulted in a significant increase in intersection traffic during the summer and fall of 2020, generating the concerns that resulted in the current study effort. The 12-hour counts were conducted at the three intersections identified in **Figure 1** and included classification and pedestrian counts. Additionally, pedestrian counts for access to the Appalachian Trail were also collected along the southern shoulder of Route 7 and the spur trail leading from the park and ride lot during the traffic count period. Hourly park and ride vehicle volumes were also collected over the initial count weekend.

Following an evaluation of the count data, the afternoon peak period on the Father's Day Sunday represented the highest volumes for the weekend counts; however, overall, the weekend volumes did not equate to significant operational concerns at the study intersection as anticipated. This observation was further supported based on comments from the brewery that they have not experienced similar crowds that occurred in 2020. The park and ride vehicle counts also supports that Appalachian Trail usage has decreased from the 2020 highs. A potential explanation for this drop in traffic volumes between 2020 and 2021 is the overall easing of COVID restrictions with more dining and recreational opportunities becoming available to the public.

The 2021 Friday counts also saw a significant drop in both Route 7 and 601 peak hour volumes when compared to the 2019 counts, indicating the continual impact of COVID on traffic volumes. While traffic monitoring across the state have shown that volumes in the Staunton District are close to returning to pre-pandemic levels, the Northern Virginia District is still experiencing up to a 10% suppression of volumes from 2019 highs. As a result of the evaluation of the June 2021 traffic data, VDOT Staunton District's recommendation is to use the AM and PM weekday counts from 2019 and the Father's Day PM counts from 2021 for analysis of intersection improvements moving forward.

- **Analysis:** Using the existing traffic data indicated above, the study will analyze existing, future no-build and future build conditions in the evaluation of intersection improvement alternatives during weekday AM and PM peak hours and the weekend PM peak hour. The existing weekday analysis will utilize the 2019 counts without modifications. The weekend 2021 counts may be adjusted on mainline Route 7 volumes to account for pandemic impacts. A StreetLight analysis will be utilized to determine appropriate adjustments, if necessary. Future year analysis will utilize a 2032 design year, representing the estimated year for construction completion should an improvement be funded through the FY24 Smart Scale cycle. Based on the improvements considered, sensitivity testing may be conducted using a longer horizon year to confirm that the identified improvement can

accommodate anticipated traffic growth. Traffic growth rates to determine future year volumes will consider historical trends using the VDOT annual count program and will be presented in a separate forecasting memo for concurrence by the study team and VDOT’s Transportation Planning and Mobility Division (TMPD) since Route 7 is part of the National Highway System (NHS).

Safety analysis will consist of a review of historical crash data from the beginning of 2016 through current 2021 data. Crash diagrams will be prepared to reflect crash information and crash reports will be evaluated to determine potential crash trends. Identified trends will be considered in the evaluation of improvement alternatives based on their ability to address the trends using current VDOT Crash Modification Factors (CMF).

The VDOT VJuST tool will be used to conduct an initial screening of intersection types for analysis consideration based on intersection volumes and reduction of conflict points. The previously developed Staunton District Traffic Engineering draft report will also be considered in the advancement of alternatives. This report analyzed a traditional traffic signal, an unsignalized RCUT, a continuous green T, and a modified RCUT that diverted northbound Route 601 left turns to the existing park and ride driveway intersection and proposed a new median break using 2019 volumes only. Traffic analysis will be completed in Synchro 10 software with the Measures of Effectiveness (MOEs) consisting of delay per vehicle and 95th percentile queue length at the identified study intersections using HCS 6 outputs. Based on the improvement alternatives to be evaluated and their ability to be properly modeled in Synchro, additional analysis through SimTraffic or Vissim may be necessary. All supporting analysis will be conducted in compliance with VDOT’s Traffic Operations and Safety Analysis Manual (TOSAM Version 2.0).

It should be noted that during previous study team meetings and in prior settings, the need for improvements to the Appalachian Trail crossing of Route 7 immediately west of the study intersection has been discussed. It is VDOT Staunton District’s opinion that such an improvement has independent utility, addressing a separate purpose and need outside of the scope of this study. The collected traffic data confirms that pedestrian crossings are generally not occurring at the study intersection and the majority of users accessing the Appalachian Trail from the park and ride are using the existing spur trail as opposed to the shoulder on Route 7. Therefore, while this study may consider possible impacts to the intersection where the trail crossing is located, pedestrian crossing improvements along Route 7 will be not included in the scope of this study. Improvements to the park and ride may be considered based on both the types of improvement alternatives advanced for analysis and the potential to generate project benefit through a potential Smart Scale application. There is a possibility that expanding the park and ride may reduce the number of trail users crossing Route 7.

- Public Outreach:** Following the identification of a preferred alternative through the study analysis process, VDOT will present the identified intersection needs and the preferred alternative to the public through an online survey using the MetroQuest platform. This information can also be presented to the Loudoun County and Clarke County Board of Supervisors or Transportation Committees by VDOT staff, as requested. Should the identified improvement advance as a Smart Scale application, a joint resolution of support would be required from both counties.

STUDY DELIVERABLE:

The study information, supporting analysis, and identification of a preferred alternative will be incorporated into a final study technical memo and submitted to the study team for review and approval. The technical memo will include a one page project recommendation summary sheet with an accompanying planning-level sketch and engineering-level cost estimate. The cost estimate will be conducted following the guidance of the VDOT Cost Estimating Manual. This information can be used by the jurisdictions for consideration and the pursuit of funding through transportation grants.

STUDY SCHEDULE:

The study schedule provided below has been developed to identify a preferred intersection alternative that will be ready to advance as a Round 5 Smart Scale application in the spring of 2022, in case the study team determines that Smart Scale is the appropriate funding route to pursue.

Study Task:	Anticipated Schedule:
Traffic Data Collection	Completed in June 2021
Summary of Traffic Data	Provided at the August 2021 study team meeting
Review of Framework Document and 2019 Staunton Traffic Engineering Analysis	September Study Team Meeting
Review of Existing Analysis, Crash Data and Study Forecast Memo	October Study Team Meeting
Review of Future No-Build Analysis and Preliminary Alternative Screening	November Study Team Meeting
Review of Future Build Alternative Analysis	December Study Team Meeting
Public Outreach	January 2022
Submit Final Study Technical Memo	March 2022

Appendix B: Traffic Growth Rate Memo and Turning Movement Volumes

The purpose of this memo is to consider historical traffic counts, anticipated future developments, and travel trends for determining appropriate growth rates, supported by the study team, for existing year and design year traffic analysis in the evaluation of improvement alternatives.

HISTORIC COUNT DATA:

Through the VDOT Annual Count Program, traffic counts are conducted on most public roadways across the state on a triannual cycle. **Table 1** below summarizes VDOT count data on Route 7 and 601 from 2003 to 2018 and provides associated growth rates over the previous 15, 6, and 3 year periods. Route 7 east of the subject intersection is counted on a different cycle and the 2020 count was not included due to impacts from Covid-19. Note that given the low volumes and dead end nature of Route 601 to the north of the study intersection, traffic counts were collected more infrequently.

Year	Route 7 west of Route 601	Route 7 east of Route 601	Route 601 south of Route 7	Route 601 north of Route 7
2003	20,939		2,163	
2005		23,566		
2006	23,887		1,829	
2008		23,249		
2009	23,282		1,654	
2011		22,161		453
2012	22,951		1,716	
2014		24,012		
2015	23,403		1,644	336
2017		25,635		
2018	24,626		1,872	
Historic Annual Growth Rates				
15 - year	1.17%	0.73%	-0.90%	
6 - year	1.22%	2.61%	1.52%	
3 - year	1.74%	2.25%	4.62%	

Table 1 - Historic Traffic Counts and Growth Rates

Based on the historic traffic growth rate trends in the study area, VDOT Staunton District Planning recommends the following linear, annual growth rates:

- Route 7 to the west of the intersection with Route 601: 1.50%
- Route 7 to the east of the intersection with Route 601: 2.00%
- Route 601 to the south of the intersection with Route 7: 1.50%
- Route 601 to the north of the intersection with Route 7: 1.00%

BACKGROUND DEVELOPMENT CONSIDERATION:

The federal government Mount Weather Emergency Operations Center located on Route 601 to the south of the subject intersection completed an expansion several years ago to add a new conference and training center. An Environmental Impact Report to support the expansion was reviewed by VDOT in 2014 and while the facility will accommodate scheduled training events that may increase trip generation to the site from time to time, the expansion was anticipated

to have negligible daily traffic impacts, as the new facility was to support current employees and not an expansion of facility workforce. Additionally, the expansion included onsite housing facilities to accommodate staff and visitors, which were expected to reduce trip generation. Loudoun County staff also shared with the study team potential developer interest in a new campground on Route 601 south of the study intersection. However, a site plan has not been submitted for this use at the time of this memo. Given the recommended growth rates based on historical traffic counts, VDOT Staunton District Planning believes minor increases in volumes related to future land use development trip generation will be adequately captured in the design year traffic volumes.

TURNING MOVEMENT COUNT DATA:

To support the current study effort, 12-hour turning movement counts with vehicle classification were collected from Friday to Sunday at the subject intersection over a three weekend period in June of 2021. Friday counts were conducted from 7 am to 7 pm and weekend counts were conducted from 9 am to 9 pm. These time periods were selected by the study team to capture both weekday commuter volumes on Route 7 and weekend activity at the subject intersection related to access to the Appalachian Trail and Bear Chase Brewing located immediately south of the intersection on Route 601. In addition to these counts, Staunton District Traffic Engineering also collected peak hour weekday count data in September 2019 to support an initial operation analysis of the study intersection. A comparison of the 2019 and 2021 weekday peak hour counts showed that current intersection volumes are still suppressed related to travel impacts associated with the Covid-19 pandemic. Therefore, the study team determined that the pre-pandemic 2019 weekday peak hours turning movement counts would be utilized as the base year volumes for existing condition traffic analysis. **Figure 1** below shows the difference between the 2019 and 2021 weekday counts during the peak hours.

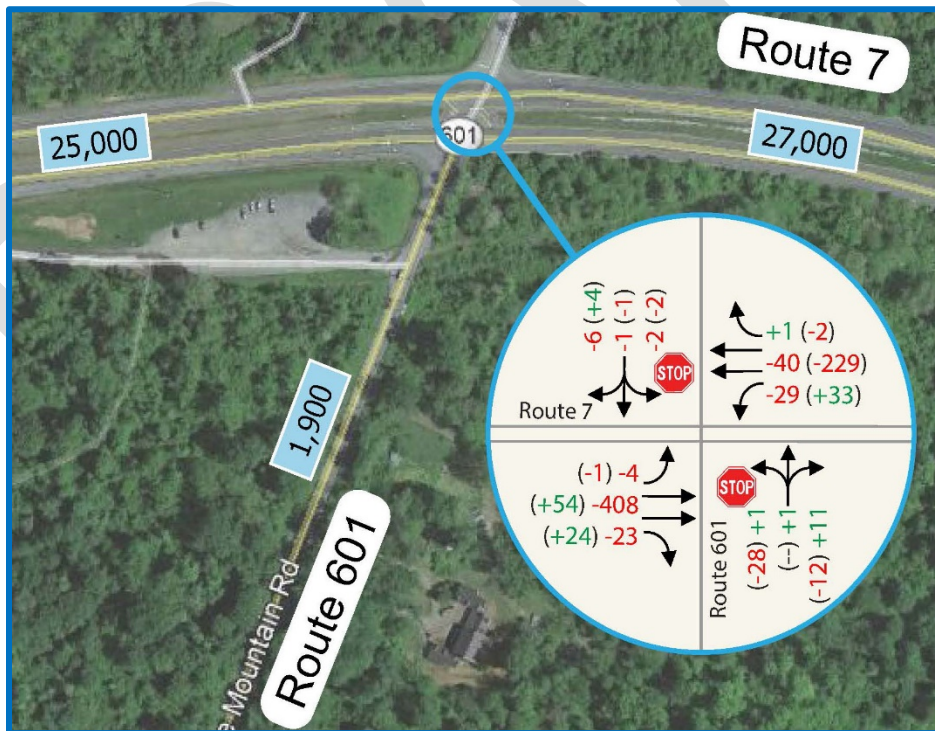


Figure 1 – 2019 to 2021 Peak Hour Turning Movement Count Comparison – AM (PM)

In addition to analyzing the weekday AM and PM peak periods, the 2021 traffic counts showed a clear peak weekend period in the afternoon of Father's Day, June 20, 2021. This weekend PM peak hour will also be included in the traffic

study operational analysis. The collected turning movement counts reflect the reported heavy vehicle percentages at the study intersection as reported by the VDOT Annual Count Program.

TRAFFIC COUNT ADJUSTMENTS BASED ON COVID-19 IMPACTS:

In order to verify the weekday differences in peak period volumes related to impacts from Covid-19 between 2019 and 2021 and provide a comparison for the 2021 weekend PM peak hour volumes, StreetLight location based services data was utilized to evaluate changes in Average Daily Traffic and the peak periods (6 – 10 AM and 3 – 7 PM) between 2019 and 2021. The StreetLight analysis confirmed that the weekday volumes from the September 2019 data collection are adequate for use as the baseline volumes for existing conditions traffic analysis, with total intersection volumes being within 3% in the AM peak period and within 1% in the PM peak period. However, the review of the weekend PM peak periods show that the 2021 mainline Route 7 volumes are down when compared to the 2019 volumes. VDOT Staunton District Planning recommends a 5% adjustment to Route 7 volumes east of the intersection with Route 601 and a 3% adjustment to Route 7 volumes west of the intersection with Route 601 for the analysis of the weekend PM peak hour.

EXISTING YEAR TRAFFIC VOLUMES:

Based on the traffic counts collected in 2019 and 2021 and the adjustments to weekend volumes as stated in the section above, the following tables identify the peak hour intersection volumes that will be utilized in the existing conditions traffic analysis.

Weekday AM Peak Hour (7:00 - 8:00 AM)									
		By Approach		In	Out	Total			
		0.88 PHF		28	8	36			
				0.75	0.25	0.9			
				9	1	18			
		Route 7				Route 601		By Approach	
Total	2672	0.63	5	Intersection Total		3	0.38	2706	Total
Out	514	0.97	2097	2797		485	0.93	2166	Out
In	2158	0.74	56	0.99 PHF		52	0.87	540	In
By Approach		Route 601				Route 7			
		0.96 PHF		20	0	51			
				0.63	N/A	0.8			
				71	109	180			
				In	Out	Total			
						PHF 0.77		By Approach	

DESIGN YEAR TRAFFIC FORECASTS:

Based on applying the recommended growth rates to the existing year traffic volumes, the following tables identify the peak hour intersection volumes that will be utilized in the design year 2032 traffic analysis. Heavy vehicle percentages will remain unchanged from the existing year traffic volumes.

Weekday AM Peak Hour (7:00 - 8:00 AM)									
By Approach			In	Out	Total				
0.88 PHF			31	9	40				
Route 7			0.75	0.25	0.9				
			10	1	20				
Route 601						By Approach			
0.96 PHF						0.92			
Route 601						Route 7			
0.74						0.38			
65						0.93			
Route 7						Route 601			
2503						2511			
0.74						0.87			
65						655			
Route 601						Route 7			
0.96 PHF						0.77			
Route 601						By Approach			
23						59			
0.63			N/A			0.8			
82			126			209			
In			Out			Total			
Total			3128			3167			
Out			625			2511			
0.63			0.97			0.93			
6			2433			655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271						655			
0.99 PHF						0.87			
3						655			
0.38						0.87			
3167						655			
Total			3167			Total			
Out			625			2511			
0.97			2433			655			
6						655			
Route 7						Route 601			
0.99 PHF						0.87			
3271									

Weekday PM Peak Hour (4:30 - 5:30 PM)									
By Approach		In	Out	Total					
0.86 PHF		26	36	63					
		10	3	13	Route 601		PHF 0.96		By Approach
Route 7					Route 601				
Total	3459	0.75	10	Intersection Total		25	0.52	3567	Total
Out	2793	0.93	635	3682		2715	0.96	731	Out
In	666	0.68	22	0.98 PHF		96	0.8	2836	In
By Approach		Route 601			Route 7				
0.95 PHF		68	1	84	PHF 0.8				
		0.74	0.25	0.86	By Approach				
		153	122	275					
		In	Out	Total					

Weekend PM Peak Hour (2:00 - 3:00 PM)									
By Approach		In	Out	Total					
0.71 PHF		22	19	41					
		12	1	9	Route 601		PHF 0.94		By Approach
Route 7					Route 601				
Total	2073	0.5	4	Intersection Total		13	0.75	2298	Total
Out	1079	0.9	926	2447		1000	0.95	1141	Out
In	994	0.92	64	0.98 PHF		144	0.89	1157	In
By Approach		Route 601			Route 7				
0.9 PHF		66	1	206	PHF 0.75				
		0.75	0.25	0.89	By Approach				
		274	209	483					
		In	Out	Total					

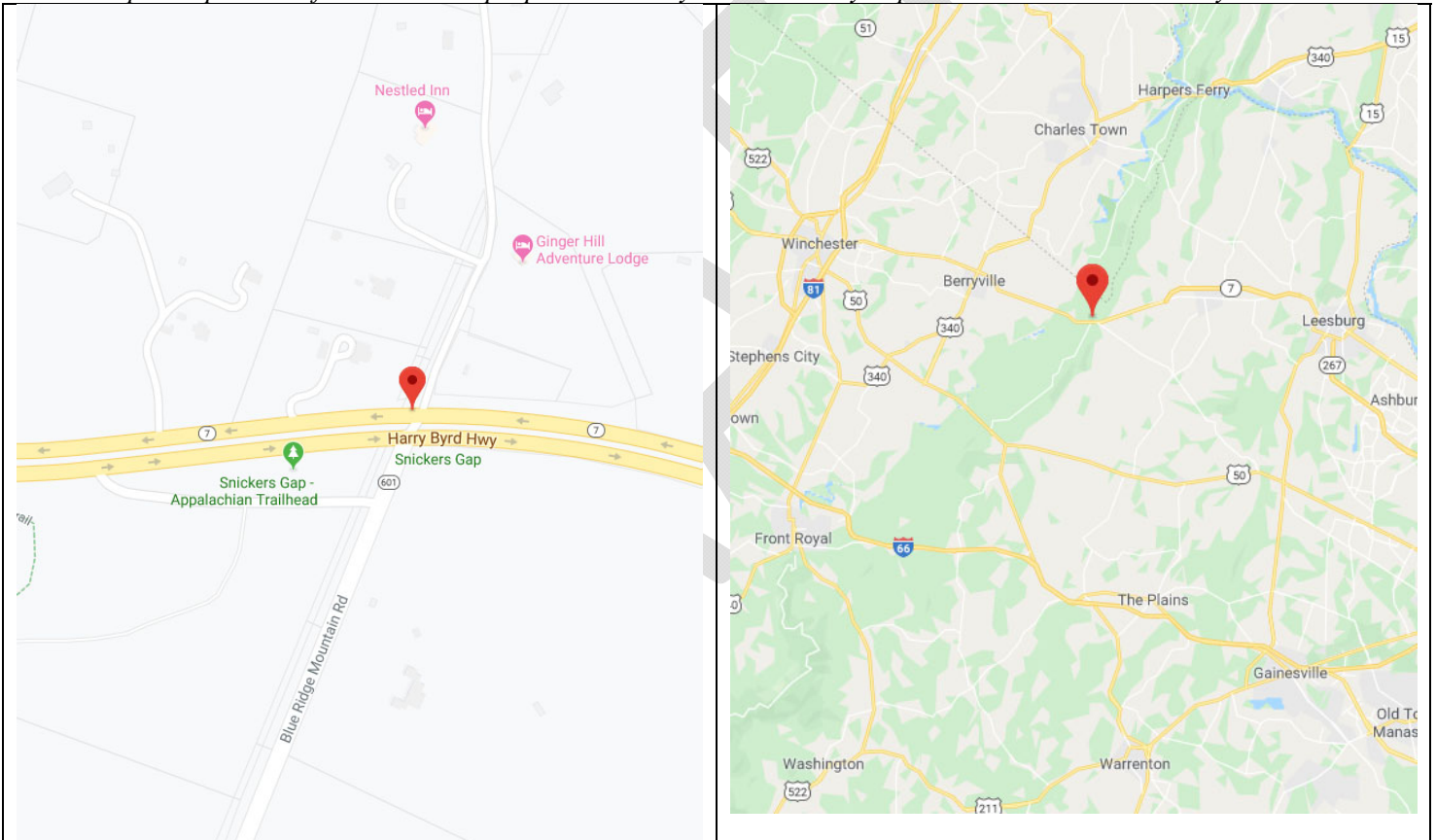
Appendix C: 2020 VDOT Staunton District Traffic Engineering Report

Staunton
Traffic Engineering

Technical Memorandum—DRAFT

To: Matthew Bond, P.E.
From: Sam Leckrone, P.E., PTOE
Date: Jan. 3, 2020
Re: Intersection alternatives at Routes 7 and 601, Clarke/Loudon County Line

NOTE: Maps are provided for illustrative purposes and may not accurately depict the most recent roadway conditions.



ISSUE:

Due to recurring issues associated with the intersection of Route 7 at Route 601 at the Clarke/Loudoun County Line, analysis was performed to try to find alternative methods of handling the traffic at this intersection.

FINDINGS/ ANALYSIS:

Turning movement counts were collected at the existing crossover at Route 7 at Route 601 on Thursday, September 12, 2019, as part of the analysis for the planned Route 9 closure in Hillsboro. The AM peak period was found to be between 7:00 and 8:00 AM, and the PM peak period was found to be between 4:45 and 5:45 PM. Figures 1 and 2 illustrate the turning movement counts for the existing conditions at this intersection.



Figure 1. Existing AM peak period volumes



Figure 2. Existing PM peak period volumes

A temporary traffic signal had been proposed for this intersection as part of the detour analysis. However, a comparison of these turning movement volumes against the signal warrants in the MUTCD has determined that the signal warrants were not met at this location:

- Warrant 3, the peak hour warrant, requires a minimum volume of 100 vehicles per hour on the higher-volume minor road approach. These conditions were not met for through and left-turning traffic on either direction of Route 601. Right turns were not considered in this analysis.
- Warrant 1, the 8-hour volume warrant, requires a minimum volume of 75 vehicles per hour on the higher-volume minor road approach **for 8 hours**. These conditions were not met for through and left-turning traffic on either direction of Route 601.

Further, the signal was analyzed and found to operate unacceptably. This is illustrated in Table 1.

Table 1. Delays in seconds with traditional signal

	Eastbound			Westbound			Northbound	Southbound	Overall
	L	T	R	L	T	R	L/T/R	L/T/R	
AM peak	74.4 (E)	18.6 (B)	0.1 (A)	104.6 (F)	4.4 (A)	0.0 (A)	7.0 (A)	75.0 (E)	17.7 (B)
PM peak	64.3 (E)	10.8 (B)	0.1 (A)	74.4 (E)	16.8 (B)	0.0 (A)	188.8 (F)	56.7 (E)	24.9 (C)

The queue length on eastbound Route 7 was 924 feet in the AM peak period and X feet in the PM peak period. On westbound Route 7, the queue length was found to be 54 feet in the AM peak period and 1,178 feet in the PM peak period. These would result in an increase in rear-end collisions over the existing conditions which do not require Route 7 traffic to stop at all. Furthermore, the policy in IIM-TE-387.1 requires that unsignalized intersections shall be analyzed before a traffic signal can be installed at this location.

During the detour traffic, in which more than 700 additional vehicles in the peak direction of Route 7 were projected to be added to the intersection volumes, the signal was found to operate over capacity on Route 7 and the queue lengths were projected to exceed 2,000 feet. Since the signal was found to operate unacceptably for Route 7 through traffic and failed to meet the volume warrants, it was eliminated from further consideration.

Unsignalized Alternatives Analysis

Three unsignalized intersection alternatives were analyzed:

1. Full restricted crossing U-turn (RCUT) intersection
2. Continuous-green T-intersection to the north at the Route 601 intersection on the north side and the service drive in the southwestern quadrant of the intersection. This adds median acceleration lanes for both left turns onto both directions of Route 7.
3. A hybrid option: A full restricted crossing U-turn (RCUT) intersection with a median acceleration lane from the service drive onto westbound Route 7

These alternatives, as Synchro models, are illustrated in Figures 3 through 5.

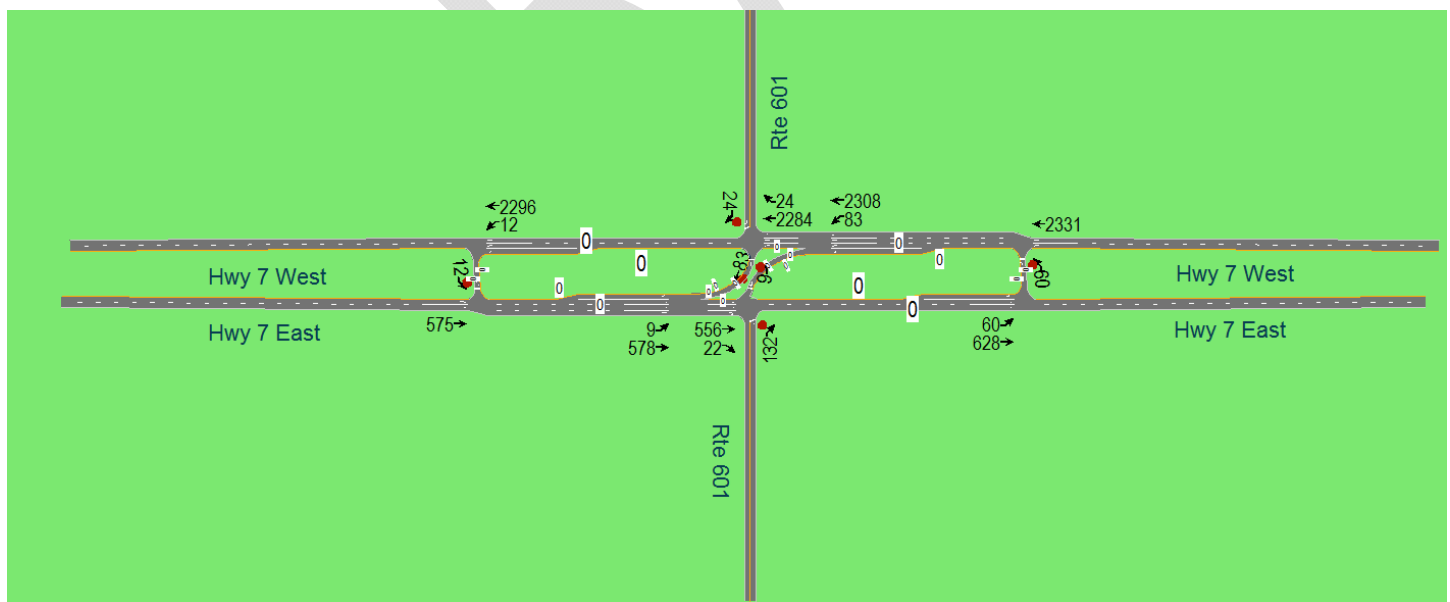


Figure 3. Alternative 1. The full RCUT intersection. PM peak period shown

A clean model had to be built for Alternative 2 with the two continuous-green T-intersections. When it was attempted to carve the model out of the existing conditions model, limitations on the Synchro software resulted in an error when attempting to model the continuous-green T-intersection.

- When attempting to analyze the hybrid option (Alternative 3) in both the AM and PM peak periods, no result was given due to HCS reporting zero capacity at the western crossover. This resulted in a division by zero error when attempting to compute the V/C ratio and no result was given for the delay or LOS.
- The hybrid alternative (Alternative 3) was re-analyzed by manually toggling off the left-turn lanes for both movements at that crossover. The result given was 26.0 seconds of delay (D) for the westbound to eastbound U-turn movement and 234.2 seconds of delay (LOS F) for the movement into the median acceleration lane, in the AM peak period. This result is not logical; both movements should be able to select the same gaps in traffic at this intersection. It is also not logical that this movement should operate worse than the existing condition.
- Further analysis of the HCS result pointed to a weakness in the methodology itself. For the northbound to westbound left-turn movement with Alternative 3, the methodology considers all 2,285 conflicting through vehicles. However, for the westbound to eastbound U-turn, here analyzed as a left-turn from a stop condition to a one-way street, only half (1,142) of the conflicting through vehicles were considered. Presumably, this assumes that all traffic turns into the left-hand lane and that traffic uses the left-hand lane and the right-hand lane on eastbound Route 7 evenly. This is illustrated in Figure 6.

Step 3: CONFLICTING FLOW RATES									
Major Street:									
Approach Movement	1U	EastBound				4U	WestBound		
	U	1	2	3		U	4	5	6
		L	T	R			L	T	R
Flow Rate, v_x		2285							
Conflicting Flow, v_c,x		2285							
Minor Street:									
Approach Movement	NorthBound				SouthBound				
	7	8	9		10	11	12		
	L	T	R		L	T	R		
Flow Rate, v_x	22				21				
Conflicting Flow, v_c,x	2285				1142				

Figure 6. Conflicting flow rates from the HCS report for Alternative 3, hybrid option, AM peak, western crossover

Due to these concerns with the trustworthiness of the HCS results for this intersection, it was instead decided to employ microsimulation to obtain the measure of effectiveness. These results were obtained by using an average from 10 simulation runs in SimTraffic for all alternatives. The previous models in Synchro, as illustrated in Figures 3 through 5 above, were used for all three “build” alternatives. A new model had to be created to obtain a result for the baseline alternative; SimTraffic will not model two-stage gap acceptance with people stopping and waiting in the median in the original baseline model where Route 7 was coded as a two-way link. Therefore, a new model had to be created where both sides of Route 7 are coded as independent one-way links. This is illustrated in Figure 7.

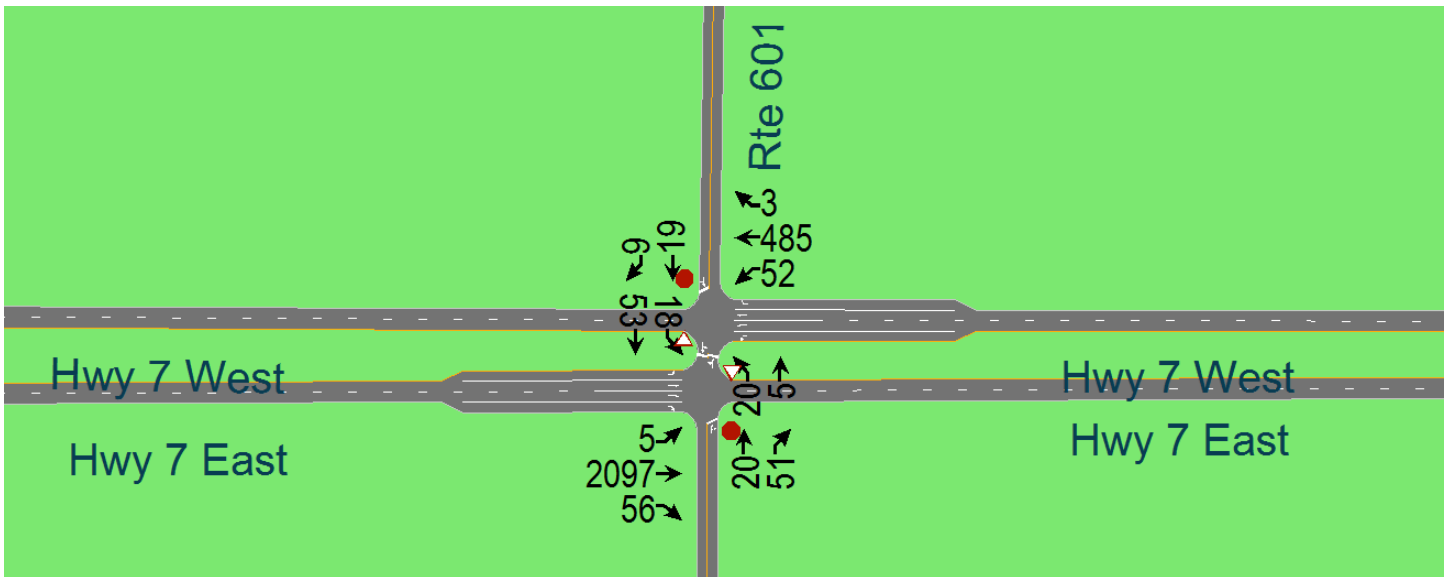


Figure 7. New baseline model for existing conditions (AM peak period shown)
 The results of the microsimulation analysis are shown in Tables 2 and 3.

Table 2. Movement delays in seconds in AM peak period

Alternative	EB left	WB left	Northbound			Southbound		
			Near	Far	Total	Near	Far	Total
0. No-build	6.0	28.4	57.0	4.6	61.6	145.9	36.4	182.3
1. Full RCUT	4.7	77.0	77.0	4.7	81.7*	3.2	33.5	36.7*
2. Continuous green T with accel ln	1.7	49.9	129.9	N/A	N/A	6.0	N/A	6.0
3. Hybrid option, at RCUT (Everything except the NB left)	6.1	54.2	25.4	2.9	28.3*	3.2	40.9	44.1*
3. Hybrid option at accel lane (NB left only)	N/A	N/A	61.3	N/A	61.3	N/A	N/A	N/A

* does not include added travel time to/from the crossover

Table 3. Movement delays in seconds in PM peak period

Alternative	EB left	WB left	Northbound			Southbound		
			Near	Far	Total	Near	Far	Total
0. No-build	66.8	7.3	280.9	41.9	322.8	138.9	4.7	143.6
1. Full RCUT	47.5	7.3	3.9	185.9	189.8*	26.4	No result	N/A
2. Continuous green T with accel ln	30.3	3.7	10.5	N/A	10.5	62.2	N/A	62.2
3. Hybrid option, at RCUT (Everything except the NB left)	33.4	6.2	2.8	35.8	38.6*	21.5	No result	N/A
3. Hybrid option at accel lane (NB left only)	N/A	N/A	7.4	N/A	7.4	N/A	N/A	N/A

* does not include added travel time to/from the crossover

These results make more sense. The no-build alternative is the worst performing alternative in both peak periods. However, Alternative 2 operates worse than either of Alternatives 1 or 3 because the continuous-green T-intersections each have three sets of conflicting movements. Whereas, Alternatives 1 and 3 only have two sets of conflicting movements. Introducing a median acceleration lane for the northbound left-turn movement, from the

service roadway, makes the northbound left-turn movement operate with less delay than it would in the RCUT intersection.

No result was obtained for the westbound to eastbound U-turn movement at the crossover during the PM peak period due to minimal traffic using that crossover. This will need to be analyzed further as there were 12 vehicles that were programmed to be making that maneuver during that peak period. However, it is expected to perform with less delay in the PM peak than in the AM peak period due to fewer conflicting vehicles.

RECOMMENDATION:

It is recommended to pursue Option 3, the hybrid option, as the best long-term solution for this intersection.

DRAFT

Appendix D: VISSIM Analysis Measures of Effectiveness Summary

Route 7 and 601 Alternatives Analysis MOEs (Delay in Seconds/Vehicle)

Feb. 4, 2022

Weekday AM	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	WB Left	Int Total
2032 No-Build	129.8s	N/A	95.4s	123.2s	181.5s	34.4s	18.5s	133.6s	6.48s
2032 Alt-1	100.8s*	N/A	51.8s	79.8s*	81.6s*	8.2s	10.5s	92.2s	5.01s*
2032 Alt-2	91.2s	N/A	67.2s	82.6s*	85.6s*	8.1s	87.1s*	75.2s	4.60s*
2032 Alt-2a	78.9s	N/A	61.1s	82.5s*	84.4*	8.1s	87.6s*	76.0s	4.58s*
2032 Alt-3	45.4s*	N/A	38.5s	70.1s*	65.5s*	8.1s	11.2s	88.9s	3.70s*

Weekday PM	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	WB Left	Int Total
2032 No-Build	317.2s	289.4s	249.2s	93.8s	92.1s	44.2s	81.2s	14.5s	13.06s
2032 Alt-1	148.5s*	197.8s*	9.2s	100.6s*	105.2s*	32.6s	50.8s	14.7s	5.77s*
2032 Alt-2	61.1s	151.7s*	22.9s	108.5s*	105.1s*	31.3s	116.1s*	14.4s	4.48s*
2032 Alt-2a	14.3s	129.9s*	9.3s	109.1s*	105.0s*	31.2s	115.2s*	13.5s	3.00s*
2032 Alt-3	50.4s*	83.8s*	7.8s	69.2s*	74.8s*	29.4s	50.9s	14.6s	3.16s*

Weekend PM	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	WB Left	Int Total
2032 No-Build	133.0s	136.9s	114.1s	36.1s	51.4s	11.4s	20.6s	28.1s	15.05s
2032 Alt-1	95.4s*	101.6s*	27.2s	82.9s*	82.5s*	10.8s	14.8s	24.3s	8.21s*
2032 Alt-2	46.9s	103.5s*	32.7s	85.6s*	83.8s*	10.3s	91.5s*	22.9s	6.43s*
2032 Alt-2a	37.0s	102.5s*	31.2s	85.3s*	85.7s*	10.3s	91.1s*	20.9s	6.11s*
2032 Alt-3	21.6s*	37.9s*	15.3s	53.0s*	59.3s*	10.2s	14.5s	23.8s	4.10s*

* - Indicates a relocated movement. Reported delay includes the extra travel time associated with the movement.

Route 7 and 601 Alternatives Analysis MOEs (Max Queue in Feet)

Feb. 14, 2022

Weekday AM	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	WB Left
2032 No-Build	188.4	188.4	188.4	53.7	53.7	53.7	92.7	139.5
2032 Alt-1	28.7*	28.7*	141.2	36.4*	36.4*	33.0	29.3	132.4
2032 Alt-2	157.9	45.8*	157.9	37.7*	37.7*	33.0	45.8*	105.3
2032 Alt-2a	147.2	N/A	147.2	N/A	N/A	33.2	N/A	116.8
2032 Alt-3	54.0	54.0	96.3	54.4*	54.4*	33.0	28.5	132.3

Weekday PM	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	WB Left
2032 No-Build	509.2	509.2	509.2	48.5	48.5	48.5	85.4	179.0
2032 Alt-1	131.0*	131.0*	95.4	37.5*	37.5*	43.8	72.3	135.8
2032 Alt-2	162.9	62.0*	162.9	32.1*	32.1*	42.3	62.0*	139.6
2032 Alt-2a	101.1	N/A	101.1	N/A	N/A	42.1	N/A	161.8
2032 Alt-3	67.7	67.7	68.9	66.2*	66.2*	42.1	70.5	155.4

Weekend PM	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	WB Left
2032 No-Build	487.2	487.2	487.2	34.1	34.1	34.1	26.9	179.5
2032 Alt-1	70.5*	70.5*	219.4	26.3*	26.3*	32.5	30.3	164.5
2032 Alt-2	250.4	29.8*	250.4	26.3*	26.3*	30.6	29.8*	130.7
2032 Alt-2a	235.3	N/A	235.3	N/A	N/A	32.4	N/A	113.6
2032 Alt-3	57.5	57.5	138.3	40.7*	40.7*	30.6	29.5	160.2

* - Max queue of downstream U-turn associated with relocated movement.

Appendix E: Summary of Public Comments

Route 7 and 601 Intersection Study

Summary of Public Comment Received May 17 – 31, 2022

Jason Balwindki - jabalwin@gmail.com

5-31-2022

I work at Mt Weather so I have been using the 7 & 601 intersection for the past 6 years, Mon-Friday, in the morning and afternoon and most everyday is like playing frogger.

Four items to consider:

- 1) No one drives 55 (more like 65 or 70+) on rt 7 unless it's a truck that's trying to climb the hill.
- 2) No one drives in the right lane because they don't want to get stuck behind a truck going up the hill eastbound or westbound.
- 3) The intersection is very busy AM and PM Mon-Friday
- 4) Trucks with trailers cannot fit in the median and are a huge safety hazard. (They cannot safely turn left onto 7 west)

Three recommendations:

- 1) Install a right turn lane with or without merge from 601 to rt 7 East- Would relieve some of the wait in the PM and backup on 601
- 2) I do not recommend forcing a U turn on 7 instead of left turns.
A: for example: If forced to turn right from 601 on to 7 E, a driver must merge, accelerate, cross into the fast lane, decel on a hill, que into the left turn, make the turn, merge uphill into the fast lane, and accelerate to go westbound. (At least the current intersection is pretty flat and makes acceleration a bit easier)
- 3) Consider a time of day restriction or restriction on movements.
A: No left turn onto 601 from 7 W from 3-5 PM if cars in median (Or just no left turn if cars in median)

Posting the signage to give those in the median the right of way has helped deconflict the intersection a lot. Restricting turns and crossing during peak periods may help as much as any reconstruction. Has that been considered? Could it be enforced?

Joan Newman - joan@mandjnewman.com

5-31-2022

I am Mick Newman's wife and we met at the meeting of the BRMCO. As you know we live off Route 601. I do not know enough to comment on any of the three solutions presented in the VDOT study and did not file comments. That being said, I do believe that excessive speed on Route 7 is a major factor in the problem regardless of which solution is finally agreed upon.

I suggest the following which could be implemented right away and at minimal cost. I do not know whose jurisdiction would handle these and I hope you will pass them on to the appropriate party.

Heading eastbound on Rt. 7 after crossing the Shenandoah River:

Several driver feedback signs posting the 55 speed limit and "your speed" beginning after crossing the river.

At least two camera enforcement signs approaching the crest of the ridge heading east: the first one near the first Rt 679 crossing and the second shortly thereafter.

Several passive speed enforced by camera signs from the river to the crest.

Determine the best place to initiate a "no passing zone" as you approach the crest headed east from the river and mark the road with double white lines.

Heading westbound implement the same protocols beginning at Route 760.

[Judith Anne Whitehouse - jaw01@me.com](mailto:jaw01@me.com)

5-29-2022

I am a resident of the Blue Ridge Mountain Community that this project greatly effects! I spoke at the March Clarke County Board of Supervisors' Meeting. I am very displeased with VDOT's plans to make this intersection safer! I believe that hearing your presentation, reading the handout, and trying to make any sense out of your proposals. If you frequent this intersection I believe that you might consider your proposals less safe than what it is presently. The speed, no lights used in fog, and of course the grade are all contributing factors which people tend to ignore. The safety officials in both counties fail to do anything to correct the two items that could be controlled - SPEED and LIGHTS. With the speeds that people are traveling especially at rush hour- at times it is impossible to make a left hand turn off of 601 going east. How is one supposed to get up enough speed to get into the left hand land to make a u turn? I can't believe that educated engineers can't do better than this! Hopefully if someone gets killed by your poor fix, it won't be a resident of our community!. Thank you for taking the time to read this. I am unable to reach the website we were told to respond to although I have tried repeatedly. YOUR website is not responding. Thank you for your time.

[Richard Marks - mtnkids727@gmail.com](mailto:mtnkids727@gmail.com)

5-28-2022

As a 25 years resident of the mtn.,the traffic has increased dramatically once BCB came.. The risk from accidents has gone up, to the point of the need for drastic change? I think that the answer to that question is no. The three proposals do not meet the needs of mtn residents. All proposals impose a hardship in some fashion or another. No one likes car accidents or pedestrians injuries, For now it may be better to do nothing, instead of imposing hardships with little or no gain.

The least intrusive aid would be to add a right hand turn lane from rte 601 to va 7.

[Bob Glover - gloverbob@yahoo.com](mailto:gloverbob@yahoo.com)

5-28-2022

I hope this does not get too long did not read. I will make our major suggestion after some background.

As I said before, I do not envy you or this project. If the ground was flat or hilly it would be easy but instead it is a four lane road that goes over a mountain ridge with a relatively steep grade that handles commuters heading to and from one of the largest cities in America that happens to be the capital of the country. Oh yeah, there are hikers on the beautiful Appalachian Trail and folks using Rt 601 for a very crowded brew pub.

I cannot think of a similar mountain pass in VA. Interstate mountain passes do not compare. Perhaps Rt 460 near Blacksburg or some of the new four passes on Rt 58 but they do have anywhere near the traffic.

We live at 2365 River Road Bluemont, VA in Clarke County, VA. Every day I drive over the mountain to Reston, VA. I travel at different hours. The conditions are never the same. Sunrises can easily block your view. The mountain can be encrusted in ice while the river just has rain.

Making a right or left at commute times is especially difficult. However, weekends are also getting bad as city folks head back to the city.

Suggestions:

Longer Deacceleration and Acceleration Lanes from River Road to Hill High Orchards

Please look at the whole mountain and not just the area near the top. This is a must in order to not impede traffic and maintain flow.

There should be long deacceleration lanes at every turn around and entrance on both sides of the mountain. Every existing lane should be longer.

Currently the only thing that slows traffic down is an accident or a deer.

The current deacceleration lanes are very short when being pushed down the mountain at 70 mph.

There is no acceleration lane at River Rd heading east bound. I know that is probably impossible to disturb because of the home above it.

Tunnel (ok please quit laughing 😄😄😄) - starts at River Rd and goes to Williams Gap Road. I know too expensive but if you do not do the mountain top project and the Appalachian Trail bridge that will provide some money.

The advantage:

Locals and emergency responders can still use the current Rt 7.

When there are accidents, traffic can be diverted.

The disadvantage:

Maintenance of a tunnel and a four lane road

I know this is expensive but has there ever been a cost study. I have seen tunnels work on many roads. I know they are Interstate roads but this road has that level of importance.

Conclusion

I really do hope they lengthen the deacceleration and acceleration lanes on both sides of the mountain all the way up and down. That will keep traffic flow constant and unimpeded when someone enters or exits the road.

Best of luck and thanks for all of your hard work in a difficult situation.

Ian and Kelly Macoy - i_macoy@netzero.net

5-27-2022

We live at 232 Harry Byrd Hwy (Rte 7) on the immediate Northwest quadrant of the 7 & 601 Intersection. Our driveway is on Rte 7 westbound just west of the intersection and the county line with Loudoun (we are in Clarke). We attended the BRNCA session on the 7&601 Intersection study. It was very informative and helpful to understanding the options being considered.

https://www.virginiadot.org/projects/staunton/clarke_county_and_loudoun_county_-_route_7_and_route_601_intersection_study.asp

Of the options presented, we definitely favor Alternative 1 -- which amounts to limiting vehicles entering or crossing Rte 7 from 601 to right turns only and use of the next available U-Turn through the Rte 7 median to proceed across or to the left from entry to Rte 7. https://www.virginiadot.org/images/Route_7-601_Alt_1_Concept.jpg;

We have long felt that this was a relatively simple solution to a complex problem, would be the least intrusive "solution," and as noted by VDOT in its presentation would cost the least to implement through improvements to the intersection and adjacent U-Turns. We would note that currently, with Rte 7 a divided highway, if we wish to travel East, we must right turn onto Rte 7 West and do the U-Turn. This poses no undue material delays to us -- never has.

We understand that the planned improvements at the adjacent U-Turns would better assist this option by adding extended turn and acceleration lanes, and widening to some degree the U-Turn itself.

Finally, we believe VDOT, and Clarke and Loudoun Counties, should also consider the following:

Reduce the speed limit on Rte 7 approaching the mountain gap/county line in both East and Westbound Lanes to 45 MPH. This should reduce actual average speeds approaching the intersection and crossing the mountain (and just East of the Appalachian Trail crossing) from 70+ MPH to 60+ MPH. We do not understand how this would adversely impact or disadvantage vehicle traffic, including truck traffic, and the reduced speed zone would of course be announced by signage before the zone is reached.

Park Sheriff (Loudoun and/or Clarke) and State troopers on a more regular basis (say 2-3 times/week, particularly at rush hours or weekend events) on the wide shoulder in the NW Quadrant of the intersection. Observed law enforcement presence on a fairly regular basis will better manage speeding and focus driver attention when transiting the intersection.

These additional steps would help mitigate the safety issues at the intersection and approaching the Appalachian Trail crossing for minimal cost and could be done immediately.

Thank you for the opportunity to express our views on this matter. With our property immediately adjacent to the intersection, whatever is done will have a direct impact on us.

Kim Kennedy - createthought@gmail.com

5-25-2022

I wanted to provide some feedback on the proposed improvements for the 601/7 intersection.

It was noted in the presentation materials that motorists use excessive speed on 7 as well as there being good visibility for turning off of and onto 601 south.

I think any concept that still allows left turns from 601 south would still be hazardous. It is even challenging to take a right turn there during morning traffic with low visibility and people travelling 70 mph over the crest of the hill. I think any solution should consider acceleration lanes for turns onto route 7 due to speed and visibility issues.

I personally like the idea of moving the left turn through the park and ride lot, I often need to turn in there anyway due to backups on 601 from traffic trying to take a left. It has much better visibility to the eastbound traffic from 7. The right turn however will still have visibility issues and an acceleration lane should be considered, there is a large shoulder there that could potentially be utilized. Any right turns should have room to acceleration due to going from 0 to merging with congested high speed traffic. It is very hazardous.

Thank you for your time. I am happy to discuss any of my thoughts in more detail and answer any questions you may have.

[Carol Dennis - carduden@aol.com](mailto:carduden@aol.com)

5-19-2022

Put in a stop light with a long left turn arrow with bright flashing lights as well.

[Mike Hudak - mikehudak@hotmail.com](mailto:mikehudak@hotmail.com)

5-19-2022

My LoCo supervisor is asking for opinions on this interchange proposals. My opinion is this, although this intersection is dangerous the interchange in Clarke county on Route 7 at the traffic light going towards Winchester is much more dangerous. This is the intersection VDOT should be working to fix preferably with a bridge like all the bridges on route 7 VDOT coordinated in Loudoun County. That Clarke county traffic light follows a blind bend and very few drivers heed the 55 MPH speed limit.

[Tracee Wink - mistermozart@yahoo.com](mailto:mistermozart@yahoo.com)

5-18-2022

An idea, a traffic light at Stoneleigh in Round Hill, Loudoun County on Route 7. This would give breaks in the traffic for folks to pull on to route 7 from the various roads on the mountain. The Berryville light on 7 East bound serves this purpose making it easier to turn East. A plus is the Stoneleigh area is another dangerous area with high amounts of accidents, this would solve two problems.

[Bob Barnett - bob.barnett@outlook.com](mailto:bob.barnett@outlook.com)

5-18-2022

I saw your presentation at the BRMCA meeting last week. You did an excellent job explaining the issues and options, and patiently fielding questions from the audience. Thanks for your professionalism!

I am writing with the following feedback:

The intersection is bad currently in terms of wait time and getting worse. Clearly something needs to be done. The worst option would be to do nothing.

While none of the three options presented is a magic bullet, my vote is for Option 3. I think it does the best job solving issues and reducing conflicts and will be well-accepted by local residents as they get used to it.

Joshua Kennedy - Joshua.Kennedy@va.gov

May 18, 2022

I just found out about the Rt 7 and 601 Intersection study. I see at the end of the May 10th Blue Ridge Mountain Civic Association Public Meeting slide deck there is an Appalachian Trail Crossing Study Team meeting today? What is the information for this Team Meeting?

As someone who crosses through this intersection multiple times a day I will have feedback when I finish reviewing the materials.

Has FEMA's Mt. Weather Emergency Operations Center formally been included in marketing of study information/materials? They are presently undergoing a multi-year construction and facilities expansion.

Tyler Sponseller - tylersponseller3@gmail.com

5-17-2022

I travel that stretch of road everyday, at least once a week I see a close call, but being summer soon the hikers and overwhelmed bear chase brewing has there over flow walk up from both parking lots. Still haven't touched the biggest one of the all. You have one of the largest United States federal compounds that Employs thousands of people. With this being said fema is a very large part of the issues because rt 601 and rt 50 are ten times more dangerous. I'm extremely surprised to see that you don't get stuck in a wreck there or more hikers have not been hit or killed. But I'm sure you will fight it until the local community says I told you so. That's my thought on that should have been there 10 plus years ago.

Kyle Fary - fary814@hotmail.com

5-17-2022

Please take a look at the attached file. I know you're busy but would like to hear your thoughts on this. (District Planning Note: Attached file was an edited version of the Alternative III concept that provides a WB median acceleration lane and EB right turn acceleration lane)

Issue also being that vehicles getting onto Route 7 EB or WB, is the ability to get up to speed of the flow of traffic. Most times there just isn't enough gap to do this(or to be real life honest they don't step on the gas a lot of the time), as everyone bunches up going up the mountain on Route 7(separate issues- could use 3rd truck/slow vehicle lanes). I travel this stretch twice a day to and from work on route 7. This concept seems to be the best of the three, just add the acceleration lanes to help them merge easier, and remove the sight distance issues. And add a No right turn onto 7 EB.

Will say it is a mess with honestly no perfect outcome, but at least it didn't meet the warrants for a signal.

To be blatant most people don't give a damn about a formal park and ride area. The people who use that parking area most are hiking the trails on the weekends or middle of the day where traffic isn't that bad.

Michael Crawford - 131dodge@gmail.com

5-17-2022

Hello sir I am writing you about the proposed changes at the 7 and 601 interchange.

Honestly they all look bad. Anyone trying a u turn or merging from the right to left during commuting hours will be a danger.

In my opinion you also have failed to address a huge factor. The Appalachian Trail. The parking and crossing of route 7 due to the trail adds risk to people and cars.

I believe you really only have 2 options. The cheaper and then the very expensive.

The cheaper would be to knock the speed limit down to 40 or 45 and enforce it with cameras. Also build a pedestrian bridge to keep people off route 7.

The 2 and extremely expensive would be to widen the intersection to accommodate a double lane traffic roundabout with a minimum radius to keep traffic moving at 35 mph. Or put bridges up but I don't think that can work given the topography. Or even a tunnel for through traffic.

Since FEMA and the AT are federal I feel they should help with the costs.

My point of view comes from commuting weekdays and using that intersection on weekends. I also see the bad side from being a Clarke County Volunteer Firefighter and EMT.

David Bralove - bralove@bralove.com

5-17-2022

Mr. Campbell, I am a resident on the south side of 601 approximately 2 miles from Route 7. I have reviewed the study and the proposed alternatives to remediate the problems at the intersection of 601 and 7.

While I concur that the intersection needs improvement due to the volume of traffic from Bear Chase Brewery and FEMA at Mount Weather, I am concerned that none of the alternatives presented take into account larger vehicles, specifically, RVs (I own a 36ft Class A) or vehicles with trailers. While restricting larger vehicles from making a left hand turn when exiting 601 southbound would help the situation of having to straddle the median, the U turn required at 679 could be problematic. Larger vehicles will have to use both westbound lanes of 7 in order to complete a U turn (I know this from my own experience in my RV). This could cause backups in the U turn lane in order for both lanes to be clear. Please take this into consideration in your design plans.

Subject to the comments above, my preference is for Alternative 1. This alternative has the highest conflict avoidance while still retaining the left had turn into 601 from westbound 7. It is also the most economical alternative.

Thank you for considering my comments.

Appendix F: Smart Scale Application and Scorecard

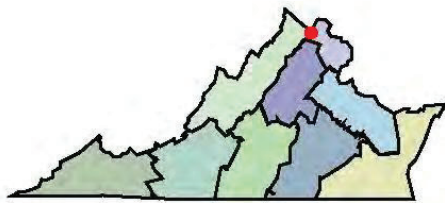
Route 7/Route 601 Intersection Improvements

Project Id: 9298

Based on the recommendation of the VDOT Staunton District Intersection Study, the project will consist of the addition of a designated northbound right turn lane on Route 601 and the extension of existing Route 7 left turn lanes for the eastbound movement at the primary intersection, the eastbound movement at the intersection with Route 734 to the east and the westbound movement at the intersection with Route 679 to the west. Crossover improvements at these three locations will consist of pavement markings to define turning movements.

0.3 SMART SCALE SCORE	#377 OF 394 STATEWIDE	SMART SCALE Requested Funds	\$2,736,690
	#39 OF 40 DISTRICTWIDE	Total Project Cost	\$3,236,690
		Project Benefit	0.1
		Project Benefit / Total Cost	0.3

- Submitting Entity:** Clarke County
- Preliminary Engineering:** Not Started
- Right of Way:** Not Started
- Construction:** Not Started
- Eligible Fund Program:** BOTH
- Evacuation Route:** No
- Resiliency Commitment:** Yes
- VTRANS Need:** RN, Safety



SMART SCALE Area Type A														
Factor	Congestion Mitigation		Safety		Accessibility			Economic Development			Environment		Land Use	
	Increase in Peak Period Person Throughput	Reduction in Peak Period Delay	Reduction in Fatal and Injury Crashes	Reduction in Fatal and Injury Crash Rate	Increase in Access to Jobs	Increase in Access to Jobs for Disadvantaged Populations	Increase in Access to Multimodal Travel Choices	Square Feet of Commercial/Industrial Development Supported	Tons of Goods Impacted	Improvement to Travel Time Reliability	Potential to Improve Air Quality	Impact to Natural and Cultural Resources	Support of Transportation-Efficient Land Development	Support of Transportation-Efficient Land Development
Measure Value	0.0 persons	0.7 person hrs.	10.9 EPDO	844.1 EPDO / 100M VMT	0.0 jobs per resident	0.0 jobs per resident	0.0 adjusted users	0.0 adj sq. ft.	0.0 daily tons	680,093.0 adj. buffer time index	0.0 adjusted points	0.0 impacted acres	0.0 access * pop/emp density.h	0.0 access * pop/emp density change.
Normalized Measure Value (0-100)	0.0	0.1	2.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Measure Weight (% of Factor)	50%	50%	70%	30%	60%	20%	20%	60%	20%	20%	100%	*	50%	50%
Factor Value	0.0		1.5		0.0			0.0			0.0		0.0	
Factor Weight (% of Project Score)	45%		5%		15%			5%			10%	5 (max point reduction)	20%	
Weighted Factor Value	0.0		0.1		0.0			0.0			0.0	0.0	0.0	
Project Benefit	0.1													
SMART SCALE Cost	\$2,736,690													
SMART SCALE Score (Project Benefit per \$10M SMART SCALE Cost)	0.3													



SMART SCALE Application

Route 7/Route 601 Intersection Improvements

Project Status: Processing

Organization: Clarke County

Project ID: 9298

General

Point of Contact Information

Project Point of Contact Name

Brandon Stidham

Project Point of Contact Email

bstidham@clarkecounty.gov

Project Point of Contact Phone

(540) 955-5130

Project Information

Project Title

Route 7/Route 601 Intersection Improvements

Principal Improvement

Highway

Project Short Description

Based on the recommendation of the VDOT Staunton District Intersection Study, the project will consist of the addition of a designated northbound right turn lane on Route 601 and the extension of existing Route 7 left turn lanes for the eastbound movement at the primary intersection, the eastbound movement at the intersection with Route 734 to the east and the westbound movement at the intersection with Route 679 to the west. Crossover improvements at these three locations will consist of pavement markings to define turning movements.

Improvements to non-VDOT maintained roadways?

No

VDOT District

Staunton

Has Scope been finalized?

Yes

Resiliency Commitment

Has the project been designed to be, or does the project sponsor commit that the design will be resilient?

Yes

Project Eligibility

Project Eligibility

Is the project a study?

No

Is the project a capacity enhancement, operational improvement, ITS or technology improvement, or safety project?

Yes

Does the project include major features that are either contiguous, proximate, or of the same improvement type? For the purpose of this question and the CTB policy contiguous means adjacent or together in a sequence. Transit stops or stations along a transit route or intersections or spot improvements along a corridor meet the definition of contiguous for the purposes of the project eligibility policy.

Yes

Is project currently fully funded and included in a Capital Improvement Program, MPO Transportation Improvement Program (TIP), or the VDOT, DRPT, or NVTA Six-Year Improvement Program(s)?

No

Does the project include a commitment by a developer through a local zoning approval process (proffered condition)?

No

Is any part of your project within an established MPO study area?

No

Features

Project Features

Highway Improvements

Shoulder Improvement(s)

No

Turn Lane Improvement(s)

Yes

Comment

New northbound right turn lane on Route 601 with approx. 200' storage. Extend the following Route 7 left turn lanes to provide 200' storage and 200' tapers: eastbound at Route 601, eastbound at Route 734, westbound at Route 679.

Access Management

No

Intersection Improvement(s)

Yes

Comment

Improve the Route 7 crossovers at Route 601, 679 and 734 to define turning movements with pavement markings and signage.

Innovative Intersection(s) / Roundabout(s)

No

Bicycle and Pedestrian Improvements

Improve Bike/Pedestrian Crossing (At Grade)

No

Bus Transit Improvements

Rail Transit Improvements (Streetcar, Light Rail, Heavy Rail, Commuter Rail)

Intercity Passenger Rail

Freight Rail

Travel Demand Management (TDM) Improvements(s)

Right-of-Way and Utilities

Right-of-Way/Easements acquisition required

Yes

Comment

Route 601 northbound right turn lane will require R/W acquisition.

Includes Utility Relocations

Yes

Comment

Route 601 northbound right turn lane will require utility relocation.

 Project Readiness

Project Readiness

Bus Transit, Rail Transit, Passenger Rail, or Freight Rail

New grade-separated interchange on an existing limited access facility

Grade separation of at-grade intersection on a non-limited access roadway

Modifications to an existing grade-separated interchange

New Location Facilities

Widening Project

NEPA Status

What is the status of NEPA for this project?

Not Started



Transit

Transit and Rail Improvements

New or Improved transit or Rail Service

Stop Improvements

Transit or Rail Technology

Bus-Only Lane

 Location

Location Details

Districts Served

- Staunton
- NOVA

Jurisdictions Served

- Loudoun County
- Clarke County

MPOs Served

- National Capital Region Transportation Planning Board

PDCs Served

- Northern Shenandoah Valley Regional Commission
- Northern Virginia

Transit Verification

Custom VTrans Needs

Do you have a safety study or a study conducted based on a 2019 VTrans Mid-Term need?

No

 Factors

Project includes transit system improvements or reduces delay on a roadway with scheduled peak service of one transit vehicle per hour.

No

Project includes improvements to existing or new HOV/HOT lanes or ramps to HOV/HOT.

No

Project includes construction or replacement of bike facilities. For bicycle projects, off-road or on-road buffered or clearly delineated facilities are required

No

Project includes construction or replacement of pedestrian facilities. For pedestrian projects, sidewalks, pedestrian signals, marked crosswalks, refuge islands, and other treatments are required (as appropriate).

Yes

Comment

Scope of project to be determined. May be related to separate project to improve Appalachian Trail pedestrian crossing.

Project provides real

time traveler information or wayfinding specifically for intermodal connections (access to transit station or park and ride lot).

No

Provides traveler information or is directly linked to an existing TMC network/ITS architecture.

No

Project includes construction or replacement of bike facilities. For bicycle projects, off-road or on-road buffered or clearly delineated facilities are required (i.e. Bike Lane or Shared Use Path).

No

Project includes construction or replacement of pedestrian facilities. For pedestrian projects, sidewalks, pedestrian signals, marked crosswalks, refuge islands, and other treatments are required (as appropriate).

Yes

Comment

Scope of project to be determined. May be related to separate project to improve Appalachian Trail pedestrian crossing.

Project includes bus facility improvements or reduces delay on a roadway with scheduled peak service of one transit vehicle per hour.

No

Project includes energy efficient infrastructure or fleets, including: hybrid or electric buses, electronic/open road tolling, alternative energy infrastructure (e.g., roadside solar panels).	Project includes improvements to freight rail network or intermodal (truck to rail) facilities/ports/terminals
--	---

No

No

Project Delivery Information

Project Planning Status

- Planning/Safety Study

Phase Estimate and Schedule

Phase Milestone		Status	
PE (Survey, Environmental, Design)		Not Started	
Base Cost Estimate	Risks/Contingency/Unknowns	Start Date	End Date
\$748,161.00	nknowns	2025-08-01	
		CEI	
Phase Estimate + Contingency			
\$1,035,719.00			

Phase Milestone		Status	
RW (Right of Way and Easement Acquisition, Utility Relocation)		Not Started	
		Base Cost Estimate	Risks/Contingency/Unknowns
		\$185,195.00	nknowns
Start Date	End Date	CEI	
2028-02-01			
Phase Estimate + Contingency			
\$350,867.00			

Phase Milestone		Status	
CN (Construction, Oversight, Contingencies)		Not Started	
Base Cost Estimate	Risks/Contingency/Unknowns	Start Date	End Date
\$888,910.00	nknowns	2029-06-12	2030-11-30
		CEI	
Phase Estimate + Contingency			
\$1,850,099.00			

Total Cost Estimate
\$3,236,685

Project Funding Sources

SYIP Allocation

--

Total SYIP Allocations
\$0.00

Other Committed Funds

Other Funds Committed to Project	Description of Fund Type	Amount
Local /Regional Funding Not in SYIP	Loudoun County funding from CIP for intersection improvements at Route 7 and 601.	\$500,000.0 0

Total Other Committed Funds
\$500,000.00

Project Financial Information

Total SYIP Allocations
\$0.00

Total Other Committed Funds
\$500,000.00

Total Requested Funds
\$2,736,685.00

Total Project Funding
\$500,000.00

Total Cost Estimate
\$3,236,685.00



Economic Development Sites

Economic Development Sites

Is this transportation project referenced in local Comprehensive Plan, local Economic Development Strategy or Regional Economic Development Strategy?

No

Site Name		Category of Property		User Defined VEDP Tier	
				N/A	
Area of Development			Driving Distance		
User	Calculated		User	Calculated	
				N/A	
Area of Development			Driving Distance		
User	Calculated		User	Calculated	

Supporting Documents

Supporting Documents

Are all the supporting documents requested in final form at this time?

Yes

Attachment Type	Description	File Name	Is Cloned	Upload Date
Planning Study/Safety Study	Route 7 - 601 Intersection Study.pdf	Route 7 - 601 Intersection Study.pdf	No	2022-07-29 8:50:14
Project Sketch	Route 7-601 Alt I Concept-Phase 1.pdf	Route 7-601 Alt I Concept-Phase 1.pdf	No	2022-07-29 8:51:12

Attachment Type	Description	File Name	Is Cloned	Upload Date
Detailed Cost Estimate	Clarke Co - Route 7 and Route 601 FINAL SUMMARY.pdf	Clarke Co - Route 7 and Route 601 FINAL SUMMARY.pdf	No	2022-07-29 8:51:50
Governing Body Resolution of Support	2022-14R Resolution of Support for SMART Scale Application_executed 07-19-2022.pdf	2022-14R Resolution of Support for SMART Scale Application_executed 07-19-2022.pdf	No	2022-07-29 8:52:00
Other	ID-9298-Route 7 and 601 Count-Diagrams.xlsx	ID-9298-Route 7 and 601 Count-Diagrams.xlsx	No	2022-09-16 15:57:00
Governing Body Resolution of Support	Loudoun Co-Item 03 Route 7-Route 601 Intersection Improvements.pdf	Loudoun Co-Item 03 Route 7-Route 601 Intersection Improvements.pdf	No	2022-09-30 15:39:02
MPO Required Resolution of Support	Rd5 SMART SCALE TPB Resolution of Support Approval.pdf	Rd5 SMART SCALE TPB Resolution of Support Approval.pdf	No	2022-09-30 15:39:32
Estimate Workbook	FINAL CEWB - Clarke Co - Route 7 and Route 601.xlsm	FINAL CEWB - Clarke Co - Route 7 and Route 601.xlsm	No	2022-09-30 15:45:19

Turning Movement Count Location

Turning Movement Counts uploaded as "Other" attachment

☆ State's Understanding

State's Understanding

Reviewer	Agreed On	Disagreed On
District Validator	2022-09-28 14:23:33	
Applicant	2022-09-28 16:22:23	

 Scores



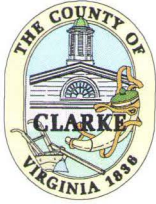
Virginia Department of
Rail and Public
Transportation
600 East Main Street,
Suite 2102
Richmond, VA 23219
(804) 786-4440



VDOT Central Office
1401 East Broad Street
Richmond, VA 23219
(804) 367-7623 (toll-free)
711 (hearing impaired)

© 2022 Commonwealth Transportation Board

Clarke County Board of Supervisors



Berryville Voting District
Matthew E. Bass
(540) 955-5175

Millwood Voting District
Terri T. Catlett – Vice Chair
(540) 837-2328

Russell Voting District
Doug Lawrence
(540) 955-2144

Buckmarsh Voting District
David S. Weiss – Chair
(540) 955-2151

White Post Voting District
Bev B. McKay
(540) 837-1331

County Administrator
Chris Boies
(540) 955-5175

Resolution of Support for SMART Scale Application for Route 7/Route 601 Intersection Improvements

WHEREAS, the Commonwealth of Virginia now prioritizes transportation projects for funding based on the cost effectiveness of those projects to meet performance goals, as established by the Smart Scale Program; and

WHEREAS, the Clarke County Board of Supervisors desires to submit an application for an allocation of funds for the Route 7 and Route 601 Intersection Project under the Smart Scale prioritization program; and

WHEREAS, the Route 7 and Route 601 intersection is identified in the VTRANS 2045 Needs Assessment as having a safety improvement and capacity preservation need; and

WHEREAS, this Intersection Project will make operational and safety improvements at the Route 7 and Route 601 intersection based on the recommendations from the ongoing VDOT Intersection Study to address the identified VTRANS 2045 Needs; and

WHEREAS, it is necessary that a resolution be received from the sponsoring local jurisdiction or agency requesting the Virginia Department of Transportation funding.

NOW, THEREFORE, BE IT RESOLVED the Clarke County Board of Supervisors hereby supports this application for the Route 7 and Route 601 Intersection Project, using the Alternative 1-Phase 1 Interim Improvement sketch developed by VDOT, to compete for state and federal funding under the Smart Scale program.

APPROVED AND ORDERED ENTERED in the official records by the unanimous vote of the Clarke County Board of Supervisors' members assembled on the 19th day of July 2022.

ATTEST 2022-14R



David S. Weiss, Chair



Loudoun County, Virginia

www.loudoun.gov

Office of the County Administrator

1 Harrison Street, S.E., 5th Floor, P.O. Box 7000, Leesburg, VA 20177-7000

Telephone (703) 777-0200 • Fax (703) 777-0325

At a business meeting of the Board of Supervisors of Loudoun County, Virginia, held in the County Government Center, Board of Supervisors' Meeting Room, 1 Harrison St., S.E., Leesburg, Virginia, on Tuesday, July 19, 2022, at 5:00 p.m.

IN RE: Route 7/Route 601 (Blue Ridge Mountain Road/Raven Rocks Road) Intersection Improvements (Blue Ridge)

Supervisor Umstadd moved that the Board of Supervisors approve the Resolution of Support for Clarke County's Smart Scale Application for improvements at the intersection of Route 7 and Route 601 (Blue Ridge Mountain Road/Raven Rocks Road), provided as Attachment 1 to the July 19, 2022, Board of Supervisors Business Meeting Action Item.

Seconded by Supervisor Kershner.

Voting on the Motion: Supervisors Briskman, Buffington, Glass, Kershner, Letourneau, Randall, Turner, and Umstadd – Yes; None – No; Vice Chair Saines – Absent for the vote.

COPY TESTE:

DEPUTY CLERK TO THE LOUDOUN COUNTY
BOARD OF SUPERVISORS

COMMONWEALTH OF VIRGINIA
COUNTY OF LOUDOUN
BOARD OF SUPERVISORS



**RESOLUTION INDICATING SUPPORT FOR
A SMART SCALE APPLICATION FROM CLARKE COUNTY
FOR ROUTE 7/ROUTE 601 INTERSECTION IMPROVEMENTS**

WHEREAS, a Smart Scale project is proposed to make operational and safety improvements at the Route 7 and Route 601 intersection based on recommendations from the ongoing VDOT Intersection Study (the “Project”); and

WHEREAS, applications to receive Smart Scale funding for projects that traverse adjacent jurisdiction boundaries require the submitting entity to provide a resolution of support from affected jurisdictions; and

WHEREAS, Clarke County’s proposed Project traverses the boundary of Loudoun County and requires a resolution of support from the Loudoun County Board of Supervisors; and

WHEREAS, Clarke County’s application for the Project will be consistent with the recommended improvements of the Route 7 and Route 601 Intersection Study, which are anticipated to be the Interim Improvement Alternative; and

WHEREAS, the Loudoun County FY 2022 Adopted Budget allocated \$550,000 for the Route 7 - Blue Ridge Mountain/Raven Rocks Intersection Improvements project, which are intended to be used for the planning and preliminary design of safety, operational, and access improvements in the vicinity of the intersection of Route 7 and Route 601; \$500,000 of this allocation will be included in the Clarke County Smart Scale Route 5 application for the Route 7 and Route 601 Intersection Interim Improvement Alternative.

NOW, THEREFORE, BE IT RESOLVED THAT, the Loudoun County Board of Supervisors, hereby adopts this Resolution in Support of Clarke County’s Smart Scale Round 5 application for the Route 7 and Route 601 Intersection Interim Improvement Alternative.

APPROVED this 19th day of July, 2022.

By: Phyllis J. Randall
Phyllis J. Randall, Chair, At-Large

By: Tim Hemstreet
Tim Hemstreet, County Administrator

NATIONAL CAPITAL REGION TRANSPORTATION PLANNING BOARD
777 North Capitol Street, N.E.
Washington, D.C. 20002

**A RESOLUTION OF SUPPORT FOR SUBMISSION OF NORTHERN VIRGINIA PROJECTS
FOR THE COMMONWEALTH OF VIRGINIA'S SMART SCALE TRANSPORTATION PROJECT
PRIORITIZATION PROCESS**

WHEREAS, the National Capital Region Transportation Planning Board (TPB), as the federally designated metropolitan planning organization (MPO) for the Washington region, has the responsibility under the provisions of the Fixing America's Surface Transportation (FAST) Act, reauthorized November 15, 2021 when the Infrastructure Investment and Jobs Act (IIJA) was signed into law, for developing and carrying out a continuing, cooperative and comprehensive transportation planning process for the metropolitan area; and

WHEREAS, on June 15, 2022, the TPB approved the 2022 Update to Visualize 2045, the long-range transportation plan for the National Capital Region, which was developed as specified in the Federal Planning Regulations and is the MPO's long-range plan of record; and

WHEREAS, localities, agencies and public transportation providers that wish to submit projects for the Commonwealth of Virginia SMART SCALE funding must demonstrate that the project is included in or is exempt from inclusion in the MPO's long-range transportation plan, or, if the project is not in the plan, the project must have an MPO resolution of support, in order to be considered for the SMART SCALE prioritization process; and

WHEREAS, the Virginia Department of Transportation (VDOT) receives all highway and transit SMART SCALE project submissions, has transmitted the attached project list, and has worked with TPB staff in reviewing the highway and transit project submissions for submission eligibility; and

WHEREAS, absent a determination by TPB staff that a project is already included in the approved plan, submission of projects for SMART SCALE funding requires a resolution of support by the TPB; and

WHEREAS, submission of projects to the Commonwealth for the SMART SCALE process does not infer nor commit TPB to include any project into its long-range plan; and

WHEREAS, all projects that are awarded SMART SCALE funding and are not already included in Visualize 2045, as amended or updated, must each be treated as a new project to the TPB's process and will be evaluated accordingly as specified in the TPB's Technical Inputs Solicitation Submission Guide; and

WHEREAS, VDOT will provide the TPB with a list of projects that were submitted, and will also provide TPB with the list of projects that were awarded funding.

NOW, THEREFORE, BE IT RESOLVED THAT the National Capital Region Transportation Planning Board supports submission of the following Northern Virginia project to the Commonwealth of Virginia SMART SCALE Project Prioritization Process as listed in the attached materials.

Adopted by the TPB Steering Committee at its meeting on Friday, September 9, 2022.



COMMONWEALTH of VIRGINIA

DEPARTMENT OF TRANSPORTATION

811 COMMERCE ROAD

STAUNTON, VIRGINIA 24401-9029

www.VirginiaDOT.org

Stephen Brich, P.E.
Commissioner

8/25/2022

The Honorable Pamela Sebesky
Chair, National Capital Regional Transportation Planning Board
Metropolitan Washington Council of Governments
777 North Capital Street, N.E., Suite 300
Washington, DC 20002-4201

RE: VDOT Staunton District – Clarke County SMART SCALE application – TPB resolution of support to apply for funding

Dear Chair Sebesky:

The Virginia Department of Transportation (VDOT) Staunton District seeks the National Capital Region Transportation Planning Board's (TPB) approval of a resolution of support for submission of a Clarke County SMART SCALE project that extends into Loudoun County on Route 7 and is not currently in the recently adopted update of the TPB's Constrained Long-Range Plan (CLRP), Visualize 2045.

The Clarke County SMART SCALE application will address safety and operational issues at the Route 7 and Route 601 intersection located on the border of Clarke and Loudoun County. Route 601, Blue Ridge Mountain Road weaves back and forth between the two counties, but falls under the maintenance responsibility of the VDOT Staunton District. VDOT Staunton District Planning conducted a transportation study at the intersection in cooperation with staff from both counties and VDOT Northern Virginia District. Several innovative intersection concepts were considered for improving safety and operations, with a Restricted Crossing U-turn (RCUT) intersection being identified as a potential solution. Based on public feedback and project cost related to SMART SCALE application competitiveness, the preferred alternative developed by VDOT to advance as an application consists of a second northbound Route 601 intersection approach as a designated right turn lane to eastbound Route 7. The project also includes the extension of existing left turn lanes along Route 7 at the primary intersection and downstream intersections at Route 679 in Clarke County and Route 734 in Loudoun County. These improvements will provide immediate operational benefits during peak travel periods for the higher traffic volumes on the southern leg of Route 601 at the intersection. The improvements will maintain full access at the intersection, while making voluntary U-turn movements more attractive and safer. Finally, the project accommodates the potential implementation of a full RCUT intersection in the future.

As part of the SMART SCALE prioritization process, Virginia law requires that SMART SCALE applicants that wish to submit projects for funding consideration within a Metropolitan Planning Organization (MPO) must show that the project is included in the CLRP. If the project is not included in the current MPO CLRP, the applicant

WE KEEP VIRGINIA MOVING

must request a resolution of support from the MPO. As the MPO representing Loudoun County, VDOT Staunton District is requesting consideration and approval by the TPB of a resolution of support for the Clarke County SMART SCALE Route 7 and Route 601 application. This resolution acts as a TPB endorsement of the project, meeting SMART SCALE eligibility requirements for scoring and prioritization. If the project is successful in being awarded funding, it will then re-enter the TPB process as a new project and will be evaluated accordingly as specified in the TPB Technical Solicitation Submission Guide. With the first year of available funding being FY2026 for the current round of SMART SCALE, there will be sufficient time for awarded projects to be incorporated into Visualize 2045.

We appreciate your consideration in this matter. Should you have any additional questions, please contact Adam Campbell, VDOT Staunton District Planner at (540)-332-9067 or via email at AdamF.Campbell@vdot.virginia.gov.

Sincerely,



Randy S. Kiser, P.E.
Staunton District Administrator

CC: Edwin Carter, Edinburg Residency Administrator, VDOT Staunton District
Darin Simpson, District Traffic Engineer, VDOT Staunton District
Chris Boies, County Administrator, Clarke County